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Manitoba Math Curriculum Statistics– Grade 7

3-Part Lesson Format

Part 1 – Minds On!

- Learning Goals
- Discussion Questions
- Quotes
- And More!

MEASURES OF CENTRAL TENDENCY

Learning Goal

We are learning to analyze how adding or removing data affects the mean, median, and mode using calculations and comparisons of data sets, so we can explain how these changes impact the shape and distribution of the data.

CALCULATING MEAN

1 2 3 4 5 6 7 8 9 0

Easter Egg Hunt— Add the total chocolates and share them equally.

Ethan	Olivia	Mia	Total	Ethan	Olivia	Mia	Mean
24	18	15	=				Mean =
Waki	Logan	Amelia	Total	Waki	Logan	Amelia	Mean
30	21	24	=				Mean =
Jacob	Rohan	Harper	Total	Jacob	Rohan	Harper	Mean
18	24	21	=				Mean =
Nora	Colin	Isa	Total	Nora	Colin	Isa	Mean
89	85	104	=				Mean =

Part 2 – Action!

- Writing
- Matching
- Drag and Drop
- Drawing
- And More!

Part 3 – Consolidation!

- Exit Cards
- Quizzes
- Reflection
- And More!

MEAN, MEDIAN, MODE, AND RANGE

Find the mean, median, mode, and range of each data set below. 1 2 3 4 5 6 7 8 9 0

32, 45, 36, 45, 28, 32, 51	94, 78, 82, 84, 83, 78, 88	84, 78, 59, 84, 82, 71, 58
Mean =	Mean =	Mean =
Median =	Median =	Median =
Mode =	Mode =	Mode =
Range =	Range =	Range =
15, 3, 16, 7, 17, 2, 18, 5, 16, 7, 15, 1, 6, 3	50, 5, 28, 7, 32, 1, 29, 9, 36, 4, 28, 7, 36, 5	22, 4, 24, 6, 23, 1, 25, 8, 24, 5, 28, 9, 23, 1
Mean =	Mean =	Mean =
Median =	Median =	Median =
Mode =	Mode =	Mode =
Range =	Range =	Range =



Manitoba Math Curriculum Statistics– Grade 7

CALCULATING MEAN

Find the mean for the data sets below.

1	2	3	4	5	6	7	8	9	10
6, 8, 10, 12, 14	20, 16, 18, 22, 14	24, 30, 36, 42, 48							
Mean	Mean	Mean							
28, 32, 36, 40, 44	80, 90, 100, 110, 120	60, 70, 80, 90, 100							
Mean	Mean	Mean							
55, 65, 75, 85, 95	22, 27, 31, 36, 46, 48	21.5, 28.75, 34.0, 47.25							
Mean	Mean	Mean							

Questions	Answer
1) Which group has the highest average screen time?	
2) Which group has the lowest average screen time?	
3) Did the teacher collect primary or secondary data?	Primary Secondary
4) Is this data discrete or continuous ?	Discrete Continuous

TYPES OF GRAPHS

Label the names of the graphs below.

			Histogram
			Multiple Bar Graph
			Bar Graph
			Stacked Bar Graph
			Circle Graph
			Broken Line Graph



Manitoba Math Curriculum Statistics– Grade 7

INTERPRETING DOUBLE BAR GRAPHS

The students in Grade 7 and Grade 8 were asked how they prefer to travel to school. The results are shown below.

Transportation Method	Grade 7	Grade 8
Walk	25	22
Bus	35	38
Car	15	12
Bike	10	8
Scooter	5	3
Other	10	8

Questions:

- Which transportation method did the Grade 7 students choose the most?
- Which transportation method did the Grade 8 students choose the most?
- How many more students chose Bus than Walk in total?
- How many students participated in the survey?
- What percentage of Grade 7 students chose Walk?
- What percentage of Grade 8 students chose Bus?

Answer Key:

- Bus
- Bus
- 10
- 50
- 25%
- 80%

INTERPRETING MULTIPLE-BAR GRAPHS

The students in Grade 5, 6, and 7 were asked which school subject is their favourite. The results are shown in the multiple-bar graph below.

Subject	Grade 5	Grade 6	Grade 7
Math	18/150	22	
Science			
English			
Art	30/150	20	
Gym			

INTERPRETING BROKEN LINE GRAPHS

Josh tracked how much water his household used each day over one week. The data is shown in the table below.

Day	Amount of Water (L)
Monday	250
Tuesday	240
Wednesday	260
Thursday	290
Friday	270
Saturday	280
Sunday	260

Fill in the frequency table and answer the questions.

Days	M	T	W	Th	F	S	Su
Amount of Water (L)							

Questions:

- What percentage of the total weekly water usage was used on Friday and Saturday?
- Which day had the highest water usage?
- Josh's friend claims that more water was used in the second half of the week (Thursday–Sunday) than in the first half (Monday–Wednesday). Is he correct? Discuss with your classmates.

Answer Key:

- 40%
- Thursday
- Yes

MEAN

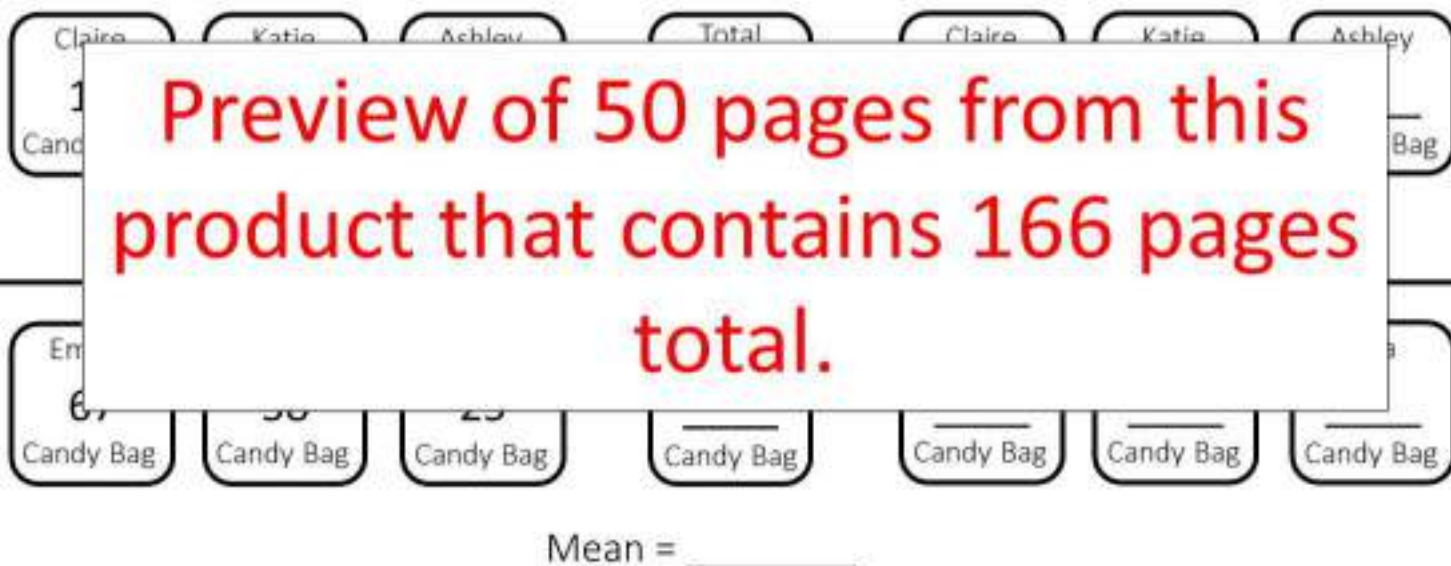
When we calculate the mean, we are finding the average of set of numbers.

Example: Three brothers named Josh, Cameron, and Morgan went 'trick or treating' on Halloween. Josh found 13 eggs, Cameron found 11, and Morgan found 9. At the end of the night, their mother told them to split the candy equally. So, they decided to put all the candy in the middle and then divide them equally amongst themselves.

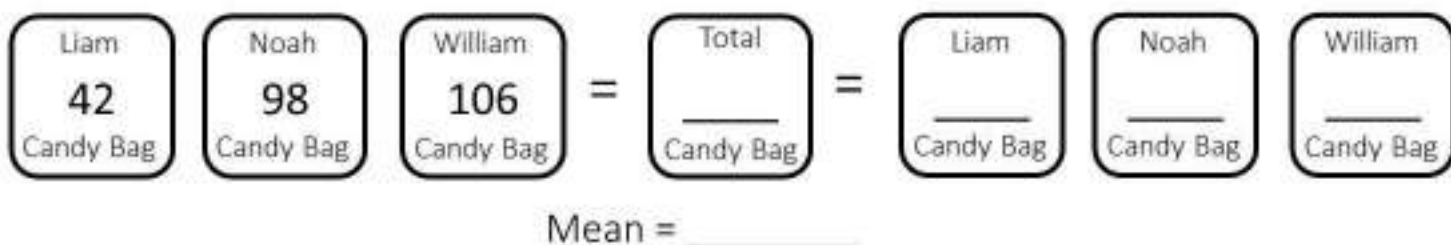
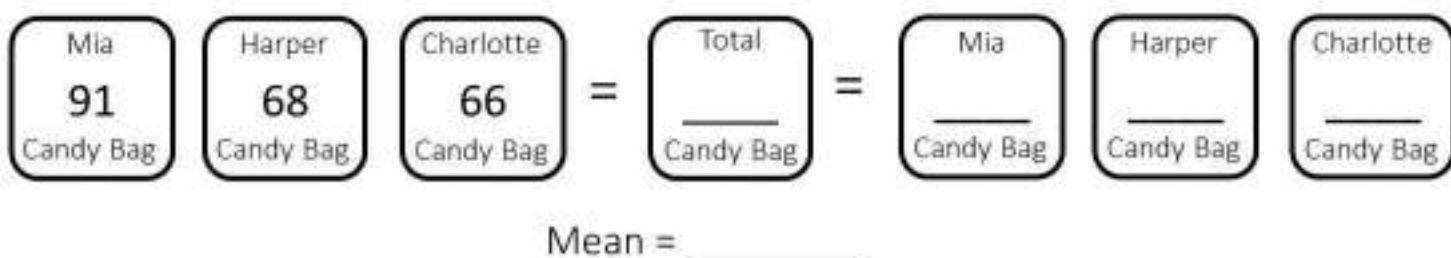
- They had $13 + 11 + 9 = 33$ candies and divided $33 \div 3 \text{ kids} = 11$ candies each.

**Questions**

Its Halloween – total up the candy and then fair share it



Preview of 50 pages from this product that contains 166 pages total.



Name: _____

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Curriculum Connection
SP.1

MEAN

Mean = the average in a set of data**Step 1:** Add up the numbers in the data set**Step 2:** Divide the sum by the amount of numbers in the set.**Example:**

Data set: 5, 3, 8, 5

Step 1: $5 + 3 + 8 + 5 = 21$ **Step 2:** $21 \div 4 = 5.25$ 

Part 1 Find the mean for each data set below

	Data	Total – Add Numbers	Mean
1)	13, 18, 2		
2)	49, 75, 35		
3)	17, 26, 13, 44		
4)	3.5, 4.8, 5.2		
5)	15, 84, 53, 48, 40, 48		
6)	53, 67, 45, 19		
7)	71, 84, 98, 103		
8)	117, 125, 132, 154		
9)	35, 45, 27, 33		
10)	11.6, 18.2, 23.8, 44.4		

Part 2 Answer the word problems below

1) Jason has completed 5 math tests this year. His marks as percents are: 81%, 72%, 93%, 68%, and 86%. What was his average mark?

2) Logan bought 6 hockey cards for the following prices: \$13, \$18, \$32, \$9, \$44 and \$52. What was the average price for one hockey card?

MODE

Mode: The number that occurs the most in a data set. The mode is used to calculate data in nominal data sets.

Step 1: Order the numbers from least to greatest

Step 2: Find the number or numbers that show up the most – You can have zero mode or more than one mode.

Example: 5, 3, 7, 3, 9, 11

3, 3, 5, 7, 9, 11

Answer: 3



Set	Ordered List	Mode
1) 1, 11, 16, 1		
2) 22, 25, 23, 2, 8		
3) 37, 49, 35, 37, 49, 35,		
4) 65, 54, 58, 58, 54, 65, 54, 58		
5) 79, 72, 75, 76, 72, 79, 75, 79		
6) 91, 95, 94, 90, 91, 94, 95, 97		
7) 121, 102, 112, 114, 104, 117		

1) Justin tracks what time he goes to bed at for 15 days. His bedtimes are written below:

7, 11, 8, 8, 7, 9, 10, 10, 7, 8, 9, 9, 8, 11, 9

What time did Justin go to bed at most often in the 15 days? _____



2) Adults were asked to choose a number from the food menu. The results are represented in the data set. What is the mode?

4, 1, 2, 4, 2, 2, 4, 1, 2, 1, 4, 2, 3, 1, 2, 2, 3, 2, 3, 4, 1, 2, 3, 1, 2, 2, 1, 3, 3, 4, 1

Which food choice was most popular? _____

1	Fish
2	Chicken
3	Steak
4	Vegetables

MEDIAN

Median: The median is the middle number in a data set.

Step 1: put numbers in order from smallest to largest

Step 2: circle the number in the middle.



*** If there is an even amount of numbers in the data set, add the two numbers in the middle together and divide by 2. This is the median.

Part 1 Find the median of the data sets below

	Data Set	Ordered List	Median
1)	8, 12, 15, 18, 20	4, 7, (8, 8), 12, 15	$8 + 8 = 16$ $16 \div 2 = 8$
2)	15, 17, 18, 19, 20, 21		
3)	27, 20, 24, 28, 26, 25		
4)	58, 64, 42, 57, 68, 48		
5)	84, 95, 54, 68, 92, 75, 86, 95		
6)	105, 125, 108, 152, 128, 135, 133		
7)	10.2, 10.8, 12.3, 11.8, 12.5		

Part 2 Answer the word problems below

1) The average temperatures across all 13 provinces and territories are listed below:
11°C, 9°C, 8°C, 9°C, 5°C, 7°C, 2°C, 3°C, 9°C, 10°C, 8°C, 8°C, 6°C

What is the median temperature in Canada? _____

2) Ten students are asked how many hours a day they spend on their phones. The results are as follows: 4, 6, 5, 3, 1, 7, 5, 4, 6, 8

What is the median number of hours the students spend on their phones? _____

RANGE

Range: The range is the difference between the biggest and smallest number in a data set.

Step 1: Find the largest number and the smallest number.

Step 2: Subtract the smallest number from the largest number

Example: 13, 74, 37, 18, 32

Step 1: 13 = smallest 74 = largest

Step 2: $74 - 13 = 61$



Part 1 Find the range of the data sets below

	Data	Calculations	Range
1)	8, 15, 4, 15, 8	$15 - 4 = 11$	11
2)	61, 75, 81, 75, 75		
3)	85, 95, 81, 106, 132,		
4)	205, 135, 178, 171, 164, 199		
5)	234, 241, 258, 226, 231, 247		
6)	318, 365, 343, 352, 368, 376		
7)	433, 418, 427, 406, 448, 439		
8)	518, 475, 428, 596, 604, 410		

Part 2 Find the range in the word problems below

1. Robin collects strawberries for her summer job. She records how many strawberries she collects each day for a week. What is the range of strawberries she collects?

471, 528, 374, 486, 598, 446, 641

2. Steven records how many minutes of screen time he uses on his phone each week. His results for 6 weeks are listed below. What is the range?

247, 311, 485, 375, 201, 399

Name: _____

8

Curriculum Connection
SP.1

Mean, Median, Mode - Decimals

**Questions**

Fill in the table using the different measures of central tendency

1)	
Data Set	1.7, 1.9, 2.5, 2.8, 2.1, 1.8, 1.9
Mean	
Median	
Mode	
Range	

2)	
Data Set	8.2, 7.5, 6.4, 7.2, 8.1, 7.5, 8.3
Mean	
Median	
Mode	
Range	

3)	
Data Set	20.3, 23.5, 20.1, 23.5, 21.5, 23.1
Mean	
Median	
Mode	
Range	

4)	
Data Set	2.5, 12.5, 12.4
Mean	
Median	
Mode	
Range	

Estimating the Mean

The mean is the average number in a data set. When we understand what the mean of a data set is, we can estimate the mean easily without doing any calculations.

For example, in the data set: 22, 18, 16, 25, 20, we can estimate that the mean will be approximately 20, without doing any calculations. This is because the mean has to be between 16 and 25. We can also see that there are two numbers above 20, and two numbers below 20.

- Estimate**
- 1) Estimate the mean by circling one of the options
 - 2) Check your answer by calculating the mean

	Data Set	Options			
		1	2	3	4
1)	5, 5, 7, 7	4	5	6	7
2)	22, 25, 24, 23, 21	22	23	24	25
3)	13, 18, 16, 14, 19	14	16	18	19
4)	22, 19, 25, 15, 14	16	25	23	19
5)	64, 68, 57, 59, 62		66	67	62
6)	74, 88, 65, 81, 62	67	77	82	64
7)	83, 99, 72, 76, 85	87		78	89
8)	93, 95, 85, 105, 87	89			93
9)	121, 102, 133, 125, 144	108	111	125	134
10)	152, 168, 158, 148, 134	152	163	145	139

Part 2

Answer the word problems below by estimating

1) Meredith bought lunch every day from Monday to Friday last week. She spent: \$9, \$5, \$11, \$12, and \$8. Approximately how much did lunch cost her per day?



2) Michelle sells popcorn at a festival. She worked for 6 hours, selling the following dollar amounts each hour: \$22, \$32, \$45, \$27, \$38, and \$46. Approximately how much did she earn each hour?



Finding Missing Data Point Using Mean

We can determine the missing number in a series if we know the mean by using the following formula:

$$\text{Mean} = \frac{\text{Sum of given numbers} + x \text{ (unknown number)}}{\text{total numbers}}$$

Example: 25, 27, ?, 30 Mean = 26

Steps

- 1) Multiply the number of total numbers you have by the mean ($26 \times 4 = 104$)
- 2) Add the numbers you know ($25 + 27 + 30 = 82$)
- 3) Find the difference (subtract) between 104 and 82 ($104 - 82 = 22$) - Answer = 22

Questions: Use the table below to find the missing data point

	Data Set	Mean	Calculations	Missing Data Point
Ex)	9, 16, ?, 22, 12, 19	18	$\begin{aligned} &1) \quad 18 \times 6 = 108 \\ &2) \quad 9 + 16 + 22 + 12 + 19 = 78 \\ &3) \quad 108 - 78 = 30 \end{aligned}$	30
1)	12, 18, 6, ?, 15	17		
2)	48, ?, 32, 45, 30, 21	32		
3)	61, 35, 51, 23, ?	45		
4)	72, 41, 32, ?, 68, 65	57		
5)	91, 85, 60, 57, ?, 52	75		

Finding Missing Data Point Using Mean

Questions

Answer the word problems below

1) Leah has completed 5 assignments in math this year. She has the following marks (written as percentages) – 79%, 89%, 68%, 77%, and 78%.

In order to get an A- on her report card, she needs an 80 average or more. She has one more assignment left. What mark does she need to achieve an 80% average?

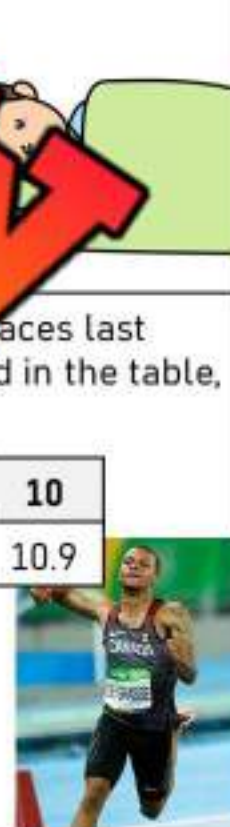


2) Tyler slept an average of 7 hours a night last week. He slept for 5.5 hours on both Monday and Tuesday. He slept 9 hours on Wednesday and 8.5 hours on Friday and Saturday. On Sunday, he slept 6 hours. How long did he sleep on Wednesday?

3) Andre De Grasse was practicing his 100m race. He ran 10 full speed races last week. His average time was 10.2 seconds. His times have been presented in the table, but he is missing his time for race 7.

Race	1	2	3	4	5	6	7	8	9	10
Time	10.1	9.7	9.8	10.3	10.9	9.8		9.9	10.8	10.9

What was his time for race number 7?



Outliers in Data Sets

An **outlier** in a data set are values that are significantly different from other measures. They may mean that something has gone wrong in the data collection, or they may represent a valid measure that needs further explanation.

Part 1

Circle any outliers in the data sets below

1)	7, 8, 9, 5, 8, 5, 10, 42, 9	6)	1524, 1531, 1585, 1563, 1284
2)	12, 15, 18, 9, 84, 25, 72	7)	102.2, 10.5, 103.9, 104.6, 102.5, 62.1
3)	85, 100, 95, 4, 121, 105	8)	2751, 2853, 2623, 3547, 2345, 1258
4)	6, 15, 18, 9, 84, 25, 72	9)	421, 521, 605, 2021, 4452, 506, 572

Part 2

Answer the questions below

1) Jonah practiced his 100m race times according to the stop watches that automatically record his times on a computer. His times were: 55, 49, 51, 52, 132, and 48.

- Which of his scores was an outlier?
- What might have caused the outlier?



2) Alex looked at how many steps he took last week. The number of steps he took over the last 7 days is recorded below:

10425, 12325, 8542, 9875, 2012, 19252, 10120

- Which of the values are outliers?
- Explain why he may have an outlier of 2012 steps?
- Why might Alex have an outlier of 19252 steps?



3) Kylie has a business where she sells cakes. She recorded her last 15 days of cake sales.

8, 7, 9, 12, 6, 25, 7, 9, 8, 6, 10, 0, 11, 12, 8

- Which of the values are outliers?
- Explain what could have led to her selling 25 cakes on day 6.
- Explain what could have led to her selling 0 cakes on day 11.



Calculating Mean - Outliers

Outliers have a big impact on the mean of a data set. For example, if John records his last 5 long jumps and jumps the following distances:

6.5m, 6.8m, 1.5m, 6.2m, 6.1m

John explains after that on his third jump, he slipped and didn't perform a full jump. The data set has an outlier that doesn't reflect John's ability to jump. We can see the difference when we use an outlier in our calculation of the mean



Mean With Outlier = 5.42m

Mean Without Outlier = 6.14m

Question: Calculate the mean using the outlier and without the outlier

	Data	With Outlier(s)	Mean Without Outlier(s)
1)	9, 7, 5, 25, 8, 3		
2)	21, 48, 24, 20, 26, 22		
3)	12.2, 15.6, 14.3, 28.4, 16.1		
4)	53, 105, 61, 11, 65, 58, 59		
5)	51, 81, 84, 83, 82, 84, 113		

Questions

Answer the word problem below

1) Explain what happened in questions 4 and 5. Why was the mean similar with the outliers?

2) Marla's teacher is deciding between an A- and B+. An A- is between 80-84 and a B+ is between 77-79. Marla received the following marks:

78, 85, 81, 82, 77, 88, 52, 84

Should the teacher give Marla an A- or B+? Explain using outliers - do calculations!

Calculating Mode and Median - Outliers

Part 1

Calculate the mode using the outlier(s) and without the outlier(s)

	Data Set	Mode With Outlier(s)	Mode Without Outlier(s)
1)	11, 15, 12, 16, 45, 15, 12, 15, 12, 15		
2)	45, 41, 48, 46, 21, 45, 46, 88, 47, 46		
3)	77, 76, 83, 132, 42, 81, 77		
4)	95, 100, 208, 48, 112		
5)	254, 265, 255, 256, 257, 258		

Do outliers have an affect on the mode? Explain why or why not.

Part 2

Calculate the median using the outlier(s) and without the outlier(s)

	Data Set	Median With Outlier(s)	Median Without Outlier(s)
1)	15, 19, 16, 2, 47, 18, 17		
2)	45, 40, 99, 48, 43, 46, 45		
3)	75, 79, 125, 21, 72, 76, 75, 81		
4)	94, 88, 156, 92, 95, 96, 97, 41		
5)	8.5, 8.4, 8.8, 7.9, 8.3, 2.5, 21.5		

Do outliers have an affect on the median? Explain why or why not.

When To Use - Mean, Median, Mode

In general, we can use the following rules when deciding which measure of central tendency to use.

Mean

- Data without outliers or data sets with many data points to "wash out" outliers
- Provides accurate average of a data set and works well with all sizes of data sets

Mode

- Working with qualitative or nominal data
- Very easy to determine the mode and is not impacted by outliers
- Does not always give an accurate average of a data set

Median

- Works well with data that has outliers and with large data sets
- In general, provides a more accurate average than mode, but less than mean

Questions

For each measure of central tendency will you choose to use? Explain

- | | |
|----|---|
| 1) | The average points scored by each player on your team. You have a large data set with no outliers.

_____ |
| 2) | People vote on their favourite number from 1 to 10. Data set: 7, 5, 6, 4, 2, 5, 7, 5

_____ |
| 3) | The average salaries for Canadians. Your data set has many outliers.

_____ |
| 4) | The average amount of medicine that is effective. The data set is small with no outliers.

_____ |
| 5) | People choose which meal number (1-6) they order from a fast-food restaurant.

_____ |

Mean, Median, Mode - Hourly Rate

Questions

Answer the questions below



You are deciding between 3 jobs to take based on their hourly rates. You have the following data, which shows how much 5 of the employees at each business earn per hour.

	Employee 1	Employee 2	Employee 3	Employee 4	Employee 5
Business 1	\$45	\$16	\$17	\$45	\$15
Business 2	\$25	\$30	\$112	\$24	\$25
Business 3	\$20	\$21	\$54	\$56	

- a) Rank the 3 businesses by their mean hourly rate. Which one would you choose?
- b) Instead of using the mean hourly rate, use the mode. Which business would you join?
- c) You want to make sure you select the best business, so you use the median hourly rate. Which business would you choose?
- d) You notice an outlier in business 2's data. What could be an explanation for this outlier?
- e) If you omit the outlier, what is the mean rate of business 2? Does this change your choice? Explain.
- f) If you were the business owner, would you include the outliers in your data? Explain.

Mean, Median, Mode - Dinner Out

Questions

Answer the questions below



You and your friends are comparing how many times you have been out for dinner in the past year. The following table shows how many dinners each friend has gone out for by month.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ben	2	2	1	4	3	2	4	1	2	1	1	1
Jill	2	2	3	2	5	4	3	1	2	2	1	1
Avi	1	2	2	3	2	3	2	2	1	1	2	2
Max	2	2	2	2	4	2	1	4	8	2	3	3

- Calculate the mean for each friend's number of times out for dinner. Who went out for dinner the most per month?
- Compare the medians of each friend. Who went out for dinner the most per month?
- Compare the mode of each friend. Who went out for dinner the most per month?
- Using the mean, which month was most popular for going out for dinner?
- What is the mean of the medians for each friend's number of visits out for dinner?



Generating Questions - Primary Data

When we collect primary data, we often use survey questions to ask people to gather the data. We can also create research questions for experiments we plan to perform so that we can collect primary data.

Example of Primary Data Survey Questions

- What is your favourite hobby?
- What is your favourite food?

Example of Primary Data Research Questions

- How much snow will fall this month in my backyard?
- How many pushups can I do every day for 10 days?

Part 1 Write 5 survey questions you could ask to gather primary data

1)

2)

3)

4)

5)

Part 2 Write 5 research questions for experiments you could do to gather primary data

1)

2)

3)

4)

5)

Collecting Data - Qualitative

Qualitative data is non-numerical data that can be organized by categories, such as type of pet, or favourite colour.

Questions of interest are questions we have that we want to learn more about. We learn more about them by collecting data from a population.



Examples - Which YouTuber is the best from this list? Which video game system is the best?

Population - Choosing your population is important. If you asked kindergartens the same question as grade 7's, you would expect different results and you might not be interested in the kindergarten data.

Data Collection - Collect data by asking the population your survey question

Survey question

Example: What is your favourite music genre?

Categories			
Tally			
Frequency			
Percentage			

Interpreting Your Survey Results

1. Which population did you ask? (ex- grade 7's, kids under 12) _____
2. How many people were surveyed? _____
3. Which category was the most popular? _____ least popular- _____
4. If you asked your entire school, which category do you think would win? Explain.

5. What conclusions can you make from your data? What did you learn?

Generating Questions - Secondary Data

When we collect secondary data, we are finding data from another source. This means someone else has collected the data for others to use as secondary data.

Using secondary data allows us to answer questions we may have. With so much data available to us, we can write research questions about almost anything and find the data online.

Examples

- 1) Which YouTubers had the most views last year?
- 2) Which players scored the most points last year?
- 3) What are the average temperatures in Canada, the USA, Jamaica, and

Practice

Write a question you could look up to gather secondary data

1)

2)

3)

4)

5)

6)

7)

8)

9)

10)

Research - Finding Secondary Data

Choose a research question that you are most interested in. Find data that answers your research question. Organize your data by using the table below.

Organizer

Fill in the table below

1) What is your research question?

2) How will you organize your data? You will need 4 or 5 categories so you can use your data to make conclusions.
For example: Swing's total totals for his first 5 seasons.

Categories					
Data					

3) What did you learn about your secondary data?

4) Why is this data considered secondary data?

5) Who is the source of the data? Where did you find it?

Interpreting a Double Bar Graph

The students in grades 7 and 8 were asked which candy was their favourite. The results have been sorted by grade in the double bar graph below.



Favourite Candy of Grade 7 and 8 Students



a) Which candy did the grade 7's like the most?

b) Which candy did the grade 8's like the most?

c) Which candy got the most votes combined?

d) How many more votes did gummies get in total over licorice?

e) How many students participated in the survey?

Gr 7

Gr 8

Total

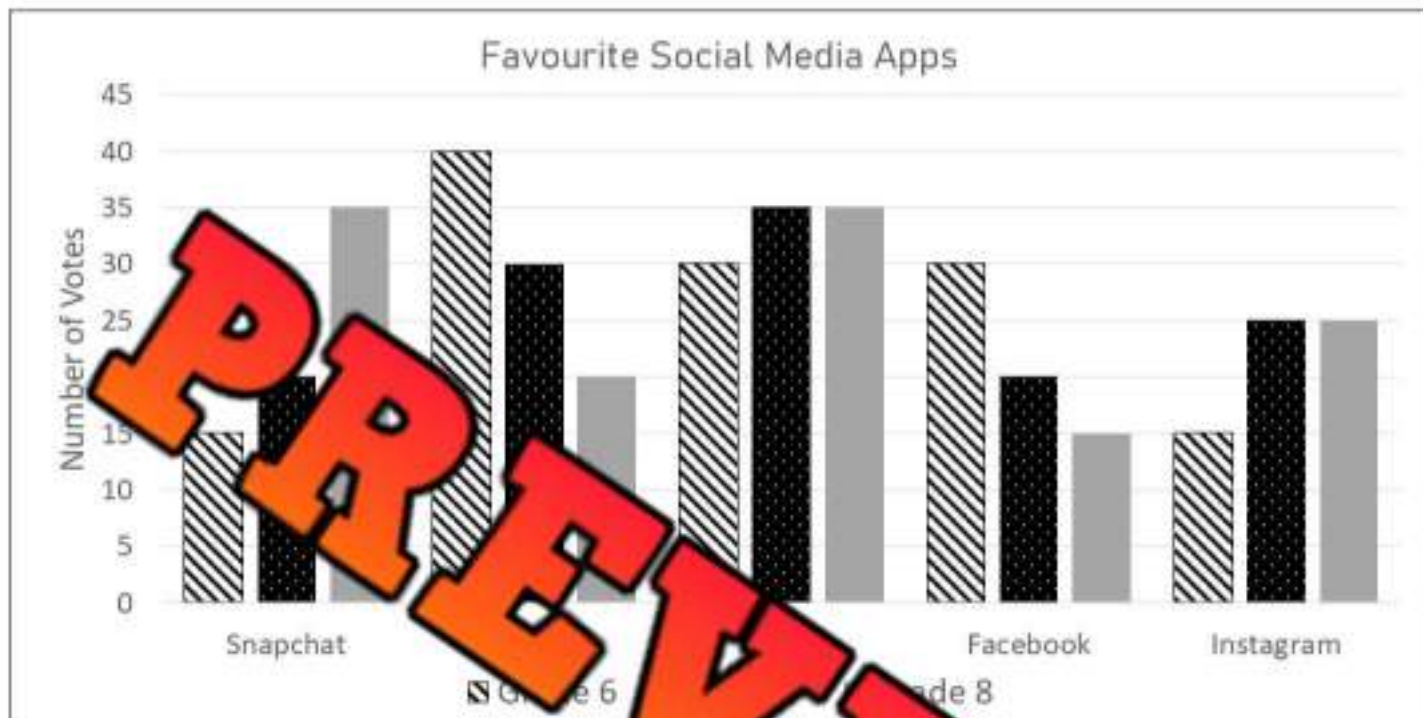
f) What percentage of students chose gum as their favourite?

g) What percentage of grade 7s chose hard candy?

h) What percentage of grade 8s chose chocolate?

Multiple-Bar Graph - Favourite Social Media

The students in grade 6, 7, and 8s were asked which social media app was their favourite. The results have been sorted by grade in the multiple-bar graph below.



Part 1 Fill in the frequency table by reading the multiple bar graph above

	6		8	
	#	%	#	%
Snapchat	15/130	12		
YouTube				
Tik Tok				
Facebook	30/130	23		
Instagram				
Total	/130			

Part 2 Answer the questions below

a) How many students in each grade were surveyed?

b) Which social media was the most popular? How many votes did it get?

Creating a Multiple-Bar Graph - 3 Groups

Assignment

Create a multiple-bar graph using data you have collected.

1. Choose a population that you can segment into 3 groups.

Example – Kids with no siblings, kids with 1 sibling, kids with more than 1 sibling.

Groups within Population: _____

2. Choose a survey question you would like to learn more about. Think about how the answers might be different based on your different groups.

Survey Question: _____

Option 1			Option 2			Option 4			Option 5		
Group 1	Group 2	Group 3									
Tally	Tally	Tally									

Name: _____

36

Curriculum Connection
SP.3

Creating a Multiple-Bar Graph - 3 Groups

Use the data you collected to plot your graph. Remember the following labels:

☐

X axis label

☐

Y axis label

☐

Title

☐

Scale

☐

Categories



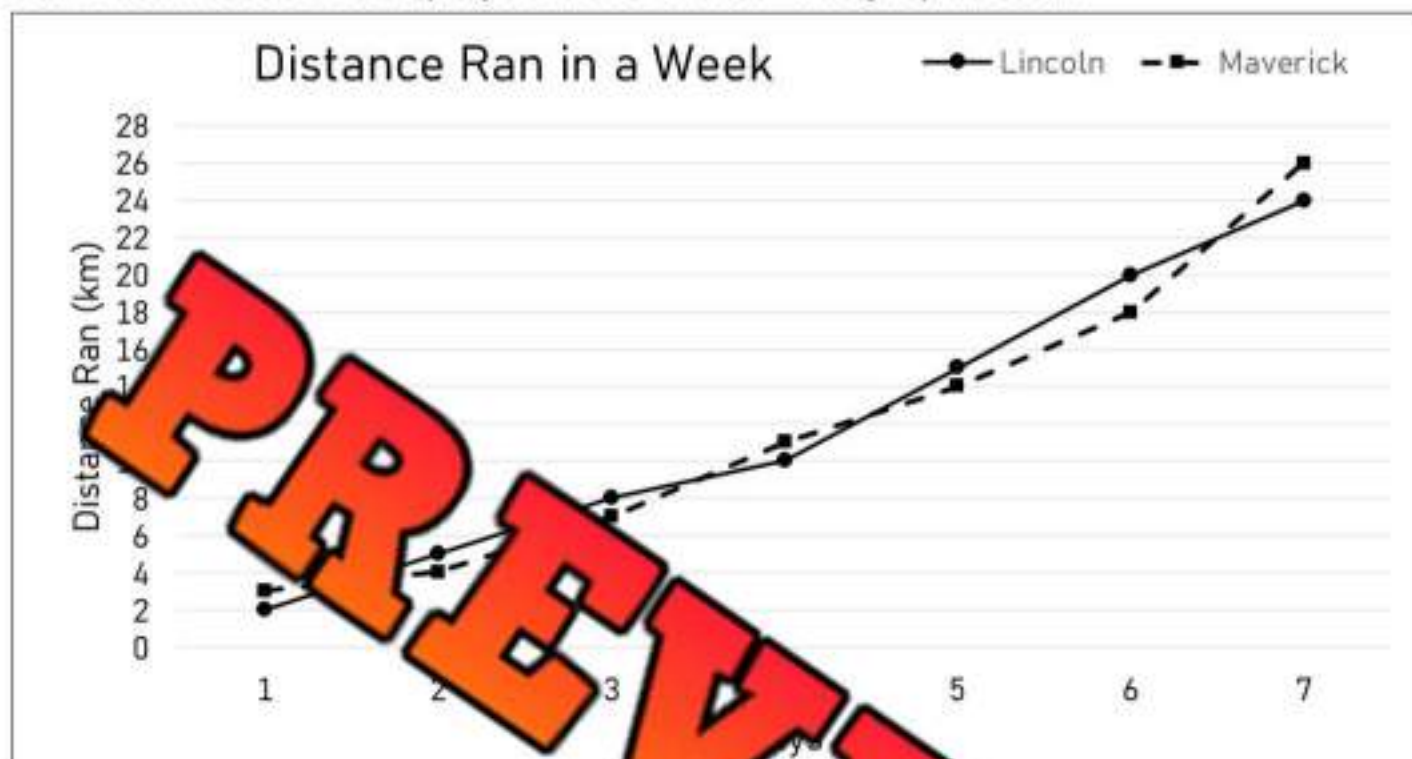
Legend

☐☐

Fill in the frequency table below with your 5 categories and 3 different groups

Interpreting Double Broken-Line Graph

Lincoln and Maverick had a contest to see who could run the most kilometres in a week. Their results are displayed in the broken-line graph below.



Part 1

Fill in the frequency table by reading the broken-line graph

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Lincoln's KM							
Maverick's KM							

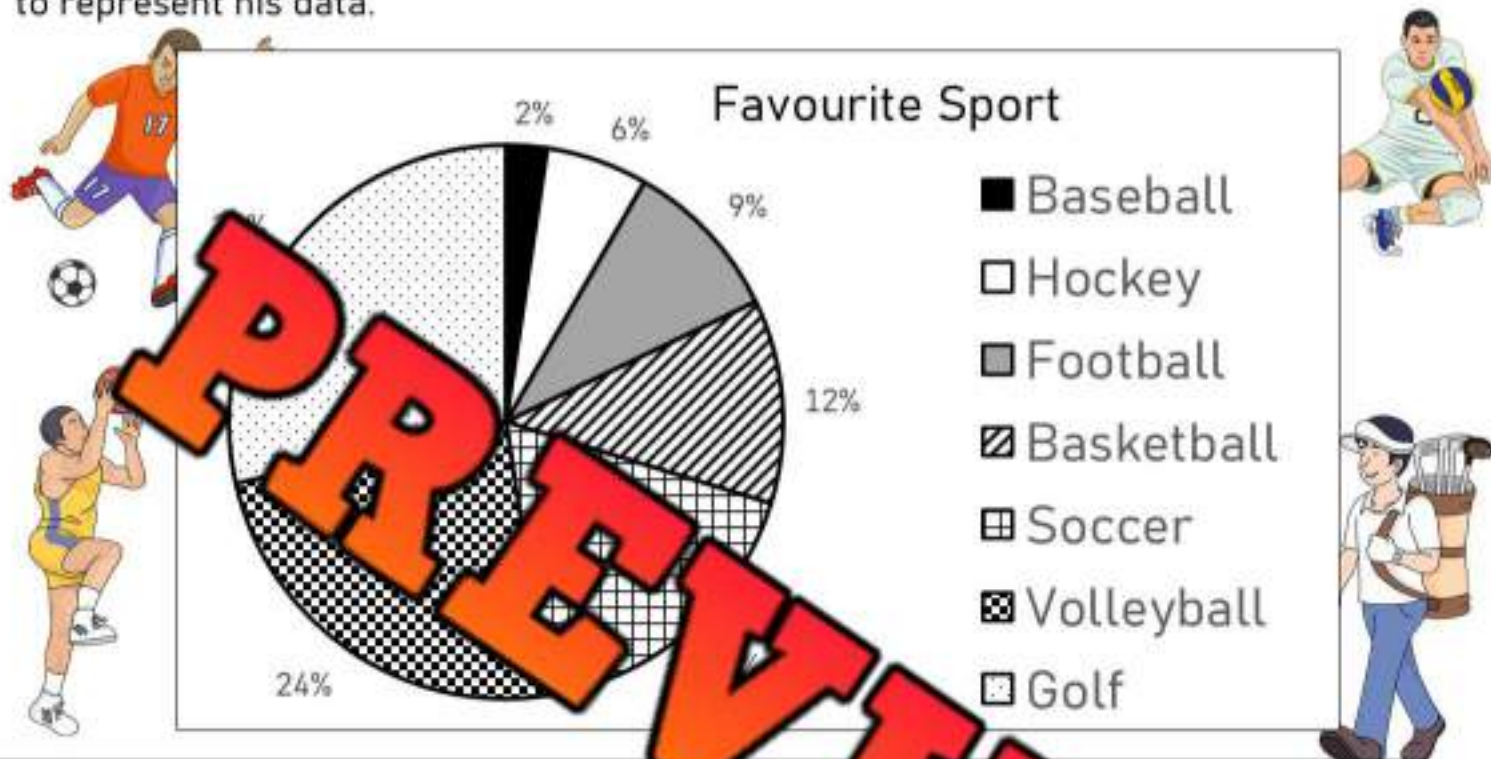
Part 2

Answer the questions below

1) Who ran more km in the week?	
2) Is the data <u>continuous</u> or <u>discrete</u> ?	
3) Which day did Maverick run the most? What percent of his total distance did he run on this day?	
4) Who was winning the contest after the fifth day?	
5) Which day did Lincoln run the most? What percent of his total distance did he run on this day?	

Interpreting a Circle Graph - Favourite Sport

Ken completed a random sample of the students in his school. He randomly asked 10 students from 10 different classes what their favourite sport is. He used a circle graph to represent his data.



Part 1

Fill in the frequency table by reading the circle graph

	Baseball	Hockey	Football	Basketball	Soccer	Volleyball	Golf
Votes							
%							

Part 2

Answer the questions below

1) Which sport is the most popular out of the 100 people surveyed?	
2) Which two sports received over 50% of the votes?	
3) How many people chose baseball as their favourite sport?	
4) What percentage do all 7 sports add up to?	
5) Is golf more popular than baseball, hockey, football, and basketball?	

Interpreting a Circle Graph - Oscar Awards

The winning movies from the Oscar awards have been displayed by genre in the circle graph below.

2021 Oscar Winning Movies By Genres



Part 1

Fill in the frequency table by using the circle graph

	Drama	Documentary	Horror	Action	Science Fiction	Comedy
Votes	9/29	4/29				6/29
%			7%	18%		

Source: Movie Database

Part 2

Answer the questions below

1) Which movie genre won the most awards?	
2) Which two genres received over half of the awards?	
3) Did comedy, horror, and action get over half of the awards?	
4) Which movie genre scored 14% of the Oscar awards?	
5) What percentage of awards went to movies other than dramas?	

Interpreting a Circle Graph - Shopping

Jordyn went shopping today. How much she spent at each store has been represented in the circle graph below.



Jordyn's Shopping Trip



Part 1

Fill in the frequency table, writing the percent of each segment

	Jewelry	Shoes	Clothing	Sporting Goods	Groceries	Total
\$ Spent						
%						

Part 2

Answer the questions below

1) Which store did Jordyn spend most of her money?	
2) Which 2 stores did she spend over half of her money?	
3) How much did she spend in total on groceries, jewelry and shoes?	
4) What percent of her money did she spend on everything except jewelry?	
5) If she went back for more groceries and spent \$100 more dollars, what percent of the money on that day would she have spent on groceries?	

Drawing a Circle Graph - Sales

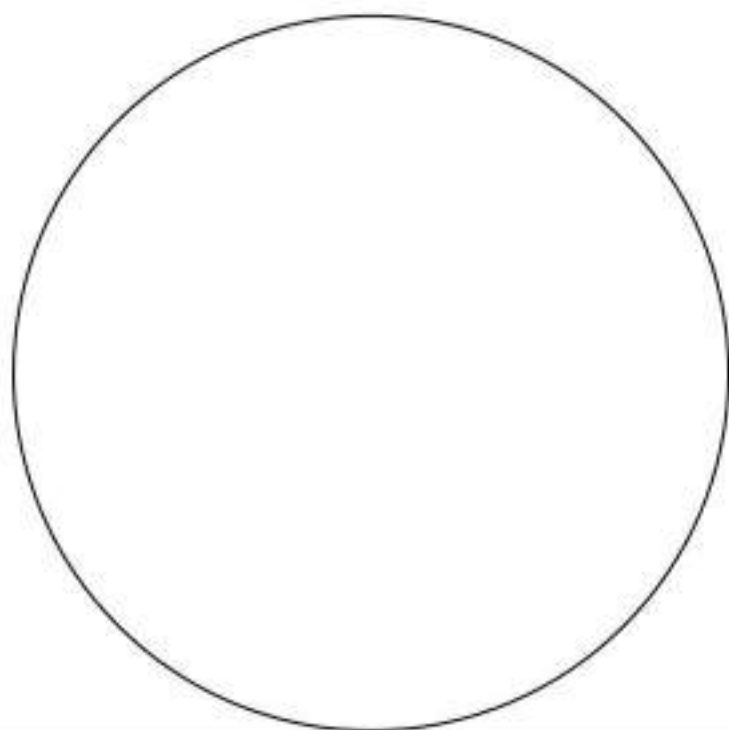
Selena has a business selling her artwork. She kept track of her sales each day last week.



Part 1 Fill in the table below to determine the angle measurements for the circle graph

	Number of Sales	Fraction	Decimal	Relative Frequency (as a percentage)	Angle Measure
Monday	4	4/50	0.08	8%	$0.08 \times 360 = 29^\circ$
Tuesday	6	6/50	0.12	12%	$0.12 \times 360 = 43^\circ$
Wednesday	5				
Thursday					
Friday					
Saturday	11				
Sunday	10				
Total	50				

Part 2 Use a protractor to draw the angles for the circle graph



2) Why do you think Selena sold more on those days?

3) What conclusions can you draw from this data?

Drawing a Circle Graph - Languages

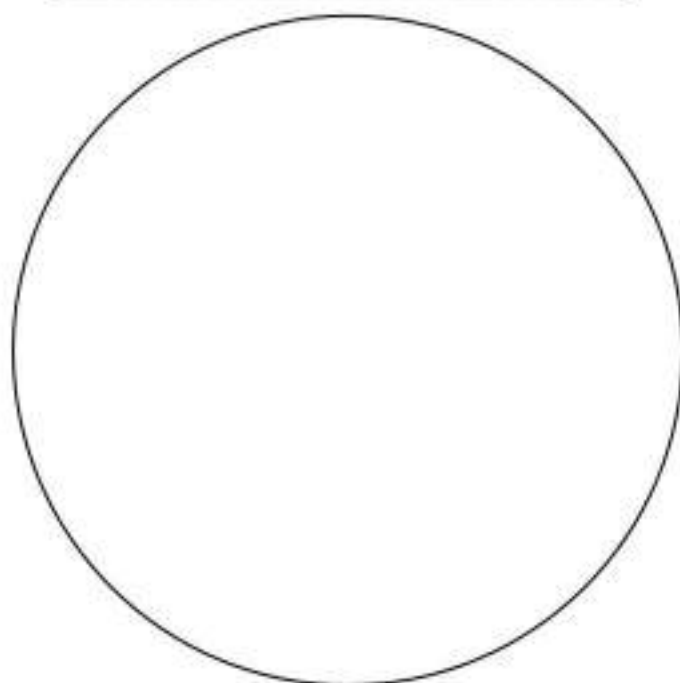
The top 7 most popular languages have been recorded in the table below. The data shows what percentage of the world speaks each language. Use the percent to find the angle measurement so you can represent the data in a circle graph.



Part 1 Fill in the table below to determine the angle measurements for the circle graph

	Relative Frequency (as a percentage)	Fraction	Decimal	Angle Measure
English	14%	14/100	0.14	$0.14 \times 360 = 50^\circ$
Mandarin	13%	13/100	0.13	$0.13 \times 360 = 47^\circ$
Hindi	12%			
Spanish	7%			
French	4%			
Russian				
Other	50%			
Total	100%			

Part 2 Use a protractor to draw angles for the circle graph



1) Which two languages are the most spoken in the world?

2) What percent of the world speaks languages other than English and Mandarin?

3) What conclusions can you draw from this data?

Drawing a Circle Graph - Basketball

Nick has been keeping track of his basketball playoff scoring for the last 5 seasons. He played 5 playoff games in each of the last 5 seasons. How many points he scored has been recorded in the table below.

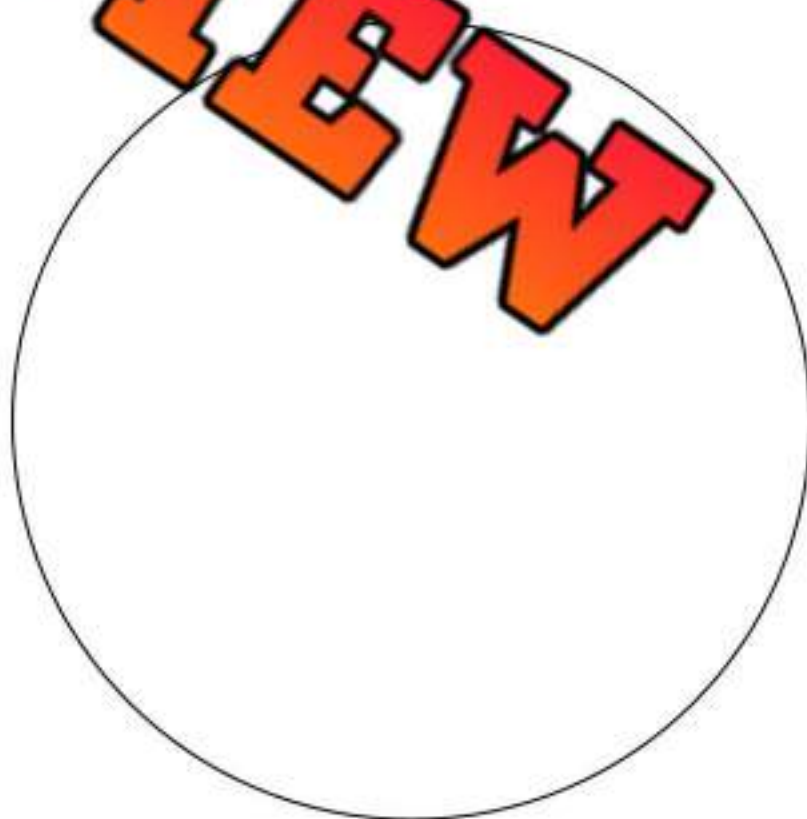


Part 1 Fill in the table below to determine Nick's average playoff scoring each season

	Game 1	Game 2	Game 3	Game 4	Game 5	Mean Scores
Season 1	6	4	5	4	6	
Season 2	10	4	6	7	10	
Season 3	15	7	12	9	12	
Season 4	18	10	11	13	16	
Season 5	20	12	16	25	22	

Part 2 Use the mean scores above and the angle measures of each season

	Angle Measure
Season 1	
Season 2	
Season 3	
Season 4	
Season 5	

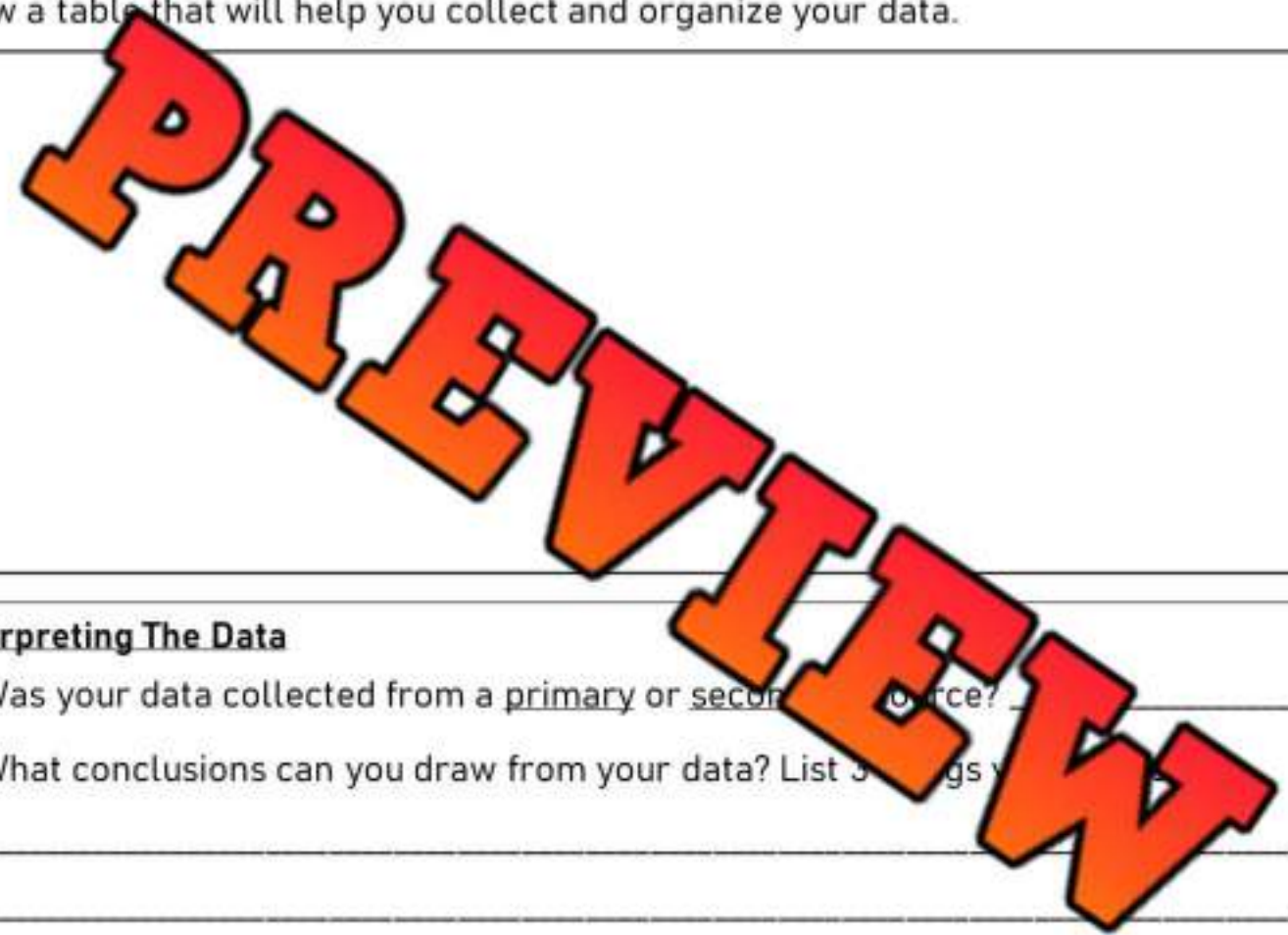


Collecting Qualitative Data - Circle Graph**Data Collection**

Collect categorical data that you can plot using a circle graph

Question of Interest(Ex. Favourite _____ or
which app you use most)

Draw a table that will help you collect and organize your data.



Interpreting The Data1) Was your data collected from a primary or secondary source? _____2) What conclusions can you draw from your data? List 3 things you _____

_____3) How will graphing this data as a circle graph help readers understand the data?

Creating a Circle Graph

Use the data you collected to plot your graph. Remember the following labels:

☐

Title

☐

Labels for each section

☐

Percentages/totals

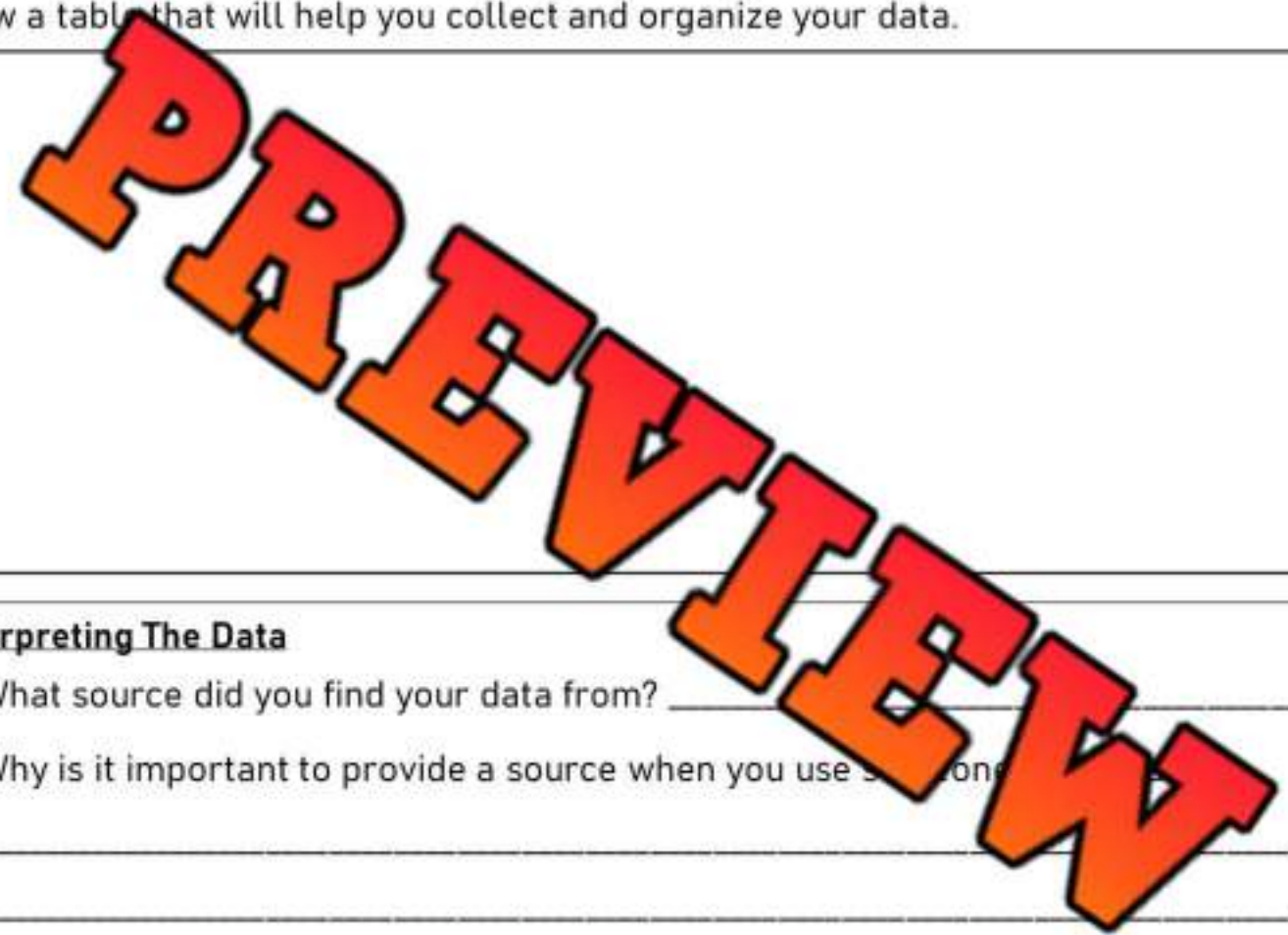
PREVIEW

Collecting Quantitative Data - Circle Graph

Data CollectionCollect **secondary quantitative** data for a circle graph**Question of Interest**

- Top 5 home run leaders
- Average house prices last 5 years in Canada

Draw a table that will help you collect and organize your data.

**Interpreting The Data**

- 1) What source did you find your data from? _____
- 2) Why is it important to provide a source when you use _____

- 3) What conclusions can you draw from your data? List 3 things you learned.

Name: _____

50

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Creating a Circle Graph

Use the data you collected to plot your graph. Remember the following labels:

☐

Title

☐

Labels for each section

☐

Source

☐

Percentages/totals

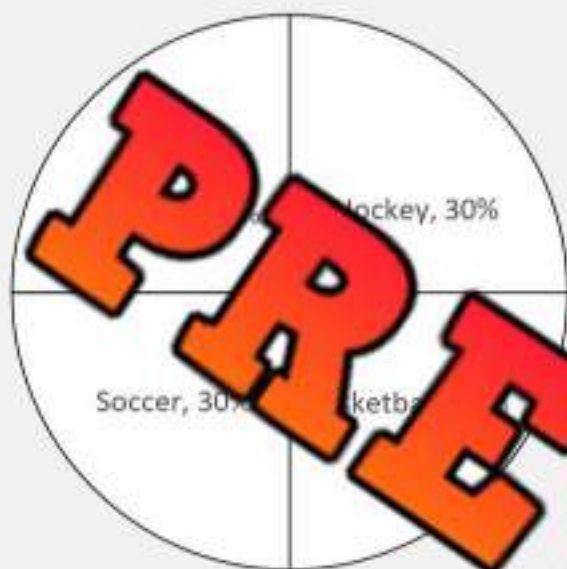
PREVIEW

Source: _____

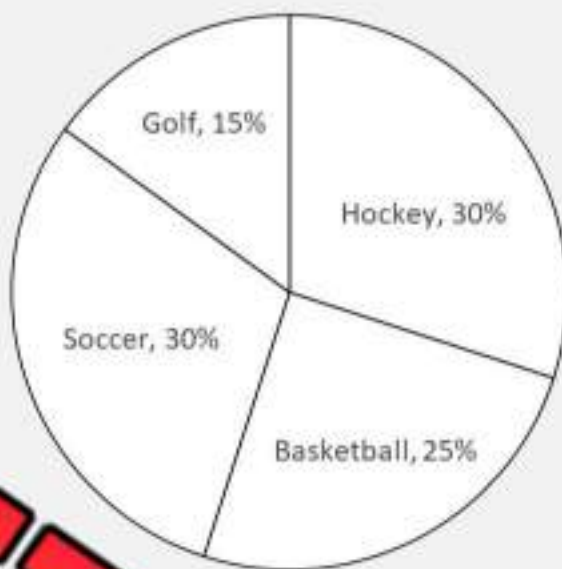
Misleading Graph - Circle Graph

A local golf course wants to advertise golf to the people in its community. They want to show that golf is just as popular to kids as hockey, soccer, and basketball.

Graph A - Most Popular Sports



Graph B - Most Popular Sports



Questions

What do you notice about the two graphs?

a) Which of the two graphs is misleading? Explain why.

b) Which graph would you use if you were the local golf course? Explain.

c) Do you think people would fall for this misleading graph? Explain your opinion.

Unit Test - Data Literacy

Part 1

Find the mean, median, mode for each data set below

Data Set	23, 28, 35, 11, 28
Mean	
Median	
Mode	
Range	

Data Set	36, 41, 55, 24, 37, 41
Mean	
Median	
Mode	
Range	

Part 2

Fill in the table below with the missing data point

	Data Set	Mean	Missing Data Point
1)	18, 24, 27, 33, ?	30	
2)	48, 55, ?, 62, 68, 74	59	

Part 3

Calculate the mean using the outlier and without the outlier

	Data Set	Mean With Outlier(s)	Mean Without Outlier(s)
1)	9, 7, 5, 25, 8, 6		
2)	21, 48, 24, 20, 26, 22		
3)	12.2, 15.6, 14.3, 28.4, 16.1		

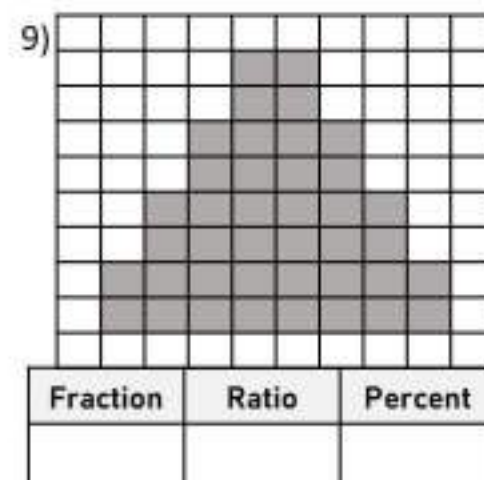
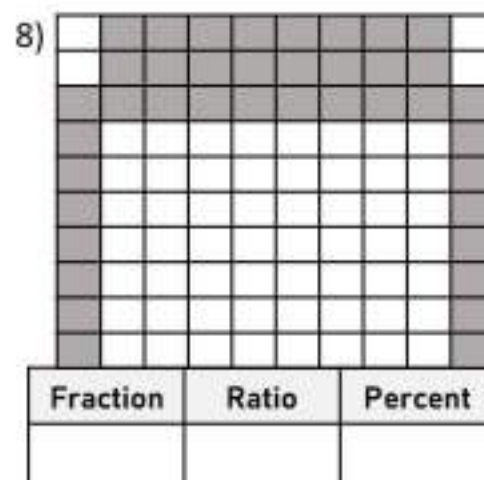
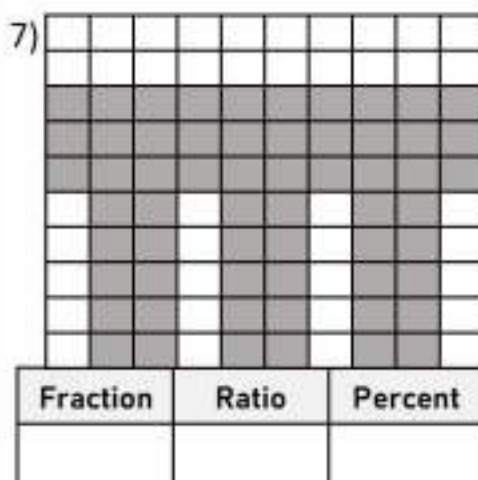
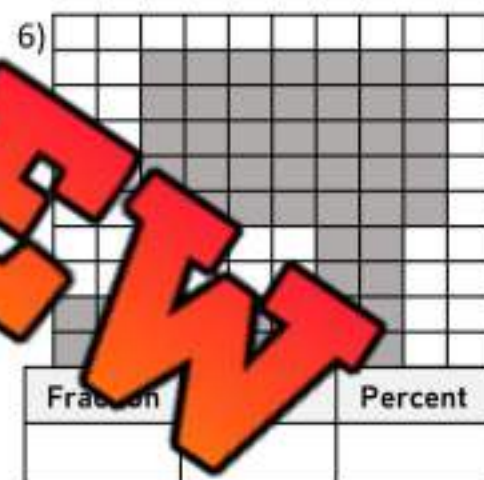
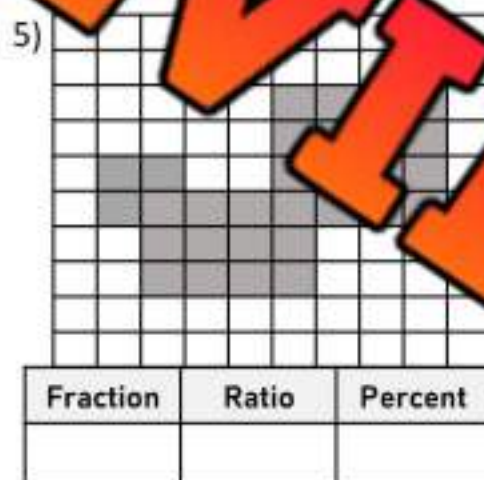
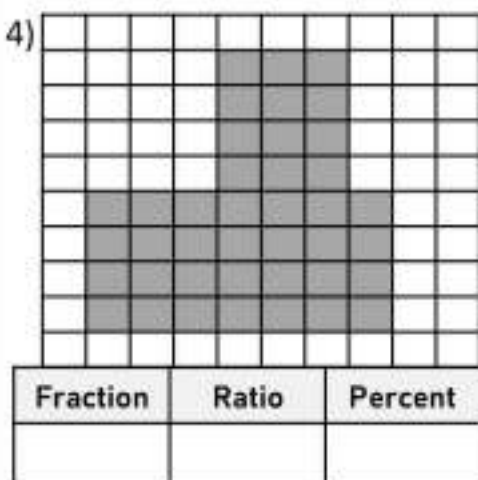
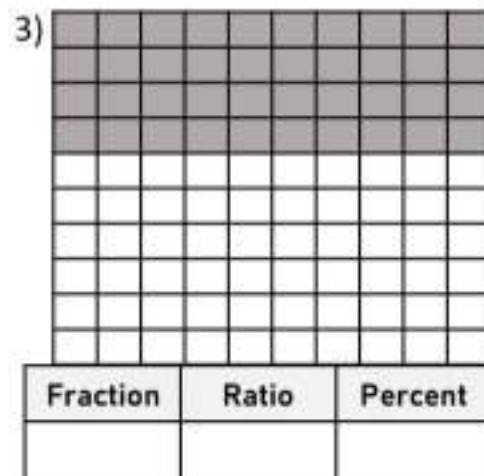
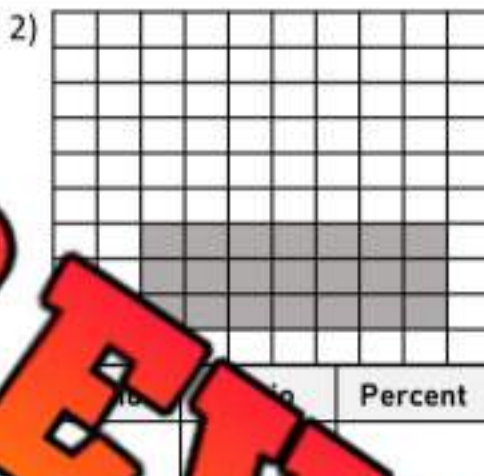
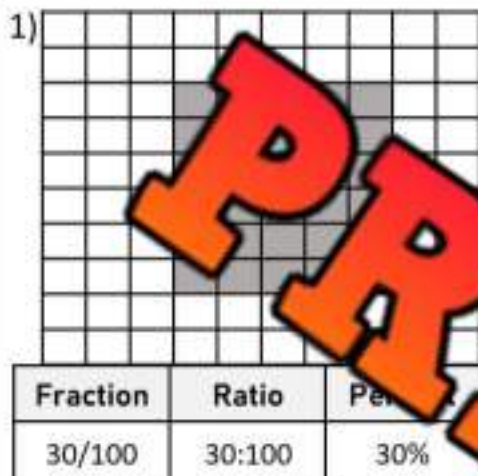
Independent Events - Darts



Independent events are two or more events that could happen at the same time without affecting the outcomes of the other events. Imagine below, that the shaded in area is a target and the white part is the wall. What is the probability of you hitting each target?

Think: Why are these independent events?

Questions Represent the probability of hitting the target using a fraction, ratio and percent



Describing the Likelihood of Events

Marbles

There are 20 marbles in a bag. What is the probability of you pulling out a white, grey, or black marble?



Frequency Table Fill in the frequency table below

Marble Color	Frequency
Black	
Grey	
White	

Questions Represent the probability of pulling out a marble as a fraction, ratio and percent

Event	Fraction	Ratio	Percent
1. What is the probability of pulling out a black marble?			
2. What is the probability of pulling out a grey marble?			
3. What is the probability of pulling out a white marble?			
4. What is the probability of pulling out a black, white, or grey marble?			
5. What is the probability of pulling out a black or white marble?			
6. What is the probability of pulling out a green marble?			

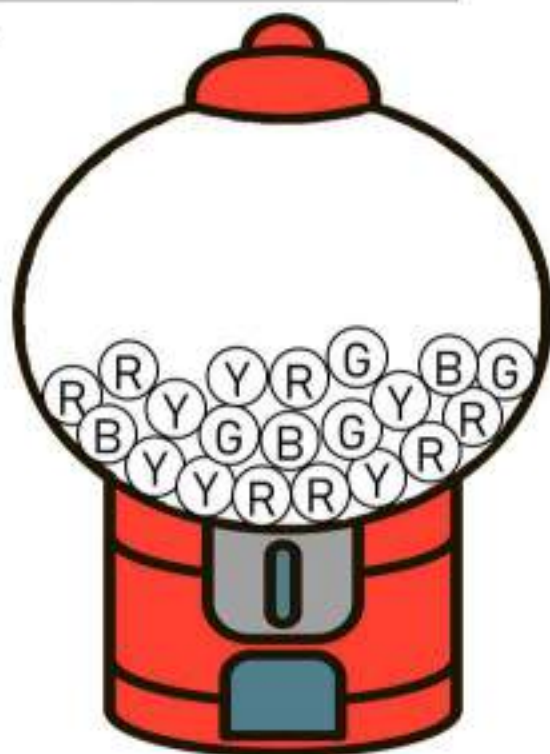
Describing the Likelihood of Events

Gumball Machine

There are 20 gumballs in a machine. What is the likelihood of you pulling out a red (R), yellow (Y), green (G), or blue (B) gumball?

Frequency Table Fill in the frequency table below

Mark	Frequency
Red	
Blue	
Yellow	
Green	



Questions Represent the probability of pulling out a gumball as a fraction, ratio and percent

Event	Ratio	Percent
1. What is the probability of pulling out a green gumball?		
2. What is the probability of pulling out a red gumball?		
3. What is the probability of pulling out a blue or green gumball?		
4. What is the probability of pulling out a red or yellow gumball?		
5. What is the probability of pulling out a blue, red, yellow, or green gumball?		
6. What is the probability of pulling out a pink gumball?		

Independent Events - Dice Challenge

Part 1

Find the probability of each sum when two dice are rolled



- 1) What is the probability of you rolling two six-sided dice and getting a sum of the two dice greater than 8?
- 2) What is the probability of you rolling two six-sided dice and getting a sum of the two dice less than 11?
- 3) What is the probability of you rolling two six-sided dice and getting a sum of the two dice less than 7?

+	1	2	3	4	5	6
1						
2						
3						
4						
5						
6						

Part 2

Find the probability of each product when two dice are rolled



x	1	2	3	4	5	6
1						
2						
3						
4						
5						
6						

- 1) What is the probability of you rolling two six-sided dice and getting a product of the two dice greater than 10?
- 2) What is the probability of you rolling two six-sided dice and getting a product of the two dice less than or equal to 9?
- 3) What is the probability of you rolling two six-sided dice and getting a sum of the two dice greater than or equal to 25?

Independent Events - Rolling a Dice

Rolling a Dice

A dice has 6 sides. Each side has a number of dots between 1 and 6. When you roll a dice, you have an unlikely chance of rolling a certain number.



Questions

What is the probability of...

1) Rolling a 1?

Fraction	Ratio	Percent

2) Rolling a 5 or 6?

Fraction	Ratio	Percent

3) Rolling an odd number?

Fraction	Ratio	Percent

4) Rolling two six-sided dice and getting a 5?

Fraction	Ratio	Percent

5) Rolling two six-sided dice and getting a 1, 2, or 3?

Fraction	Ratio	Percent

6) Rolling two six-sided dice and getting an even number?

Fraction	Ratio	Percent

7) Rolling two six-sided dice and getting a 6?

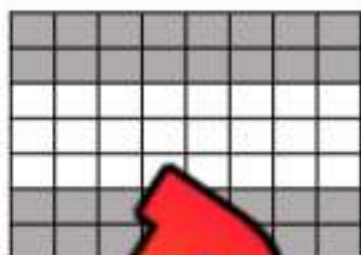
Fraction	Ratio	Percent

Independent Events - Darts

Questions

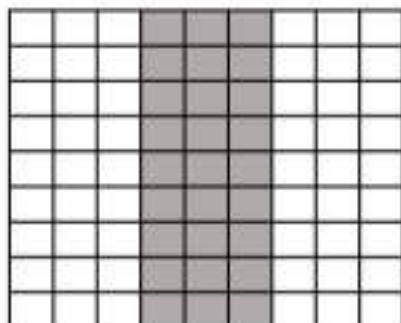
What is the probability of hitting the target if you get 2 throws?

1)



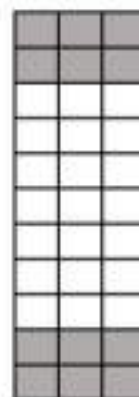
Fraction	
Ratio	
Percent	

2)



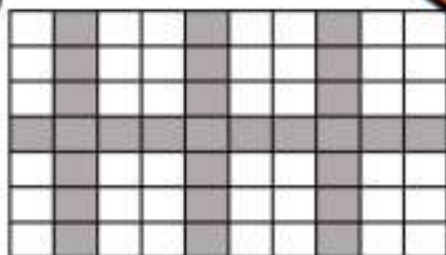
Fraction	
Ratio	
Percent	

3)



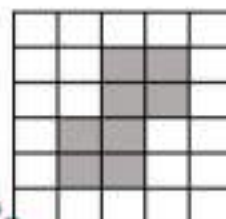
Fraction	
Ratio	
Percent	

4)



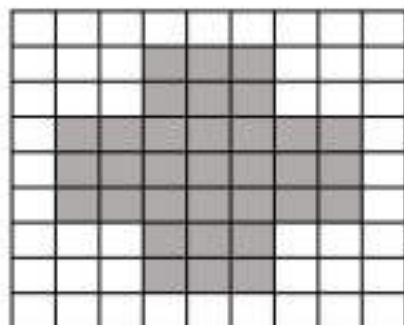
Fraction	
Ratio	
Percent	

6)



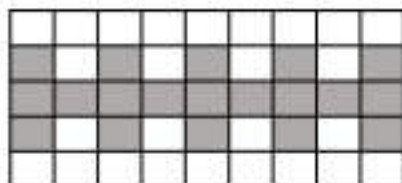
Fraction	
Ratio	
Percent	

7)



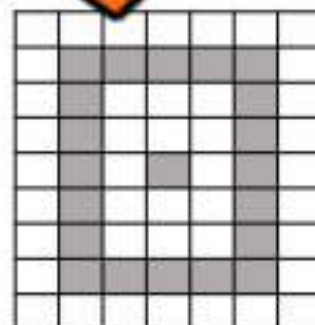
Fraction	
Ratio	
Percent	

8)



Fraction	
Ratio	
Percent	

9)



Fraction	
Ratio	
Percent	

Theoretical vs Experimental Probability

Examples of Theoretical and Experimental Probability

Theoretical: You should roll a 3 once every 6 rolls = $\frac{1}{6}$

Experimental: You rolled a 3 twice when you rolled a dice six times = $\frac{2}{6}$



Part 1

Circle if the example is theoretical or experimental

Example	Theoretical	Experimental
1) Your free throw percentage is 80%, so you should make 8 of 10 free throws.		
2) You have a 1-in-13 million chance of winning the probability being 1/13 million!		
3) There is an 80% chance of snow today.		
4) It rained today, even though the forecast only a 10% POP.		
5) Your teacher handed out 25 candies. You got a hard candy.		
6) You have a 25% chance of drawing a heart from a deck of cards.		
7) You rolled a dice twice and got a 2 and a 4.		
8) The Toronto Blue Jays have a 50% probability of winning their game tonight.		
9) You flipped a coin 100 times and got heads 100 times!		
10) The Liberal government won the Federal election.		

Part 2

Follow the instructions below to complete the experiments

Example	Theoretical or Experimental	Fraction	Decimal	Percent
1) You should make 2 in every 5 three pointers.				
2) There is a one-in-8 chance of pulling a green candy from the candy bag.				
3) You rolled a dice 4 times. You got a 5 two times.				

Theoretical vs Experimental Probability

Theoretical Probability

What should happen

Example - The theoretical probability of flipping a heads is 1 time out of 2 or $\frac{1}{2}$.

Experiment Probability

What did happen after the event (experiment)

Example - You flipped a coin 10 times and got 7 heads. The experimental probability is $\frac{7}{10}$.

Part 1

Write the theoretical probability of the events happening below

Question	Fraction	Decimal	Percent
1) What is the theoretical probability of flipping a heads?			
2) What is the theoretical probability of flipping a tails?			
3) What is the theoretical probability of flipping a heads if you flipped the coin 10 times?			
4) What is the theoretical probability of flipping a heads and then rolling a dice and getting a 1?			
5) What is the theoretical probability of rolling a 1 on a dice and then flipping a heads?			

Part 2

Experimental Probability - Flip a coin 20 times and record your results

- 1) How many heads and tails do you think you will flip out of 20?
 Heads: _____ Tails: _____
- 2) Perform the experiment by flipping a coin 20 times. Record how many heads and tails you get

	Tallies	Total
Heads		
Tails		

- 3) Was the theoretical probability and experimental probability the same? Should it be the same? Explain.

Theoretical vs Experimental Probability - Sock Drawer**Part 1**

Write the theoretical probability of the events happening below

Your sock drawer is a mess! You have 50 socks in there in 5 different colours – white, blue, black, green, and red. Here is the breakdown of the socks in your drawer.

Colour of Sock	White	Yellow	Black	Green	Red
Number of Socks	14	4	22	6	4

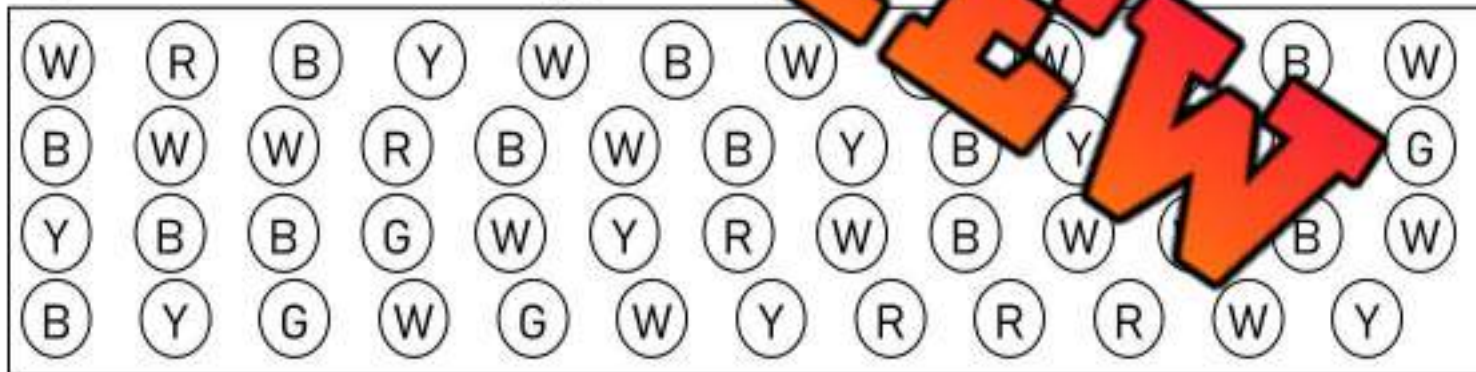
1) If you reach into the drawer 50 times without looking, what is the theoretical probability that you will pull each of the colours below.

	White	Yellow	Black	Green	Red
Fraction					
Ratio					
Percent					

Part 2

Complete the experimental probability

2) Close your eyes and point to a random spot in the box below with your eraser. Repeat this for 50 trials and tally your results.

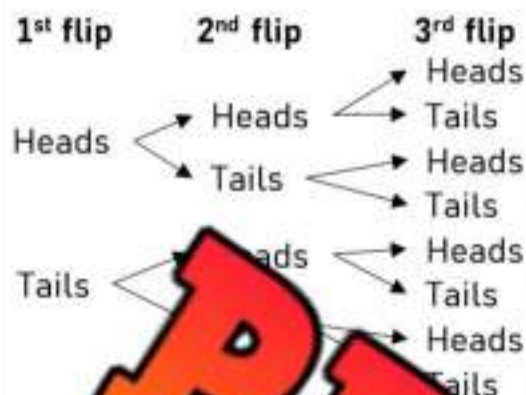


Colour of Sock	White	Yellow	Black	Green	Red
Tally					
Percent					

a) How did the experimental probability compare with the theoretical probability? Explain.

Theoretical Probability of Two Events - Tree Diagrams

A tree diagram is used to show the probability of an outcome happening when we have more than one event



Combinations
HHH
HHT
HTH
HTT
THH
THT
TTH
TTT



If you flip a coin three times, you could have 8 different combinations of outcomes.

HHH, HHT, HTH, HTT, THH, THT, TTH, TTT

This means you have a $\frac{1}{8}$ probability of flipping three heads or tails in a row.

Questions Draw a tree diagram to show how many different combinations you could have

An ice cream shop sells soft-serve cones and two different cones. Show the combinations of ice cream you could have in the tree diagram below.

		Combinations
_____	→	_____
_____	→	_____
_____	→	_____
_____	→	_____

Menu

- Waffle cone (W)
- Sugar cone (S)
- Chocolate (C)
- Vanilla (V)



1) How many combinations of ice cream could you have? _____

Combinations	Fraction	Ratio	Percent
a) Waffle cone with chocolate:			
b) Waffle cone with vanilla:			
c) Sugar cone with chocolate:			
d) Sugar cone with vanilla:			

Tree Diagrams - Independent Events

Questions

Draw a tree diagram to help you find the probability of different combinations

A restaurant sells hot dogs, sausages, and cheeseburgers. They also have toppings and sauces. What is the probability a customer will order a specific combination of food, topping, and sauce?



Food	Topping	Sauce
Hot Dog (H)	Onion (O)	Ketchup (K)
Sausage (S)		Mustard (M)
Cheeseburger (C)		Relish (R)
		Mayonnaise (M)

PREVIEW

1) How many combinations of food could you have? _____

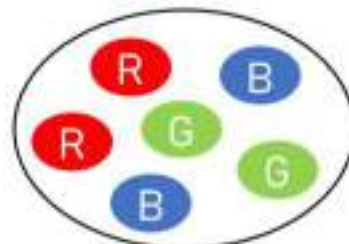
What is the probability of a customer ordering a...	Fraction	Ratio	Percent
2) Hot dog with onion, and ketchup			
3) Sausage with onion and relish or mustard			
4) Cheeseburger or Sausage with onion and relish			
5) Hot dog or sausage with onion and ketchup, mustard, relish, or mayonnaise			
6) Cheeseburger with onion and ketchup, mustard, or mayonnaise			

Tree Diagrams - Independent Events

Questions Draw a tree diagram to help you find the probability of different combinations

There is a bag full of the following different colour marbles:

- 2 red marbles (R)
- 2 blue marbles (B)
- 2 green marbles (G)



Draw a tree diagram for the following scenario:

You pull one marble, and then put it back in the bag before pulling another marble

Tree Diagram		Combinations
1 st Draw	2 nd Draw	

1) How many combinations of colours could you draw? _____

What is the probability of drawing...	Fraction	Ratio	Percent
2) A red marble and then a green marble?			
3) A green marble and then a blue marble?			
4) A blue marble and another blue marble?			
5) A red marble and a blue marble?			

Experimental Probability of Two Events**Activity**

Complete the experiment below to find the experimental probability

Question: What is the experimental probability of getting two heads in a row when flipping a coin?Directions

- 1) Flip a coin twice
- 2) Repeat times
- 3) Record results in the frequency table



Results	Frequency
HH	
HT	
TT	
TH	

- 1) Fill in the table below to find the experimental probability as a percent, decimal, and fraction.

Results	Fraction	Ratio	Percent
HH			
HT			
TT			
TH			

- 2) Fill in the table below to determine the theoretical probability of getting two heads in a row if you completed 30 trials (each trial is flipping a coin twice).

Results	Fraction	Ratio	Percent
HH			
HT			
TT			
TH			

- 3) If you performed this experiment 100 times instead of 30, would you be closer to the theoretical probability? Explain.



Google Slides Lessons Preview





Manitoba Math Curriculum Shape & Space – Grade 7

3-Part Lesson Format

Part 1 – Minds On!

- Learning Goals
- Discussion Questions
- Quotes
- And More!

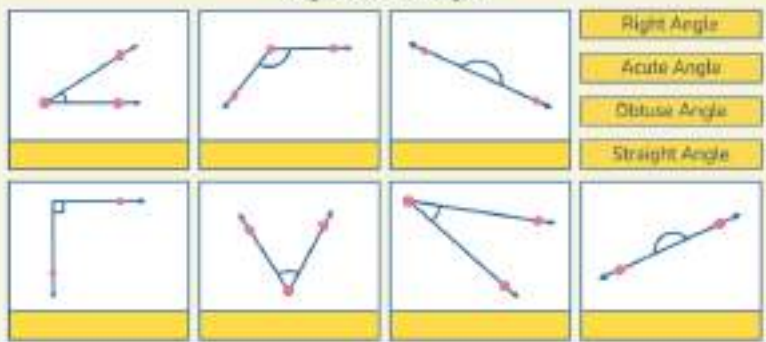
Learning Goal

We are learning to compare angles and determine their sizes so we can understand which angles are larger or smaller by matching them and measuring with non-standard units.



Angles

Drag and label the angles.



- Right Angle
- Acute Angle
- Obtuse Angle
- Straight Angle

Part 2 – Action!

- Writing
- Matching
- Drag and Drop
- Drawing
- And More!

Part 3 – Consolidation!

- Exit Cards
- Quizzes
- Reflection
- And More!

Consolidation – Multiple-Choice Questions

Drag the checkmark to answer the following multiple-choice questions about the topic.

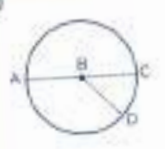
1) You draw a 335° angle clockwise from the starting point. What is the angle measurement if you draw it counterclockwise instead?	2) Which of the following statements is TRUE about clockwise and counterclockwise angles?	3) Which angle is the smallest turn from the 0° starting line measured clockwise?
1) 270°	1) They are always equal in value.	1) 180°
2) 45°	2) 180° is only possible in counterclockwise direction.	2) 145°
3) 135°	3) A 90° clockwise angle is the same as a 270° counterclockwise angle.	3) 60°
4) 225°	4) 360° is the same as 90° in both directions.	4) 300°



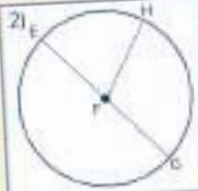
Manitoba Math Curriculum Shape & Space – Grade 7

Intro – Radius and Diameter

Drag the letters to identify the elements for each question. The first one is done for you.

1) 

Centre	Diameter
B	AC
Radius	
AB, BC, BD	

2) 

Centre	Diameter
Radius	

3) 

Centre	Diameter
Radius	

4) 

Centre	Diameter
Radius	

A	B
C	D
E	F
G	H
I	J
K	L
M	N
O	P

1 2 3 4 5 6 7 8 9 0 .

1) 

Area: _____

2) 

Area: _____

3) 

Area: _____

4) 

Area: _____

5) 

Area: _____

6) 

Area: _____

7) 

Area: _____

8) 

Area: _____

Find the area ($A = b \times h$). Drag and drop the answers to answer the questions.



Area = _____



Area = _____



Area = _____



Area = _____



Area = _____



Manitoba Math Curriculum Shape & Space – Grade 7

Introduction – Area of a Triangle

Find the area of the triangles below ($A = b \times h \div 2$).
Drag the numbers to answer the questions.

mm² cm² m² 1 2 3 4 5 6 7 8 9 0.

Area of a rectangle = _____ Area of a triangle = _____	Area of a rectangle = _____ Area of a triangle = _____	Area of a rectangle = _____ Area of a triangle = _____
Area of a rectangle = _____ Area of a triangle = _____	Area of a rectangle = _____ Area of a triangle = _____	Area of a rectangle = _____ Area of a triangle = _____

Parallel, Perpendicular

Drag a second line from the line bank that is intersecting, perpendicular, or parallel to the first.

1)	2)	3)
Perpendicular	Parallel	Intersecting
4)	5)	6)
Intersecting	Perpendicular	Parallel
7)	8)	9)
Parallel	Intersecting	Perpendicular

LINE BANK

Symbols	Coordinates (x, y)
	(,)
	(,)
	(,)
	(,)
	(,)
	(,)
	(,)

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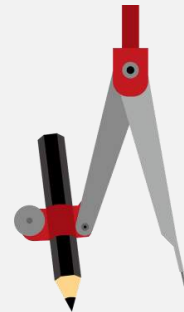
Table of Contents

Grade 7 – Manitoba Math Curriculum – This resource covers all outcomes in the Grade 7 – Manitoba Math Curriculum – **Strand:** Shape and Space: Measurement, 3-D Objects and 2-D Shapes, and Transformations.

There are **227 activity sheets** for your students to learn and practice the specific outcomes in the curriculum. Using this resource will ensure that your students will be learning the Manitoba curriculum. We have studied the curriculum so that you can focus on delivering the content as opposed to creating materials.

Some of the concepts that are covered:

- Radius, diameter, and circumference of circles
- Relating circumference to pi
- Constructing circles with a given radius or diameter
- Solving word problems involving radii, diameters, and circumferences of circles
- Determining the area of triangles, parallelograms, and circles
- Calculating the area of compound shapes made up of triangles, parallelograms and rectangles.
- Determining the area of semi-circles
- Rays, lines, line segments and points
- Constructing perpendicular line segments and perpendicular bisectors using graph paper, a protractor, and a compass
- Constructing parallel line segments using graph paper, a protractor, and a compass
- Constructing angle bisectors using a compass
- Labeling each of the four quadrants on a cartesian plane
- Identify and plot points in the four quadrants of a cartesian plane
- Translations, reflections, and rotations of up to 360 degrees on a cartesian plane



This is a MASSIVE unit that will save you hours of planning! It has been tested and found effective to helping students achieve the learning goals setup by the Ministry of Education.

Grade 7

SHAPE AND SPACE (Measurement)

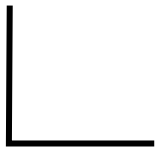
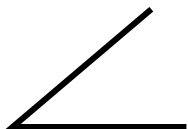
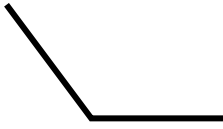
	Curriculum Expectations	Pages That Cover the Expectations
SS.1	Demonstrate an understanding of circles by: • describing the relationships among radius, diameter and circumference • relating circumference to pi • determining the sum of the central angles • constructing circles with a given radius or diameter • solving problems involving the radii, diameters and circumferences of circles	3 – 33, 37 – 40
SS.2	Develop and apply a formula for determining the area of: • triangles • parallelograms • circles	34 – 38, 41 – 42, 46 – 61

Name: _____

3

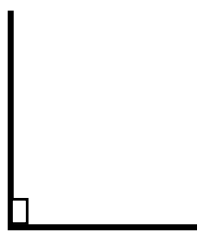
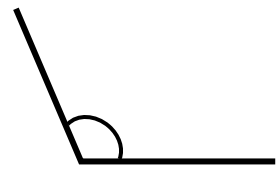
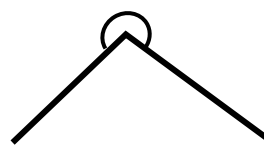
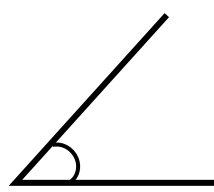
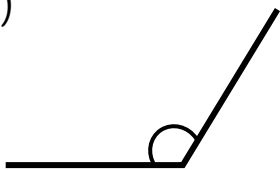
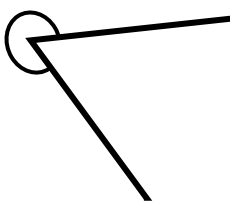
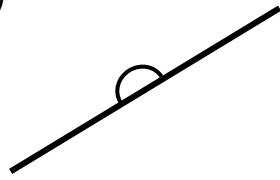
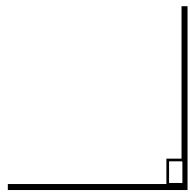
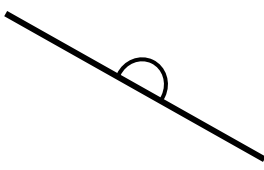
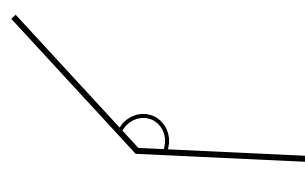
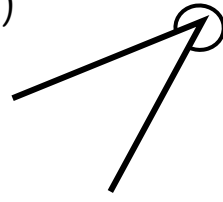
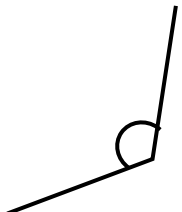
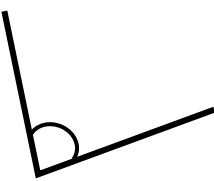
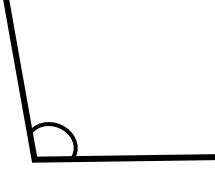
Curriculum Connection
SS.1

Naming Angles - Right, Obtuse, Acute, Straight, and Reflex

Right Angle - 90°	Acute Angle - smaller than 90°	Obtuse Angle - larger than 90°	Straight Angle - 180°	Reflex Angle - larger than 180°
				

Questions

Label the angle - straight, acute, obtuse, right, or reflex

1) 	2) 	3) 	4) 
5) 	6) 	7) 	8) 
9) 	10) 	11) 	12) 
13) 	14) 	15) 	16) 

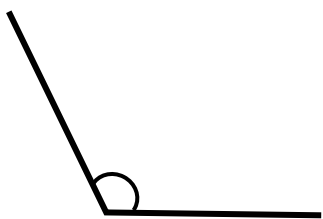
Name: _____

4

Curriculum Connection
SS.1**Naming Angles - Right, Obtuse, Acute, and Reflex****Questions**

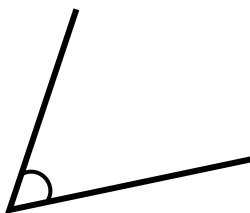
Label the angle – acute, obtuse, right, or reflex

1)



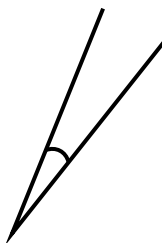
right acute obtuse reflex

2)



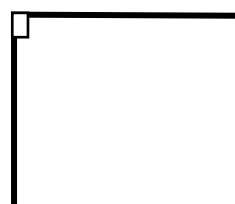
right acute obtuse reflex

3)



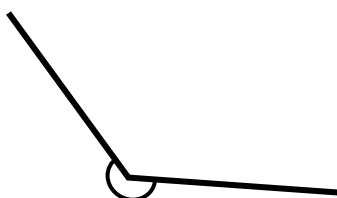
right acute obtuse reflex

4)



right acute obtuse reflex

5)



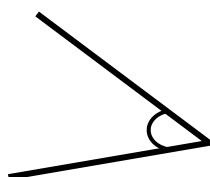
right acute obtuse reflex

6)



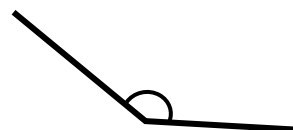
right acute obtuse reflex

7)



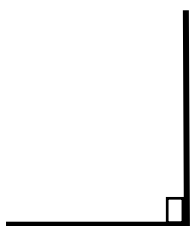
right acute obtuse reflex

8)



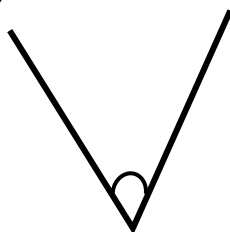
right acute obtuse reflex

9)



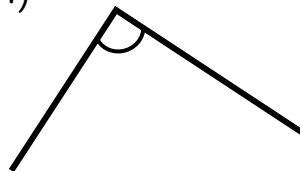
right acute obtuse reflex

10)



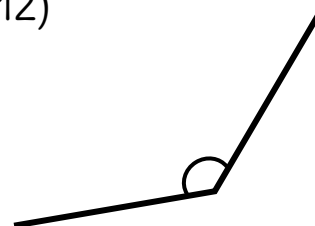
right acute obtuse reflex

11)



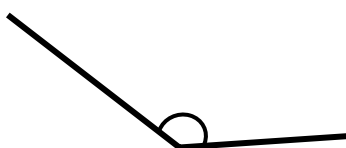
right acute obtuse reflex

12)



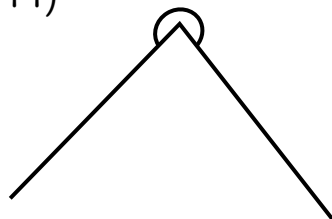
right acute obtuse reflex

13)



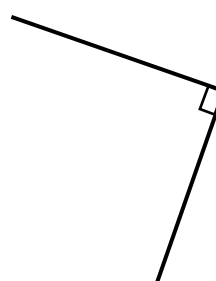
right acute obtuse reflex

14)



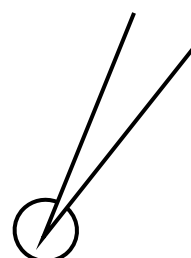
right acute obtuse reflex

15)



right acute obtuse reflex

16)

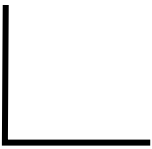
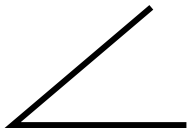
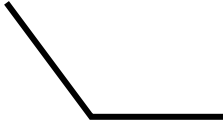


right acute obtuse reflex

Name: _____

5

Curriculum Connection
SS.1**Drawing Angles - Right, Obtuse, Acute, and Reflex**

Right Angle - 90°	Acute Angle - smaller than 90°	Obtuse Angle - larger than 90°	Straight Angle - 180°	Reflex Angle - larger than 180°
				

Questions

Draw acute, obtuse, right, and reflex angles below

1)	2)	3)	4)
Acute	Obtuse	Right	Reflex
5)	6)	7)	8)
Reflex	Obtuse	Acute	Straight
9)	10)	11)	12)
Right	Acute	Obtuse	Reflex

Name: _____

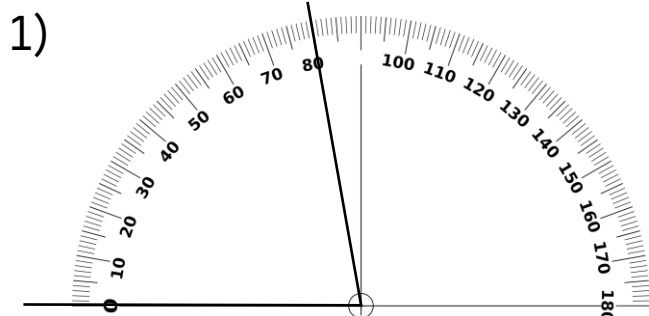
6

Curriculum Connection
SS.1

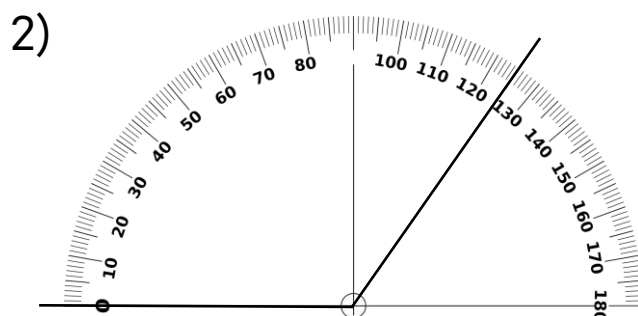
Measuring Angles - Printed Protractor

Questions

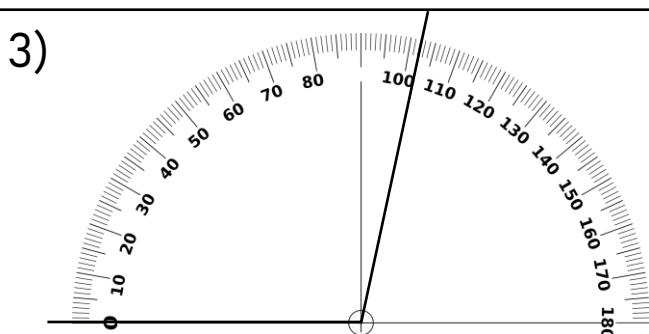
Measure the angles and label them acute, right or obtuse



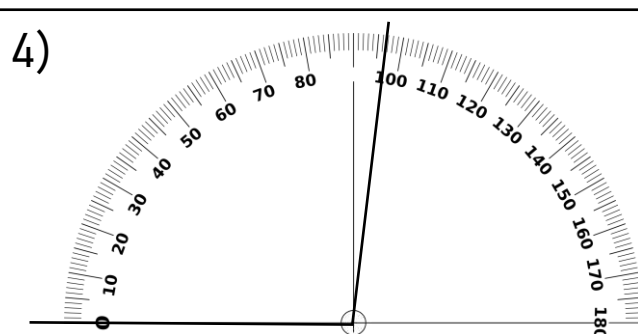
Angle = Type of Angle =



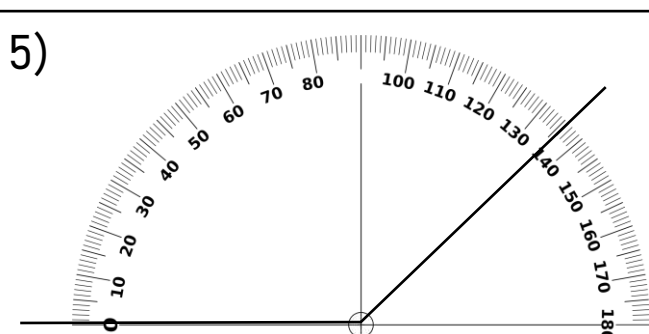
Angle = Type of Angle =



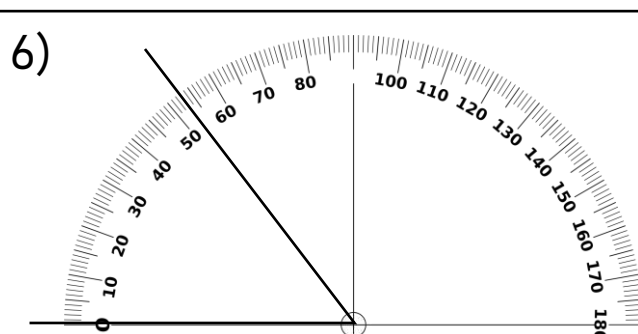
Angle = Type of Angle =



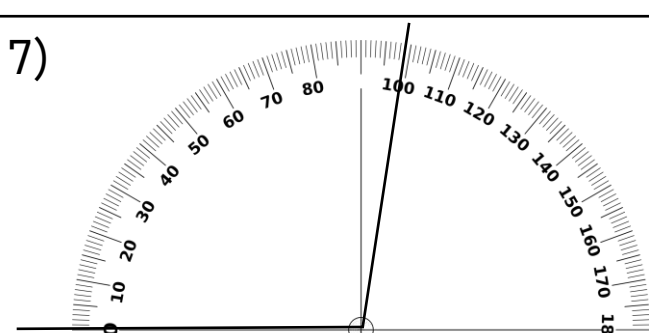
Angle = Type of Angle =



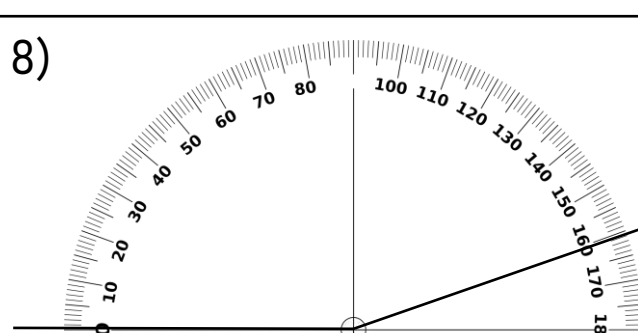
Angle = Type of Angle =



Angle = Type of Angle =



Angle = Type of Angle =



Angle = Type of Angle =

Name: _____

7

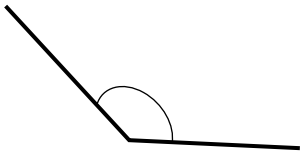
Curriculum Connection
SS.1

Measuring Angles Up To 180°

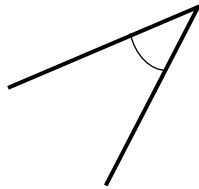
Questions

Measure the angles and label them acute, right, or obtuse

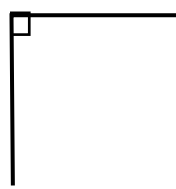
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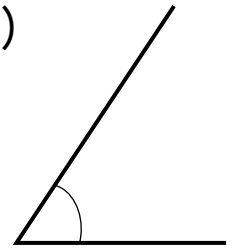
2)



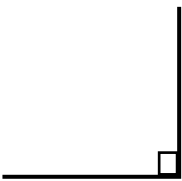
3)



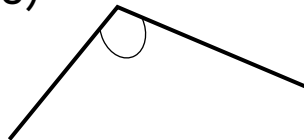
4)



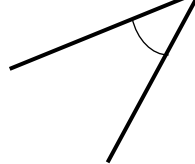
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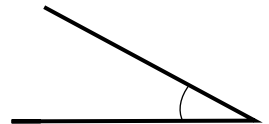
6)



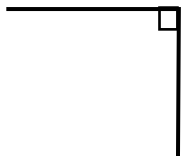
7)



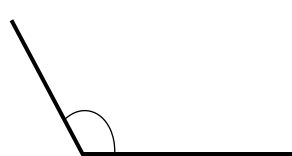
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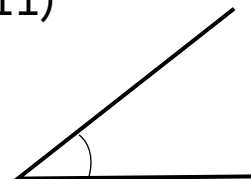
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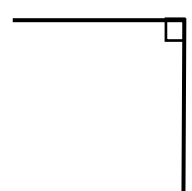
10)



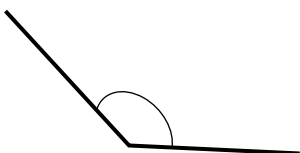
11)



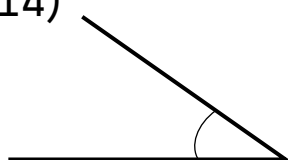
12)



13)



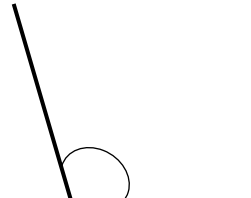
14)



15)



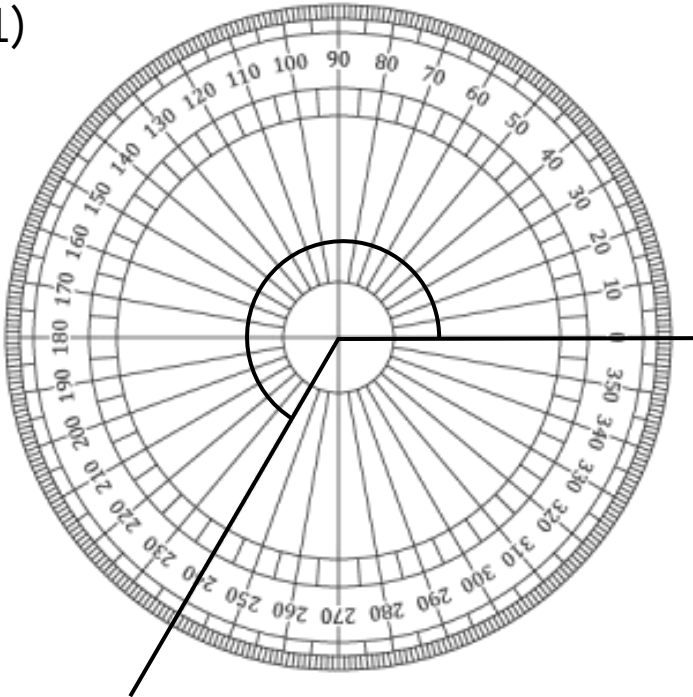
16)



Using Printed Protractor - Angles Up To 360°**Questions**

Measure the angles below using the circular protractor

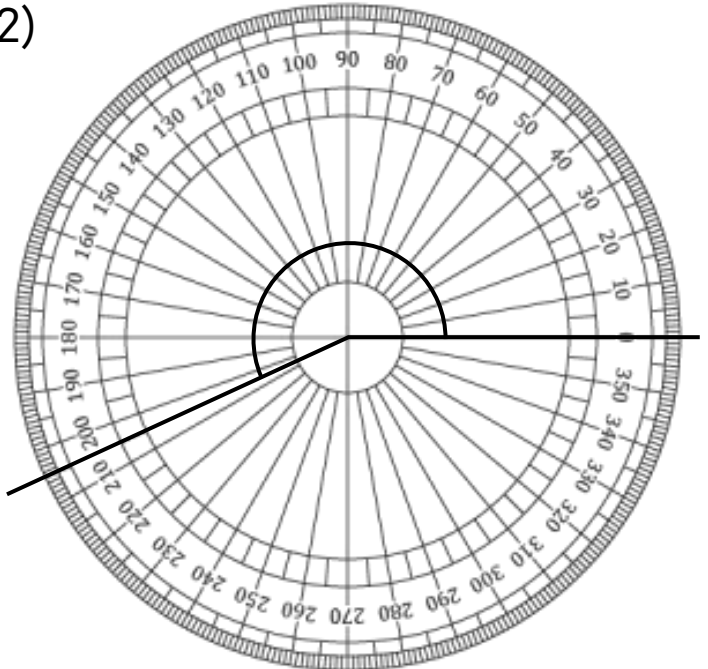
1)



Angle =

Type of Angle =

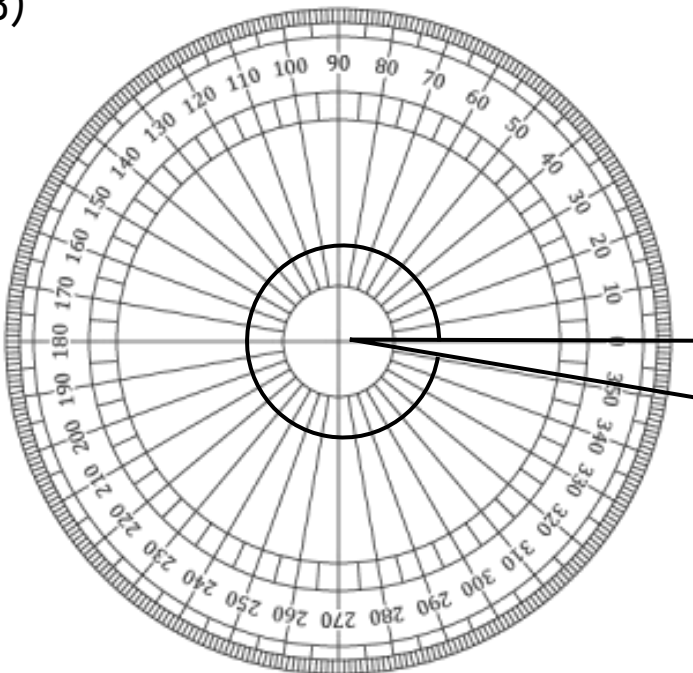
2)



Angle =

Type of Angle =

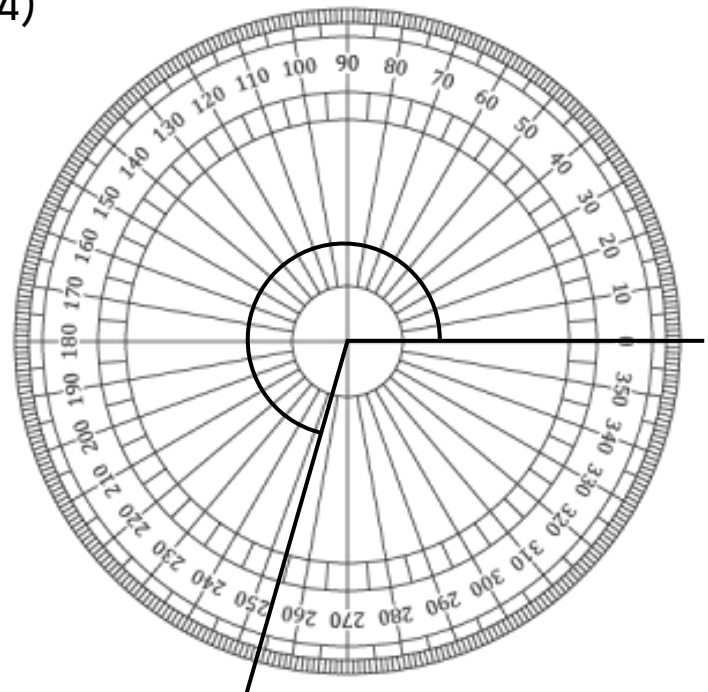
3)



Angle =

Type of Angle =

4)



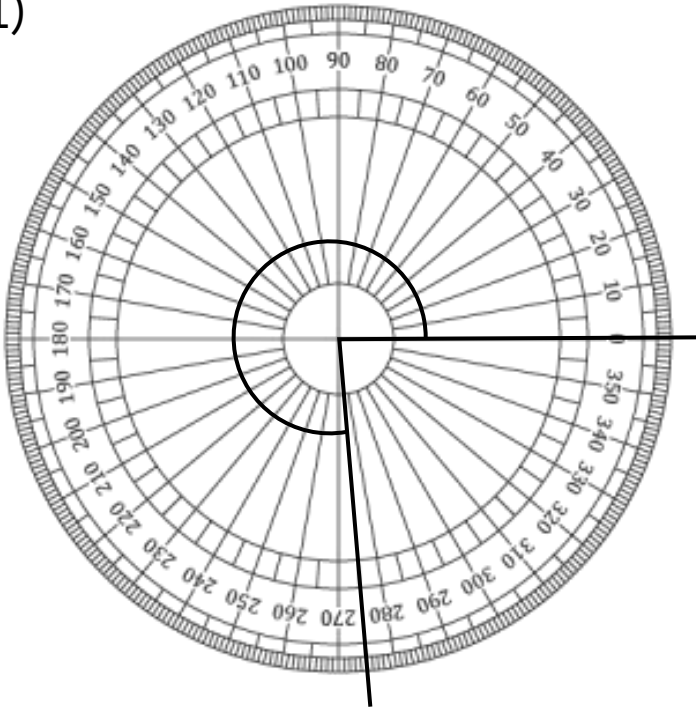
Angle =

Type of Angle =

Using Printed Protractor - Angles Up To 360°**Questions**

Measure the angles below using the circular protractor

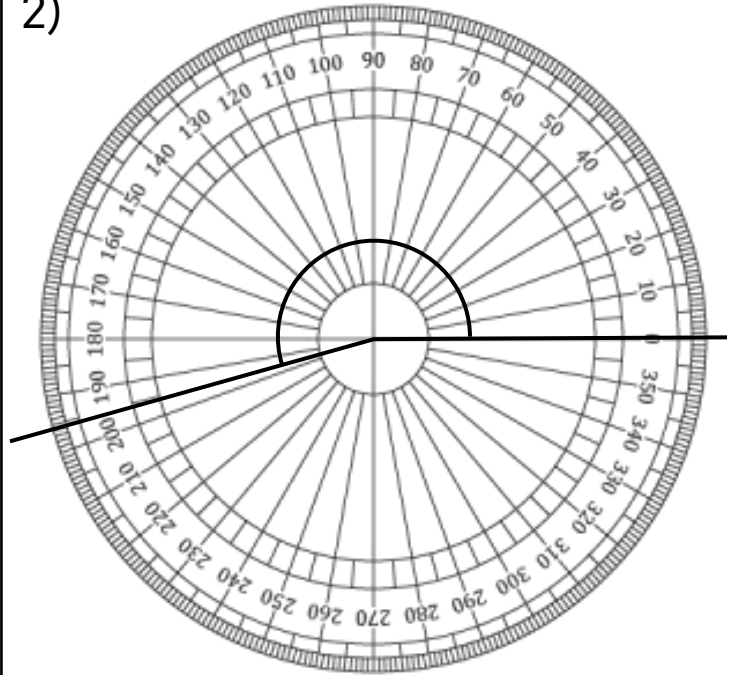
1)



Angle =

Type of Angle =

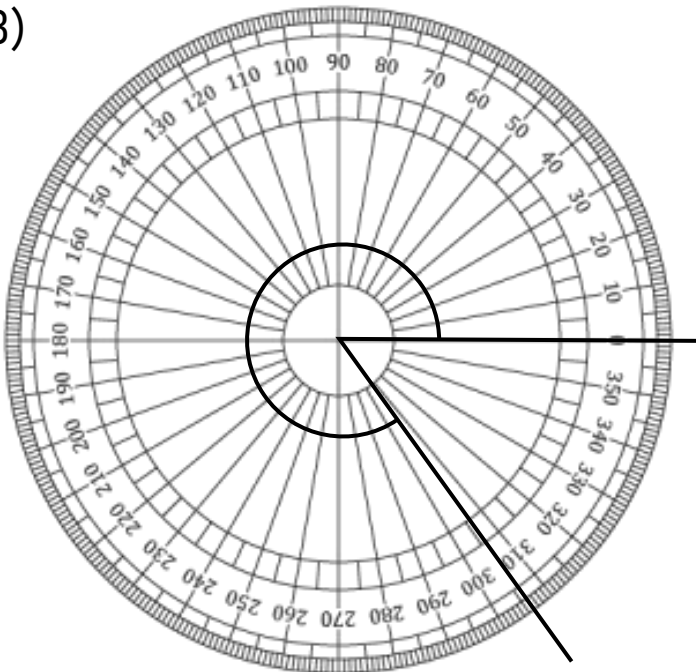
2)



Angle =

Type of Angle =

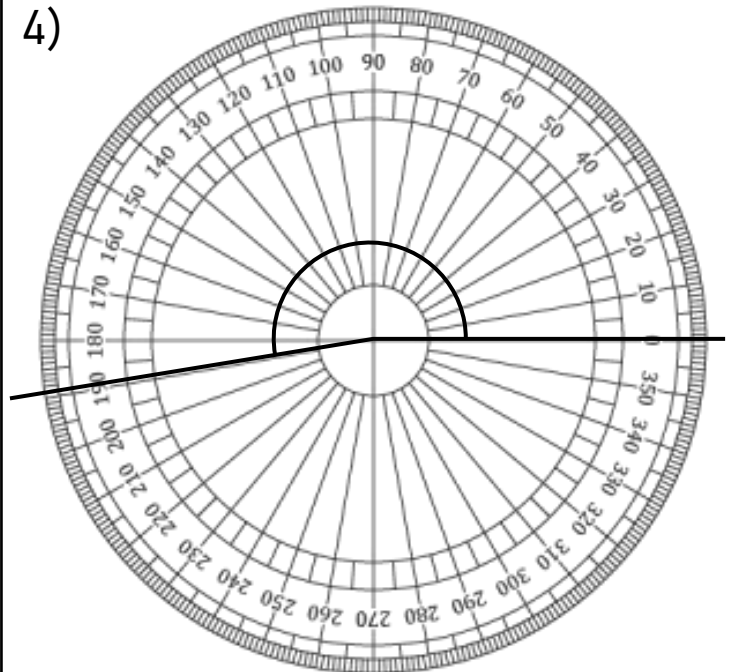
3)



Angle =

Type of Angle =

4)



Angle =

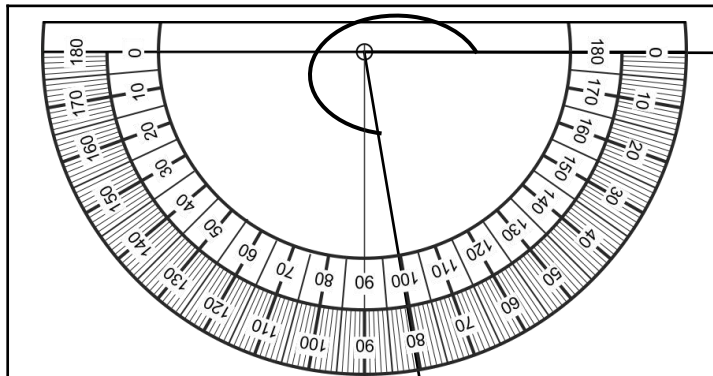
Type of Angle =

Measuring Angles Up To 360°

We can measure reflex angles that are larger than 180° by using a circular protractor or a semi-circular protractor.

When using a semi-protractor, you can use one of two strategies:

- 1) Measure the angle starting with 180° and add 180°
- 2) Measure the remaining angle from 0° and subtract 360°



Solution

Strategy 1

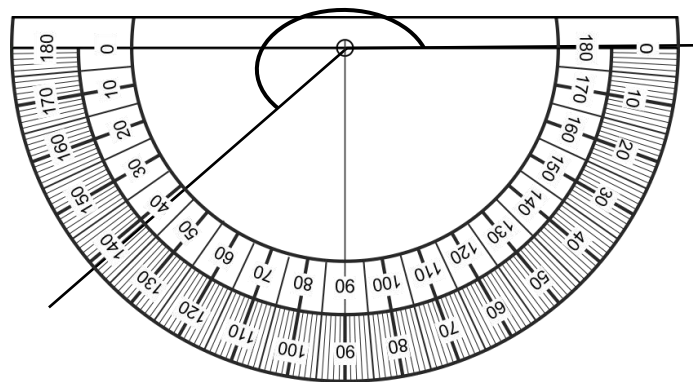
$$180 + 100 = 280$$

Strategy 2

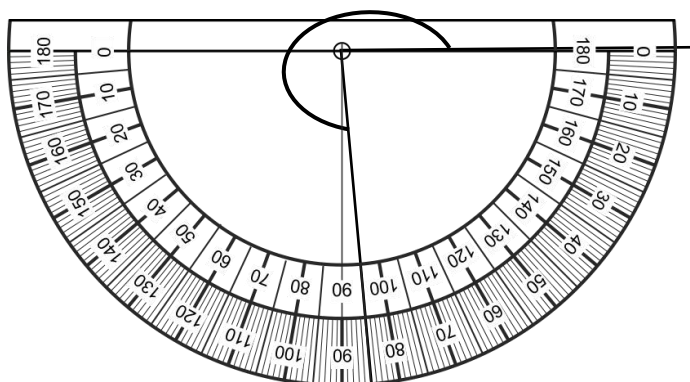
$$360 - 80 = 280$$

Questions

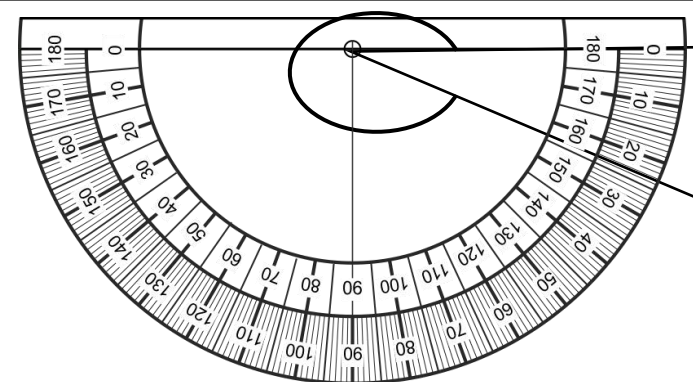
Measure the reflex angles below



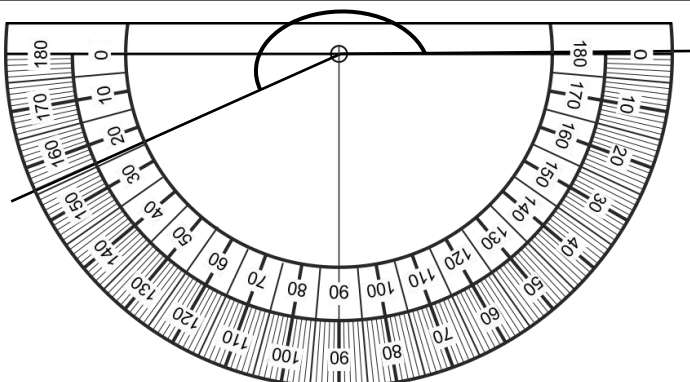
1) Angle Size =



2) Angle Size =



3) Angle Size =

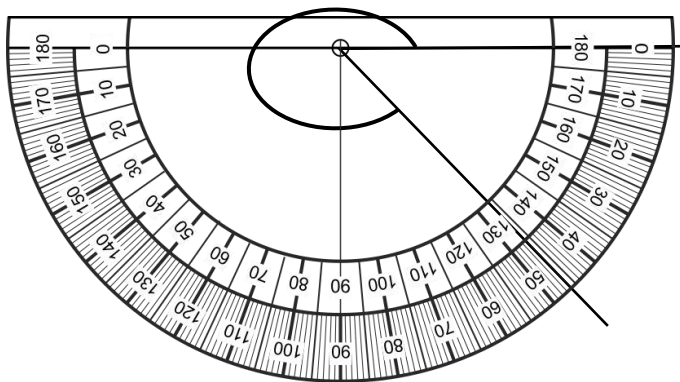


4) Angle Size =

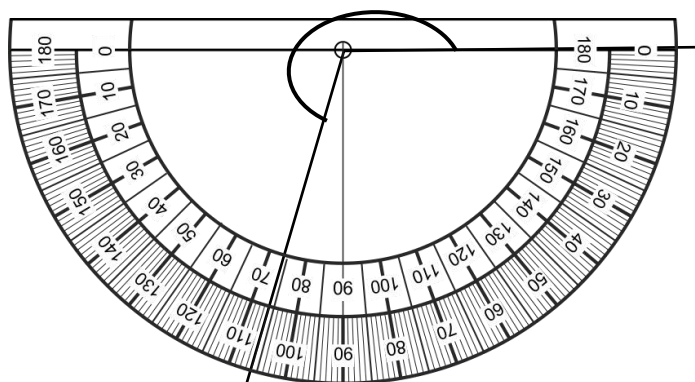
Measuring Angles Up To 360°

Questions

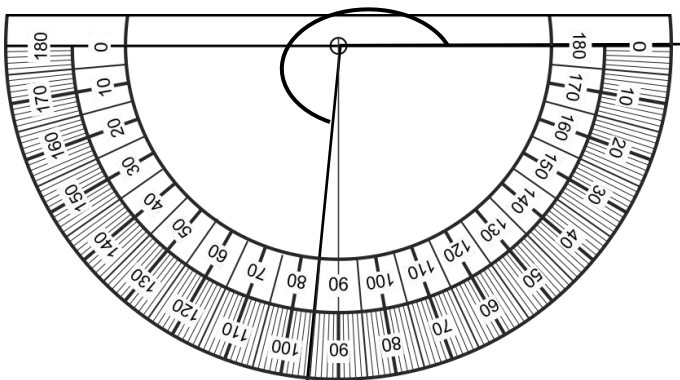
Measure the reflex angles below



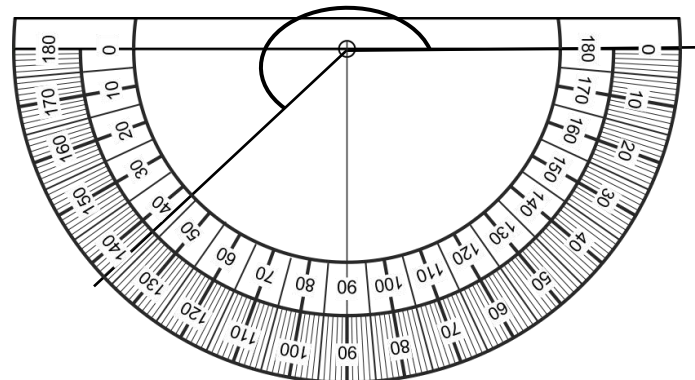
1) Angle Size =



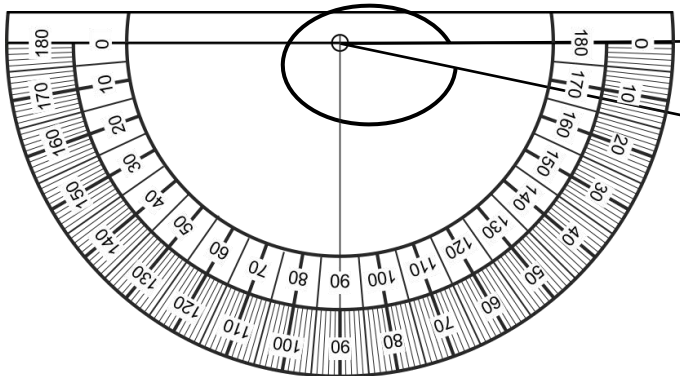
2) Angle Size =



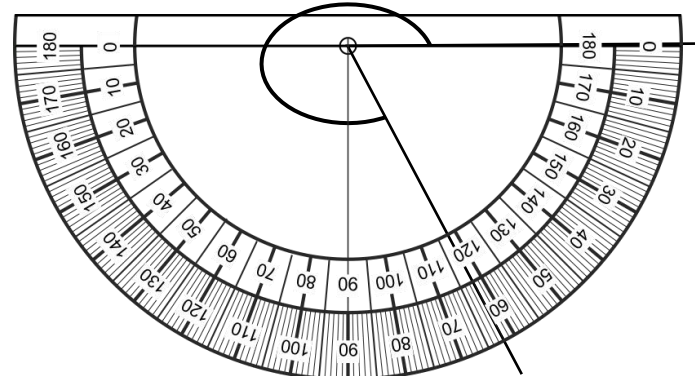
3) Angle Size =



4) Angle Size =



5) Angle Size =



6) Angle Size =

Name: _____

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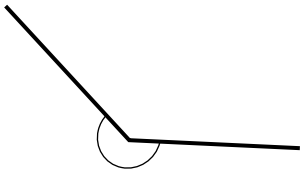
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Measuring Angles Up To 360°

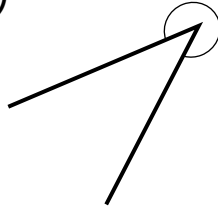
Questions

Measure the angles below

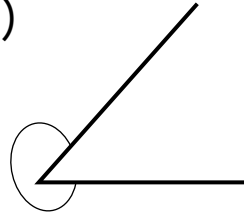
1)



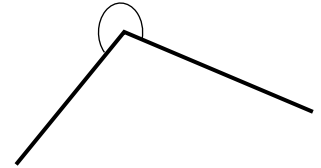
2)



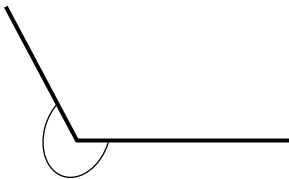
3)



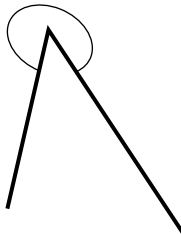
4)



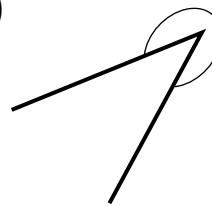
5)



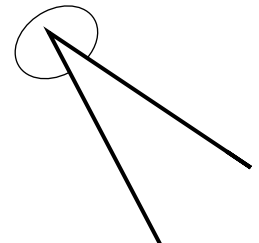
6)



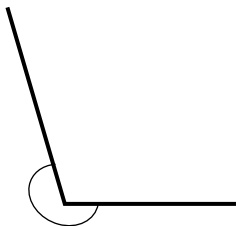
7)



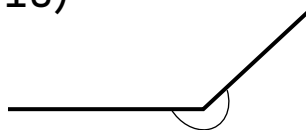
8)



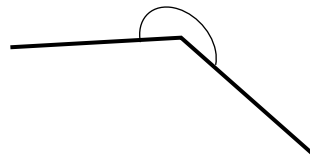
9)



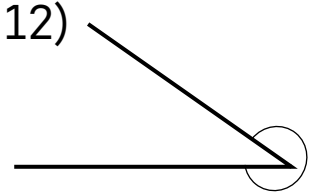
10)



11)



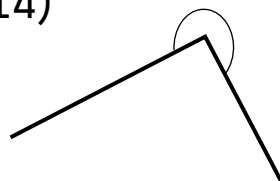
12)



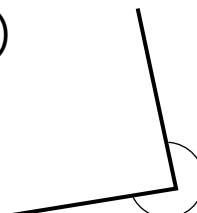
13)



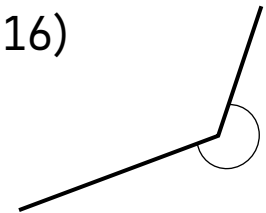
14)



15)



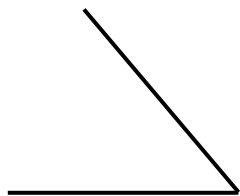
16)



Constructing Angles - Estimating - Multiple Choice**Questions**

Circle which angle you think it is. Do not use a protractor.

1)



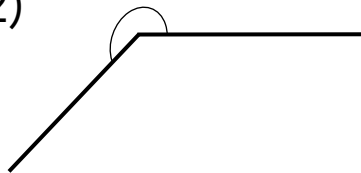
a) $\angle = 95^\circ$

b) $\angle = 50^\circ$

c) $\angle = 110^\circ$

d) $\angle = 160^\circ$

2)



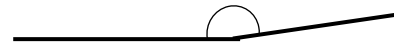
a) $\angle = 95^\circ$

b) $\angle = 100^\circ$

c) $\angle = 225^\circ$

d) $\angle = 290^\circ$

3)



a) $\angle = 171^\circ$

b) $\angle = 9^\circ$

c) $\angle = 50^\circ$

d) $\angle = 85^\circ$

4)



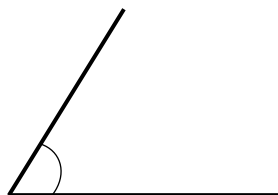
a) $\angle = 168^\circ$

b) $\angle = 50^\circ$

c) $\angle = 120^\circ$

d) $\angle = 10^\circ$

5)



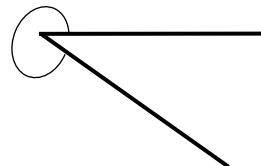
a) $\angle = 60^\circ$

b) $\angle = 120^\circ$

c) $\angle = 10^\circ$

d) $\angle = 160^\circ$

6)



a) $\angle = 90^\circ$

b) $\angle = 180^\circ$

c) $\angle = 270^\circ$

d) $\angle = 325^\circ$

7)



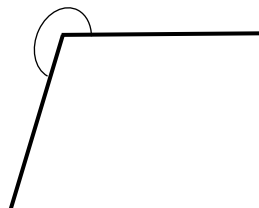
a) $\angle = 50^\circ$

b) $\angle = 160^\circ$

c) $\angle = 20^\circ$

d) $\angle = 100^\circ$

8)



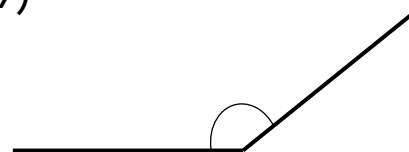
a) $\angle = 75^\circ$

b) $\angle = 190^\circ$

c) $\angle = 255^\circ$

d) $\angle = 355^\circ$

9)



a) $\angle = 40^\circ$

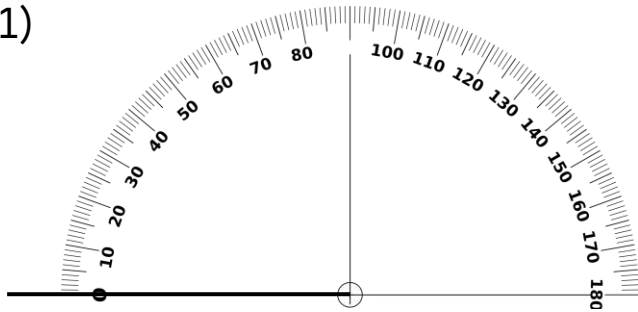
b) $\angle = 30^\circ$

c) $\angle = 140^\circ$

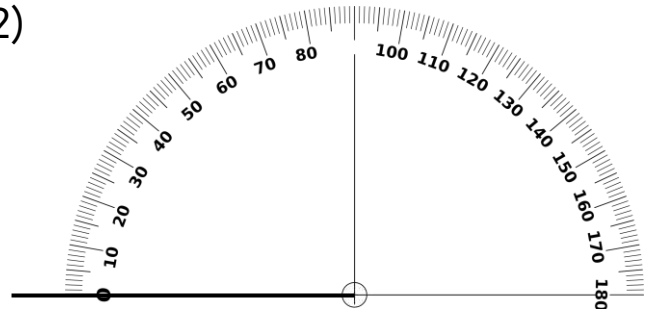
d) $\angle = 170^\circ$

Construction Angles Up To 180°**Questions**Construct the angles and label them acute, right or obtuse

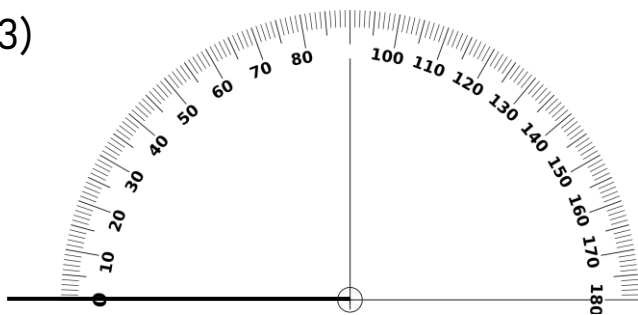
1)

 $\angle = 75^\circ$ Type of Angle = _____

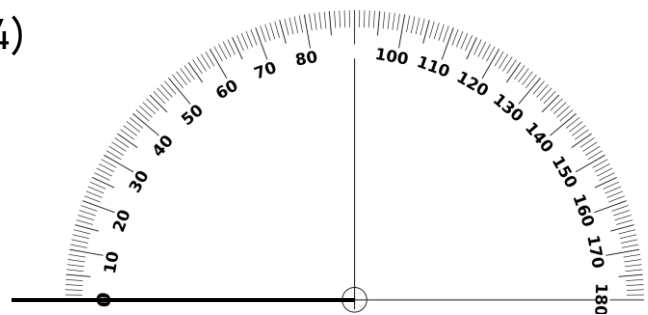
2)

 $\angle = 130^\circ$ Type of Angle = _____

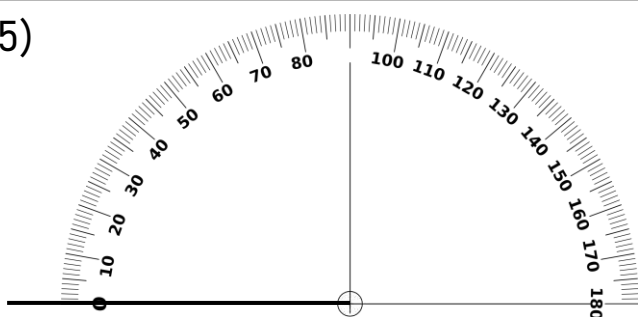
3)

 $\angle = 126^\circ$ Type of Angle = _____

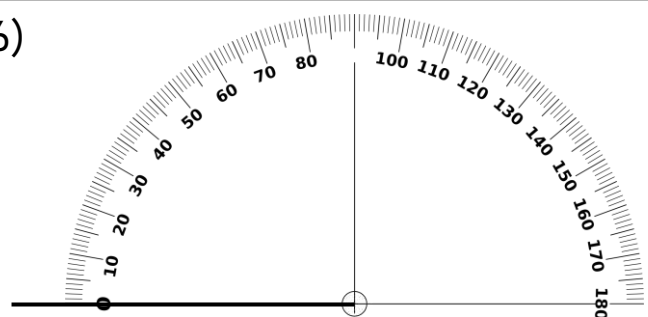
4)

 $\angle = 148^\circ$ Type of Angle = _____

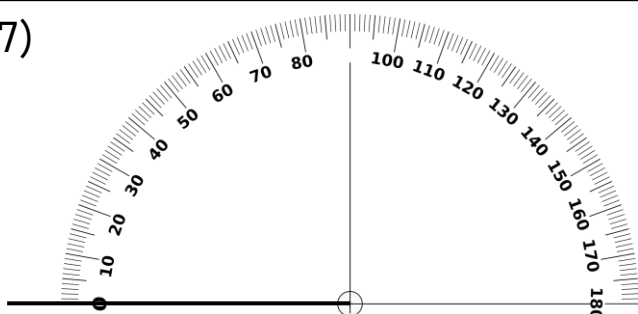
5)

 $\angle = 101^\circ$ Type of Angle = _____

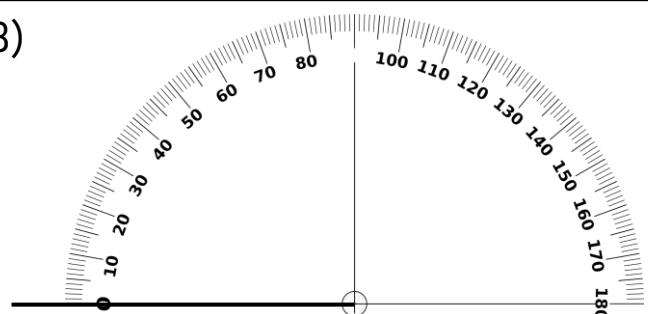
6)

 $\angle = 178^\circ$ Type of Angle = _____

7)

 $\angle = 156^\circ$ Type of Angle = _____

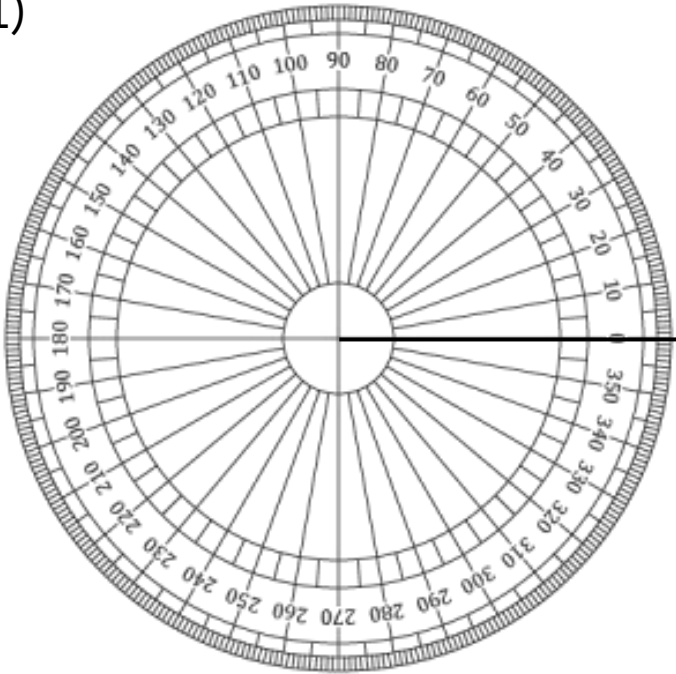
8)

 $\angle = 71^\circ$ Type of Angle = _____

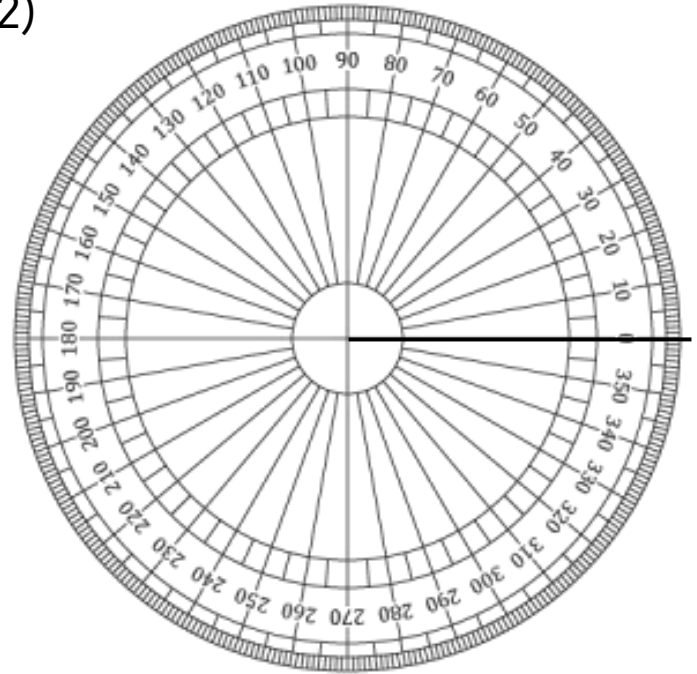
Contraction Angles Up To 360°**Questions**

Construct the angles below

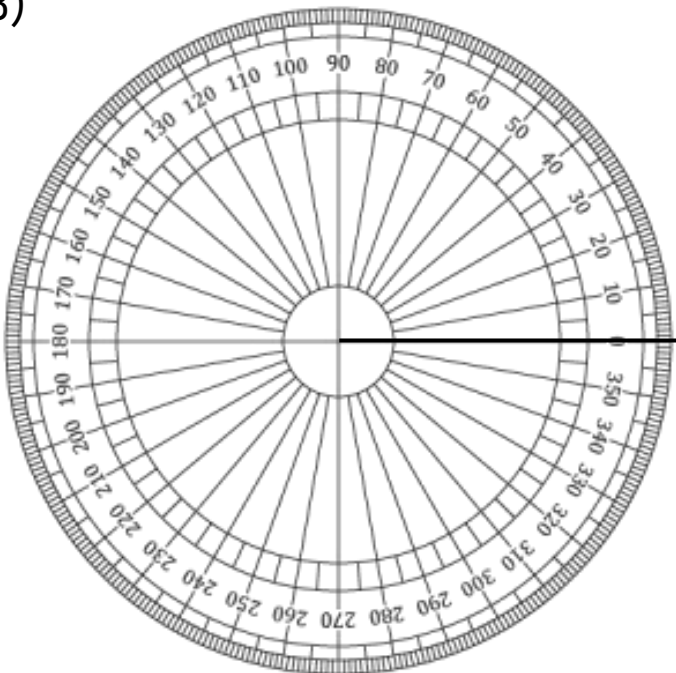
1)

Angle = 195°

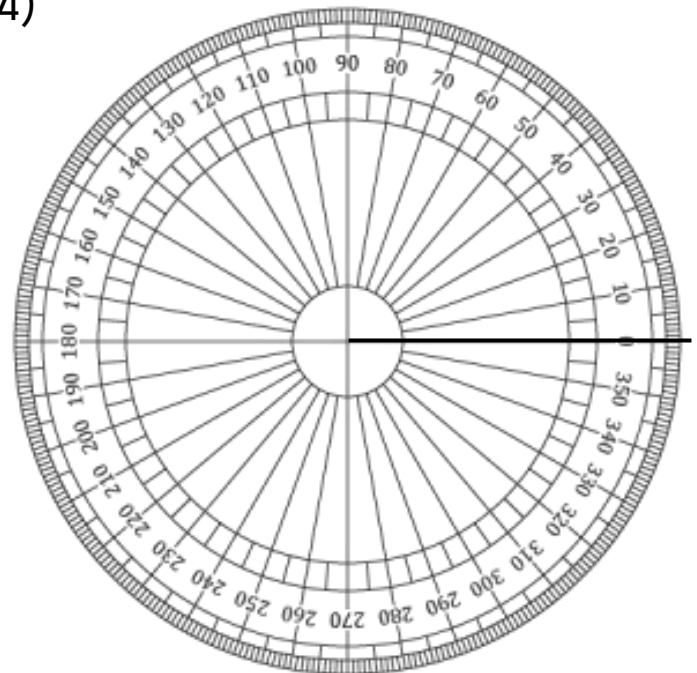
2)

Angle = 292°

3)

Angle = 347°

4)

Angle = 262°

Name: _____

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Construction Angles Up To 360°

Part 1

Use a protractor to draw the angles below using the line provided

1) 	2) 	3) 
$\angle = 200^\circ$	$\angle = 275^\circ$	$\angle = 350^\circ$

Part 2

Use a protractor to draw the angles below

1)	2)	3)
$\angle = 287^\circ$	$\angle = 322^\circ$	$\angle = 196^\circ$
4)	5)	6)
$\angle = 248^\circ$	$\angle = 318^\circ$	$\angle = 264^\circ$

Name: _____

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Construction Angles Up To 360°

Practice

Use a protractor to draw the angles below

1)

 $\angle = 267^\circ$

2)

 $\angle = 236^\circ$

3)

 $\angle = 184^\circ$

4)

 $\angle = 326^\circ$

5)

 $\angle = 241^\circ$

6)

 $\angle = 279^\circ$

7)

 $\angle = 351^\circ$

8)

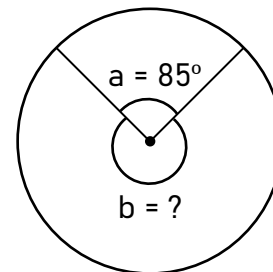
 $\angle = 249^\circ$

9)

 $\angle = 355^\circ$

Introduction to Central Angles

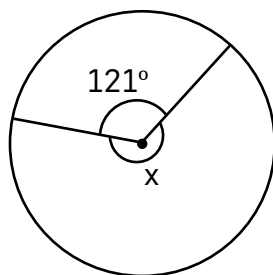
A **central angle** is an angle with a vertex at the centre of a circle. Both angles a and b in the example are central angles. The sum of all central angles need to equal 360° . Therefore, if angle a = 85° , then angle b would equal 275° ($360 - 85$).



Practice

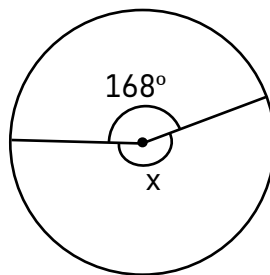
Determine the value of angle x

1)



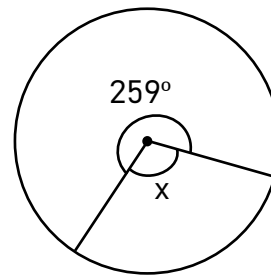
$$\angle x =$$

2)



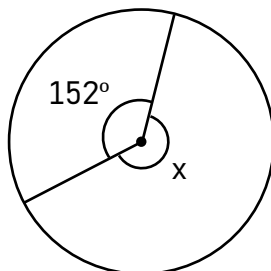
$$\angle x =$$

3)



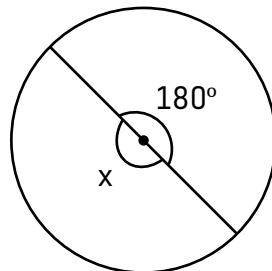
$$\angle x =$$

4)



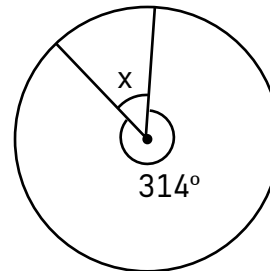
$$\angle x =$$

5)



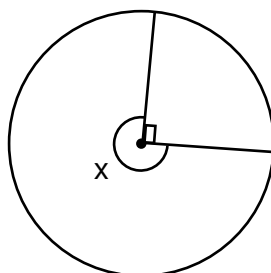
$$\angle x =$$

6)



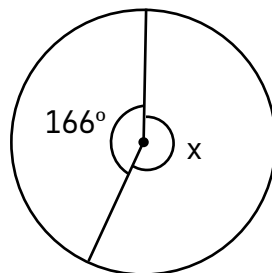
$$\angle x =$$

7)



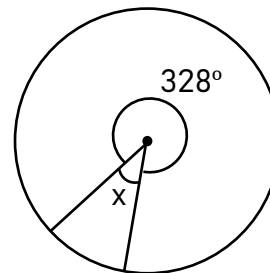
$$\angle x =$$

8)



$$\angle x =$$

9)



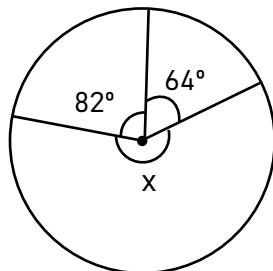
$$\angle x =$$

Finding the Missing Angle - Central Angles

Practice

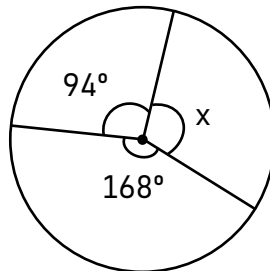
Determine the value of angle x

1)



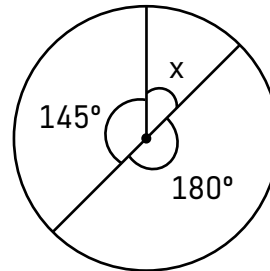
$\angle x =$

2)



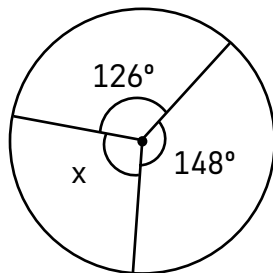
$\angle x =$

3)



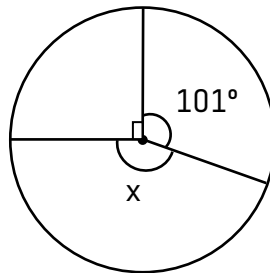
$\angle x =$

4)



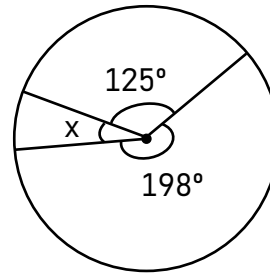
$\angle x =$

5)



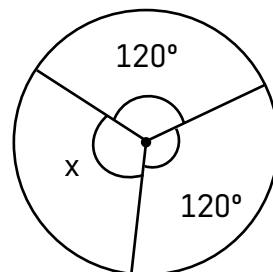
$\angle x =$

6)



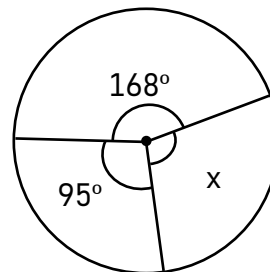
$\angle x =$

7)



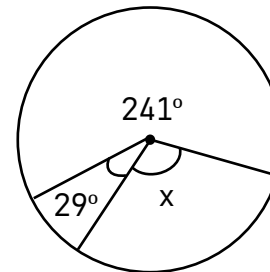
$\angle x =$

8)



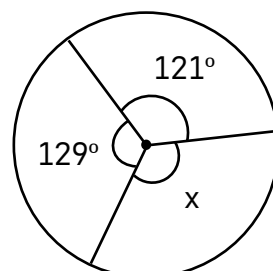
$\angle x =$

9)



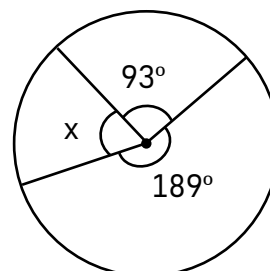
$\angle x =$

10)



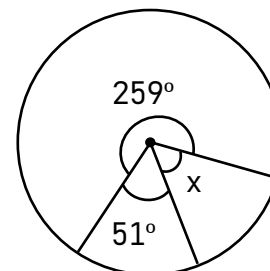
$\angle x =$

11)



$\angle x =$

12)



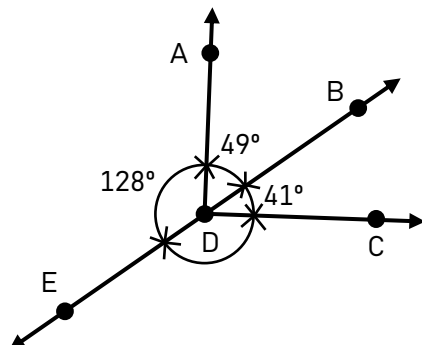
$\angle x =$

Finding the Missing Angle - Central Angles

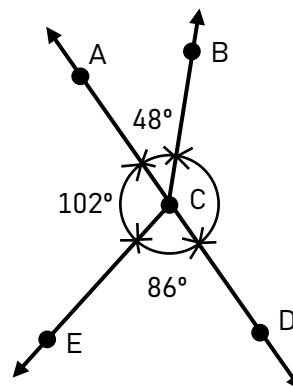
Practice

Find the missing angles below

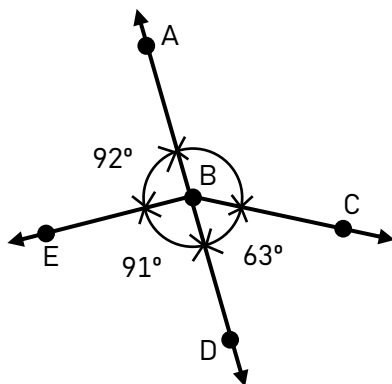
1)

 $\angle CDE =$

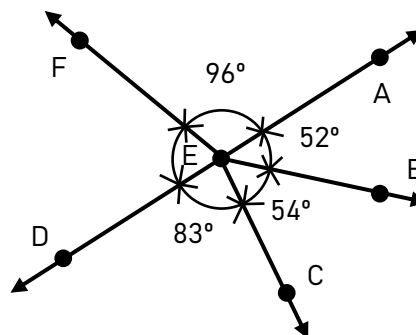
2)

 $\angle BCD =$

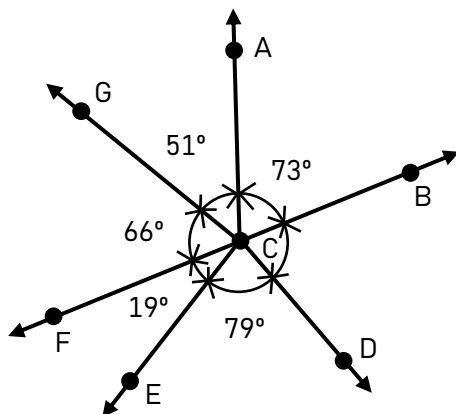
3)

 $\angle ABC =$

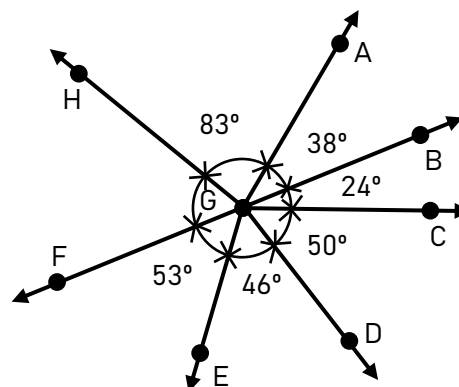
4)

 $\angle FED =$

5)

 $\angle BCD =$

6)

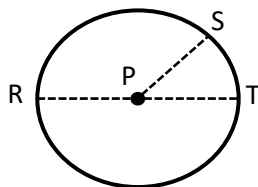
 $\angle FGH =$

Intro - Radius and Diameter

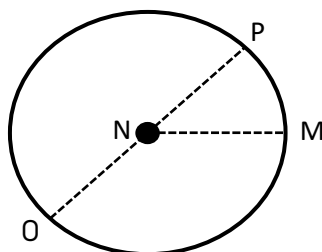
Questions

Identify the elements for each question. The first one is done for you

1)

Centre = PRadius = PS, PT, PRDiameter = RT

2)

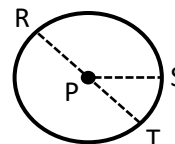


Centre = _____

Radius = _____

Diameter = _____

3)

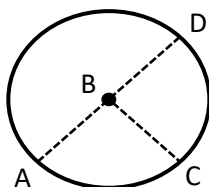


Centre = _____

Radius = _____

Diameter = _____

4)

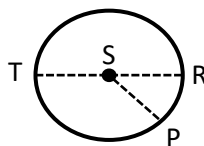


Centre = _____

Radius = _____

Diameter = _____

5)

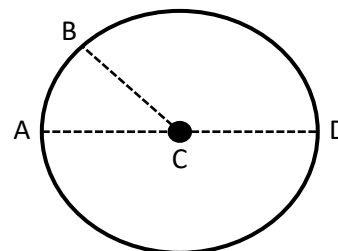


Centre = _____

Radius = _____

Diameter = _____

6)

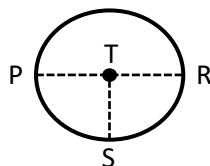


Centre = _____

Radius = _____

Diameter = _____

7)

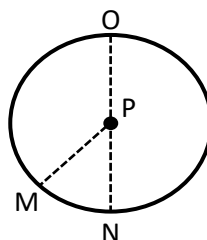


Centre = _____

Radius = _____

Diameter = _____

8)

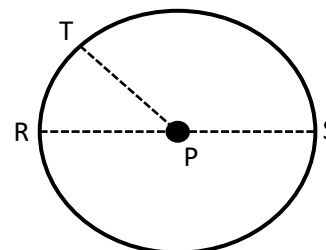


Centre = _____

Radius = _____

Diameter = _____

9)



Centre = _____

Radius = _____

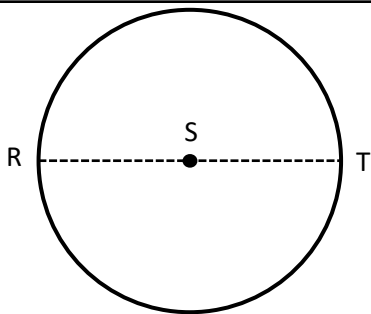
Diameter = _____

Relationship Between Radius and Diameter

The distance from any point on the outside of a circle to its centre is always the same. This distance is a circle's radius (r).

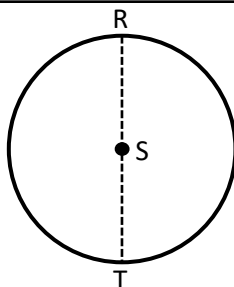
Part 1 Use a ruler to measure the line segments. Is the radius related to the diameter?

1)



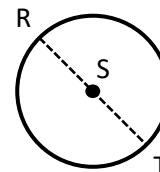
- a) $SR = \underline{\hspace{2cm}}$ (radius)
 b) $ST = \underline{\hspace{2cm}}$ (radius)
 c) $RT = \underline{\hspace{2cm}}$ (diameter)

2)



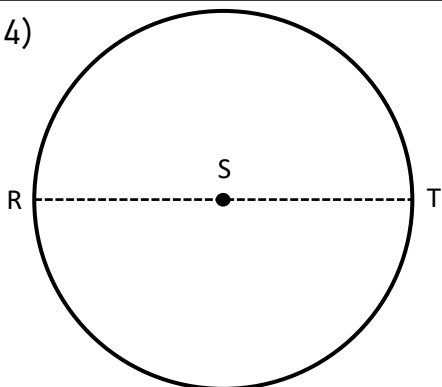
- a) $SR = \underline{\hspace{2cm}}$ (radius)
 b) $ST = \underline{\hspace{2cm}}$ (radius)
 c) $RT = \underline{\hspace{2cm}}$ (diameter)

3)



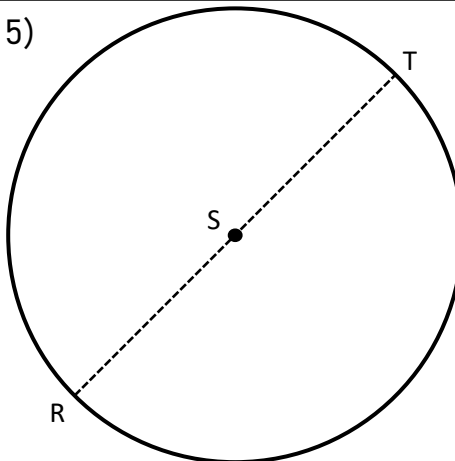
- a) $SR = \underline{\hspace{2cm}}$ (radius)
 b) $ST = \underline{\hspace{2cm}}$ (radius)
 c) $RT = \underline{\hspace{2cm}}$ (diameter)

4)



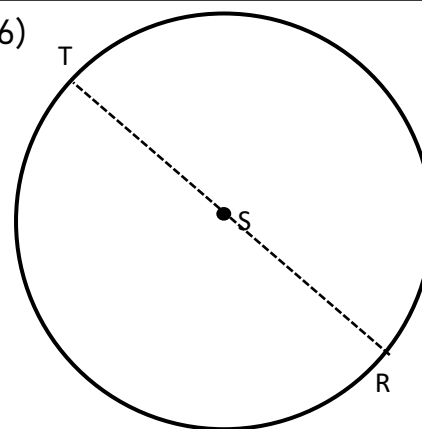
- a) $SR = \underline{\hspace{2cm}}$ (radius)
 b) $ST = \underline{\hspace{2cm}}$ (radius)
 c) $RT = \underline{\hspace{2cm}}$ (diameter)

5)



- a) $SR = \underline{\hspace{2cm}}$ (radius)
 b) $ST = \underline{\hspace{2cm}}$ (radius)
 c) $RT = \underline{\hspace{2cm}}$ (diameter)

6)



- a) $SR = \underline{\hspace{2cm}}$ (radius)
 b) $ST = \underline{\hspace{2cm}}$ (radius)
 c) $RT = \underline{\hspace{2cm}}$ (diameter)

Part 2

Answer the questions below

Question	Formula
1) If you know the length of the radius, how could you use it to determine the length of the diameter? Write a formula for calculating diameter.	
2) Write a formula for calculating the radius of a circle if you have the diameter.	

Calculating Radius and Diameter

Calculating Radius Formula

$$r = \frac{d}{2} \quad \text{or} \quad r = d \div 2$$

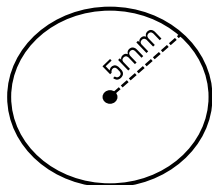
Calculating Diameter Formula

$$d = 2r \quad \text{or} \quad d = r \times 2$$

Questions

Find the radius and diameter of each circle below

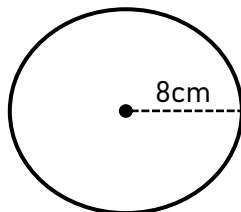
1)



Radius = _____

Diameter = _____

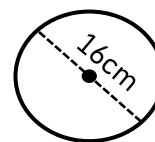
2)



Radius = _____

Diameter = _____

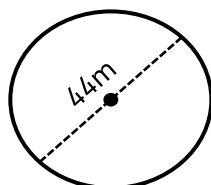
3)



Radius = _____

Diameter = _____

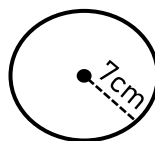
4)



Radius = _____

Diameter = _____

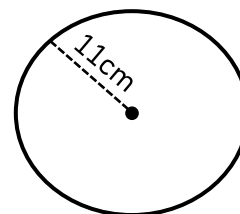
5)



Radius = _____

Diameter = _____

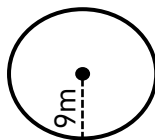
6)



Radius = _____

Diameter = _____

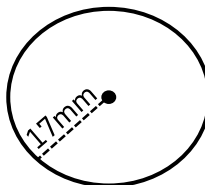
7)



Radius = _____

Diameter = _____

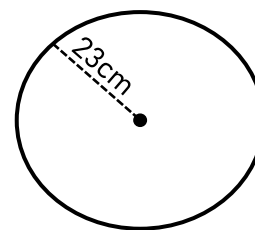
8)



Radius = _____

Diameter = _____

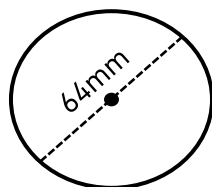
9)



Radius = _____

Diameter = _____

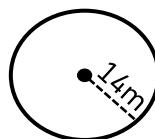
10)



Radius = _____

Diameter = _____

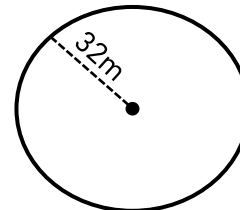
11)



Radius = _____

Diameter = _____

12)



Radius = _____

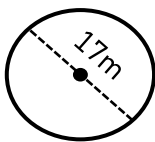
Diameter = _____

Calculating Radius and Diameter

Part 1

Find the radius and diameter of each circle below

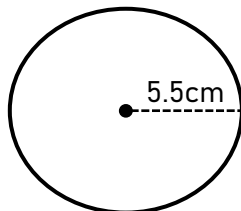
1)



Radius = _____

Diameter = _____

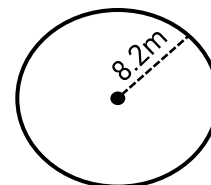
2)



Radius = _____

Diameter = _____

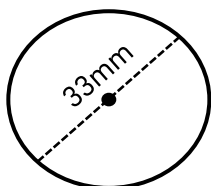
3)



Radius = _____

Diameter = _____

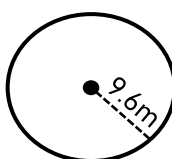
4)



Radius = _____

Diameter = _____

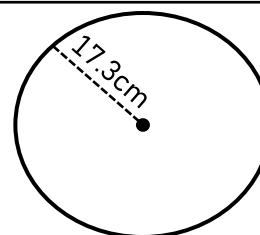
5)



Centre = _____

Radius = _____

6)



Radius = _____

Diameter = _____

Part 2

Fill in the blanks below

	Radius	Diameter
1)	7cm	
2)		28mm
3)		35m
4)	19cm	
5)		53mm

	Radius	Diameter
6)	5.5km	
7)	13.5m	
8)		77cm
9)		85mm
10)	62.2cm	

Part 3

Answer the word problems below

1)	A pizza has slice is 12cm long. What is the width of the entire pizza?	
2)	A circular pool is 13m long across the middle of the pool. How far is the middle of the pool from the side?	

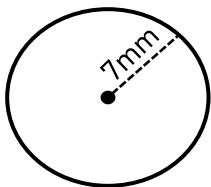
Estimating Circumference

The perimeter of a circle is called its circumference (c). The circumference is a little more than 3 times the length of the diameter. When we do not need a precise calculation of circumference, we can estimate by multiplying the diameter by 3. We may estimate the circumference of a pizza to know how large a box we need.

Part 1

Estimate the circumference of the circles below

1)

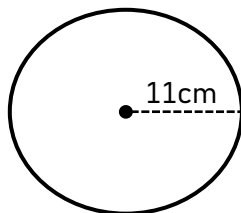


Radius = _____

Diameter = _____

Circumference = _____

2)

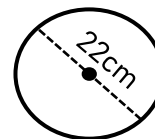


Radius = _____

Diameter = _____

Circumference = _____

3)

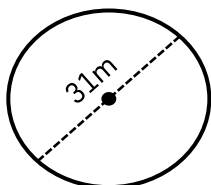


Radius = _____

Diameter = _____

Circumference = _____

4)



Radius = _____

Diameter = _____

Circumference = _____

5)

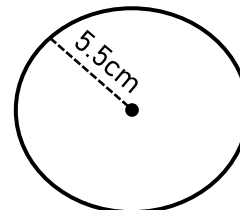


Radius = _____

Diameter = _____

Circumference = _____

6)



Radius = _____

Diameter = _____

Circumference = _____

Part 2

Answer the word problems below

1)

Chase is drawing a circular logo. He needs the logo to be approximately 18cm in circumference. What will the radius of the logo be?

2)

Leon is building a deck around his pool. He needs an estimate of the circumference of his pool, so he knows how much wood to buy. The radius of the pool is 3.3m. What is an estimate of the circumference?

Calculating Circumference

The circumference of a circle is slightly more than 3 times the length of the diameter, or a little more than 6 times the length of the radius. When we need to calculate the circumference of a circle more precisely, we use pi (π). Pi is equal to approximately 3.14, but it is an irrational number, meaning it never ends!



Calculating Circumference (Diameter)

$$c = \pi d \quad \text{or} \quad c = \pi \times d$$

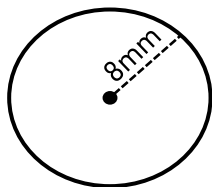
Calculating Circumference (Radius)

$$c = 2\pi r \quad \text{or} \quad c = 2 \times \pi \times r$$

Practice

Calculate the circumference of the circles below

1)

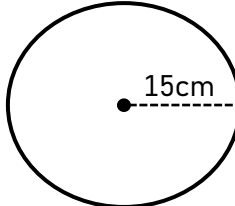


Radius = _____

Diameter = _____

Circumference = _____

2)

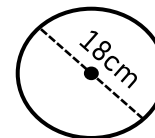


Radius = _____

Diameter = _____

Circumference = _____

3)

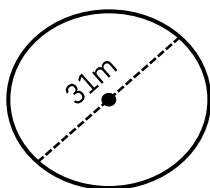


Radius = _____

Diameter = _____

Circumference = _____

4)

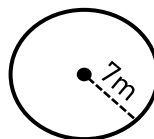


Radius = _____

Diameter = _____

Circumference = _____

5)

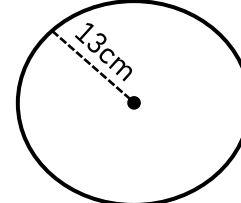


Radius = _____

Diameter = _____

Circumference = _____

6)

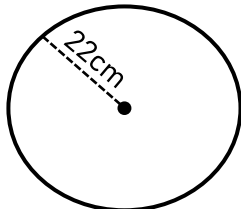


Radius = _____

Diameter = _____

Circumference = _____

7)

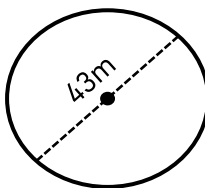


Radius = _____

Diameter = _____

Circumference = _____

8)

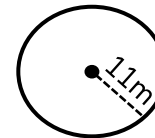


Radius = _____

Diameter = _____

Circumference = _____

9)



Radius = _____

Diameter = _____

Circumference = _____

Calculating Circumference

Calculating Circumference (Diameter)

$$c = \pi d \quad \text{or} \quad c = \pi \times d$$

Calculating Circumference (Radius)

$$c = 2\pi r \quad \text{or} \quad c = 2 \times \pi \times r$$

Part 1

Fill in the table with the missing information

	Radius	Diameter	Circumference
1)	6cm		
2)	17m		
3)		22m	
4)		46cm	
5)	16mm		
6)		33m	
7)	2.5km		
8)	6.8m		
9)		15.8m	
10)		48.6mm	

Part 2

Answer the word problems below

1)	Harrison is deciding which pizza to buy. He has two options. Option A: Pizza with the radius of 18cm Option B: Pizza with a circumference of 106cm Which pizza is larger? 	
2)	You need to wrap a label around a can. If the diameter of the can is 9.5cm, what length does the label need to be? 	
3)	Alexa needs to wrap a cake she made with a ribbon. The cake has a radius of 12.5cm. How long does the ribbon need to be? 	

Circumference Word Problems

Questions

Answer the word problems below

1)

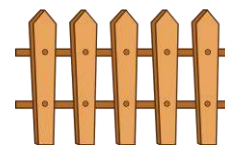
An asteroid hit the moon and created a massive round crater. Scientists measured the diameter of the crater as 31.2km. What is the circumference of the crater?



2)

George is building a fence around his circular yard. His house is in the centre of the yard. The distance from his house to the edge of the yard is 15.5 metres.

a) What is the perimeter of his yard?



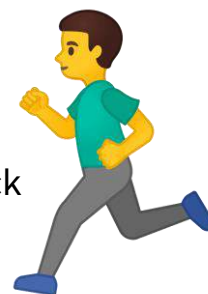
b) If 1 metre of fencing costs \$8.60, how much will his fence cost him?

3)

Mark can run 100m in 14 seconds. He is at a new circular track and is trying to figure out how long it will take him to run 4 laps. The track has a diameter of 16m.

a) What distance is the track?

b) Approximately how long will it take him to run around the track four times?



4)

The radius of your bicycle wheel is 40cm.

a) How far will your bike move in one turn of your wheel?



b) Neill thinks it will take around 3 rotations of the wheel to move 1m. Dane thinks it will take around 4. Who is correct?

Circumference, Radius, and Diameter

We can calculate the diameter and radius of a circle by using the circumference. Use the formulas below to find the missing information.

Calculating Diameter (Circumference)

$$d = \frac{c}{\pi} \quad \text{or} \quad d = c \div \pi$$

Calculating Radius (Circumference)

$$r = \frac{c}{\pi} \div 2$$

Practice

Calculate the diameter and radius. Round to the nearest tenth

	Circumference	Diameter	Radius
1)	28 mm	8.9 mm	4.5 mm
2)	15 cm		
3)	36 m		
4)	47 cm		
5)	55 m		
6)	32 mm		
7)	59 km		
8)	64 m		
9)	71 cm		
10)	68 mm		

Part 2

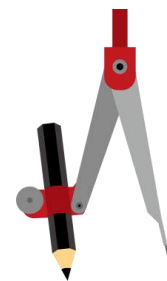
Answer the word problems below



	Questions	Answer
1)	The circumference of a bicycle wheel is 44cm. What is the diameter?	
2)	A donut has a circumference of 12cm. What is the radius?	
3)	A 20cm wire is bent into a circle. What is the diameter of the circle?	
4)	A pizza has a circumference of 1m. What is the radius of the pizza in centimeters?	

Drawing Circles Using Radius and Diameter

A circle is a shape that has all points in a plane that are equal distance from the centre point. Therefore, an oval is not a circle. We can draw a circle by using a tool called a compass.

**Draw**

Use a compass and a ruler to draw circles below

1)

Radius = 2cm

Diameter = _____

2)

Radius = _____

Diameter = 3cm

3)

Radius = _____

Diameter = 6cm

4)

Radius = 2.5cm

Diameter = _____

5)

Radius = _____

Diameter = 40mm

6)

Radius = 1cm

Diameter = _____

Name: _____

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Curriculum Connection
SS.1

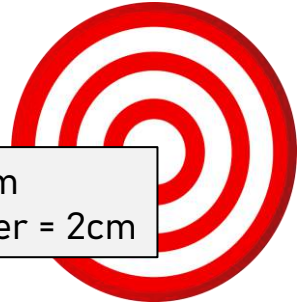
Drawing Circles Using Radius and Diameter

Draw

Draw a target using the measurements below

- 1) Outside circle – radius = 9cm
- 2) Next circle – diameter = 14cm
- 3) Next circle – radius = 5cm

- 5) Next circle – radius = 3cm
- 6) Smallest circle – diameter = 2cm



Name: _____

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Curriculum Connection
SS.1

Drawing Circles Using Circumference

We can draw a circle if we know the radius, diameter, or circumference. Use the formula for calculating radius so you can set your compass to the right length.

Calculating Radius

$$r = \frac{c}{\pi} \div 2$$

Draw

Use a compass and a ruler to draw circles below. Round to the nearest tenth

1)

Circumference = 12.5cm

2)

Circumference = 62.8mm

3)

Circumference = 19cm

4)

Circumference = 15.7cm

5)

Circumference = 20.4cm

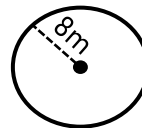
6)

Circumference = 14.1cm

Area of a Circle - Radius

The area of a circle is the region inside the circle. We can calculate the area of a circle by using its radius. For most calculations, we can use 3.14 for pi. The formula is $\pi \times \text{radius}^2$. We can write this as $a = \pi r^2$

Calculating Area Using Radius



$$a = \pi r^2$$

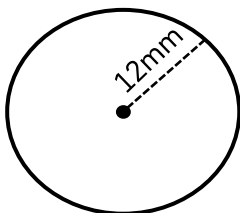
$$a = \pi \times 8 \times 8$$

$$a = 200.96\text{m}^2$$

Practice

Calculate the area of the circles using the radius

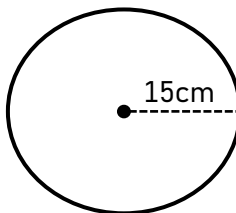
1)



Radius = _____

Area = _____

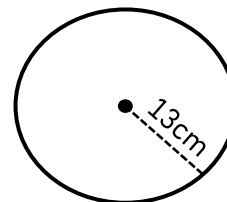
2)



Radius = _____

Area = _____

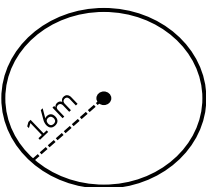
3)



Radius = _____

Area = _____

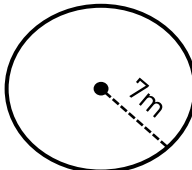
4)



Radius = _____

Area = _____

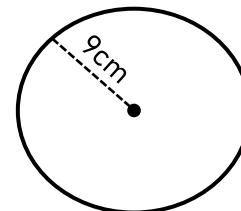
5)



Radius = _____

Area = _____

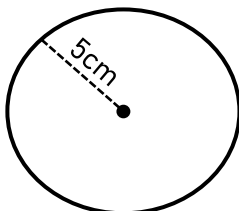
6)



Radius = _____

Area = _____

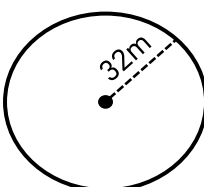
7)



Radius = _____

Area = _____

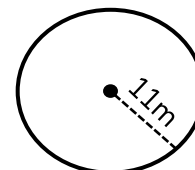
9)



Radius = _____

Area = _____

10)



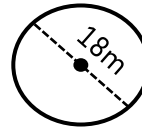
Radius = _____

Area = _____

Area of a Circle - Diameter

When we know the diameter of a circle, we can divide it by two to get the radius. Once we have the radius, we can use it to calculate the area of a circle using the formula: $a = \pi r^2$

Calculating Area Using Diameter



$$a = \pi r^2$$

$$\text{diameter} = 18, \text{radius} = 9$$

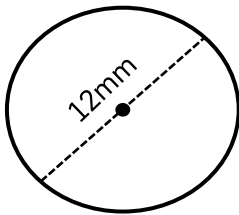
$$a = \pi \times 9 \times 9$$

$$a = 254.34\text{m}^2$$

Practice

Calculate the area of the circles using the radius

1)

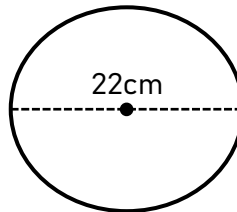


Diameter = _____

Radius = _____

Area = _____

2)

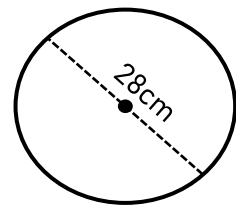


Diameter = _____

Radius = _____

Area = _____

3)

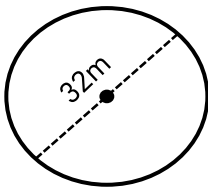


Diameter = _____

Radius = _____

Area = _____

4)

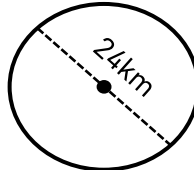


Diameter = _____

Radius = _____

Area = _____

5)

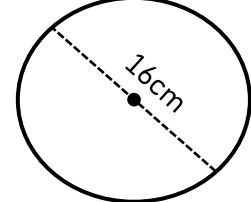


Diameter = _____

Radius = _____

Area = _____

6)



Diameter = _____

Radius = _____

Area = _____

Word Problems

Solve the problems below



	Questions	Answer
1)	A dinner plate has a diameter of 14cm. What is the area of the plate?	
2)	A circular table is 1.2 metres wide. What is the area of the table in centimetres?	

Calculating Area of a Circle - Circumference

We can calculate the radius of a circle by using the circumference. Once we have the radius of a circle, we can figure out its area.

Calculating Radius From Circumference

$$r = \frac{C}{\pi} \div 2$$

Calculating Area Using Radius

$$A = \pi r^2$$

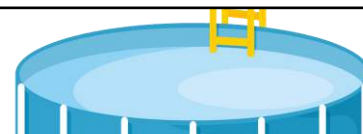
Practice

Calculate the diameter and radius. Round to the nearest tenth

	Circumference	Radius	Area
1)	12 mm	1.9 mm	11.3 mm ²
2)	18 cm		
3)	22 m		
4)	42 cm		
5)	36 m		
6)	58 mm		
7)	55 km		
8)	17 m		
9)	63 cm		
10)	76 mm		

Part 2

Answer the word problems below



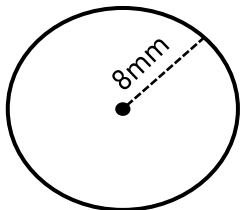
	Questions	Answer
1)	A pool has a perimeter of 15m. What is the area inside the pool?	
2)	A ribbon that wraps around a circular present is 42cm. What is the area of the present?	
3)	The city of Williamsport is building a circular track. The track is 400m long. What will the area inside the track be?	

Circles - Mixed Review

Practice

Fill in the blanks below

1)



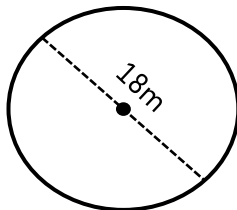
Radius = _____

Diameter = _____

Circumference = _____

Area = _____

2)



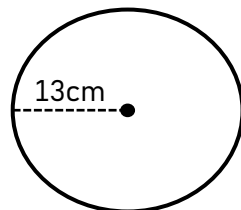
Radius = _____

Diameter = _____

Circumference = _____

Area = _____

3)



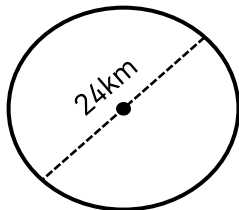
Radius = _____

Diameter = _____

Circumference = _____

Area = _____

4)



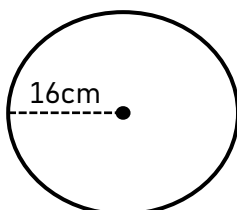
Radius = _____

Diameter = _____

Circumference = _____

Area = _____

5)



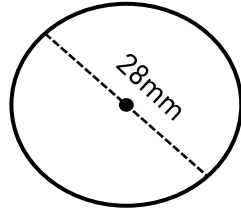
Radius = _____

Diameter = _____

Circumference = _____

Area = _____

6)



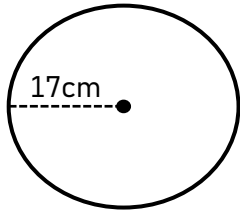
Radius = _____

Diameter = _____

Circumference = _____

Area = _____

7)



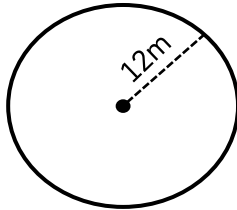
Radius = _____

Diameter = _____

Circumference = _____

Area = _____

8)



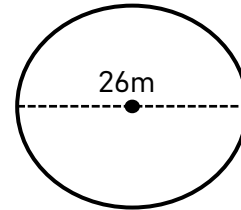
Radius = _____

Diameter = _____

Circumference = _____

Area = _____

9)



Radius = _____

Diameter = _____

Circumference = _____

Area = _____

Circles - Word Problems

Questions

Answer the word problems below

1)

A dinner plate has a diameter of 18cm. What is the area of the dinner plate?

2)

A circular golf green has an area of 15m^2 . What is the diameter of the green?



3)

A dog is put on an 8m leash in the middle of its yard. It goes to the end of its leash and runs in a circle. What is the area the dog can play in?

4)

The largest living tree in the world has a circumference of 36m. What is the diameter of the tree?



5)

A hula hoop has a diameter of 1.2m. What is the perimeter of the hula hoop in centimetres?

6)

A steel rod is bent into a circle. The circle now has a circumference of 19cm. What is the area inside the circle?

7)

A storm is expected to hit 8km in every direction from the center of a town. What is the area that the storm will affect?



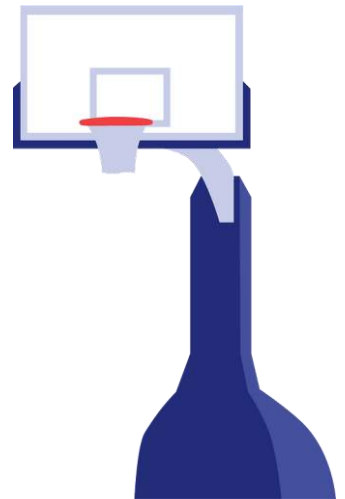
Circles - Basketball Word Problem

Questions

Answer the word problems below

A basketball hoop has a circumference of 145cm. A standard NBA basketball has a circumference of 75cm.

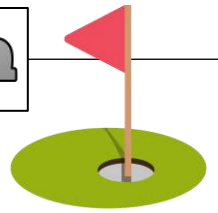
- a) Can 2 NBA basketballs fit through the hoop at the same time?



- b) A WNBA basketball has a circumference of 72cm. Will 2 WNBA basketballs fit through the hoop at the same time?



Circles - Putting Word Problem

**Questions**

Answer the word problems below

A golf hole has a diameter of 11cm.

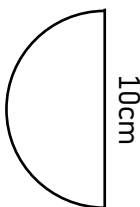
a) Draw a golf hole below using a compass and the proper measurements.

b) A golf ball has a circumference of 13.4cm. Draw a golf ball below using the proper measurements.

c) Will 2 or 3 golf balls fit in a line across the middle of a golf hole? Explain.

Semi-Circles

A semi-circle is half of a circle. If we can find the area of a full-circle, we can divide it by two to find the area of a semi-circle.



Calculating Area of Semi-Circle

$$a = \pi r^2 \div 2$$

$$\text{diameter} = 10, \text{radius} = 5$$

$$a = 3.14 \times 5 \times 5 \div 2$$

$$a = 78.5\text{cm}^2 \div 2$$

$$\text{area of semi-circle} = 39.25\text{cm}^2$$

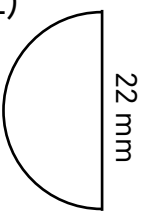
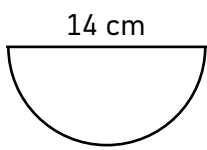
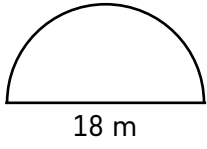
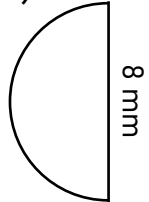
Part 1

Fill in the table below

	Diameter	Radius	Area of Full Circle	Area of Semi-Circle
1)	6 cm			
2)	4 km			
3)	24 m			
4)	10 mm			
5)	16 m			
6)	30 cm			

Part 2

Calculate the area of the semi-circles

1) 	2) 	3) 
4) 	5) 	6) 

Semi-Circles - Word Problems

Questions

Answer the word problems below

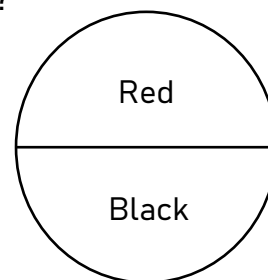
1)

A semi-circle shaped rug has a diameter of 44cm. What is the area of the rug?



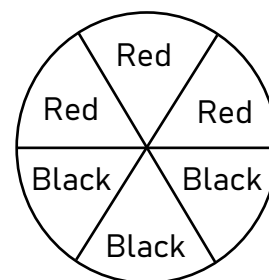
2)

A circular spinner has 2 sections, half red and half green. The spinner has a radius of 8cm. What is the area of the red side of the spinner?



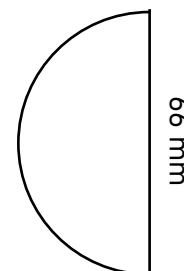
3)

A circular spinner has 6 sections. Half are red and half are black. If the diameter of the spinner is 18cm, what is the area of one section of the spinner?



4)

A semi-circle window has a diameter of 66cm. What is the area of the window?



Name: _____

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Quiz - Circles

Part 1

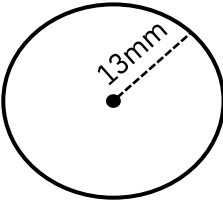
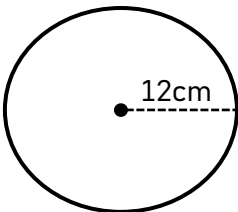
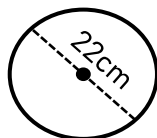
Fill in the blanks below

	Radius	Diameter
1)	12 cm	
2)		17 mm
3)		45 m

	Radius	Diameter
4)	7.5 km	
5)	22.5 m	
6)		88 cm

Part 2

Fill in the blanks

1)  Radius = _____ Diameter = _____ Circumference = _____	2)  Radius = _____ Diameter = _____ Circumference = _____	3)  Radius = _____ Diameter = _____ Circumference = _____
---	---	---

Part 3

Calculate the diameter and radius. Round to the nearest tenth

	Radius	Diameter	Circumference
1)	5 mm		
2)		16 m	
3)			22 cm
4)	32 mm		
5)			55 m

Part 4

Use a compass and a ruler to draw circles below

1)

Radius = 2cm

Diameter = _____

2)

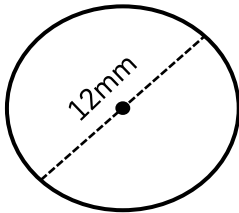
Radius = _____

Diameter = 3cm

Part 5

Calculate the area of the circles

1)

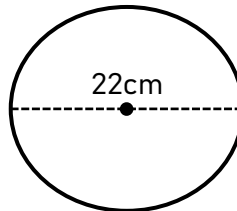


Diameter = _____

Radius = _____

Area = _____

2)

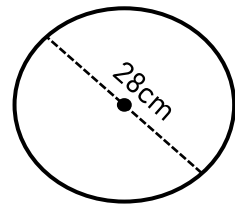


Diameter = _____

Radius = _____

Area = _____

3)



Diameter = _____

Radius = _____

Area = _____

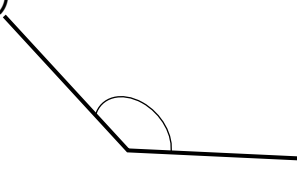
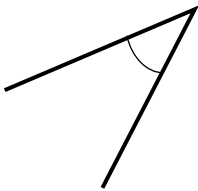
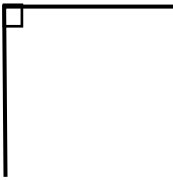
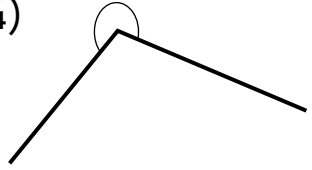
Part 6

Solve the problems below

	Questions	Answer
1)	The distance around a carousel is 18m. What is its radius? 	
2)	A dog has its leash tied to a stake in a backyard. The dog's leash is 6.5 metres long. How much area can the dog play in?	
3)	The diameter of a wheel on a car is 25 centimetres. How far does the car move with one rotation of the wheel? 	

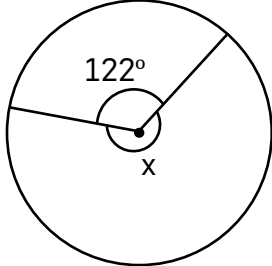
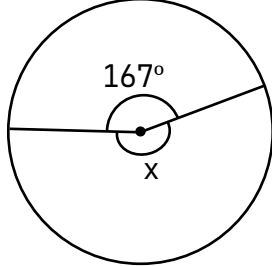
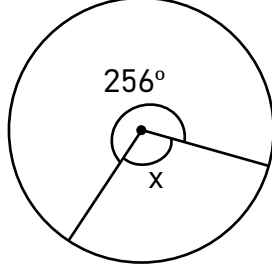
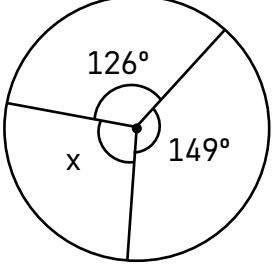
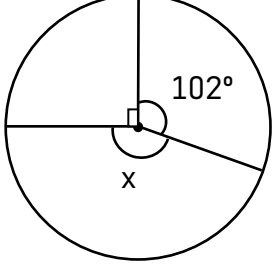
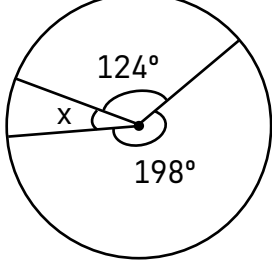
Part 7

Measure the angles and label them acute, right, obtuse, or reflex

1) 	2) 	3) 	4) 

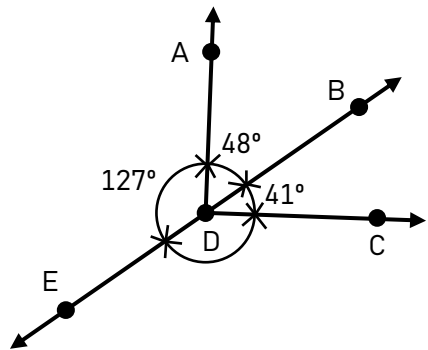
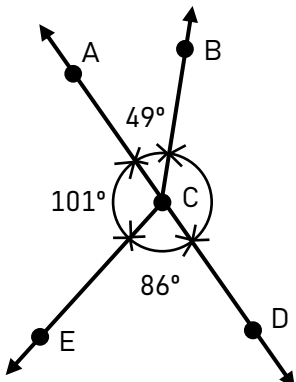
Part 8

Determine the value of angle x

1) 	2) 	3) 
$\angle x =$	$\angle x =$	$\angle x =$
4) 	5) 	6) 
$\angle x =$	$\angle x =$	$\angle x =$

Part 9

Find the missing angles below

1) 	2) 
$\angle CDE =$	$\angle BCD =$

Name: _____

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Curriculum Connection
SS.2

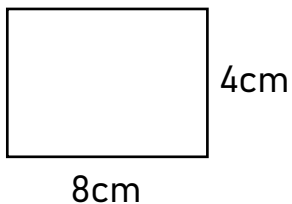
Finding the Area of Rectangles

Questions

Find the area ($A = b \times h$)

*Not to Scale

1)



Area = _____

2)

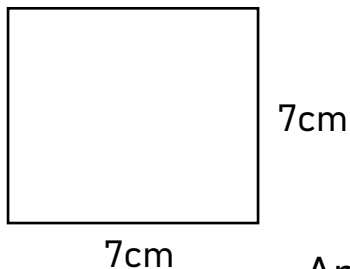
3m



10m

Area = _____

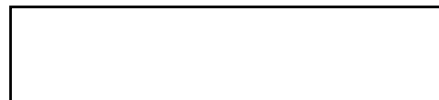
3)



Area = _____

4)

4cm

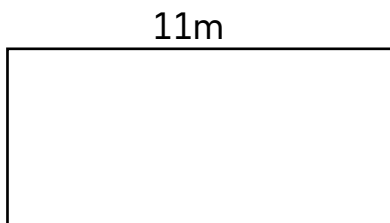


15cm

Area = _____

5)

5m

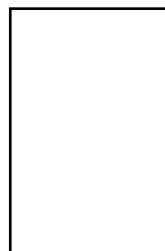


11m

Area = _____

6)

13cm



4cm

Area = _____

7)



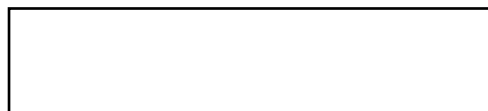
6cm

15cm

Area = _____

8)

3m



12m

Area = _____

9)

5cm



20cm

Area = _____

10)

6cm



14cm

Area = _____

Name: _____

47

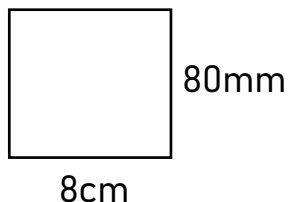
Curriculum Connection
SS.2

Finding the Area of Rectangles

Questions

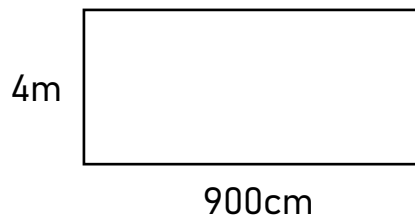
Write the area as any metric unit of measurement

1)



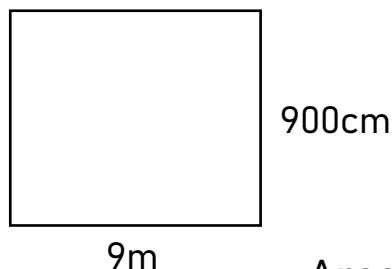
Area = _____

2)



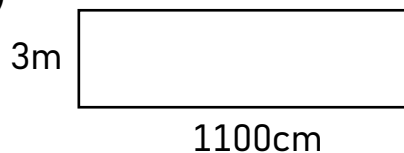
Area = _____

3)



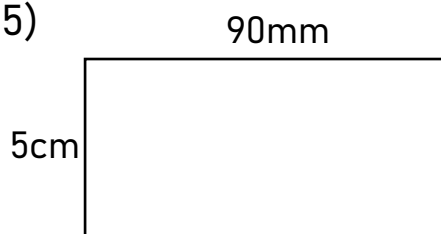
Area = _____

4)



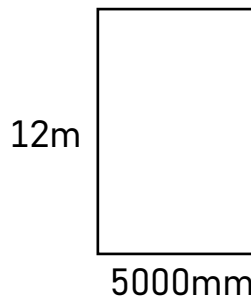
Area = _____

5)



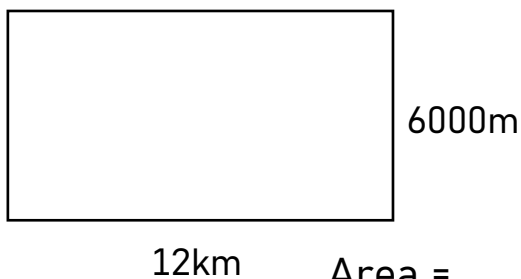
Area = _____

6)



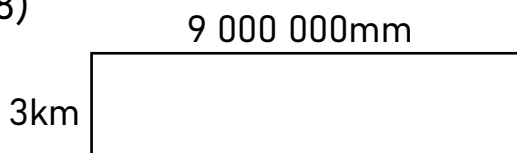
Area = _____

7)



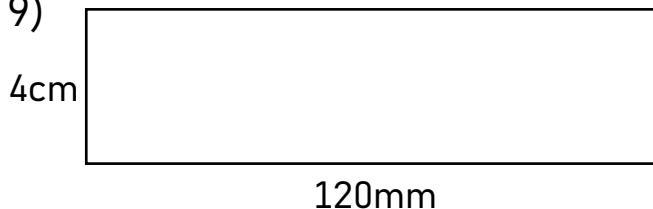
Area = _____

8)



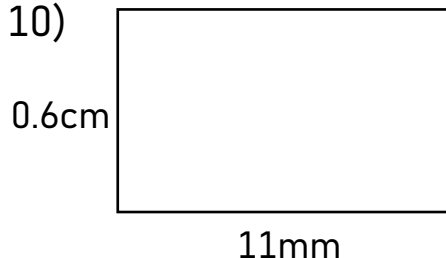
Area = _____

9)



Area = _____

10)



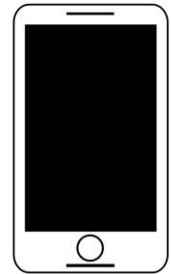
Area = _____

Area Word Problems

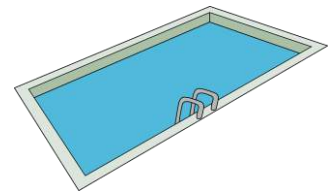
Questions

Draw a picture of the problem and then find the area

1) A phone is 11cm by 60mm. What is the area of the phone?



2) A pool is 12m by 400cm. What is the area of the pool?



4) A candy wrapper is 40mm wide and 0.10m long. What is the area of the wrapper in cm?



4) The front of a square box is 12cm wide. What is the area of the side of the box?



5) A door is 3m by 150cm. What is the area of the door?



Finding the Missing Information

Questions

Find the missing value ($A = b \times h$)

1)

11m

 $A = 44\text{m}^2$

Base = _____

Height = _____

Area = _____

2)

1m

 $A = 14\text{m}^2$

Base = _____

Height = _____

Area = _____

3)

7cm

 $A = 63\text{cm}^2$

Base = _____

Height = _____

Area = _____

4)

4m

 $A = 48\text{m}^2$

Base = _____

Height = _____

Area = _____

5)

3cm

 $A = 27\text{cm}^2$

Base = _____

Height = _____

Area = _____

6)

 $A = 77\text{cm}^2$

Base = _____

Height = _____

11cm

Area = _____

7)

 $A = 45\text{cm}^2$

Base = _____

Height = _____

5cm

Area = _____

8)

 $A = 72\text{cm}^2$

Base = _____

Height = _____

8cm

Area = _____

9)

9cm

 $A = 45\text{cm}^2$

Base = _____

Height = _____

Area = _____

10)

 $A = 56\text{cm}^2$

Base = _____

Height = _____

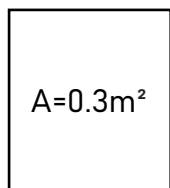
8cm

Area = _____

Finding the Missing Information

QuestionsFind the missing value ($A = b \times h$)

1)



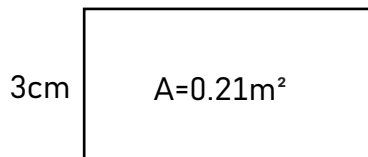
5cm

Base = _____

Height = _____

Area = _____

2)



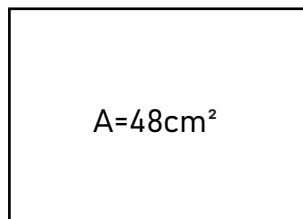
3cm

Base = _____

Height = _____

Area = _____

3)

 $A = 48\text{cm}^2$

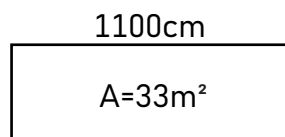
80mm

Base = _____

Height = _____

Area = _____

4)



1100cm

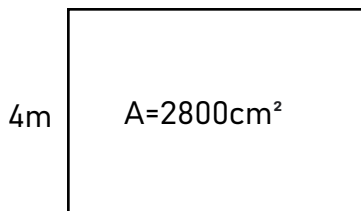
 $A = 33\text{m}^2$

Base = _____

Height = _____

Area = _____

5)



4m

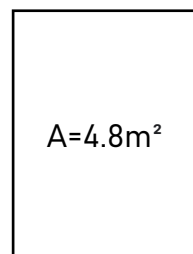
 $A = 2800\text{cm}^2$

Base = _____

Height = _____

Area = _____

6)

 $A = 4.8\text{m}^2$

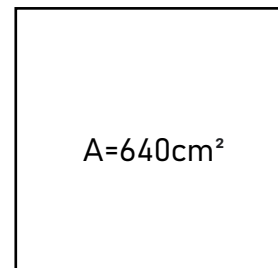
400mm

Base = _____

Height = _____

Area = _____

7)

 $A = 640\text{cm}^2$

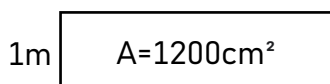
80mm

Base = _____

Height = _____

Area = _____

8)



1m

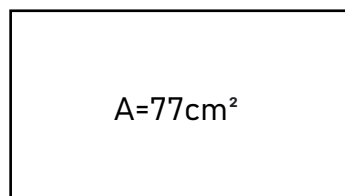
 $A = 1200\text{cm}^2$

Base = _____

Height = _____

Area = _____

9)

 $A = 77\text{cm}^2$

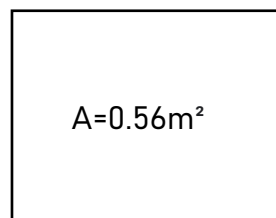
110mm

Base = _____

Height = _____

Area = _____

10)



7cm

 $A = 0.56\text{m}^2$

Base = _____

Height = _____

Area = _____

Finding the Missing Information - Word Problems**Questions**

Use the information you have to find the missing height or base

1) A piece of paper has an area of 88cm^2 . The base of the paper is 8cm . What is the height of the paper?



2) Jack's yard has an area of 56m^2 . The height of the yard is 8m . What is the base?



3) A bus has an area of 24m^2 . The height of the bus is 3m . What is the base?



4) A square poster has an area of 36cm^2 . What is the base and the height?



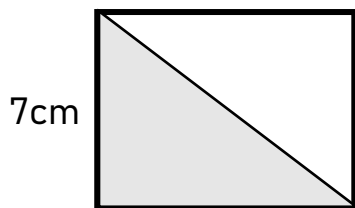
5) A cookie sheet has an area of 72cm^2 . The base of the sheet is 9cm . What is the height of the cookie sheet?



Introduction - Area of a Triangle**Questions**

Find the area of the rectangles and triangles below

1)



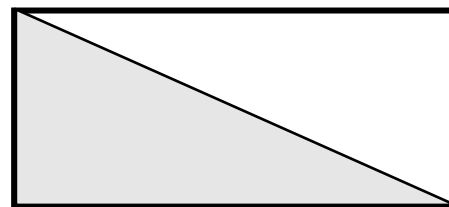
7cm

8cm

Area of a rectangle = _____

Area of a triangle = _____

2)



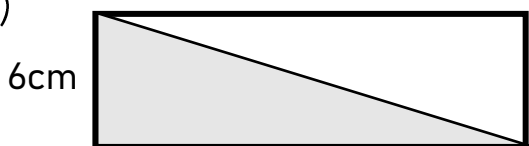
4cm

7cm

Area of a rectangle = _____

Area of a triangle = _____

3)



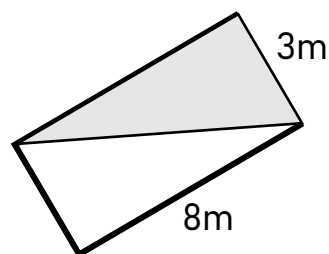
6cm

9cm

Area of a rectangle = _____

Area of a triangle = _____

4)



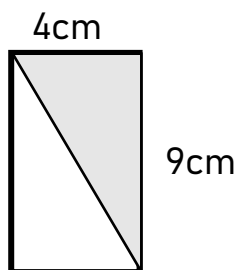
3m

8m

Area of a rectangle = _____

Area of a triangle = _____

5)



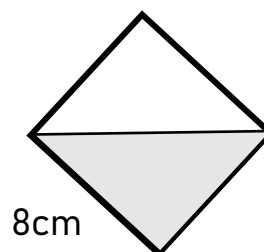
4cm

9cm

Area of a rectangle = _____

Area of a triangle = _____

6)

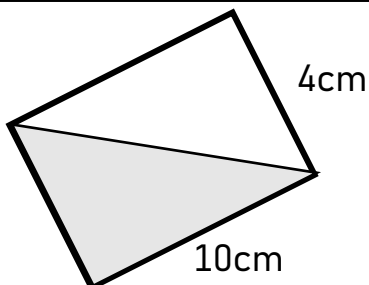


8cm

Area of a square = _____

Area of a square = _____

7)



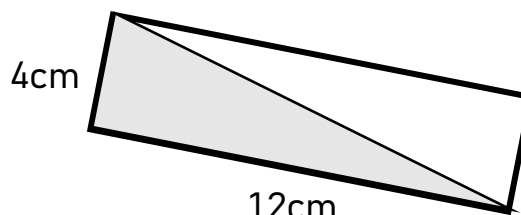
4cm

10cm

Area of a rectangle = _____

Area of a triangle = _____

8)



4cm

12cm

Area of a rectangle = _____

Area of a triangle = _____

Name: _____

53

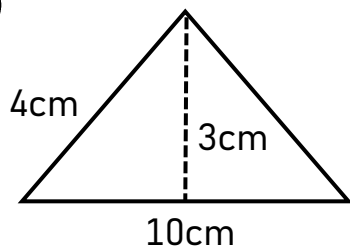
Curriculum Connection
SS.2

Area of a Triangle

Questions

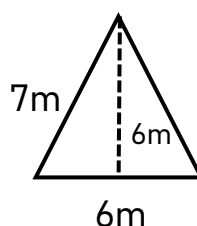
Find the area of the triangles below ($A = b \times h \div 2$)

1)



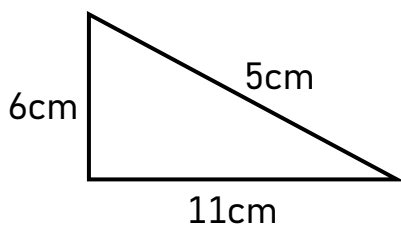
Area = _____

2)



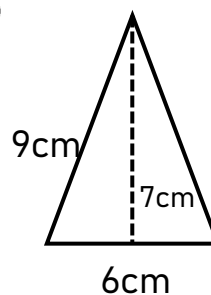
Area = _____

3)



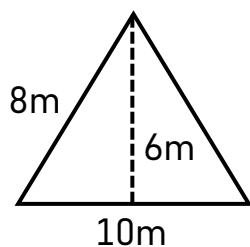
Area = _____

4)



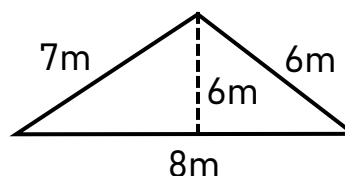
Area = _____

5)



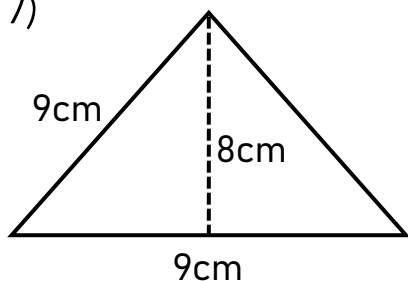
Area = _____

6)



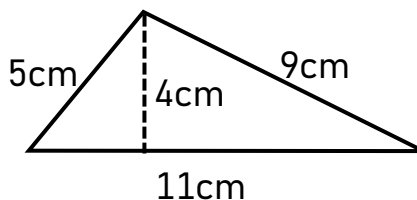
Area = _____

7)



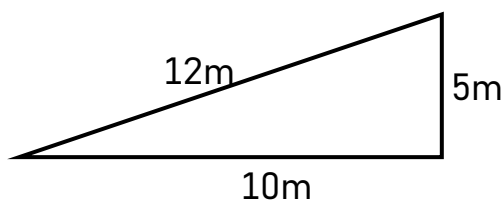
Area = _____

8)



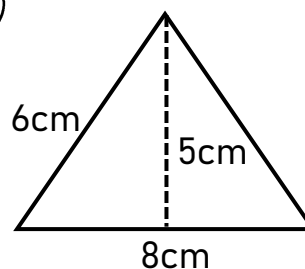
Area = _____

9)



Area = _____

10)



Area = _____

Name: _____

54

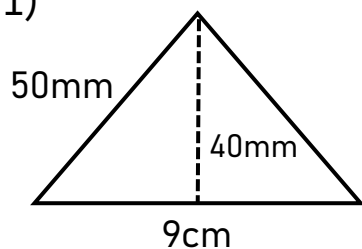
Curriculum Connection
SS.2

Area of a Triangle

Part 1

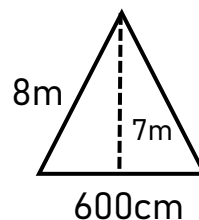
Find the area of the triangles below ($A = b \times h \div 2$)

1)



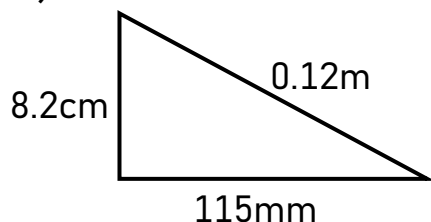
Area = _____

2)



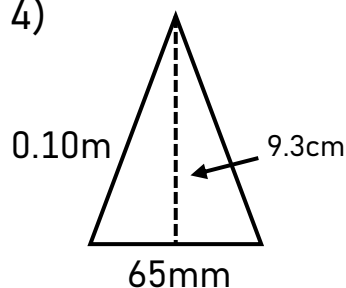
Area = _____

3)



Area = _____

4)

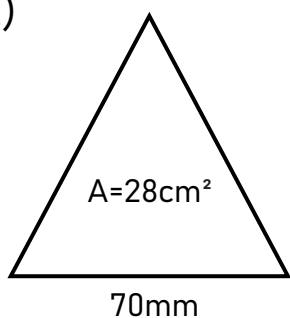


Area = _____

Part 2

Find the missing value

1)

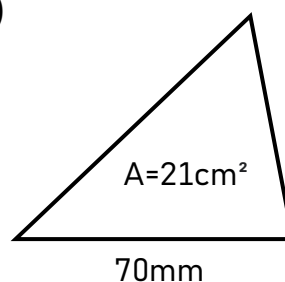


Base = _____

Height = _____

Area = _____

2)

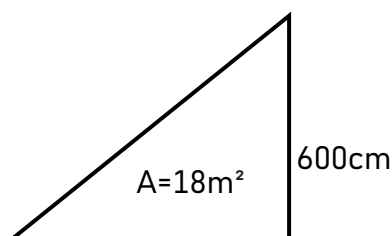


Base = _____

Height = _____

Area = _____

3)

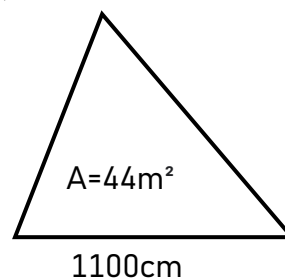


Base = _____

Height = _____

Area = _____

4)



Base = _____

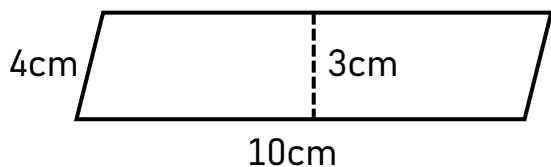
Height = _____

Area = _____

Perimeter and Area of Parallelograms

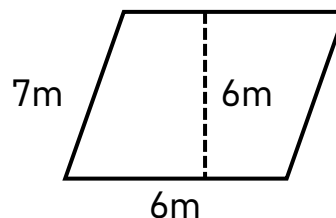
QuestionsFind the perimeter and area of the parallelograms below ($A = b \times h$)

1)



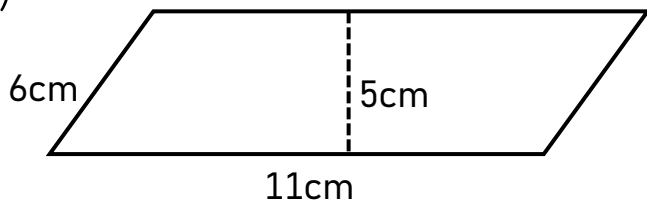
Perimeter = _____ Area = _____

2)



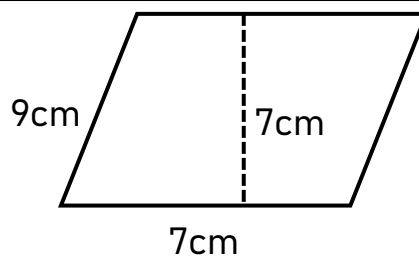
Perimeter = _____ Area = _____

3)



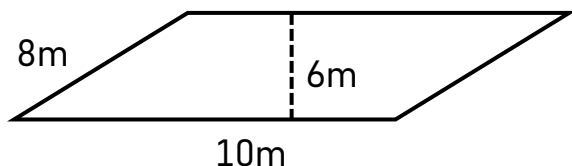
Perimeter = _____ Area = _____

4)



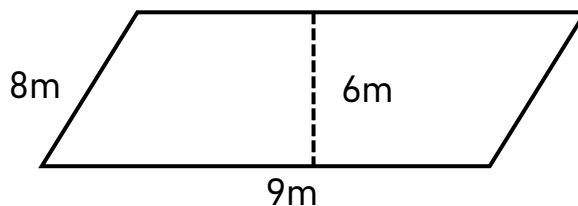
Perimeter = _____ Area = _____

5)



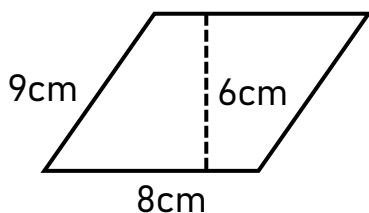
Perimeter = _____ Area = _____

6)



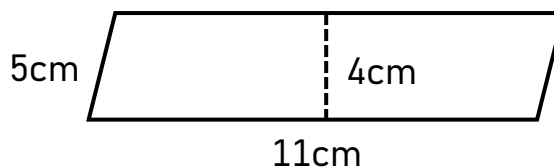
Perimeter = _____ Area = _____

7)



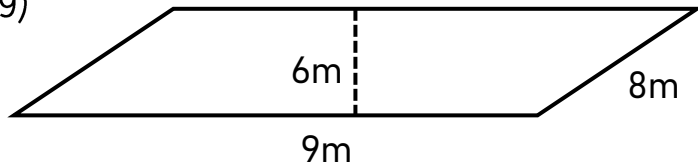
Perimeter = _____ Area = _____

8)



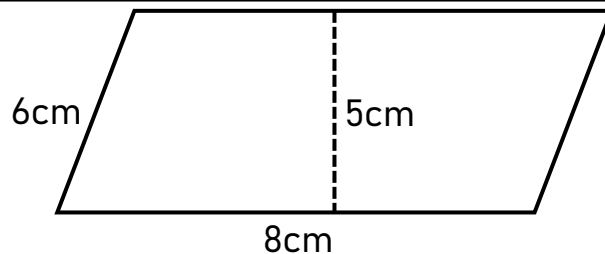
Perimeter = _____ Area = _____

9)



Perimeter = _____ Area = _____

10)

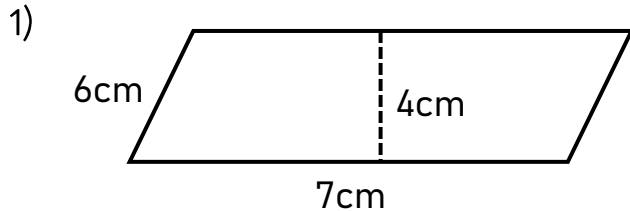


Perimeter = _____ Area = _____

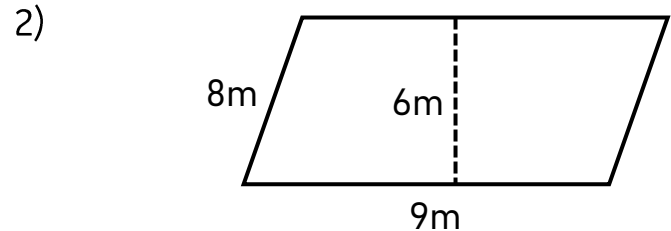
Perimeter and Area of Parallelograms

Part 1

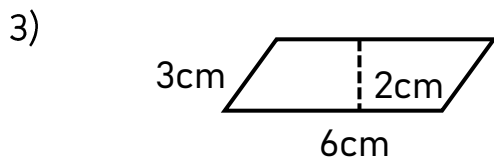
Find the perimeter and area of the parallelograms below ($A = b \times h$)



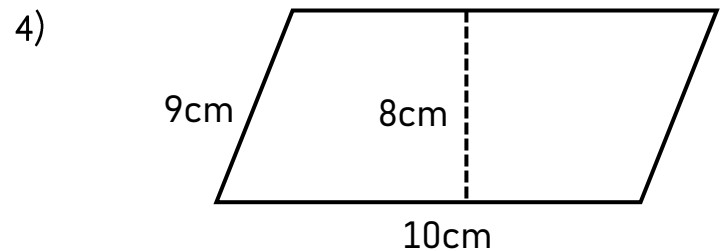
Perimeter = _____ Area = _____



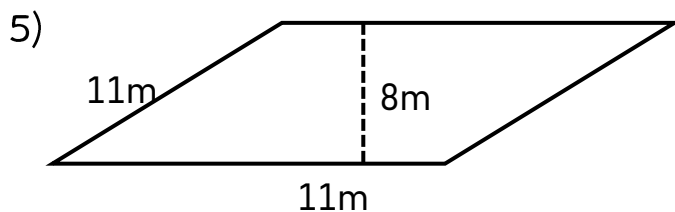
Perimeter = _____ Area = _____



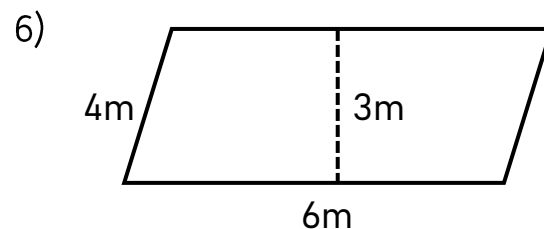
Perimeter = _____ Area = _____



Perimeter = _____ Area = _____



Perimeter = _____ Area = _____



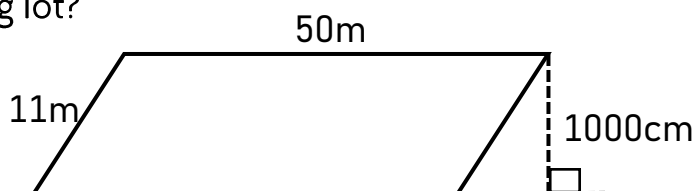
Perimeter = _____ Area = _____

Part 2

Answer the word problems below

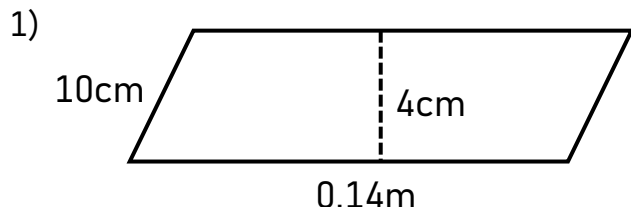
- 1) A parallelogram has a top side length of 12cm. The height of the parallelogram is 7cm. What is the area of the parallelogram?

- 2) A parking lot is constructed in the shape of a parallelogram. What is the area of the parking lot?

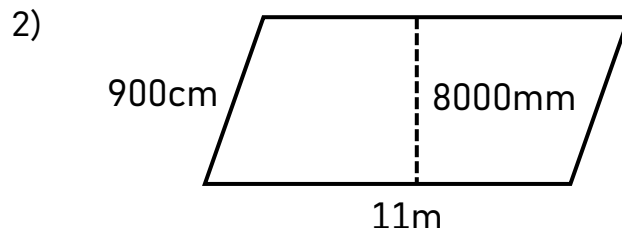


Perimeter and Area of Parallelograms

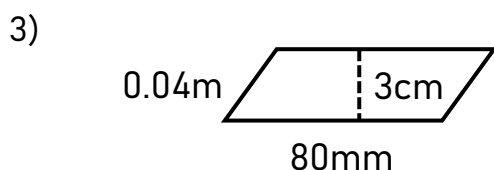
Part 1

Find the perimeter and area of the parallelograms below ($A = b \times h$)

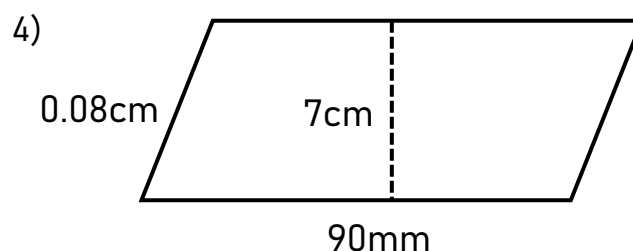
Perimeter = _____ Area = _____



Perimeter = _____ Area = _____



Perimeter = _____ Area = _____



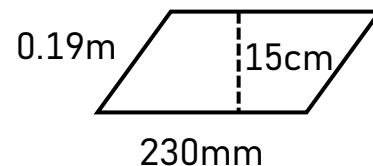
Perimeter = _____ Area = _____

Part 2

Answer the word problems below

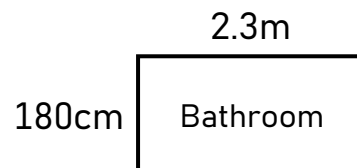
A bathroom is being tiled with parallelogram shaped tiles. The dimensions of the tiles are below.

1) What is the area of the parallelogram?



2) The dimensions of the bathroom are displayed below.

a) What is the area of the bathroom?



b) How many tiles will fit in the bathroom?

Area of a Triangle/Parallelogram Word Problems**Questions**

Draw a picture of the problem and then find the area

1) Jake is building a triangular garden. He needs to know how much fertilizer he needs to cover the space. If the garden has a base of 500cm and a height of 4m, what is the area of the garden in metres?



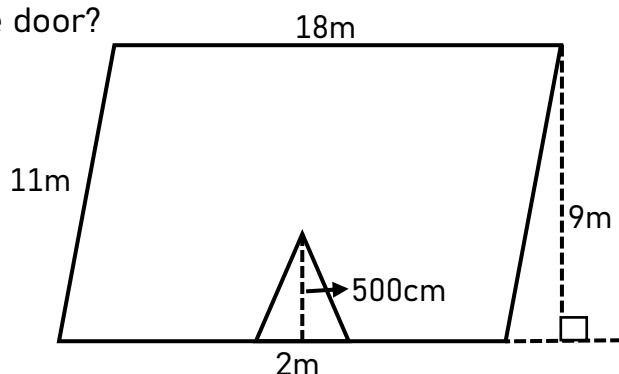
2) A farmer is buying seed for his farmland. His land is shaped like a parallelogram. It has a base of 5000cm and a height of 10m. The sides of the garden are 2000cm. What is the area of his farmland in metres?



3) Christina is painting her triangular artwork. The artwork has a base of 14cm and a height of 80mm. What is the area of her artwork in millimetres?



4) Harold is building a unique house. The shape of the front of the house is a parallelogram. It will have a triangular door cut out of it. What is the area of the front of his house without the door?

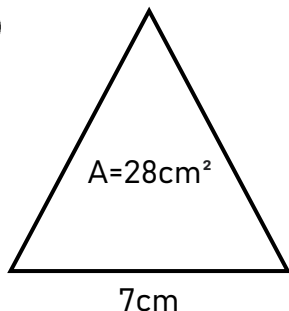


Finding the Missing Information

Questions

Find the missing value ($A = b \times h$)

1)

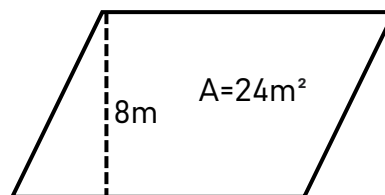


Base = _____

Height = _____

Area = _____

2)

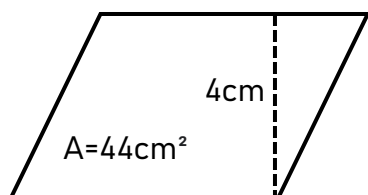


Base = _____

Height = _____

Area = _____

3)

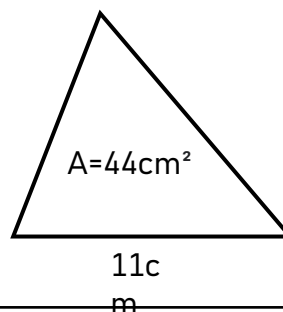


Base = _____

Height = _____

Area = _____

4)

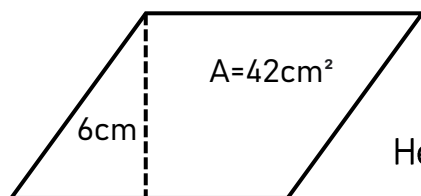


Base = _____

Height = _____

Area = _____

5)

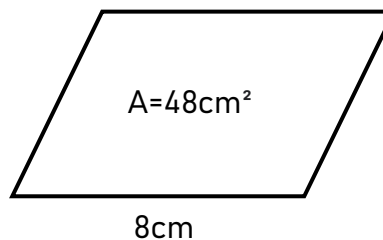


Base = _____

Height = _____

Area = _____

6)

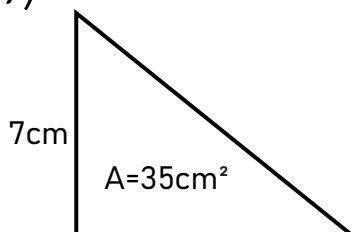


Base = _____

Height = _____

Area = _____

7)

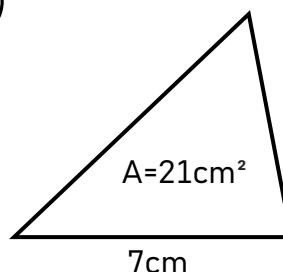


Base = _____

Height = _____

Area = _____

8)

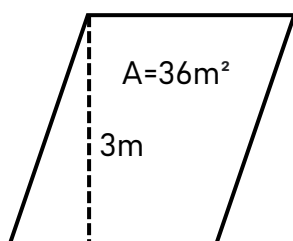


Base = _____

Height = _____

Area = _____

9)

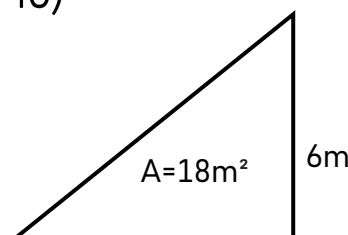


Base = _____

Height = _____

Area = _____

10)



Base = _____

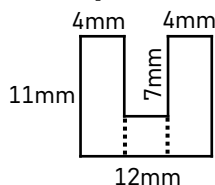
Height = _____

Area = _____

Area of Composite Polygons

Find the area of the polygons below by splitting them into separate shapes.

Example



Area = area of rectangle 1 + area of rectangle 2 + area of rectangle 3

Rectangle 1:
 $A = 11 \times 4$
 $A = 44 \text{ mm}^2$

Rectangle 2:
 $A = 4 \times 4$
 $A = 16 \text{ mm}^2$

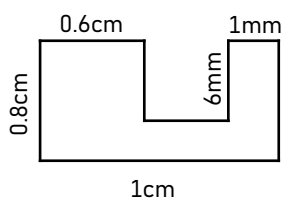
Rectangle 3:
 $A = 4 \times 11$
 $A = 44 \text{ mm}^2$

Area = $44 + 44 + 16$
 $A = 104 \text{ mm}^2$

Questions

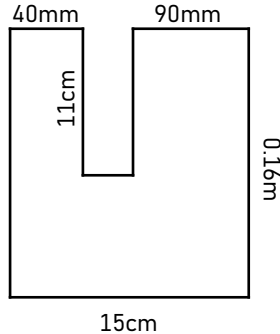
Find the area of the composite polygons below

1)



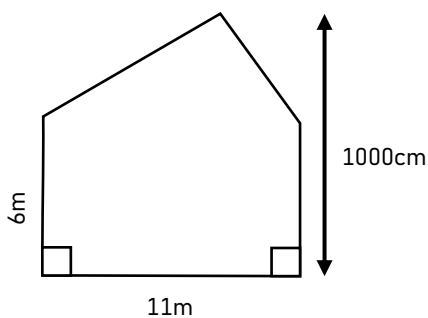
Area = _____

2)



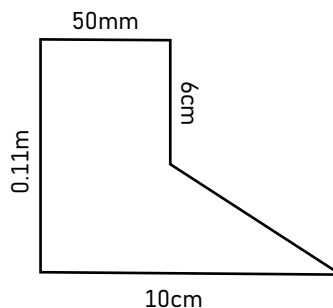
Area = _____

3)



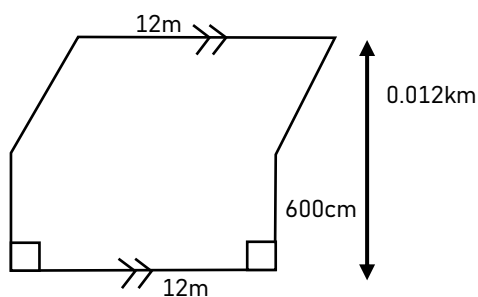
Area = _____

4)



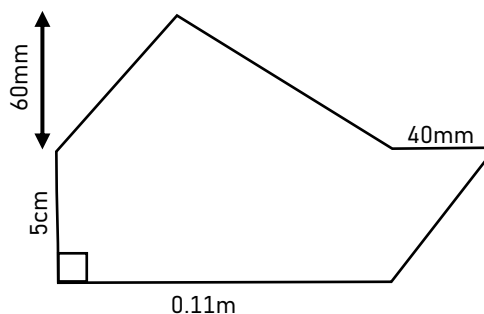
Area = _____

5)



Area = _____

6)



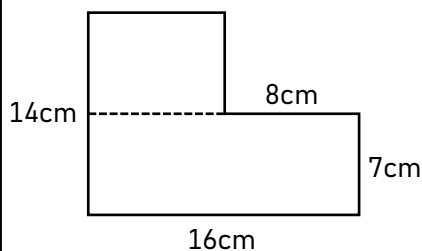
Area = _____

Area of Composite Polygons

Questions

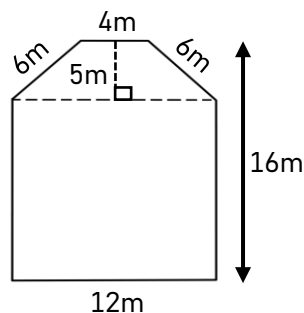
Find the area of each composite shape

1)



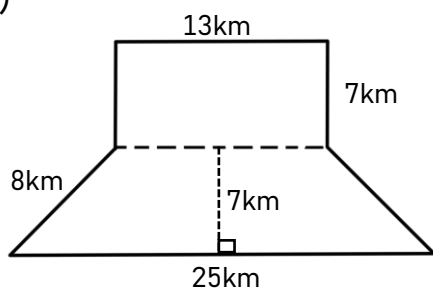
Area: _____

2)



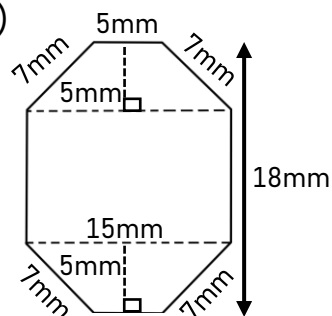
Area: _____

3)



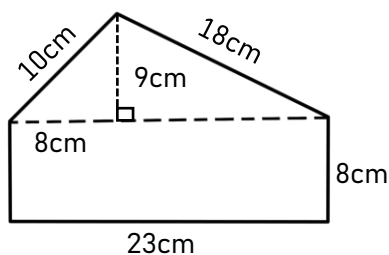
Area: _____

4)



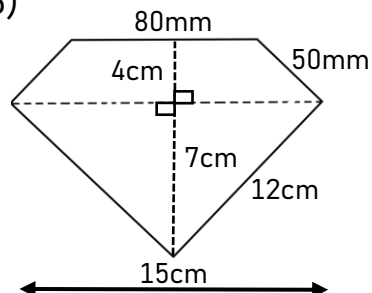
Area: _____

5)



Area: _____

6)



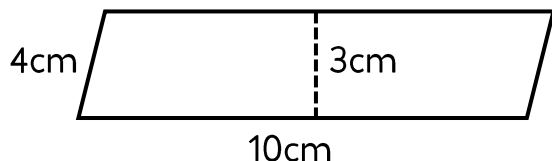
Area: _____

Area Quiz - Triangles and Parallelograms

Part 1

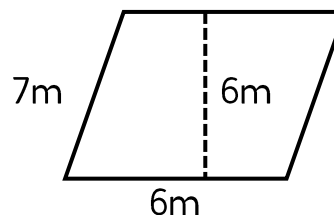
Find the area of the parallelograms below

1)



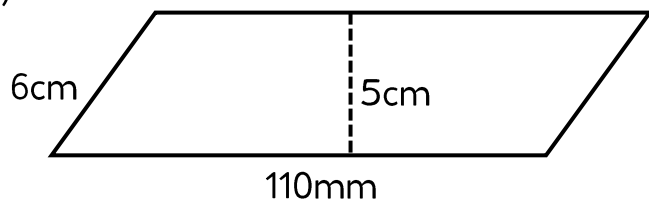
Area = _____

2)



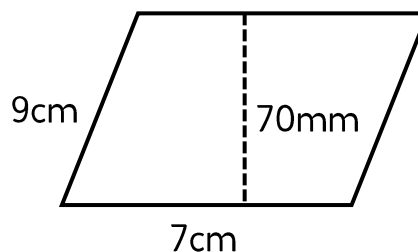
Area = _____

3)



Area = _____

4)

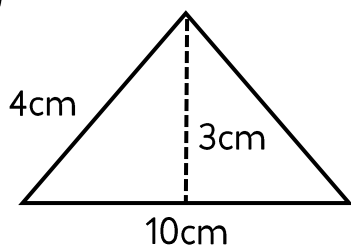


Area = _____

Part 2

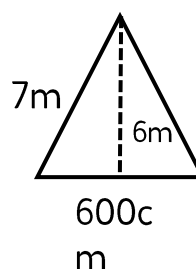
Find the area of the triangles below

1)



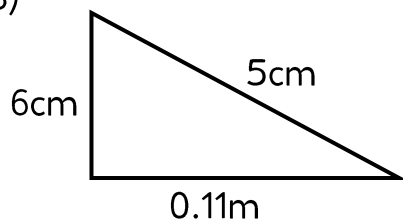
Area = _____

2)



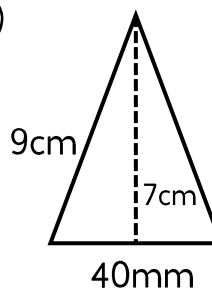
Area = _____

3)



Area = _____

4)

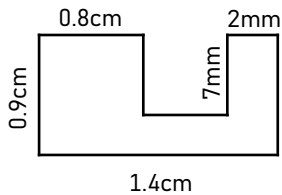


Area = _____

Part 3

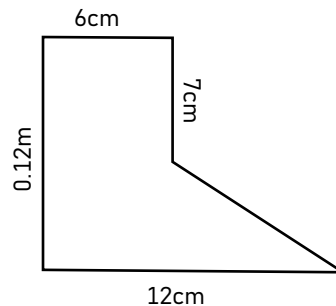
Find the area of the composite polygons below

1)



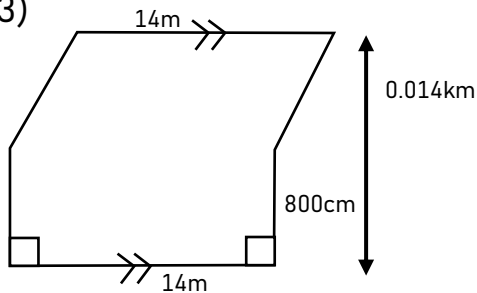
Area = _____

2)



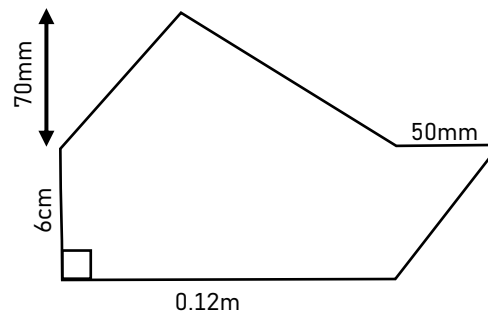
Area = _____

3)



Area = _____

4)



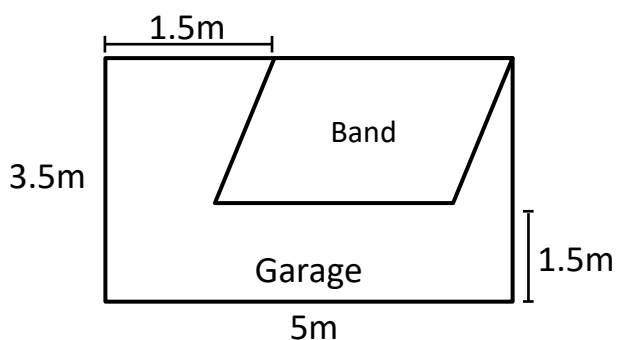
Area = _____

Part 4

Solve the word problems below. Make sure to show your work

1) Jeremy's triangular picture frame has a base of 10cm and a height of 0.12m. What is the area of the triangular frame?

2) Brian and his garage band practice playing in his garage. He has a lot of stuff in his garage, so he taped off some area for them to play. The dimensions of his garage and area they play in is displayed in the diagram. What is the area of the space the band plays in?



Grade 7
(3-D Objects and 2-D Shapes) and
(Transformations)

	Curriculum Expectations	Pages That Cover the Expectations
SS.3	Perform geometric constructions, including: • perpendicular line segments • parallel line segments • perpendicular bisectors • angle bisectors	65 – 77
SS.4	Identify and plot points in the four quadrants of a Cartesian plane using ordered pairs.	78 – 82
SS.5	Perform and describe transformations of a 2-D shape in all four-quadrants of a Cartesian plane (limited to integral vertices).	83 – 111

Lines, Rays, and Line Segments

Point

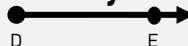
A **point** is a dot.
We often name points with a capital letter

Line



A **line** is straight and goes on forever in both directions (arrows). Lines can have points on them ($\overleftrightarrow{AB}$ or $\overleftrightarrow{BA}$)

Ray



A **ray** is a straight path that goes on forever in one direction (1 arrow). The ray above is $\overrightarrow{DE}$.

Line Segment



A **line segment** is a straight line between two points. The line segment above is $\overline{DE}$ or $\overline{ED}$.

Part 1

Label whether the example is a point, line, ray or line segment

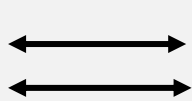
1) 	2) 	3) 	4)
Line JK or KJ $\overleftrightarrow{JK}$ or $\overleftrightarrow{KJ}$			
5) 	6) 	7) 	8)
9) 	10) 	11) 	12)

Part 2

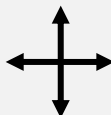
Construct a ray, line, point, and line segment. Label each.

1) 	2) 	3) 	4)
Line Segment – AB	Point C	Line – QR	Ray – MN

Parallel, Perpendicular and Intersecting Lines



= Parallel Lines



= Perpendicular Lines

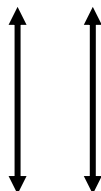


= Intersecting Lines

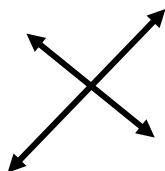
Part 1

Label the lines parallel, perpendicular, or intersecting

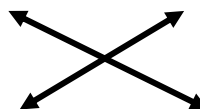
1)



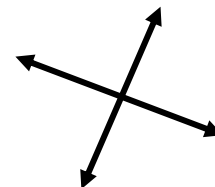
2)



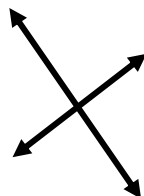
3)



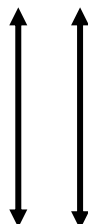
4)



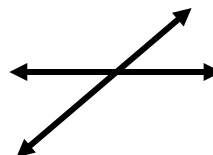
5)



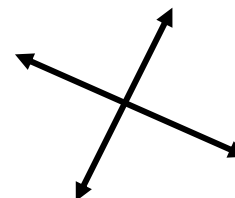
6)



7)



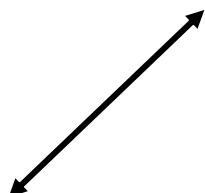
8)



Part 2

Draw a second line that is intersecting, perpendicular, or parallel to the other line

1)



2)



3)



4)



Perpendicular

Parallel

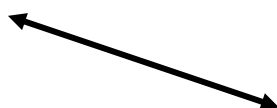
Intersecting

Parallel

5)



6)



7)



8)



Intersecting

Perpendicular

Intersecting

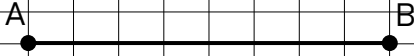
Parallel

Perpendicular and Parallel Line Segments

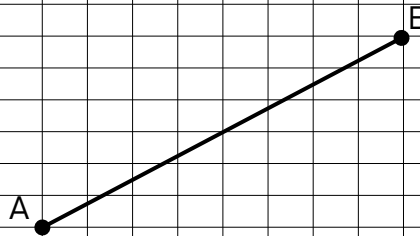
Part 1

Construct perpendicular lines of the line segments $\overleftrightarrow{AB}$

1)



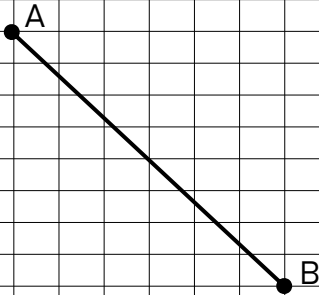
2)



3)



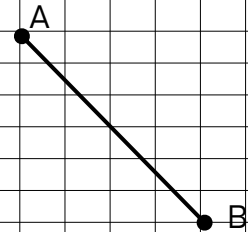
4)



5)



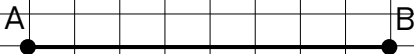
6)



Part 2

Construct parallel lines of the line segments $\overleftrightarrow{AB}$

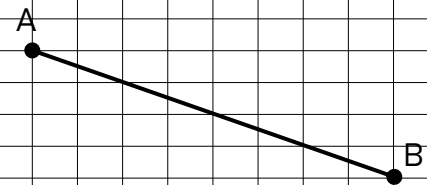
1)



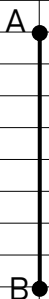
2)



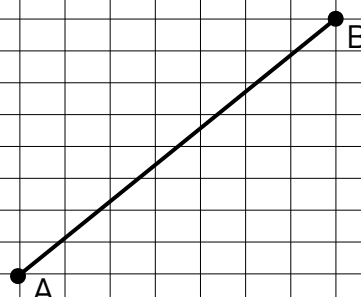
3)



4)



5)

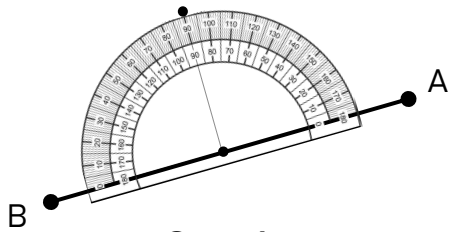


6)

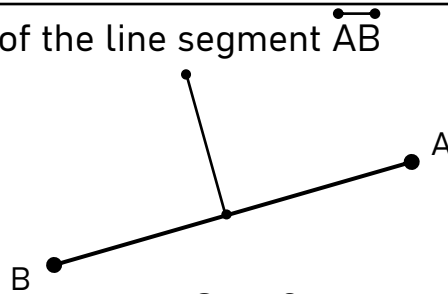


Perpendicular Line Segments

Example - perpendicular line of the line segment $\overline{AB}$



Step 1



Step 2

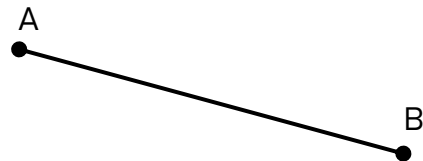
Questions

Construct perpendicular lines of the line segments $\overline{AB}$

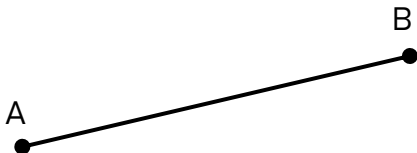
1)



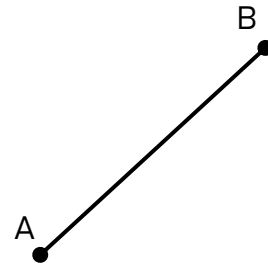
2)



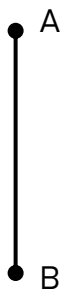
3)



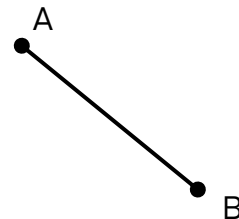
4)



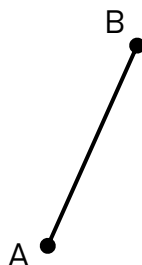
5)



6)



7)

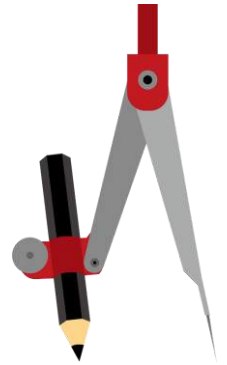
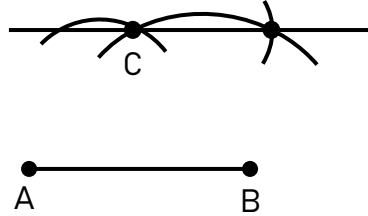


8)



Parallel Line Segments

Use a compass to draw an arc from points A, B, and C.



Questions

Construct parallel lines of the line segments $\overline{AB}$

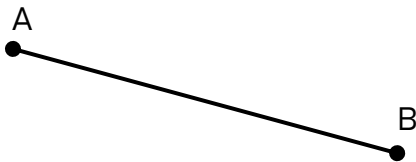
1)



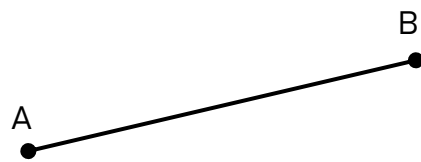
2)



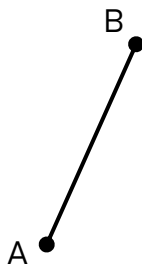
3)



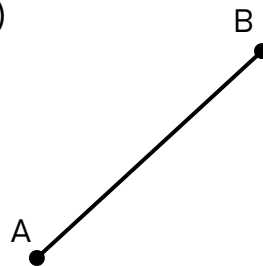
4)



5)



6)



Name: _____

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Constructing Quadrilaterals - Parallel and Perpendicular Lines

Questions

Construct the quadrilaterals below using parallel and perpendicular lines

1)

2)

Square

Rectangle

3)

4)

Parallelogram (2 sets of parallel lines)

Trapezoid (bases have parallel lines)

5)

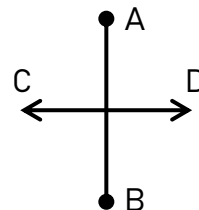
6)

Rhombus (parallel opposite sides)

Kite (diagonal lines are perpendicular)

Perpendicular Bisector

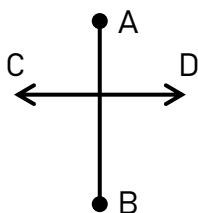
A **perpendicular bisector** is a line that cuts a line segment into two equal parts at 90° . This means the new line is **perpendicular** to the other line and it passes through the **middle** of the other line.



Part 1

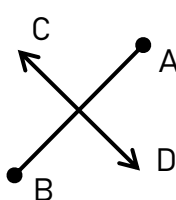
Is the line $\overleftrightarrow{CD}$ a perpendicular bisector of the line segment?

1)



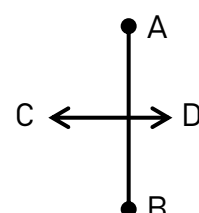
Yes No

2)



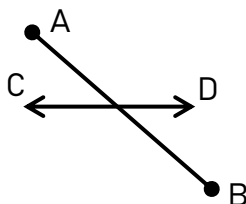
Yes No

3)



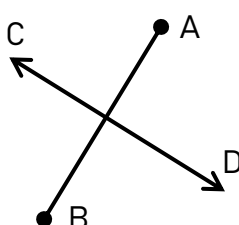
Yes No

4)



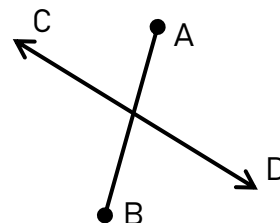
Yes No

5)



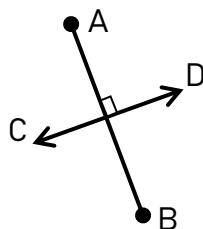
Yes No

6)



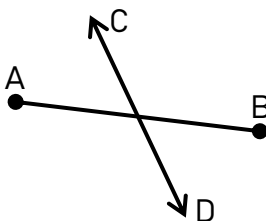
Yes No

7)



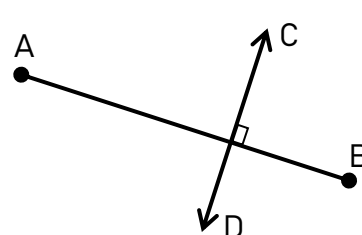
Yes No

8)



Yes No

9)



Yes No

Part 2

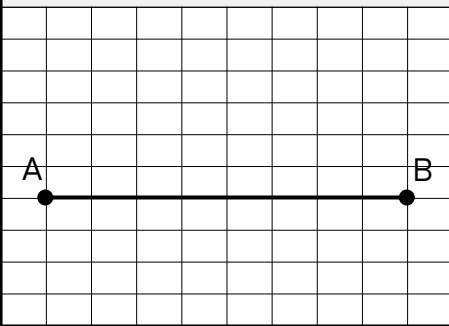
Write what the terms below mean in your own words

Term	Definition
Perpendicular	
Midpoint	

Perpendicular Bisector

DirectionsConstruct a perpendicular bisector of the line segment $\overline{AB}$

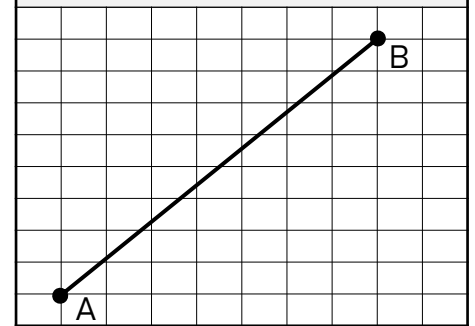
1)



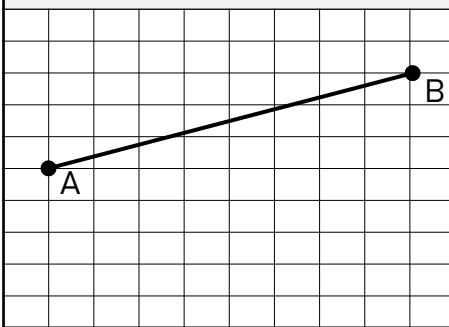
2)



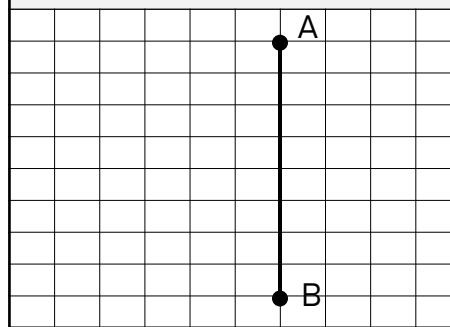
3)



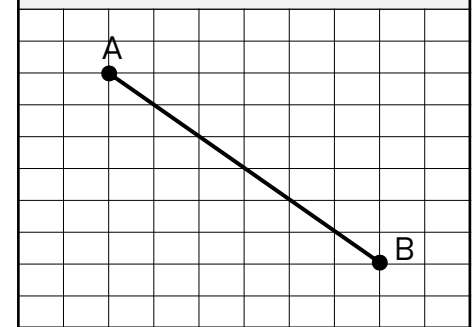
4)



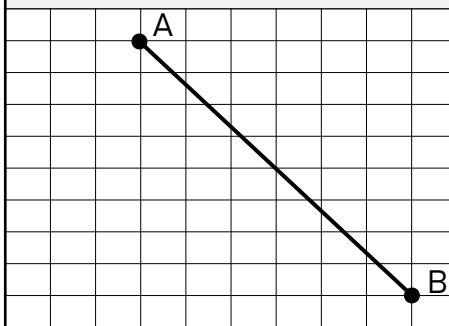
5)



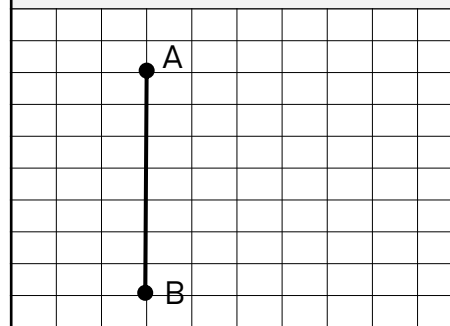
6)



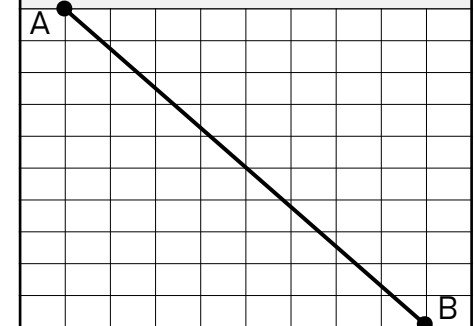
7)



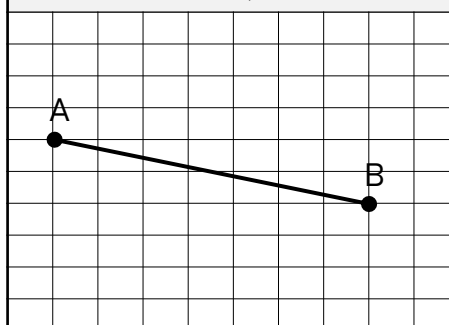
8)



9)



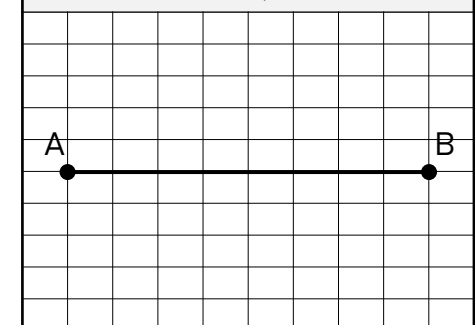
10)



11)



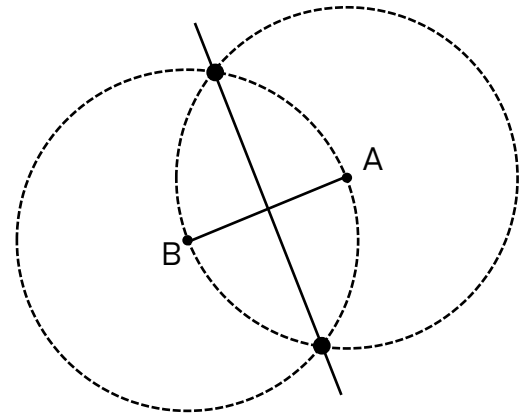
12)



Perpendicular Bisector

Example - Perpendicular line bisector of the line segment AB

- Use a compass to sketch a circle around point A
- Use a compass to sketch a circle around point B
- Where the circles intersect, place a point
- Connect the two points to finish constructing your perpendicular bisector



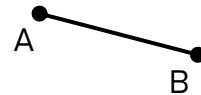
Questions

Construct perpendicular bisectors of the line segment $\overline{AB}$

1)



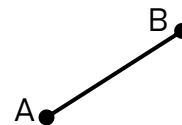
2)



3)



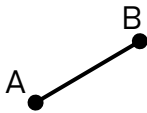
4)



Perpendicular Bisector

QuestionsConstruct perpendicular bisectors of the line segment $\overline{AB}$

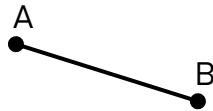
1)



2)



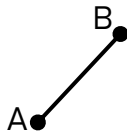
3)



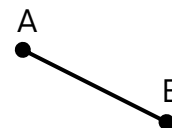
4)



5)

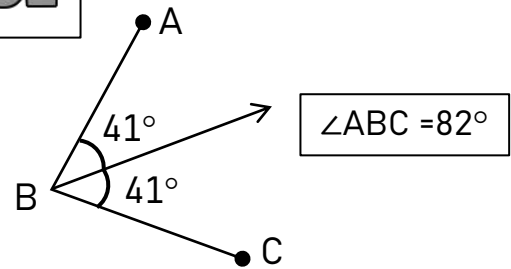


6)



Angle Bisector

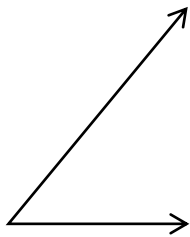
An **angle bisector** is a line that cuts an angle into two identical (congruent) parts. For example, if we construct an angle bisector on a 90° angle, we will have two 45° angles.



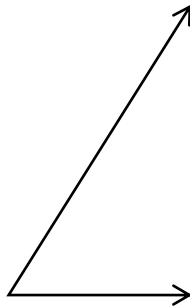
Directions

Construct an angle bisector of the angles below using a protractor

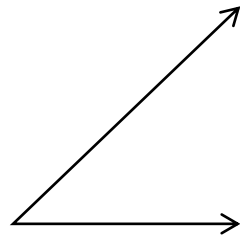
1)



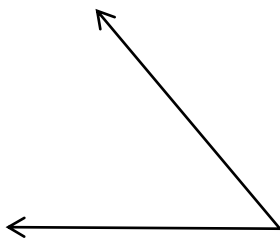
2)



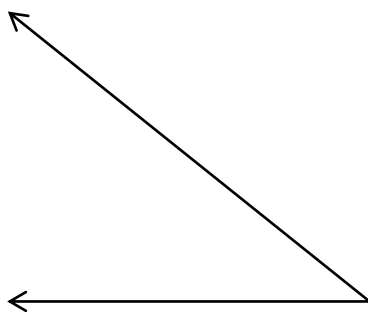
3)



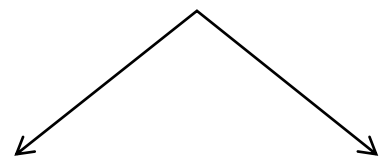
4)



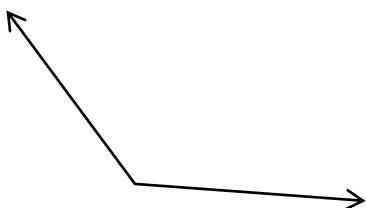
5)



6)



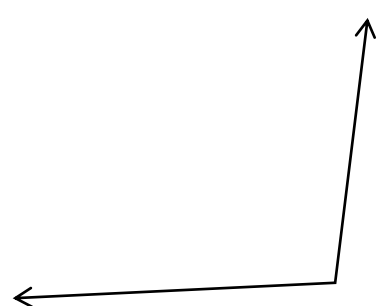
7)



8)



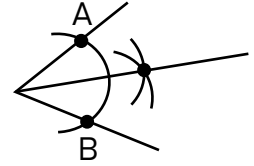
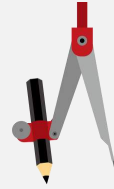
9)



Angle Bisector

We can also use a compass to find an angle bisector.

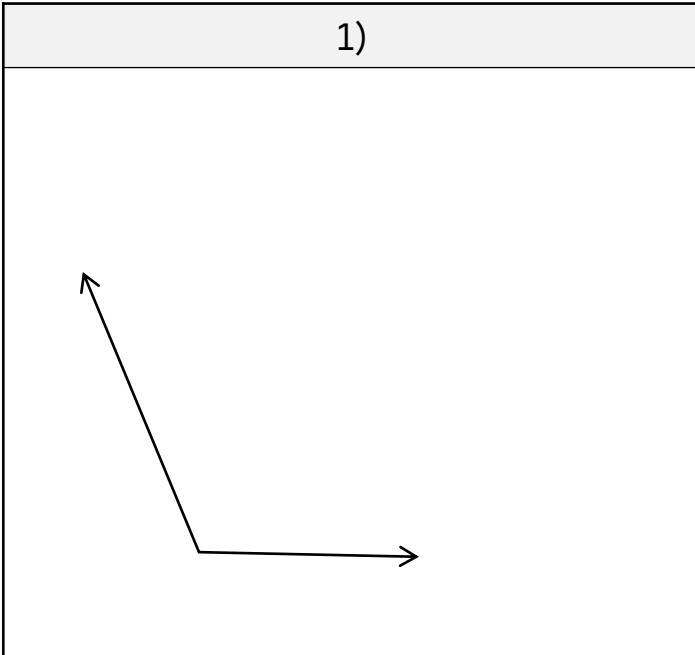
- Draw an arc using point A as the anchor point
- Draw an arc using point B as the anchor point
- Place a point where your two arcs intersect
- Draw a line from the vertex to your new point



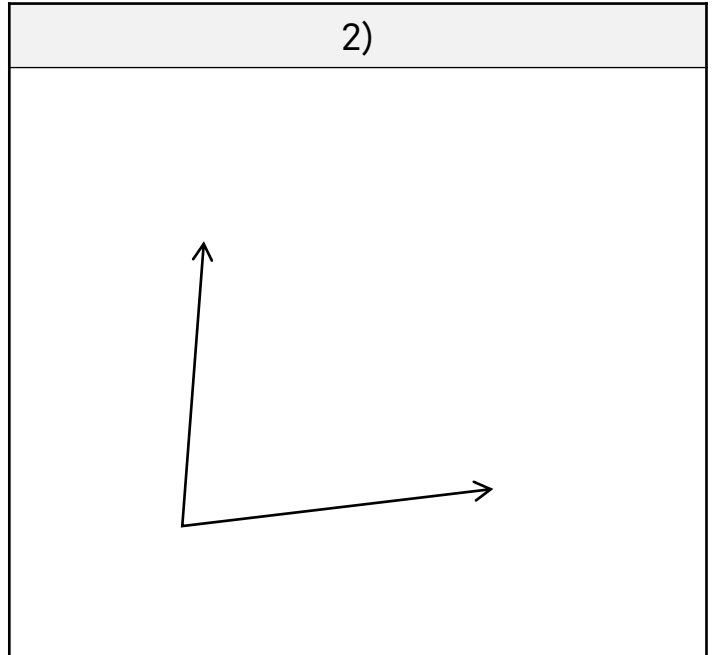
Directions

Construct an angle bisector of the angles below using a compass

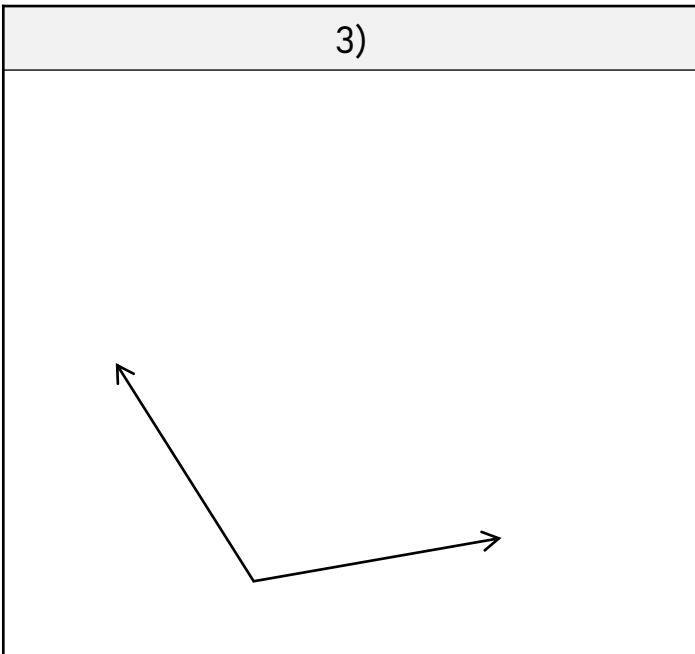
1)



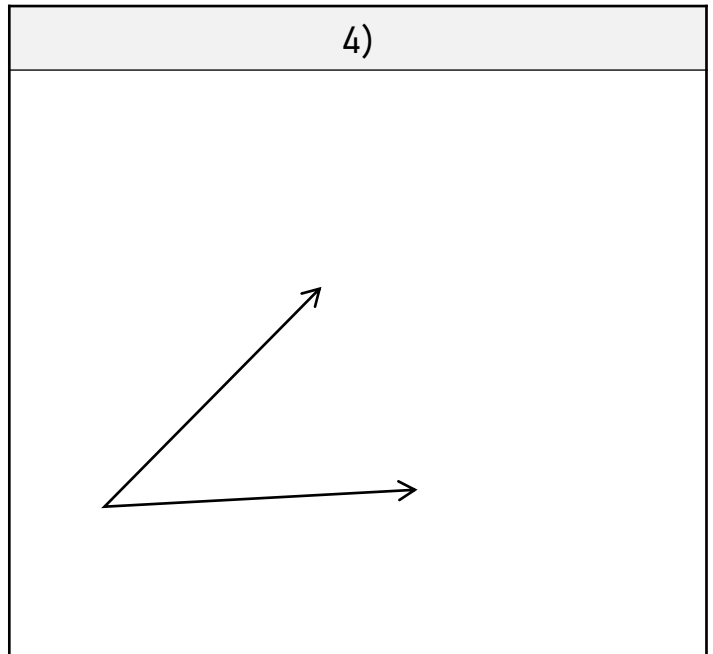
2)



3)



4)



Name: _____

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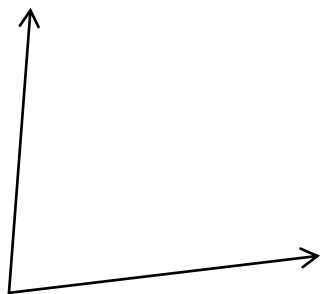
Curriculum Connection
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Angle Bisector

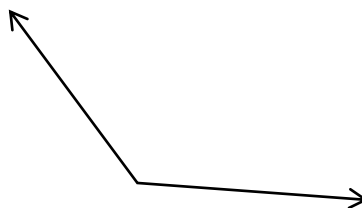
Directions

Construct an angle bisector of the angles below using a compass

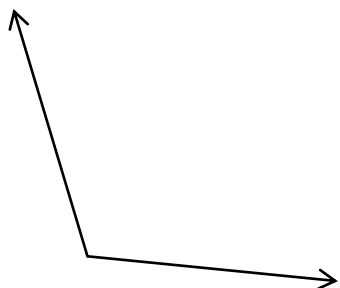
1)



2)



3)



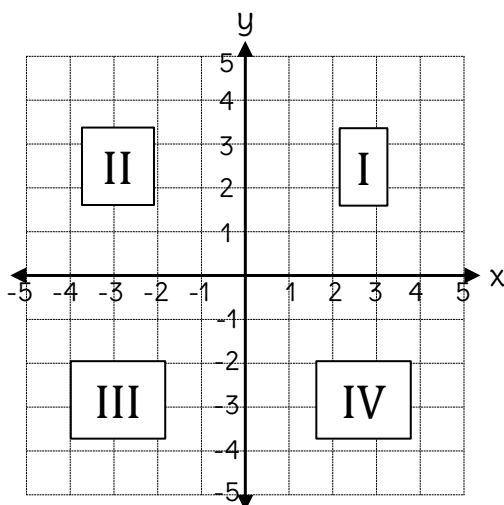
4)



Four Quadrants - Cartesian Plane

Part 1

Write which quadrant the points would be found



Coordinates (x, y)	Quadrant
(2, -4)	
(5, 4)	
(-4, -5)	
(-2, 3)	
(5, 2)	

Part 2

Write your own coordinates for a point that could be found in the quadrant

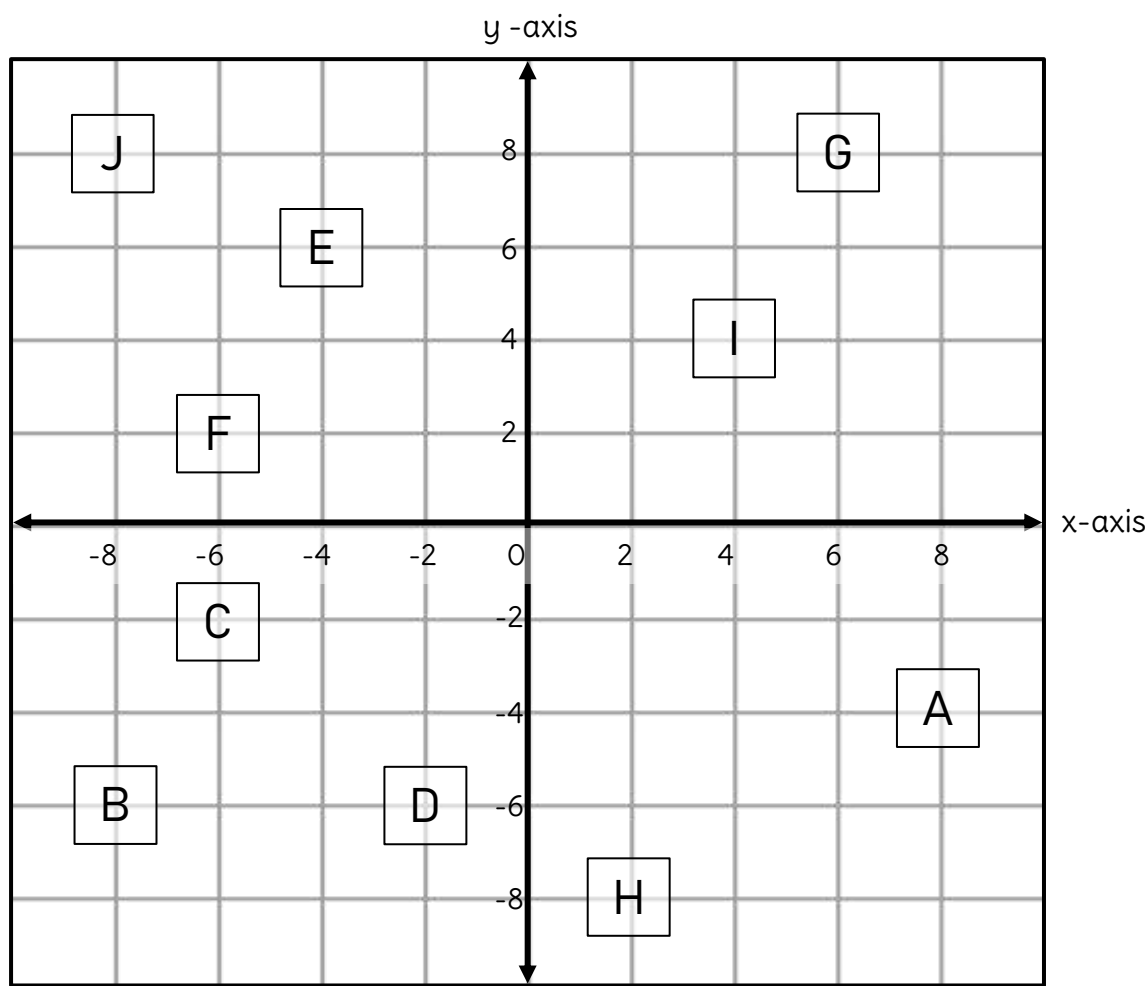
Quadrant	Coordinates (x, y)
Quadrant I	
Quadrant II	
Quadrant III	
Quadrant IV	
Quadrant III	
Quadrant II	
Quadrant IV	
Quadrant I	

Part 3

Which quadrant number is associated with the descriptions below

	Description	Quadrant
1)	Both positive values	
2)	Both negative values	
3)	An x positive value and y negative value	
4)	An x negative value and y positive value	

Using 4 Quadrants on a Cartesian Plane

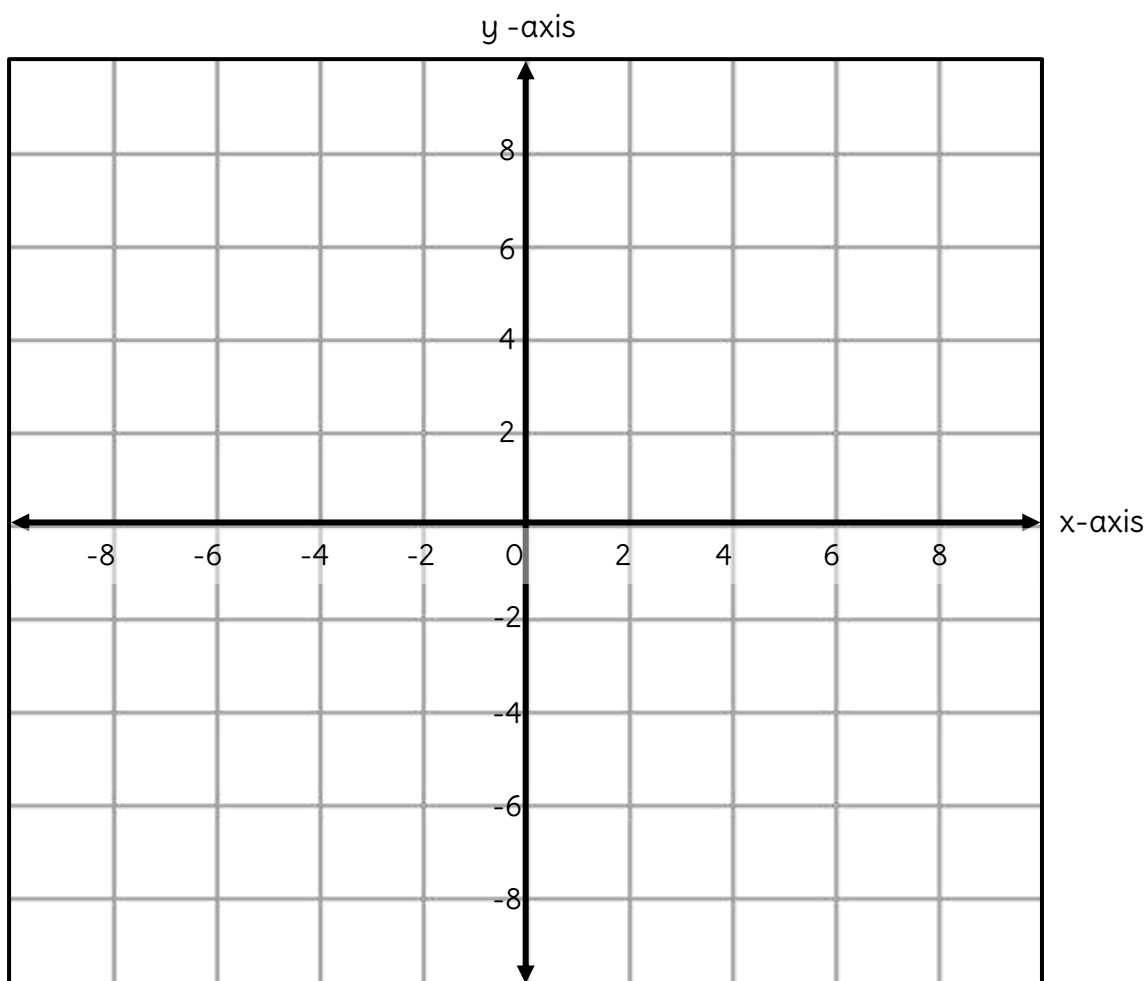


Questions

Write the coordinates for each object on the cartesian plane

Symbol	Coordinates (x, y)
A	(8, -4)
B	(____, ____)
C	(____, ____)
D	(____, ____)
E	(____, ____)

Symbol	Coordinates (x, y)
F	(____, ____)
G	(____, ____)
H	(____, ____)
I	(____, ____)
J	(____, ____)

Using 4 Quadrants on a Cartesian Plane**Questions**

Write the letters on the grid according to the coordinates

Letter	Coordinates (x, y)
A	(-2, 4)
B	(-6, 6)
C	(8, -4)
D	(7, 4)
E	(-2, -2)

Letter	Coordinates (x, y)
F	(-5, 3)
G	(8, 8)
H	(-6, 1)
I	(3, -8)
J	(0, -7)

Plotting Ordered Pairs on Cartesian Plane

Directions

Plot the ordered pairs on the cartesian plane

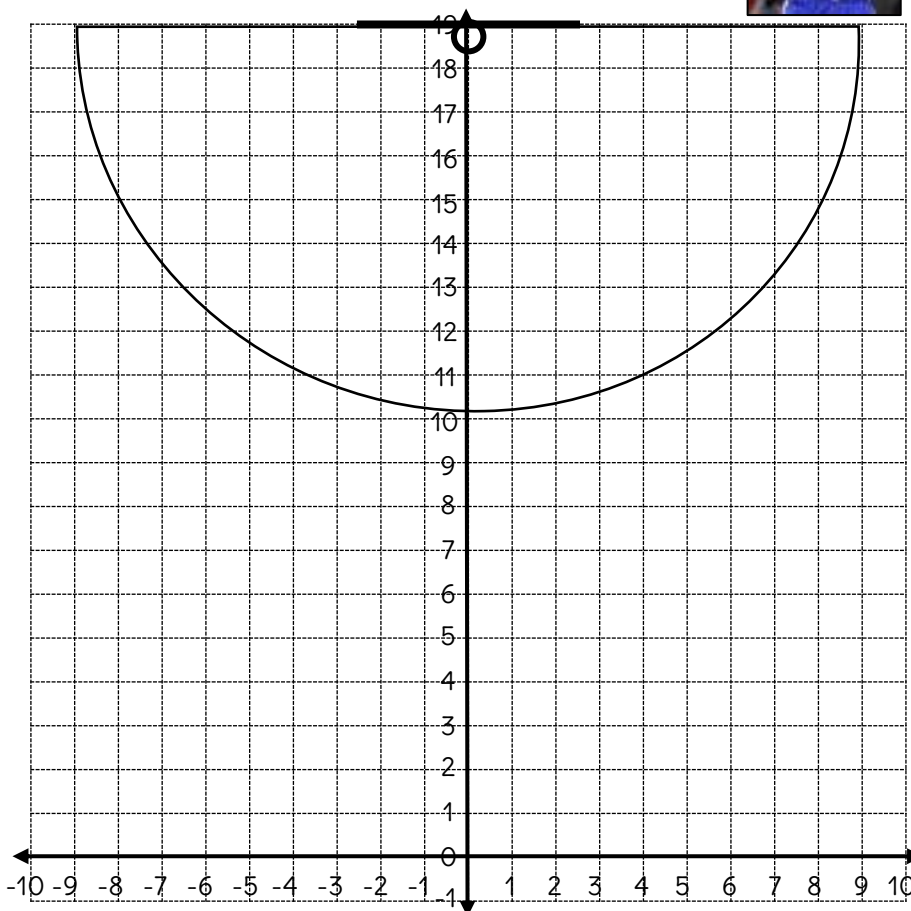
Steph Curry is a tremendous shooter. His shot attempts and shot makes from his last game have been displayed in the table below. The coordinates for each shot show where Curry made or missed from.



If the shot is made, plot a green dot using the coordinates.

If the shot is missed, plot a red dot using the coordinates.

Shot Make	Shot Miss
(3, 9)	(2, 12)
(-5, 10)	(5, 13)
(1, 8)	(3, 14)
(-10, 18)	(-8, 17)
(-1, 18)	(6, 10)
(4, 1)	(-8, 12)
(2, 15)	(9, 15)
(-6, 11)	(6, 14)
(-2, 15)	
(1, 18)	



Questions

Answer the questions below

Questions	Answers
1) What was Curry's field goal percentage? (#Makes/#Total Shots)	
2) What was Curry's 3-point percentage? (#3-Point Makes/#Total 3-Point Shots)	
3) How many points did Curry have?	
4) Curry has asked you where he should shoot from. Use the coordinates you plotted to give him at least 2 tips.	

Plotting Ordered Pairs on Cartesian Plane

Directions Plot the ordered pairs on the cartesian plane

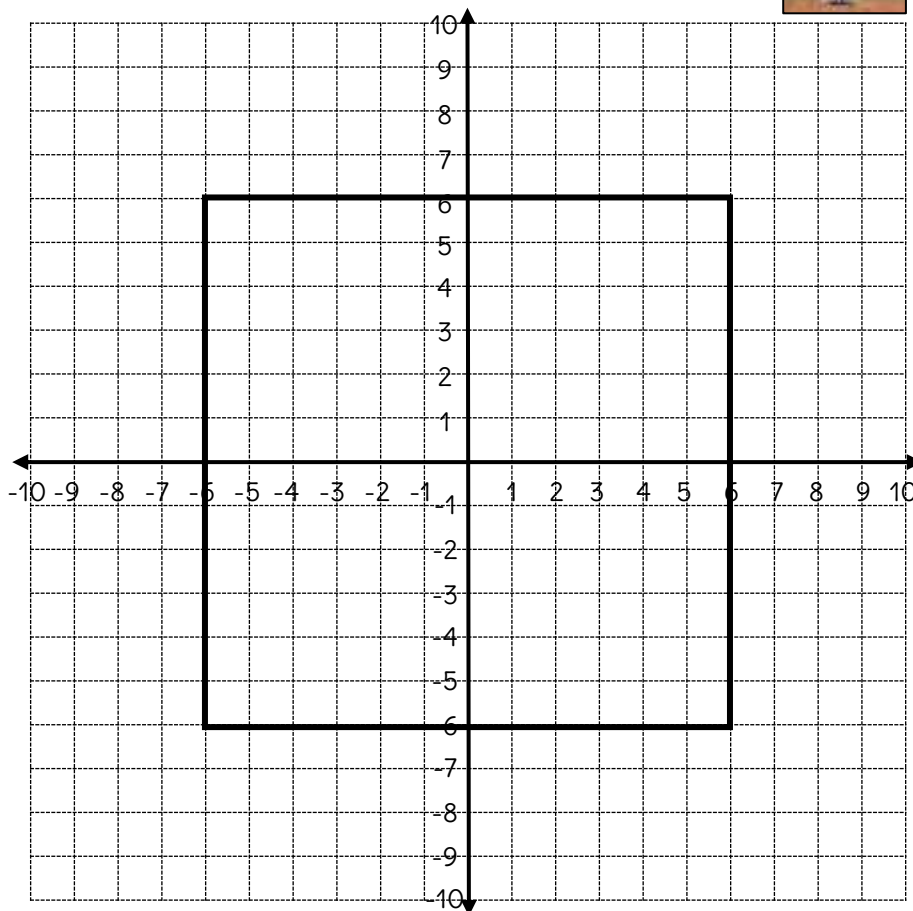
Robbie Ray pitches for the Blue Jays. He only pitched 3 innings last game. His strikes and pitches that resulted in a hit are recorded in the table. Where he threw each pitch has been displayed using coordinates.

If the pitch is a strike, plot a green dot using the coordinates

If the pitch is hit, plot a red dot using the coordinates.



Strikes	Hits
$(-3, 0)$	$(0, 0)$
$(-6, -6)$	$(0, 2)$
$(5, -5)$	$(-1, -1)$
$(3, 6)$	$(-2, 2)$
$(-7, 6)$	$(2, -1)$
$(6, 6)$	$(-3, -2)$
$(-5, -4)$	$(3, -2)$
$(-8, -4)$	$(-2, -3)$
$(5, 5)$	$(2, -2)$
$(-3, 5)$	



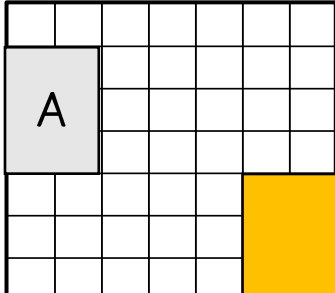
Questions Answer the questions below

Questions	Answers
1) How many strikes did Ray throw?	
2) How many hits did he give up?	
3) How many pitches did he make in the upper part of the strike zone?	
4) How many strikes did Ray throw out of the strike zone?	
5) Ray has asked you where he should throw his pitches. Use the coordinates you plotted to give him at least 2 tips.	

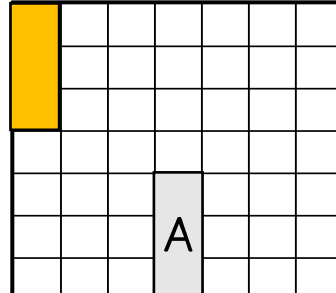
Transformations - Translations

Part 1

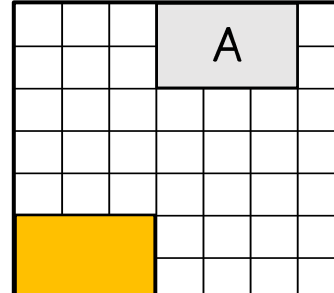
Describe the translations below. Shape A is the original object



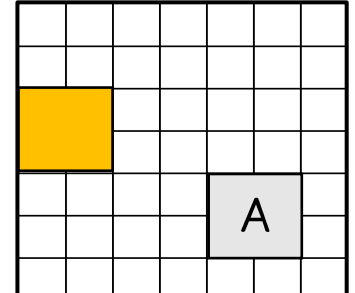
1) down 3, right 5



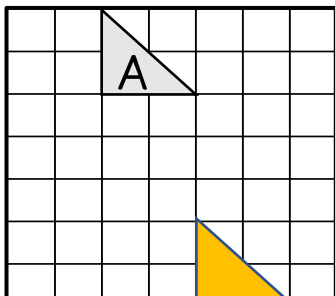
2) _____



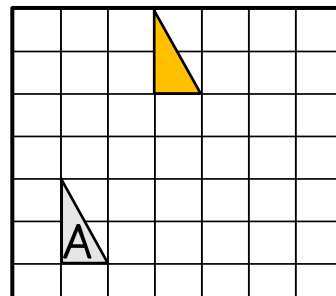
3) _____



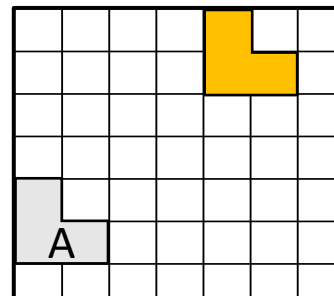
4) _____



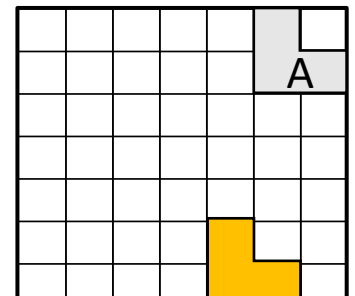
5) _____



6) _____



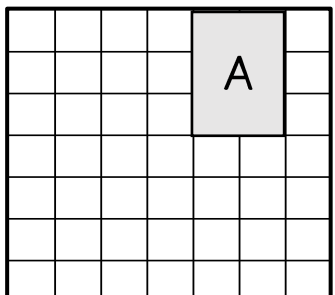
7) _____



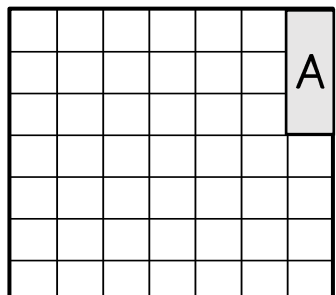
8) _____

Part 2

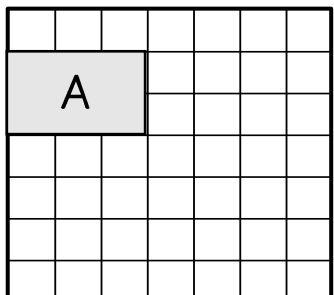
Draw the translations below



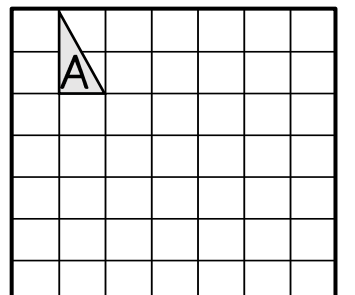
1) 4 ↓



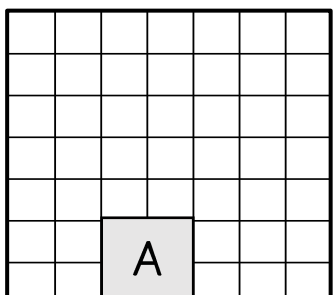
2) 3 ↓, 4 ←



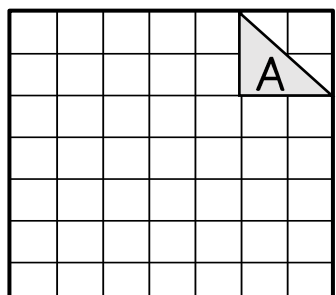
3) 2 ↓, 4 →



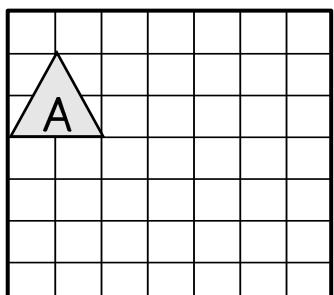
4) 4 ↓, 3 →



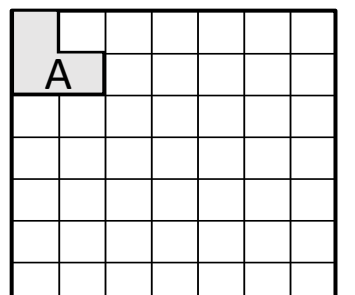
5) 4 ↑, 2 →



6) 5 ↓, 4 ←



7) 2 ↓, 5 →

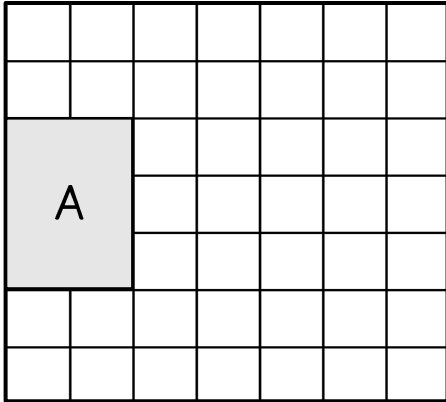


8) 3 ↓, 5 →

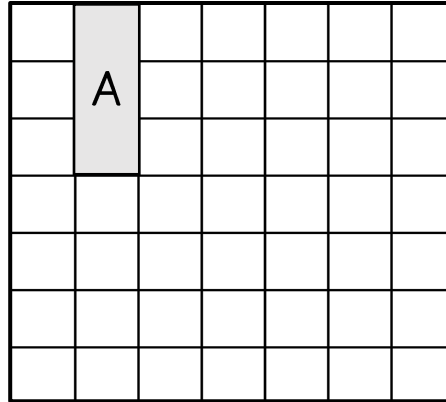
Performing Translations

Questions

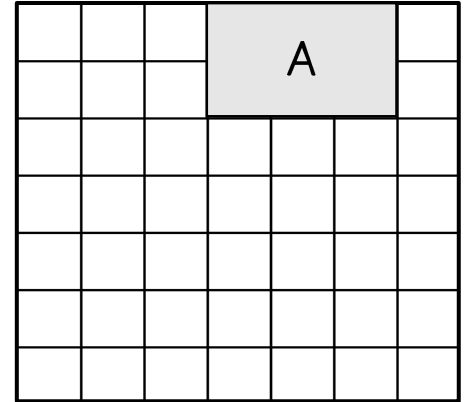
Draw the new shape after reading the 3 steps



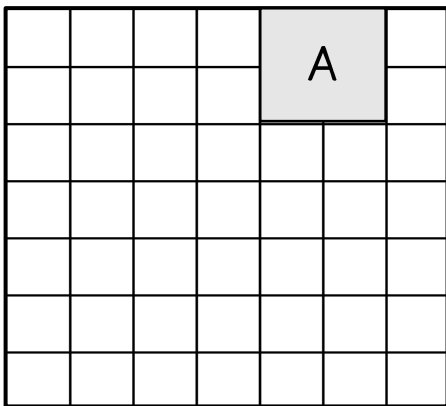
1) 2↑, 5→, 3↓



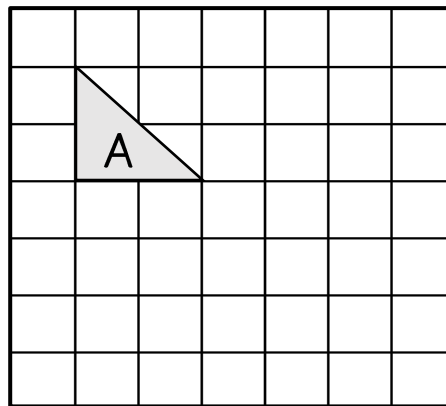
2) 3↓, 4→, 1↓



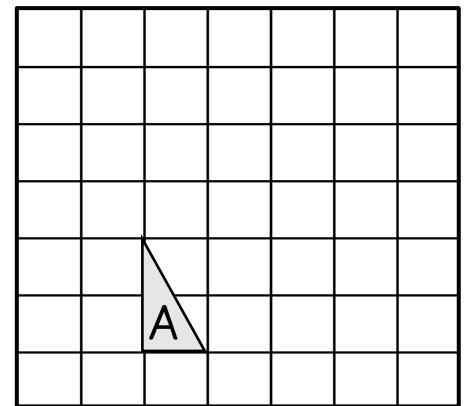
3) 1↓, 3←, 2↓



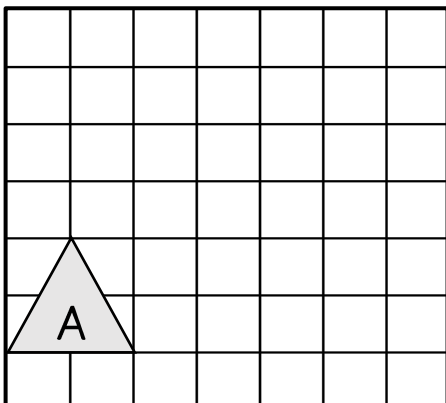
4) 4↓, 3←, 2↑



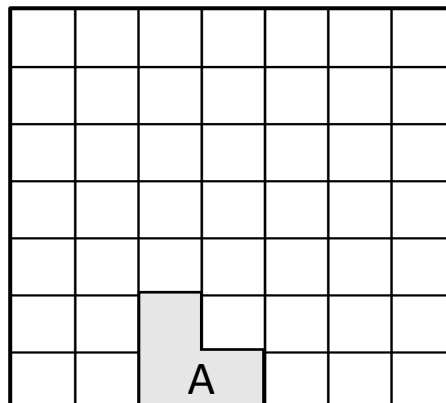
5) 3↓, 3→, 4↑



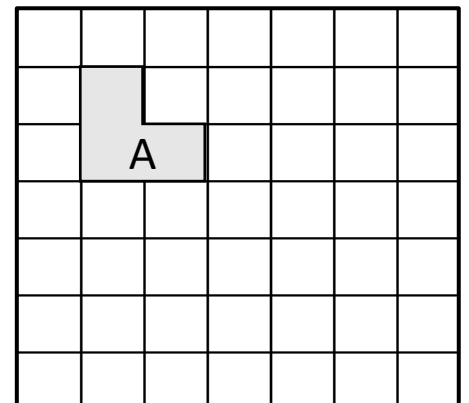
6) 4↑, 3→, 2↓



7) 4↑, 3→, 1←



8) 5↑, 2→, 4↓



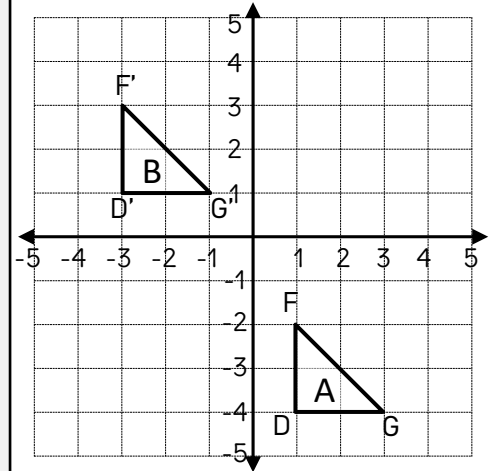
9) 3↓, 3→, 3↑

Translations - Mapping Rules

Mapping Rules for Translations

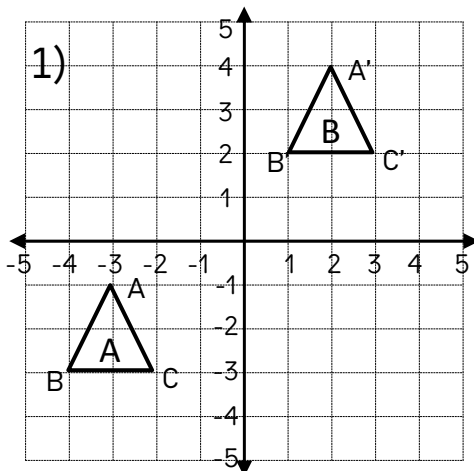
Each point on a shape slides according to the mapping rule.
The rule is $(x, y) \rightarrow (x + a, y + b)$

- 1) Choose 1 coordinate from the shape to translate
- 2) We need to move the x coordinate -4 spaces to the left. This means we subtract 4.
- 3) We need to move the y coordinate +5 spaces up. This means we add 5.
- 4) The **mapping rule** is: $(x, y) \rightarrow (x - 4, y + 5)$
- 5) Remember: if we move to the left or down, we are adding a negative number (subtracting) and if we move right or up, we are adding a positive number.

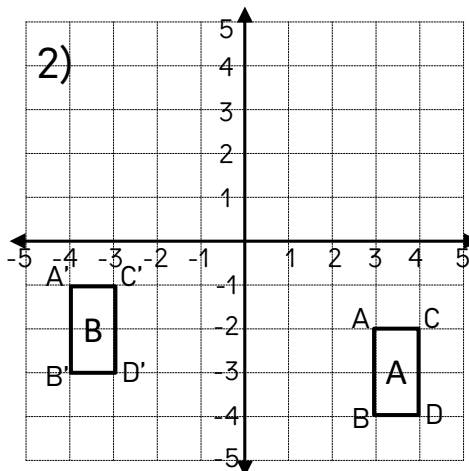


Questions

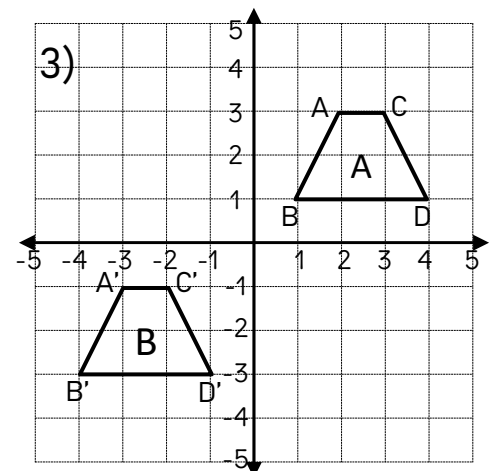
Fill in the mapping rule that translates figure A to figure B



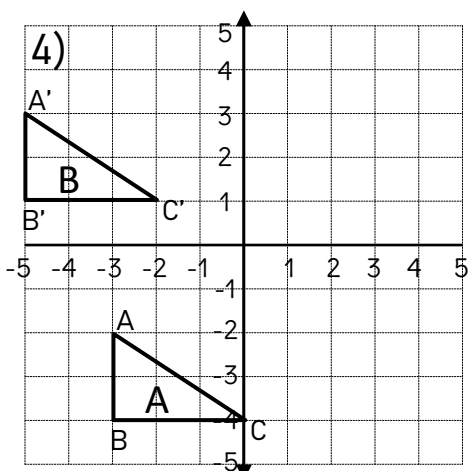
Mapping Rule $(x \square _, y \square _)$



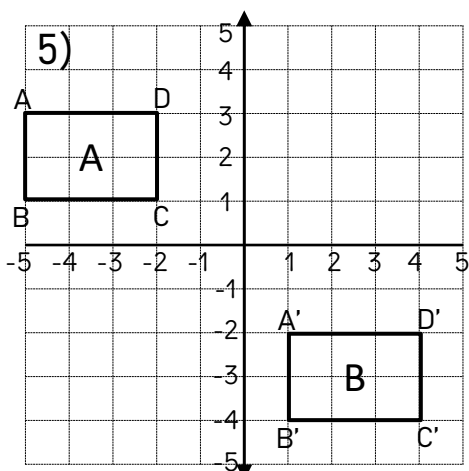
Mapping Rule $(x \square _, y \square _)$



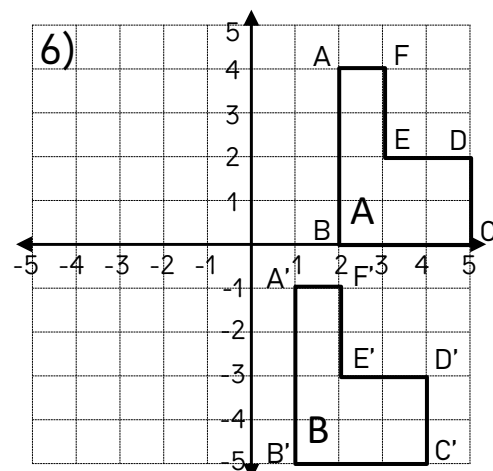
Mapping Rule $(x \square _, y \square _)$



Mapping Rule $(x \square _, y \square _)$



Mapping Rule $(x \square _, y \square _)$

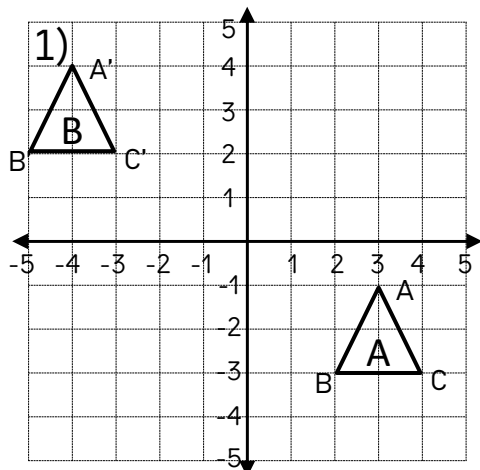


Mapping Rule $(x \square _, y \square _)$

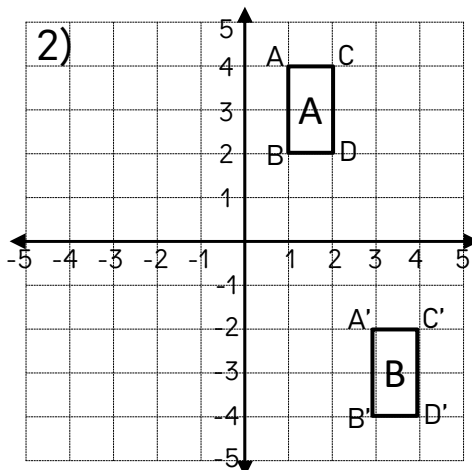
Translations - Mapping Rules

Questions

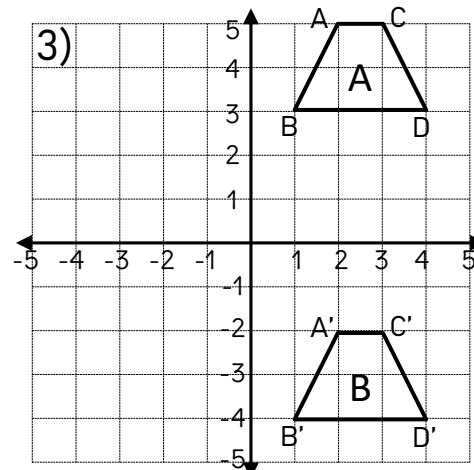
Fill in the mapping rule



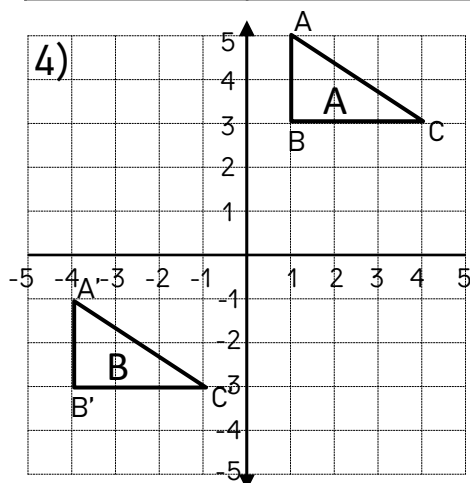
Mapping Rule



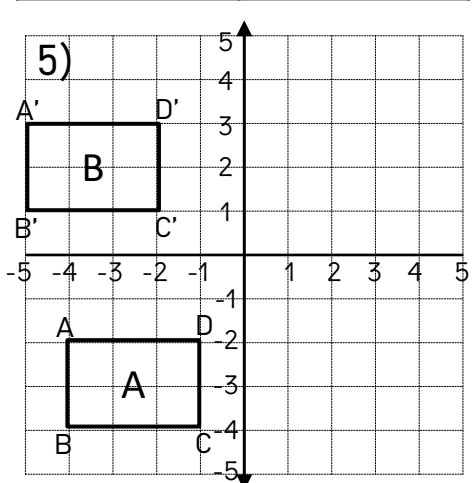
Mapping Rule



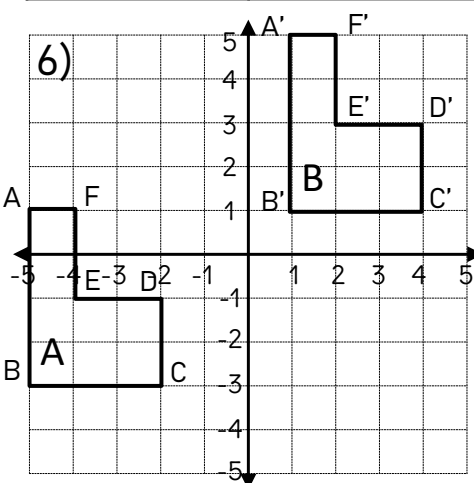
Mapping Rule



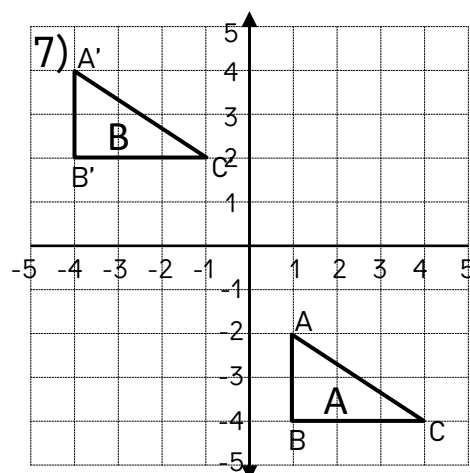
Mapping Rule



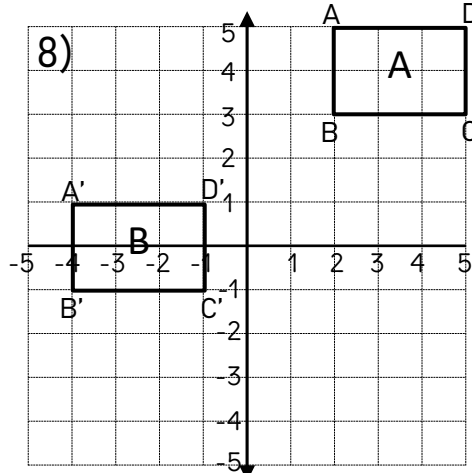
Mapping Rule



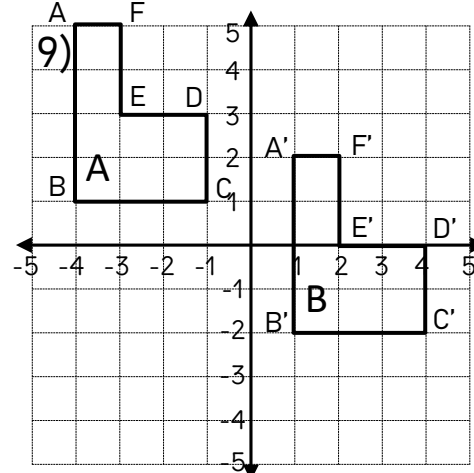
Mapping Rule



Mapping Rule



Mapping Rule

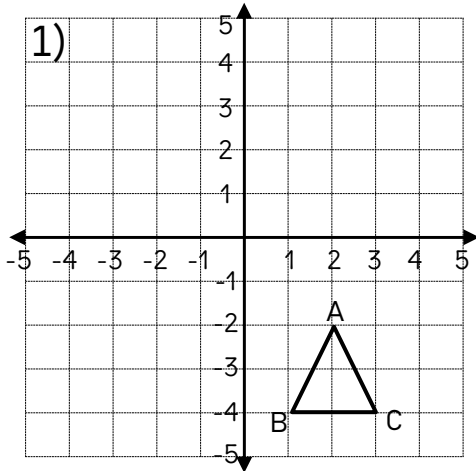


Mapping Rule

Translations - Mapping Rules

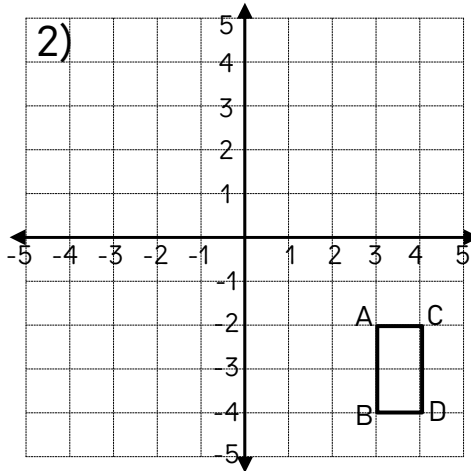
Questions

Translate the shape using the mapping rule



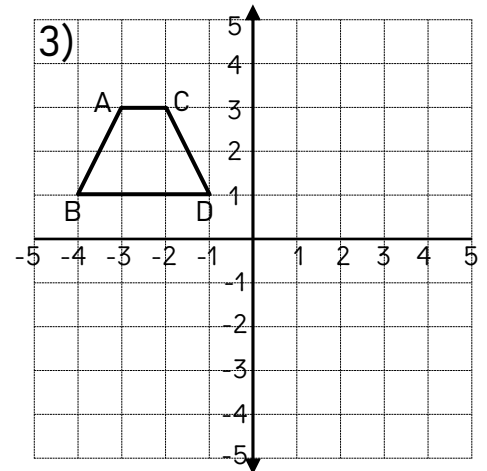
Mapping Rule

$$(x - 5, y + 4)$$



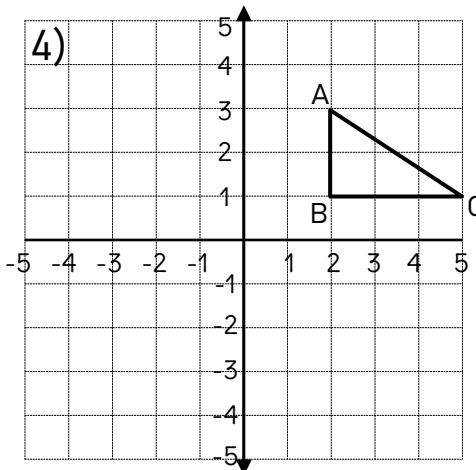
Mapping Rule

$$(x - 7, y + 6)$$



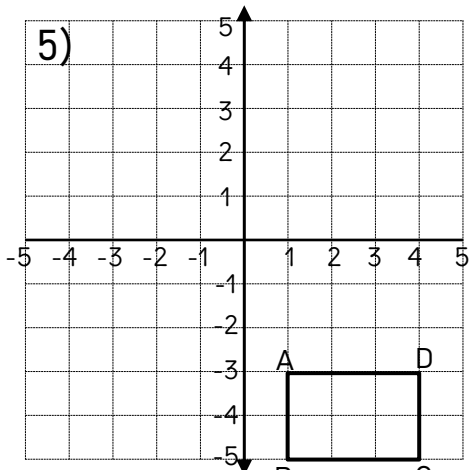
Mapping Rule

$$(x + 5, y - 4)$$



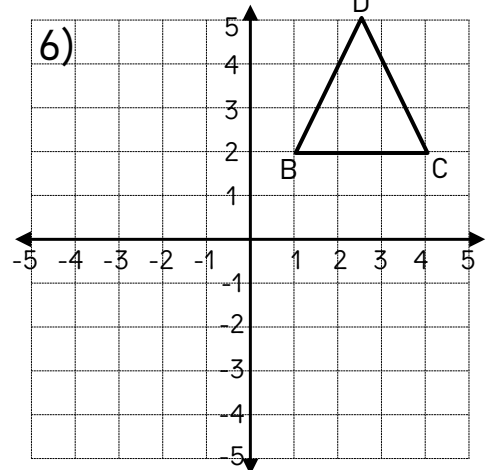
Mapping Rule

$$(x - 5, y + 2)$$



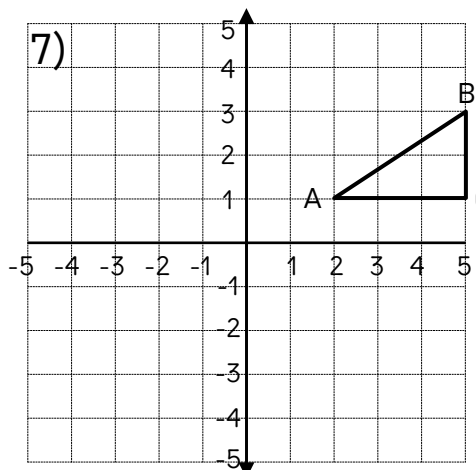
Mapping Rule

$$(x - 5, y + 8)$$



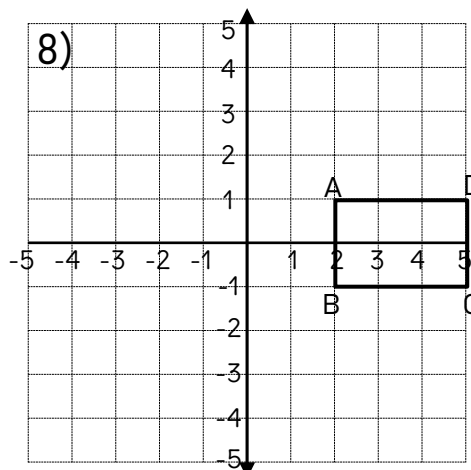
Mapping Rule

$$(x - 3, y - 6)$$



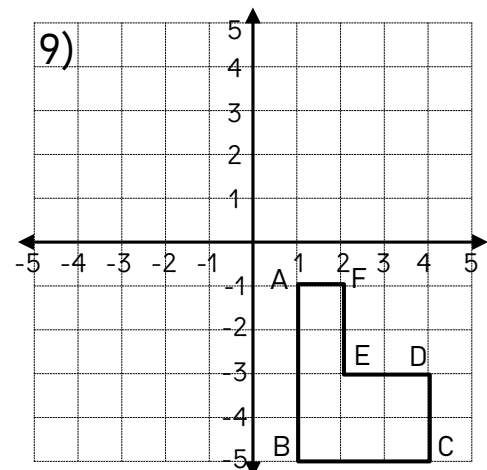
Mapping Rule

$$(x - 4, y - 5)$$



Mapping Rule

$$(x - 5, y + 3)$$



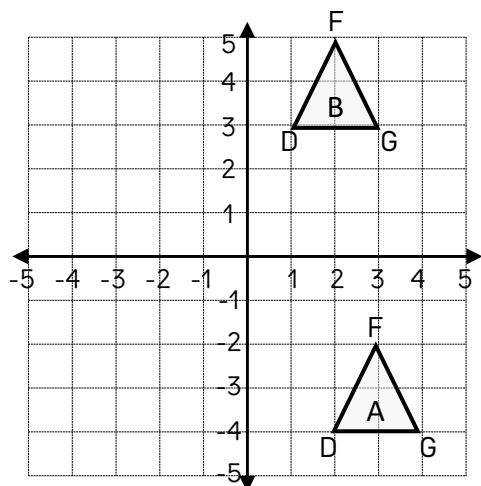
Mapping Rule

$$(x - 6, y + 5)$$

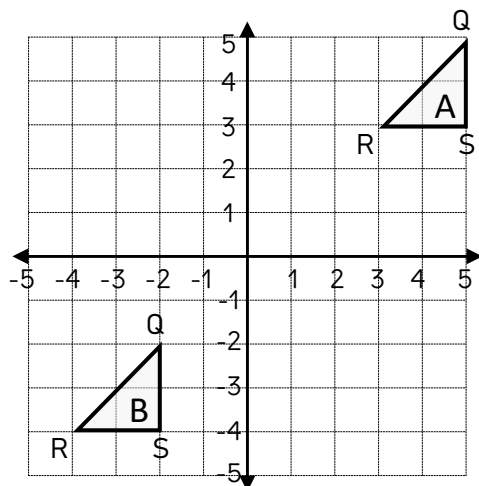
Transformations - Translations

Questions

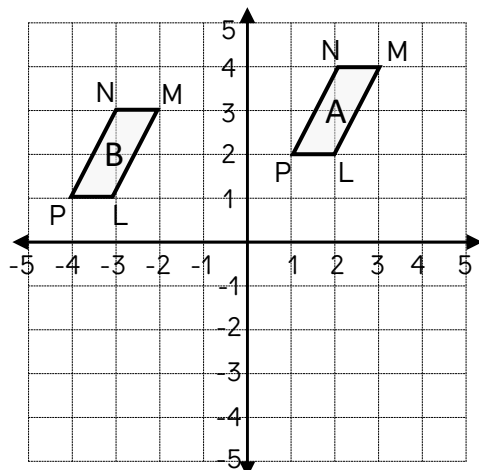
1) Fill in the coordinates 2) Describe the translation 3) Translate shape C



Coordinates A	Coordinates B
Mapping Rule $(x, y) \rightarrow (x, y) \rightarrow (x + a, y + b)$	
Translate Shape B to Shape C $(x - 4, y - 5)$	Coordinates C



Coordinates A	Coordinates B
Mapping Rule $(x, y) \rightarrow (x, y) \rightarrow (x + a, y + b)$	
Translate Shape B to Shape C $(x, y + 6)$	Coordinates C



Coordinates A	Coordinates B
Mapping Rule $(x, y) \rightarrow (x, y) \rightarrow (x + a, y + b)$	
Translate Shape B to Shape C $(x + 4, y - 5)$	Coordinates C

Translations - New Coordinates

Part 1 Draw the shapes using the coordinates provided. Then translate the shape

Shape A

P(2,5), Q(2,1), R(8,3), S(9,5)

Translate the shape A

$(x - 3, y - 5)$

Shape B

F(-9,4), G(-6,5), H(-6,2)

Translate the shape B

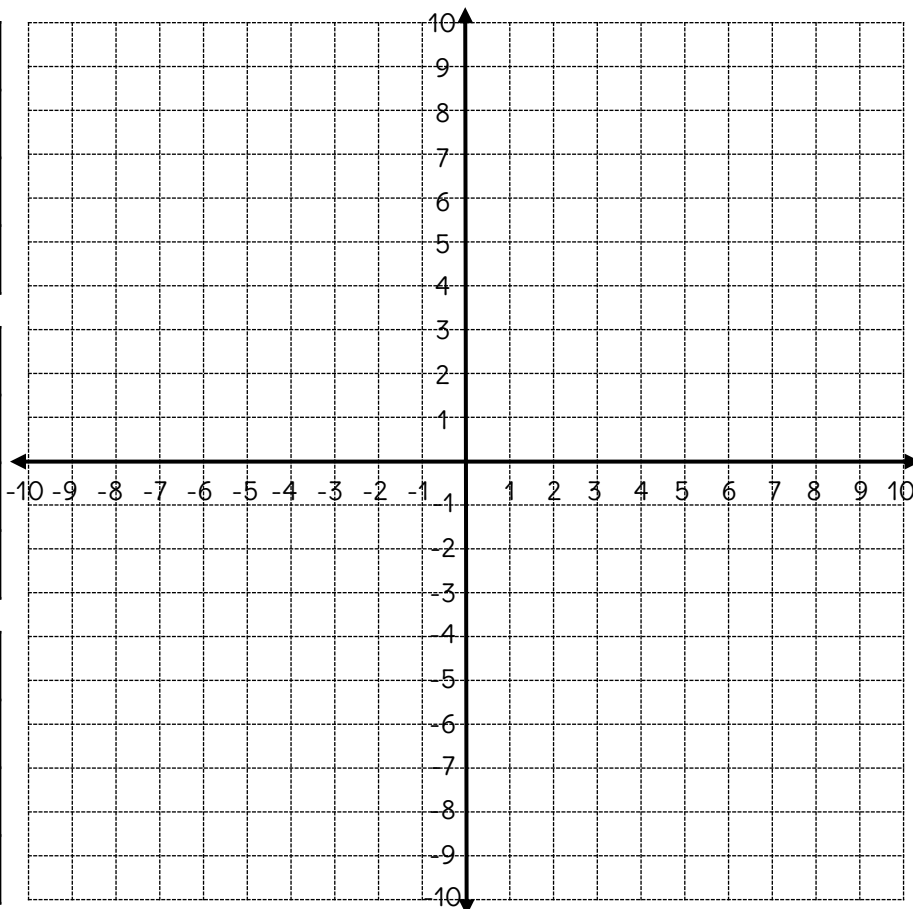
$(x + 4, y - 6)$

Shape C

J(-7,-8), K(-4,-8), L(-3,-5)

Translate the shape C

$(x + 6, y - 2)$



Part 2 Give the coordinates of each point after the translation

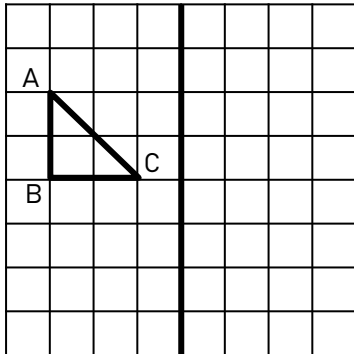
	Original Coordinate	Translation - Mapping Rule	New Coordinates
1)	P(3, -4)	$(x - 6, y + 4)$	P(-3, 0)
2)	S(-5, 8)	$(x + 3, y - 5)$	
3)	Q(-9, -5)	$(x + 2, y - 7)$	
4)	L(10, 5) P(-3, -8)	$(x - 5, y + 8)$	
5)	T(-8, 7) Y(-9, -5)	$(x + 8, y + 5)$	
6)	S(-14, -16) R(15, 12)	$(x - 11, y - 6)$	
7)	N(-21, 11) K(20, -14)	$(x - 9, y + 13)$	
8)	P(28, -21) E(-25, 20)	$(x + 17, y + 22)$	

Drawing Reflections

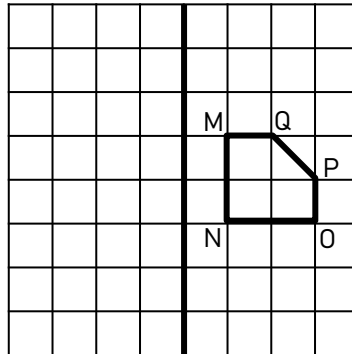
Questions

Reflect the shapes across the mirror line

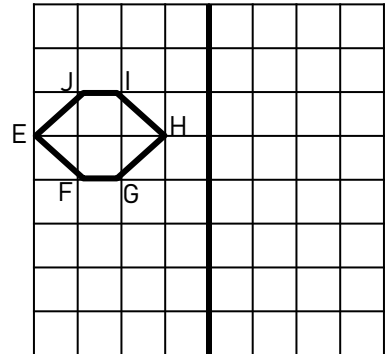
1)



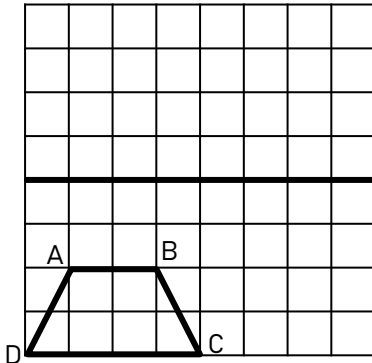
2)



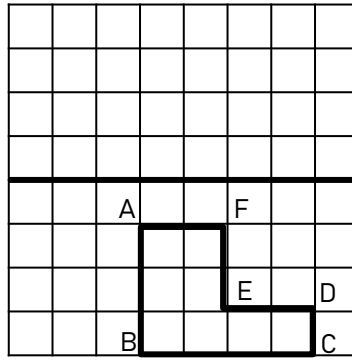
3)



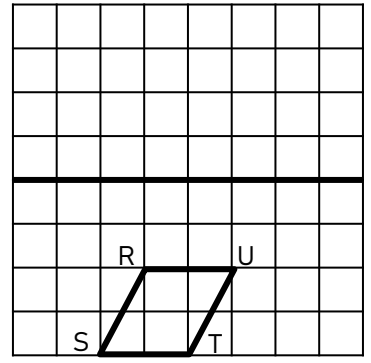
4)



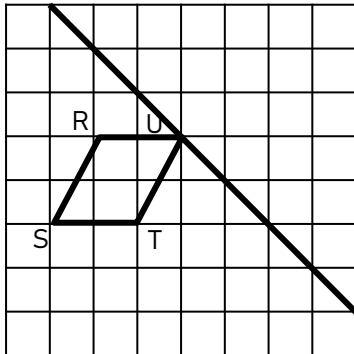
5)



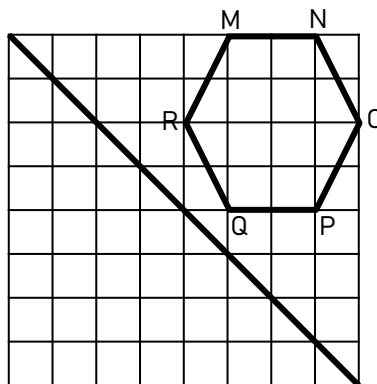
6)



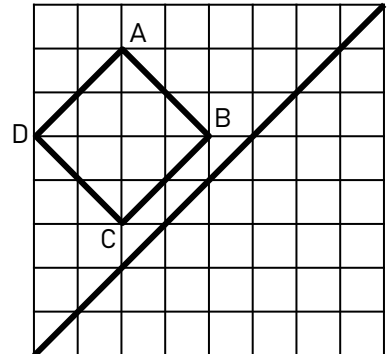
7)



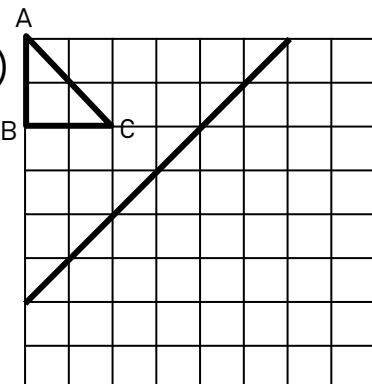
8)



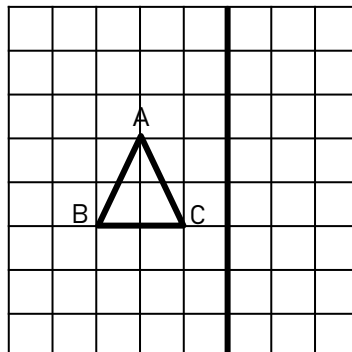
9)



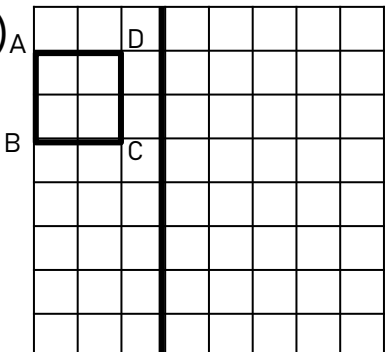
10)



11)



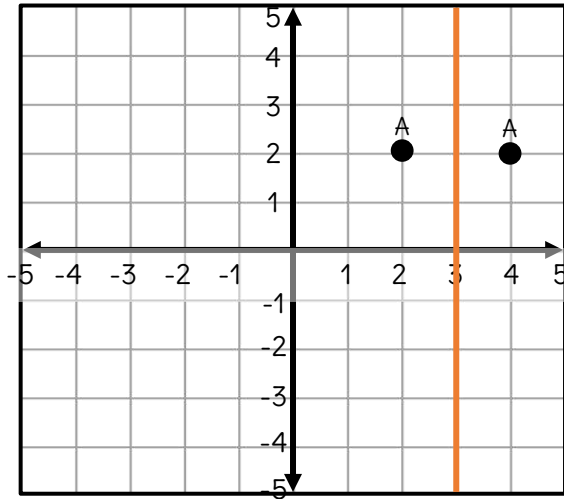
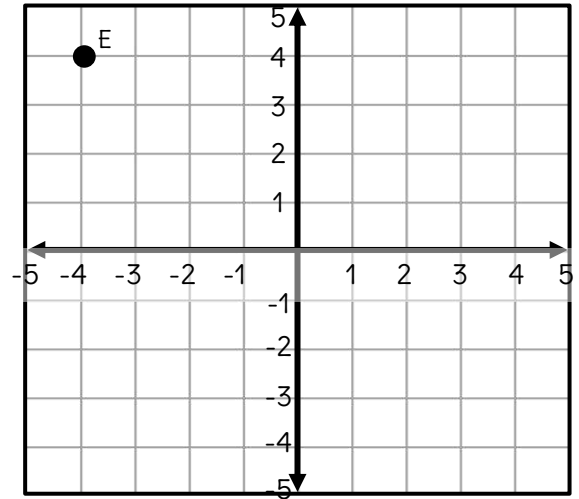
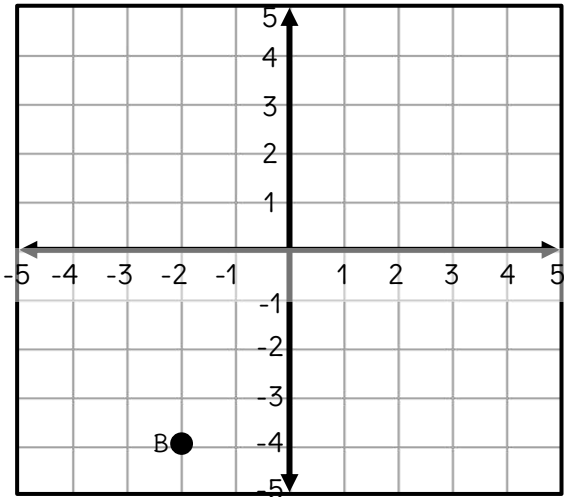
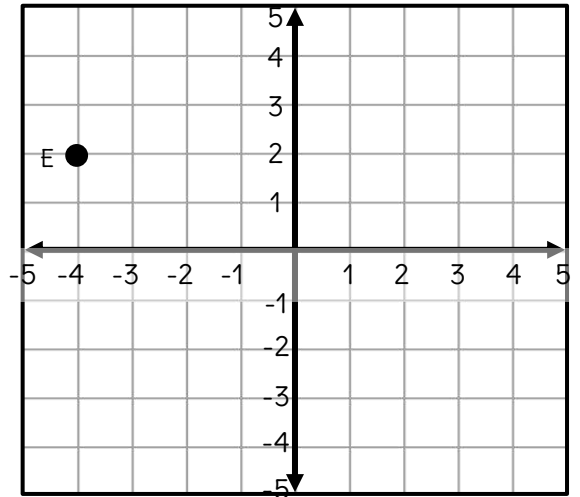
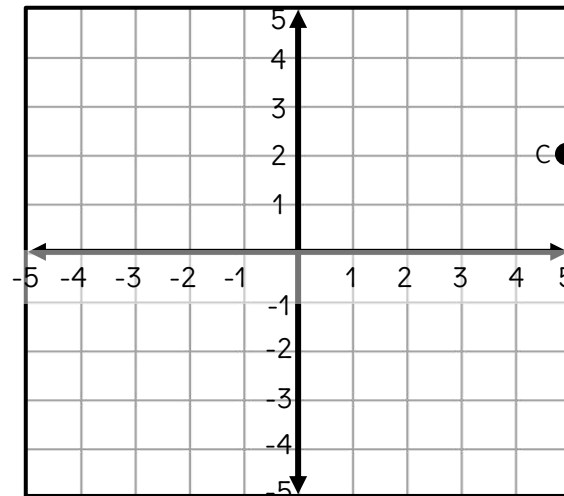
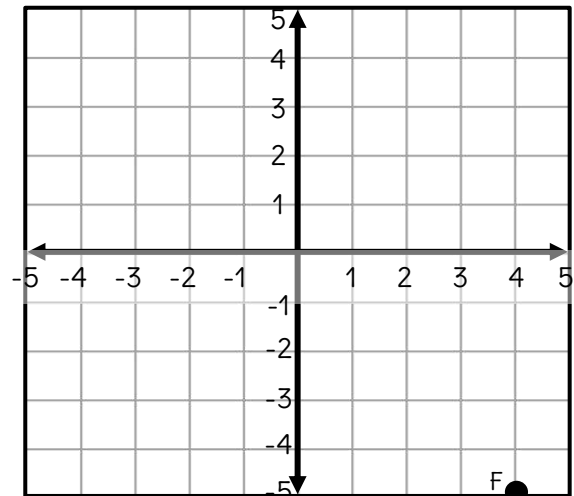
12)



Reflecting a Point Using a Mirror Line

Questions

Graph the new position of each point. The first one is done for you

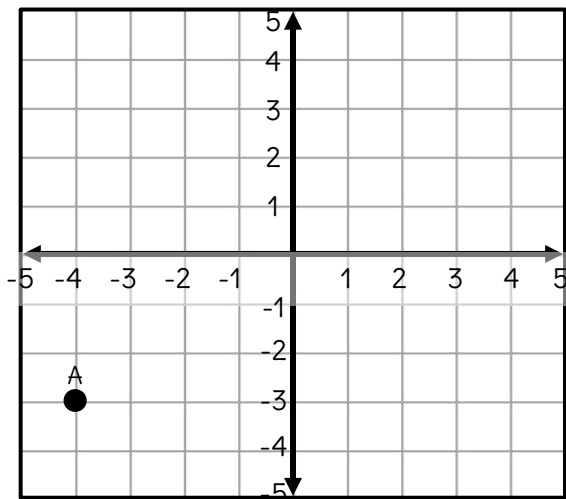
1) Reflection across the line $x = 3$ 2) Reflection across the line $y = 2$ 3) Reflection across the line $y = -2$ 4) Reflection across the line $x = -1$ 5) Reflection across the line $x = 2$ 6) Reflection across the line $y = -3$ 

Reflecting a Point Using a Mirror Line

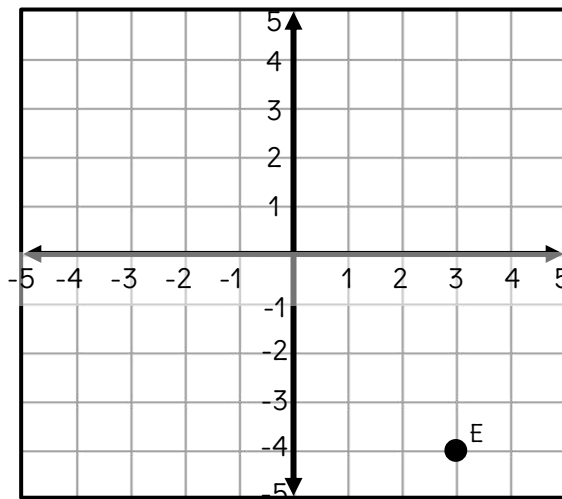
Questions

Graph the new position of each point after the given reflection

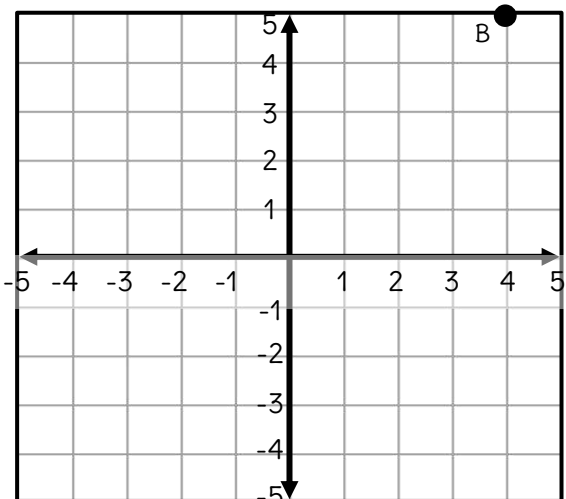
1) Reflection across the y-axis



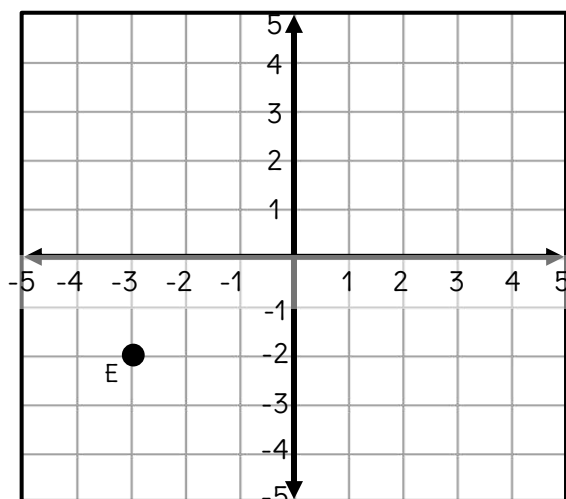
2) Reflection across the line $y = -1$



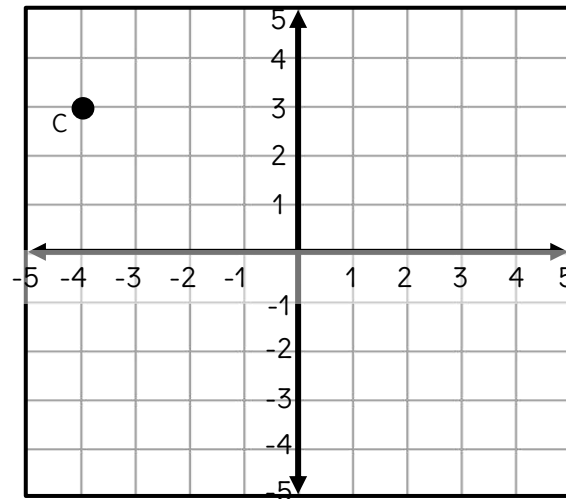
3) Reflection across the line $y = 3$



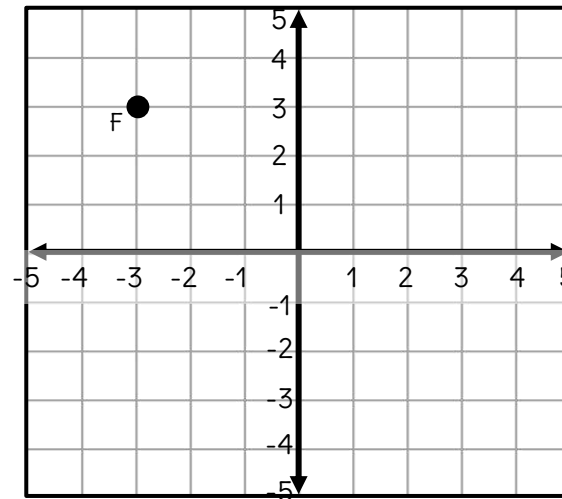
4) Reflection across the line $x = -1$



5) Reflection across the x-axis



6) Reflection across the line $y = 4$

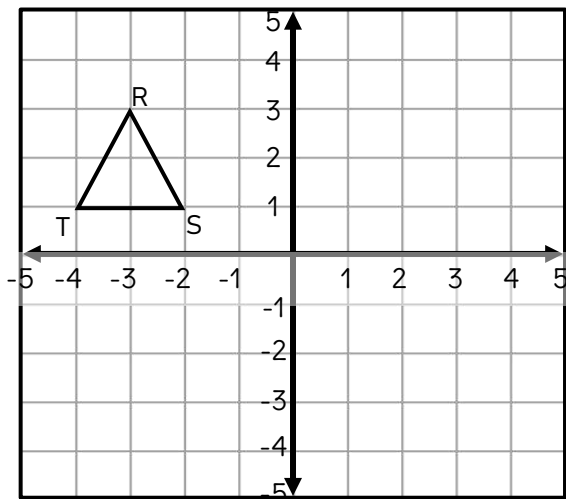


Reflecting Shapes using a Mirror Line

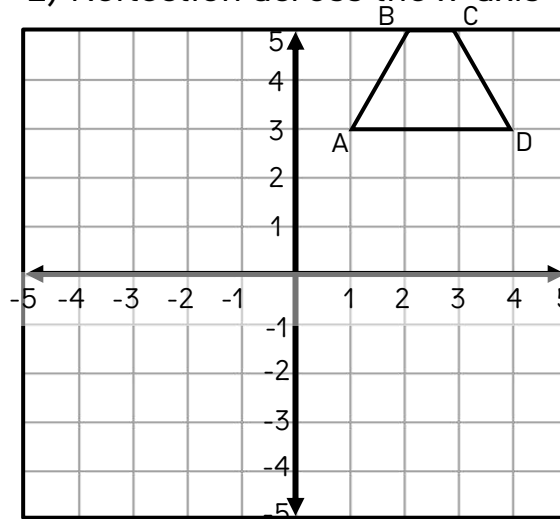
Questions

Graph the new position of each shape after the given reflection

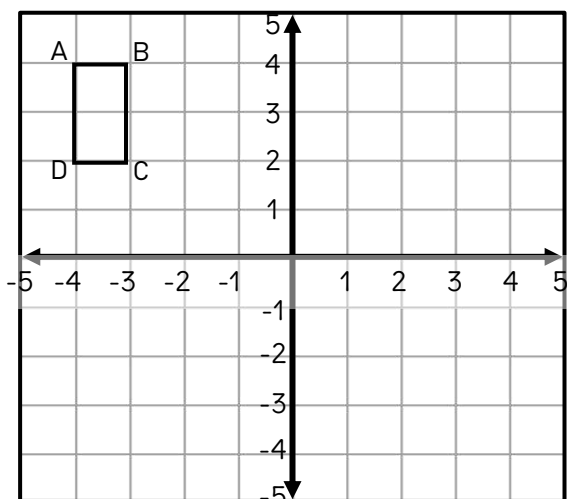
1) Reflection across the y-axis



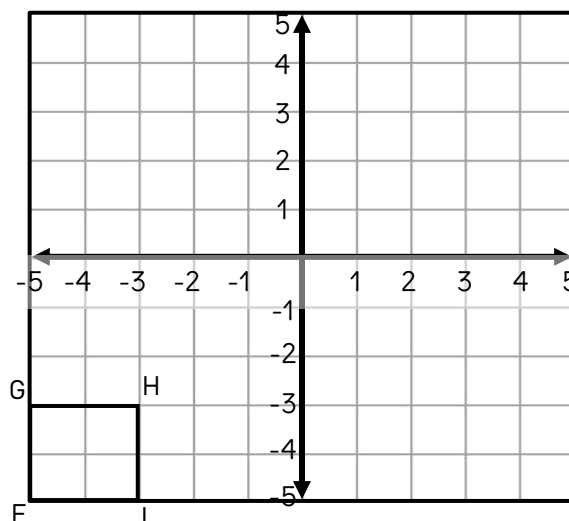
2) Reflection across the x-axis



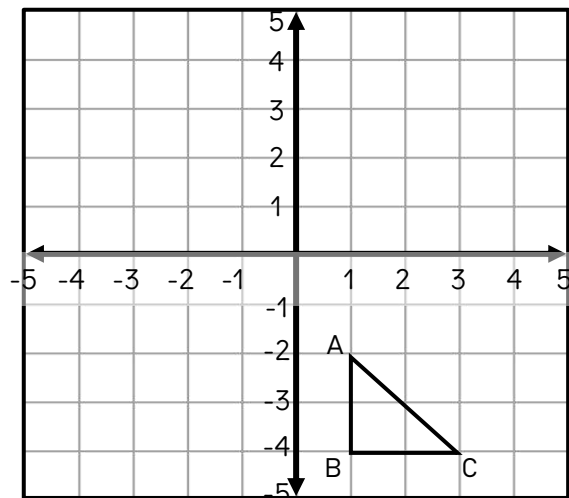
3) Reflection across the line $y = 2$



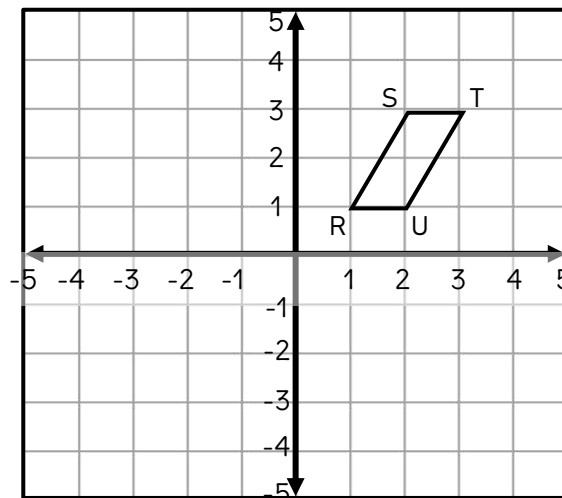
4) Reflection across the line $x = -1$



5) Reflection across the line $y = -1$



6) Reflection across the line $x = 1$

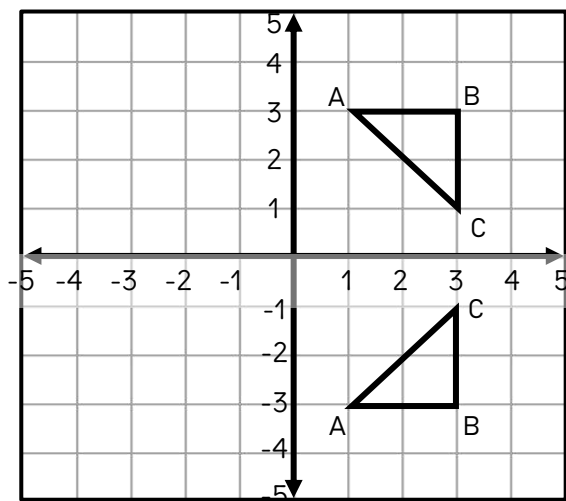


Reflections - Determine the Rule

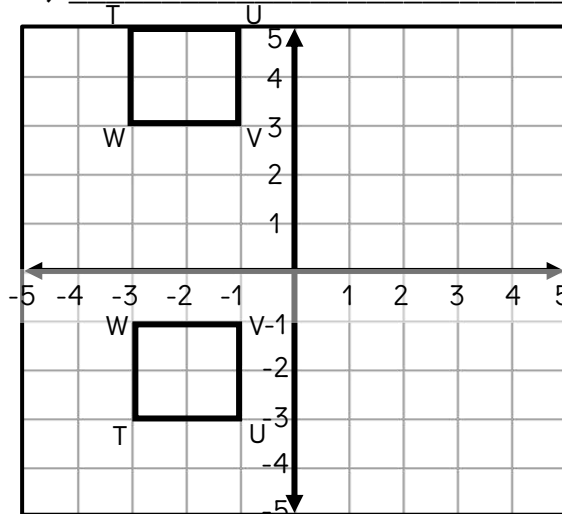
Questions

Describe the rule for the reflection line – Ex. Reflection across the line $x = 2$

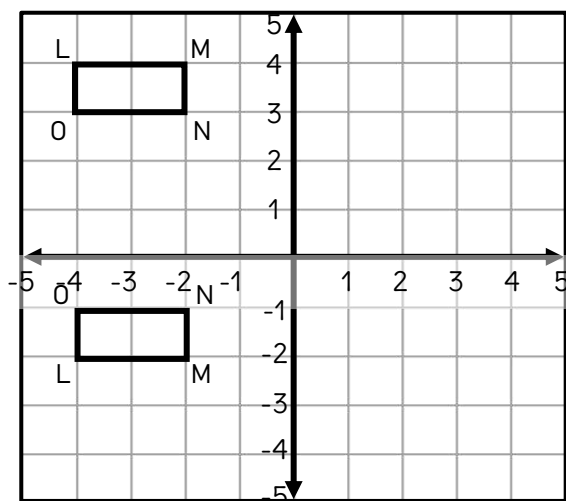
1) _____



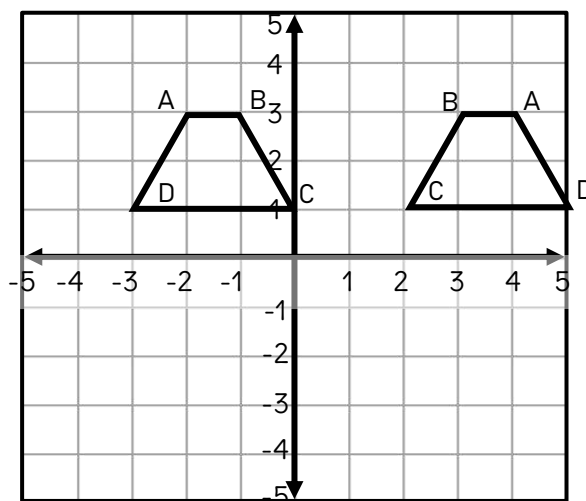
2) _____



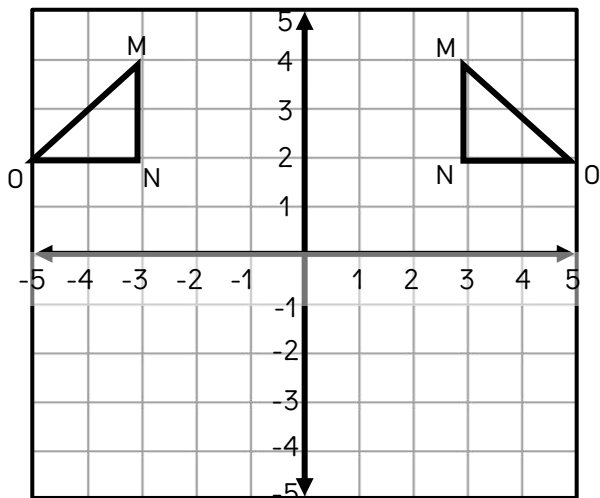
3) _____



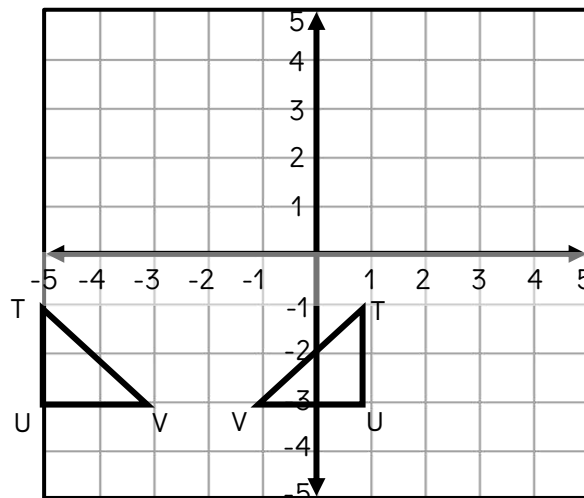
4) _____



5) _____



6) _____



Reflections - Mapping Rules

Mapping Rules for Reflections

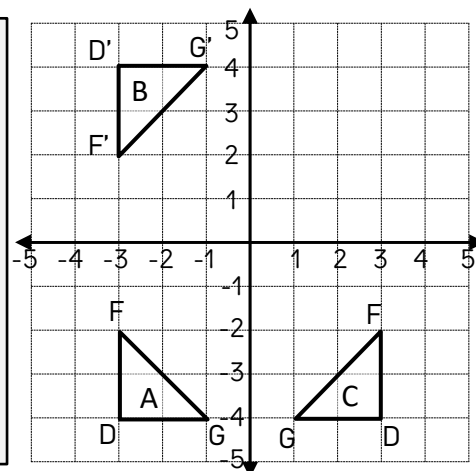
Each point on a shape moves according to the mapping rule.

The rule for a reflected shape in the x-axis is $(x, y) \rightarrow (x, -y)$

The rule for a reflected shape in the y-axis is $(x, y) \rightarrow (-x, y)$

In the example of Shape A being reflected to Shape B, point F $(-3, -2)$ has been reflected across the x-axis, which means the new coordinates for F are $(-3, 2)$.

If Shape A was reflected across the Y axis to Shape C, point F becomes $(3, -2)$.



Questions

Use the mapping rules to write the new coordinates

	Original Coordinate(s)	Reflection across the	New Coordinates
1)	P(5, 4)	y-axis	P(-5, 4)
2)	S(8, -3)	x-axis	
3)	Q(-6, 7)	y-axis	
4)	P(-4, -2)	y-axis	
5)	T(-5, 9) Y(-11, -15)	x-axis	
6)	S(-12, -3) R(7, 13)	x-axis	
7)	N(-4, 9) K(8, -17)	y-axis	
8)	P(13, -5) E(-6, 15)	x-axis	
9)	S(-18, -13) R(9, 14)	y-axis	
10)	N(-6, 11) K(7, -23)	x-axis	

Reflections - Coordinates

Part 1

Draw the shapes using the coordinates provided. Then reflect the shapes

Shape A

P(5,4), Q(3,7), R(3,3)

Reflect over the x-axis

New Coordinates

P(,), Q(,), R(,)

Shape B

F(-8,9), G(-4,5), H(-8,2)

Reflect over the x-axis

New Coordinates

F(,), G(,), H(,)

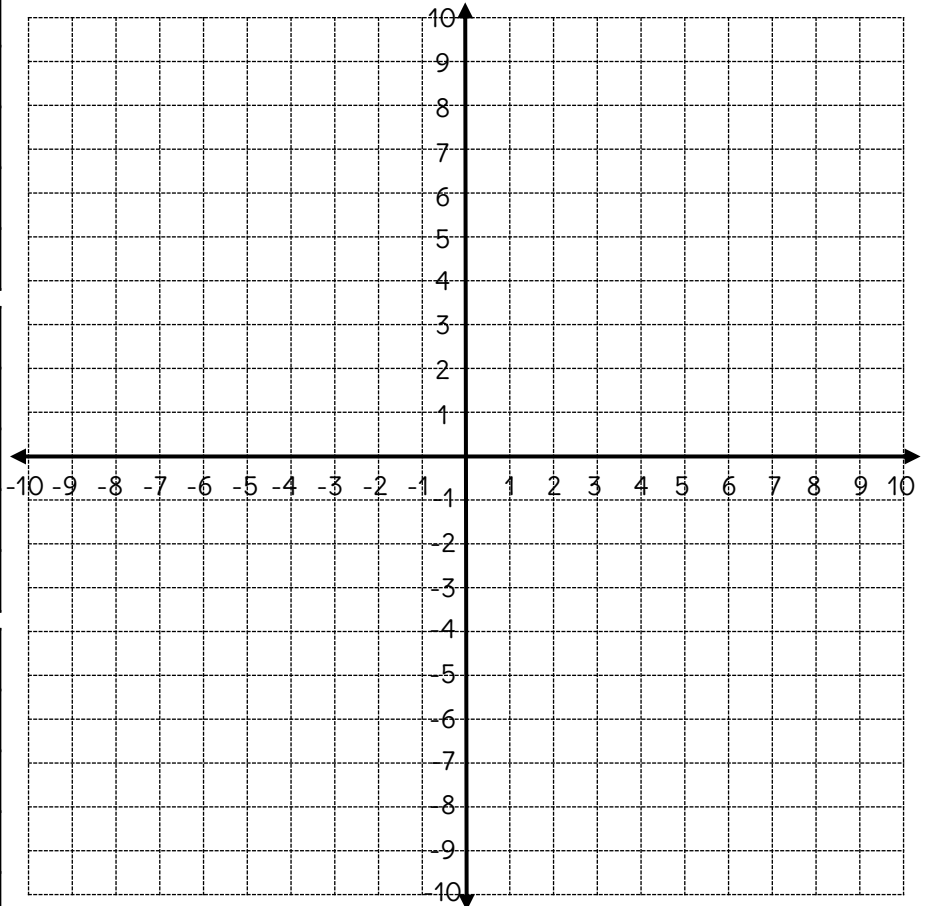
Shape C

J(-7,-4), K(-4,-9), L(-3,-3)

Reflect over the y-axis

New Coordinates

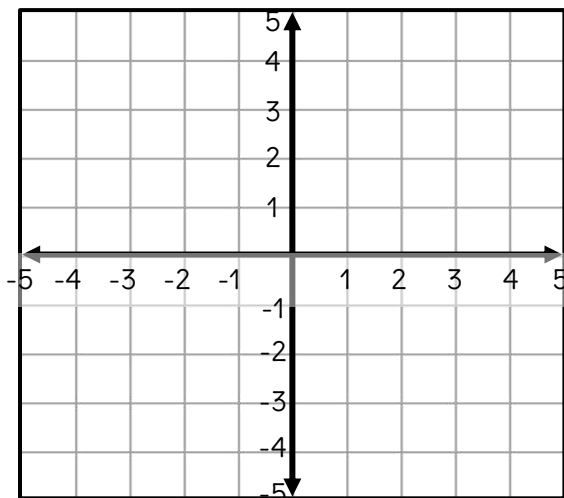
J(,), K(,), L(,)



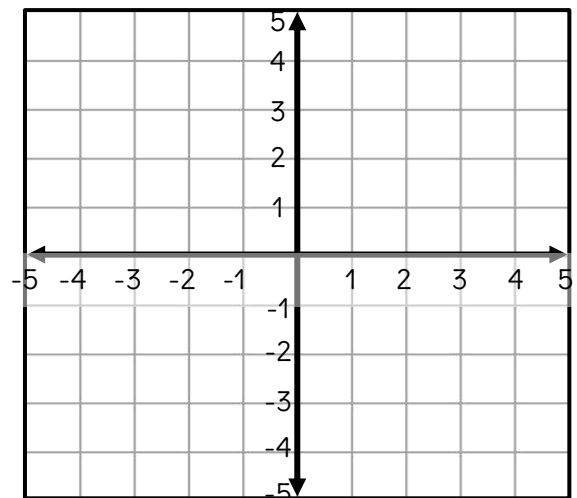
Part 2

Draw your own shape and then perform the reflection provided

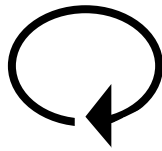
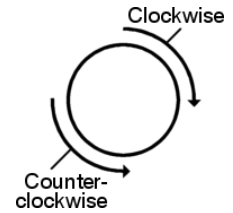
1) Reflection across the y-axis



2) Reflection across the line $x = -1$



Clockwise and Counterclockwise Rotations

360°
rotation180°
rotation90°
rotation

Questions

Draw the smiley face after it has been rotated

1)



Clockwise 90° rotation

2)

Counterclockwise 90°
rotation

3)



Clockwise 180° rotation

4)

Counterclockwise 180°
rotation

5)



Clockwise 360° rotation

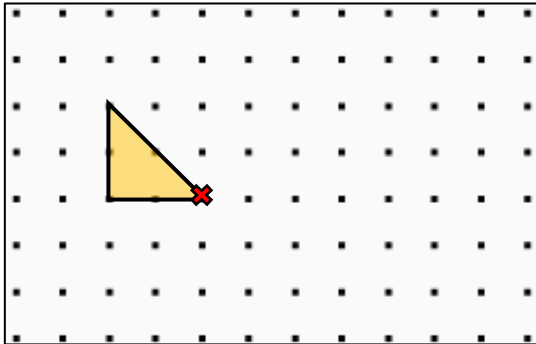
6)

Counterclockwise 360°
rotation

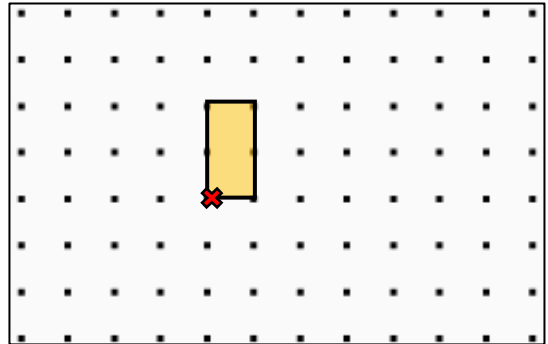
Drawing Rotations

Questions

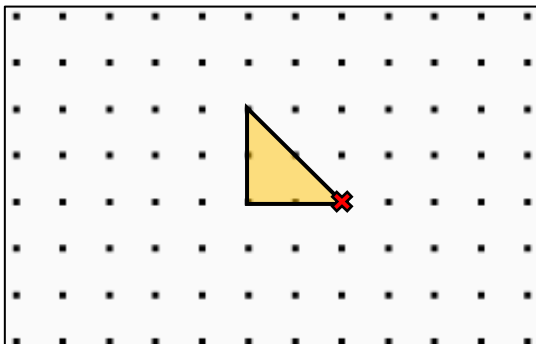
Rotate the shapes around the point marked ✕



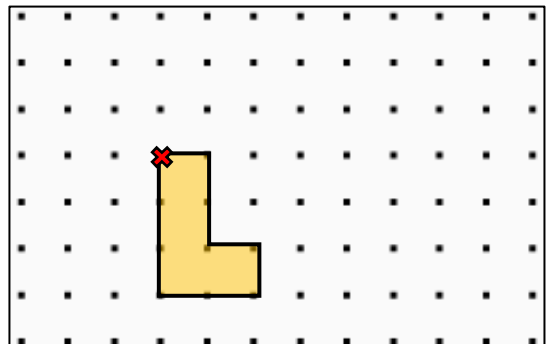
1) 90° clockwise rotation



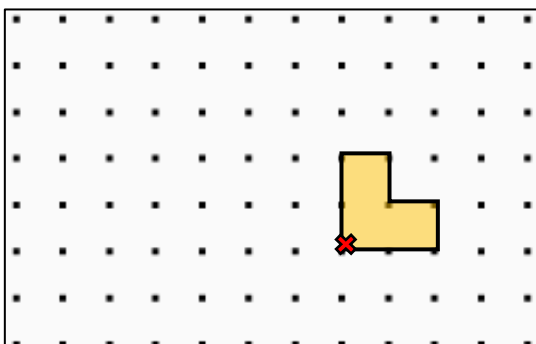
2) 180° clockwise rotation



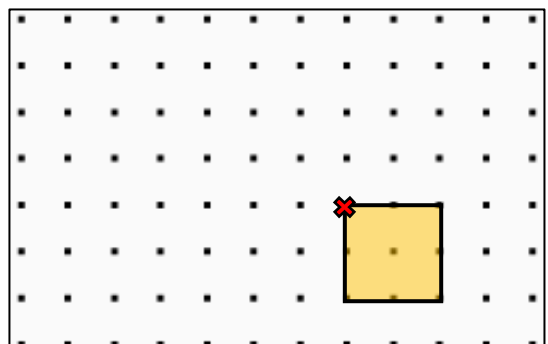
3) 90° counter-clockwise rotation



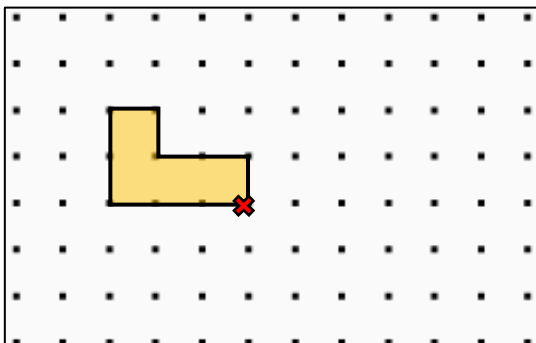
4) 360° clockwise rotation



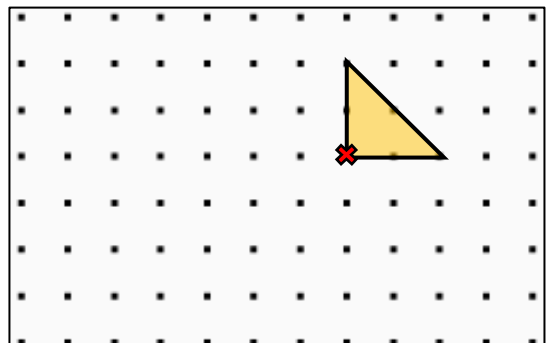
5) 90° counter-clockwise rotation



6) 180° counter-clockwise rotation



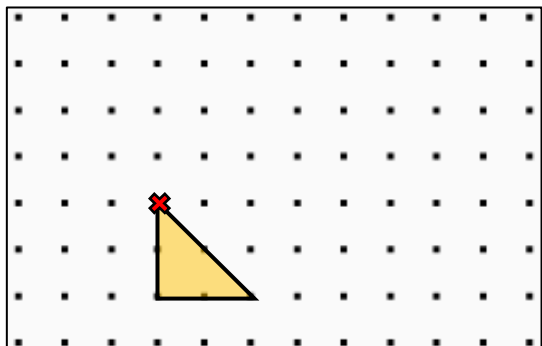
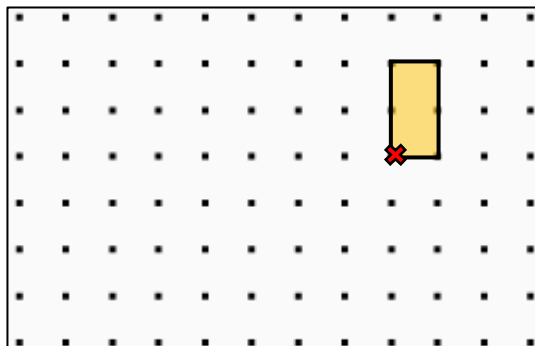
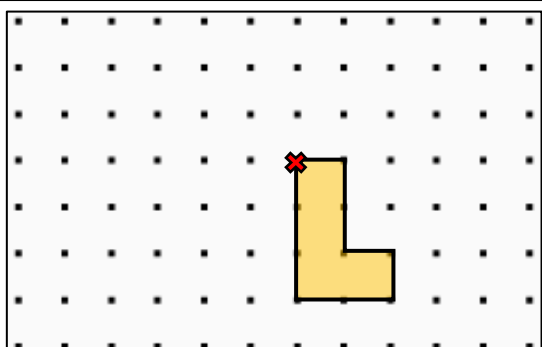
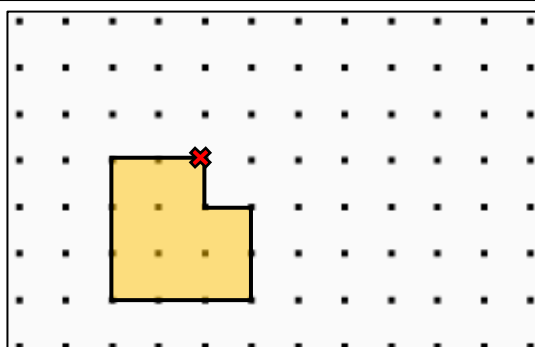
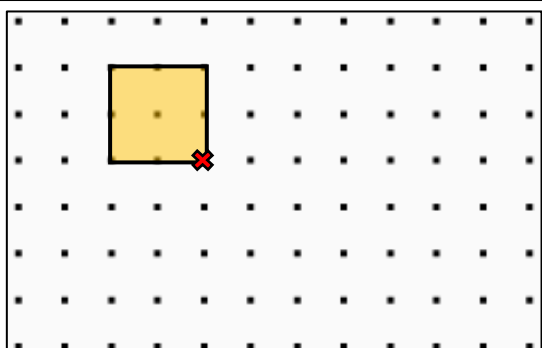
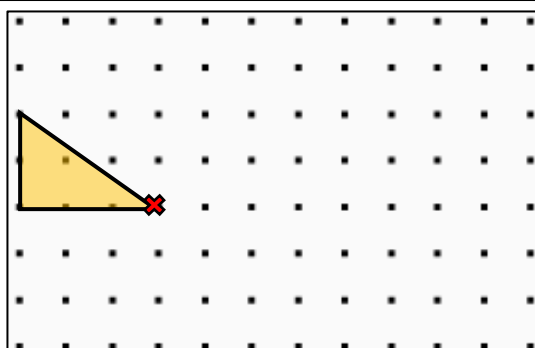
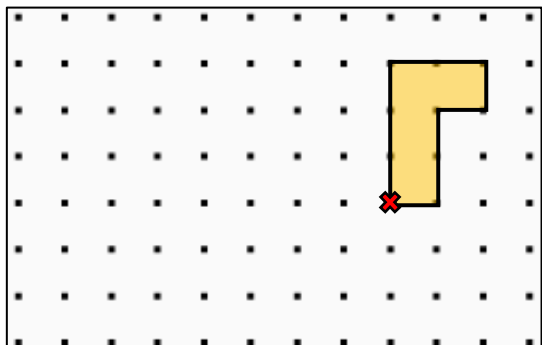
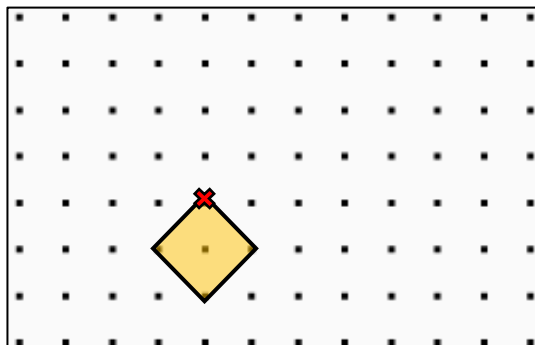
7) 90° clockwise rotation



8) 180° counter-clockwise rotation

Drawing Rotations

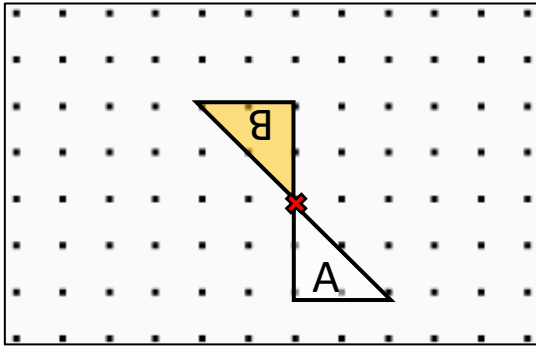
Questions

Rotate the shapes around the point marked **x**1) 90° counter-clockwise rotation2) 180° counter-clockwise rotation3) 180° clockwise rotation4) 360° clockwise rotation5) 90° counter-clockwise rotation6) 180° counter-clockwise rotation7) 90° clockwise rotation8) 180° counter-clockwise rotation

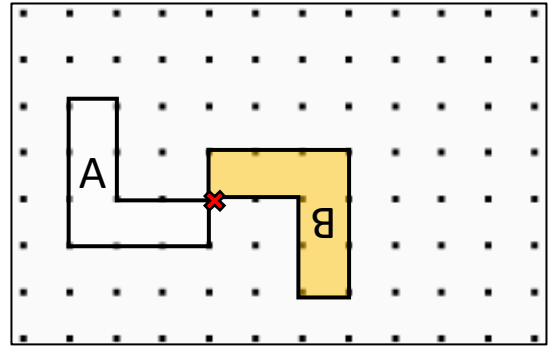
Describing Rotations

Questions

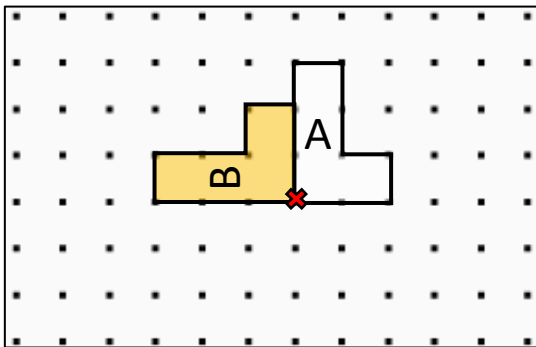
Describe the rotations. Shape A is the original shape



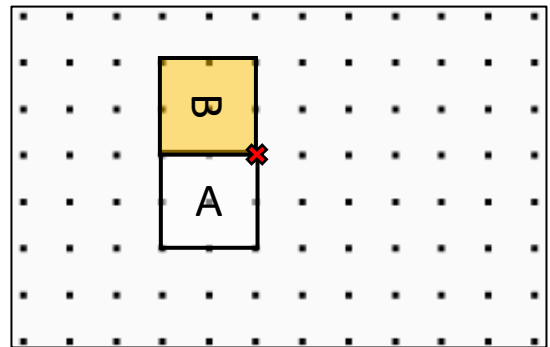
1) _____



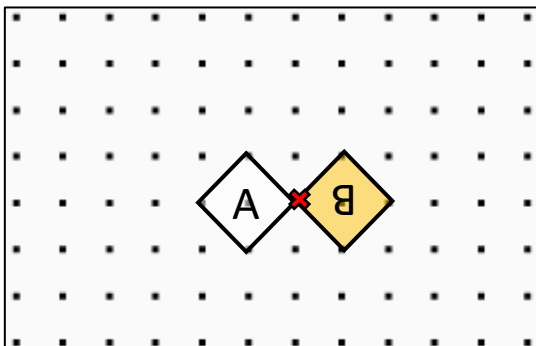
2) _____



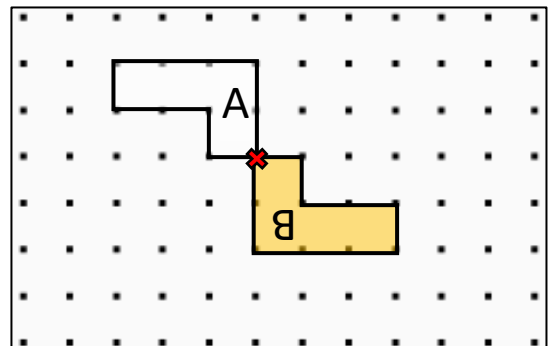
3) _____



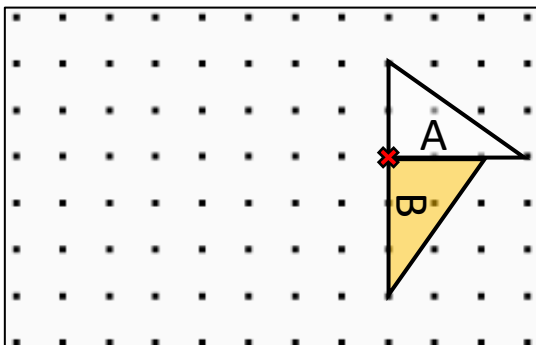
4) _____



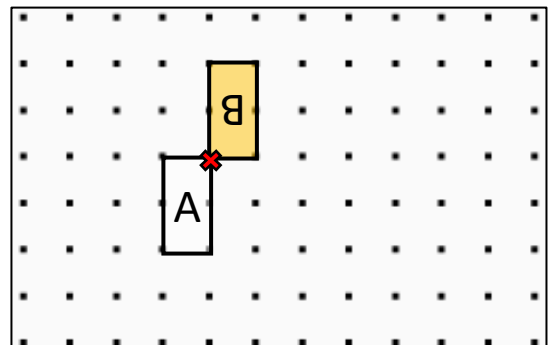
5) _____



6) _____



7) _____

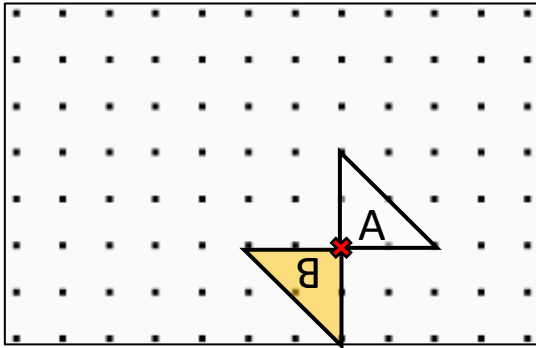


8) _____

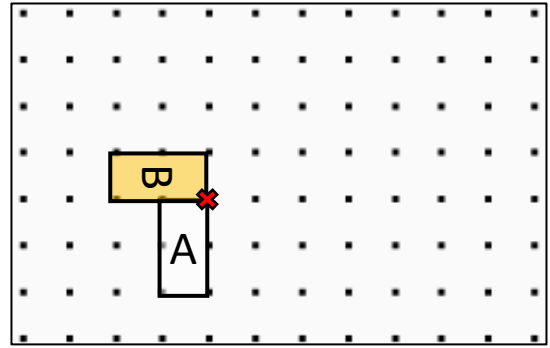
Describing Rotations

Questions

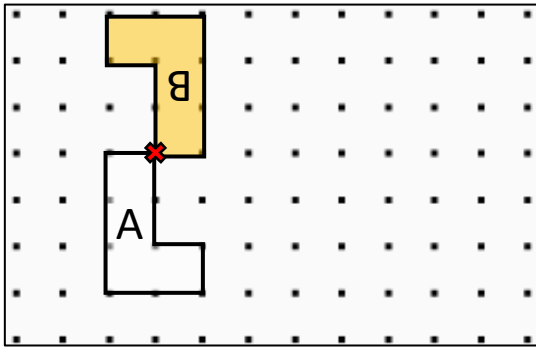
Describe the rotations. Shape A is the original shape



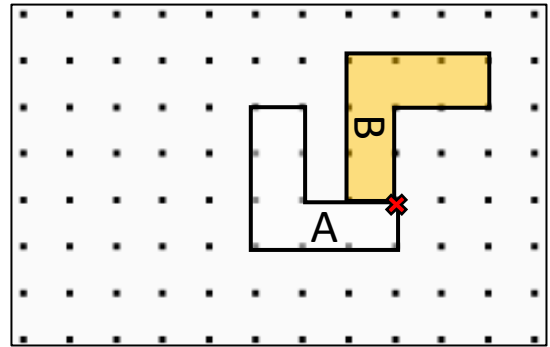
1) _____



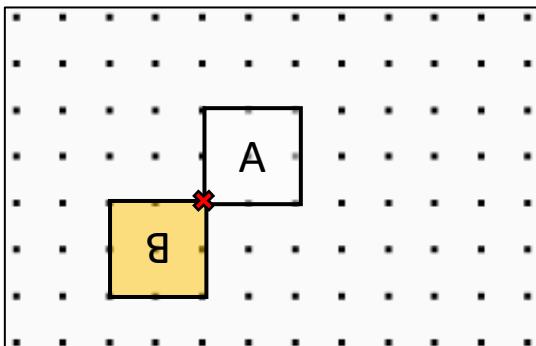
2) _____



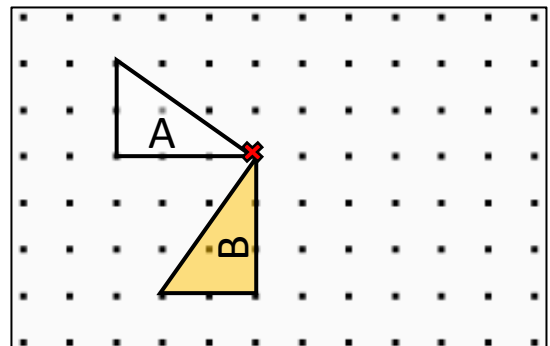
3) _____



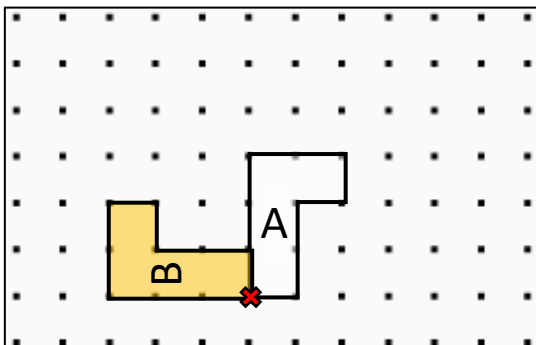
4) _____



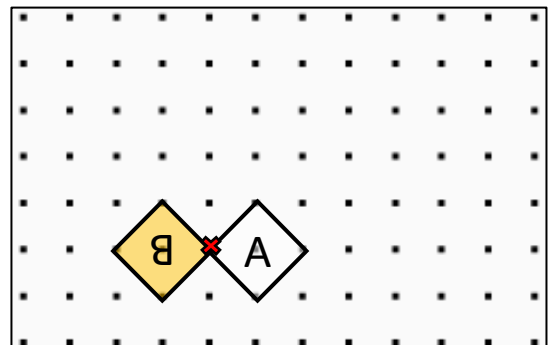
5) _____



6) _____



7) _____



8) _____

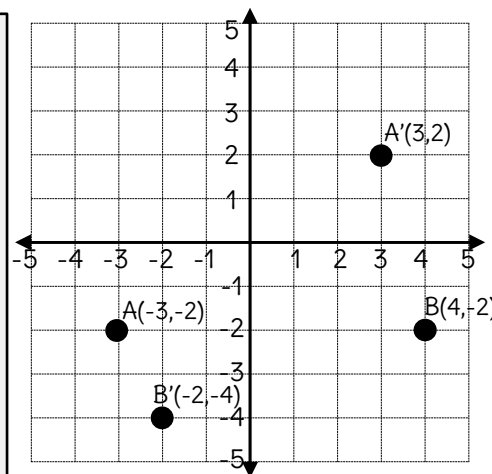
Rotating a Point

Mapping Rules for Rotations

Each point on a shape moves according to the mapping rule.

- a shape rotated 90° counterclockwise has a mapping rule of: $(x, y) \rightarrow (-y, x)$.
- a shape rotated 180° counterclockwise has a mapping rule of: $(x, y) \rightarrow (-x, -y)$.
- a shape rotated 270° counterclockwise has a mapping rule of: $(x, y) \rightarrow (y, -x)$.

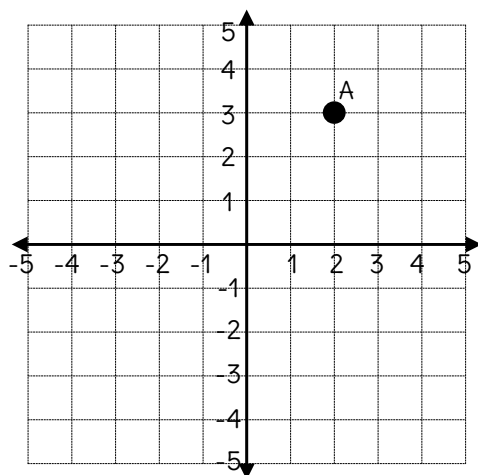
In the example, Point A was rotated 180° counter-clockwise
In the example, Point B was rotated 90° clockwise



Questions

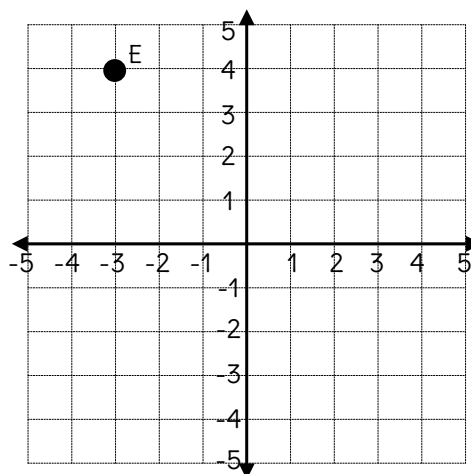
Graph the new position after rotating around the origin

1) 180° rotation



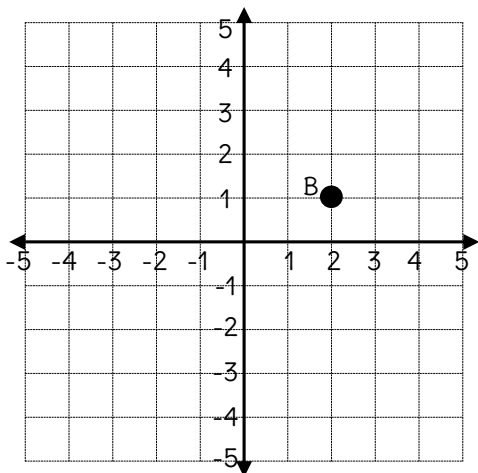
Original Coordinates
A(,)
Rotated Coordinates
A(,)

2) 90° clockwise rotation



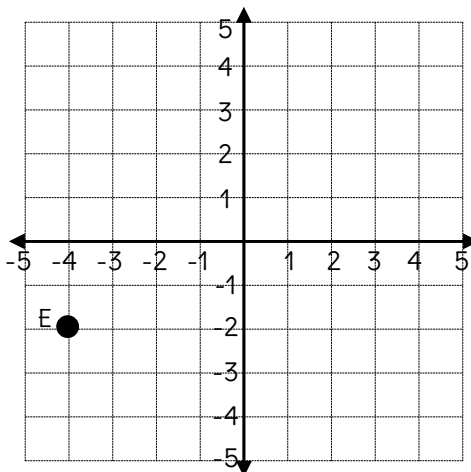
Original Coordinates
E(,)
Rotated Coordinates
E(,)

3) 90° counterclockwise rotation



Original Coordinates
B(,)
Rotated Coordinates
B(,)

4) 90° clockwise rotation



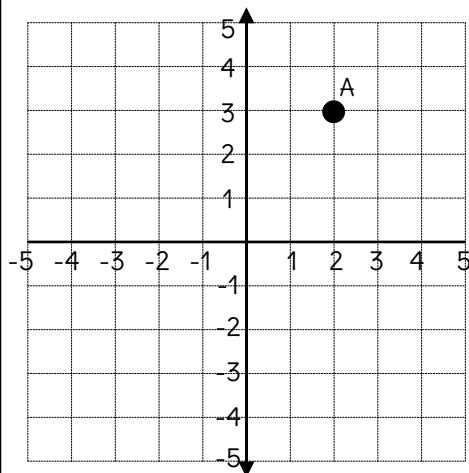
Original Coordinates
E(,)
Rotated Coordinates
E(,)

Rotating a Point

Questions

Graph the new position after rotating around the origin

1) 90° clockwise rotation



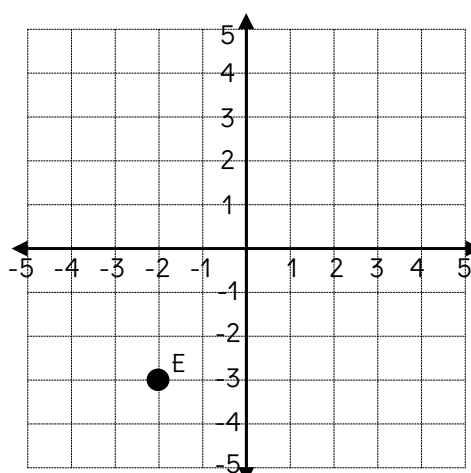
Original Coordinates

A(,)

Rotated Coordinates

A(,)

2) 90° counterclockwise rotation



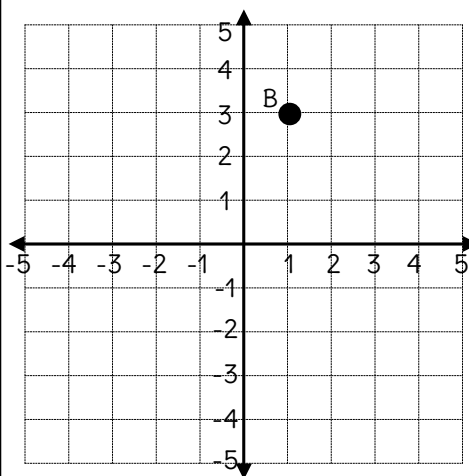
Original Coordinates

E(,)

Rotated Coordinates

E(,)

3) 180° rotation



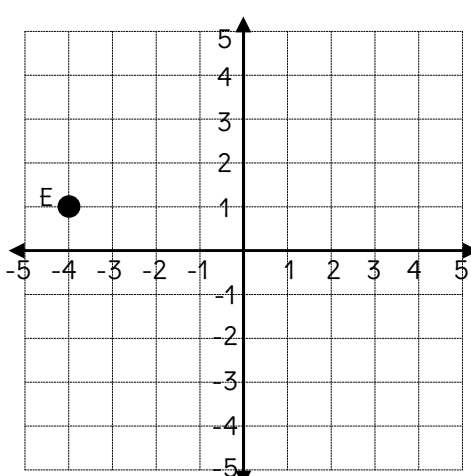
Original Coordinates

B(,)

Rotated Coordinates

B(,)

4) 270° clockwise rotation



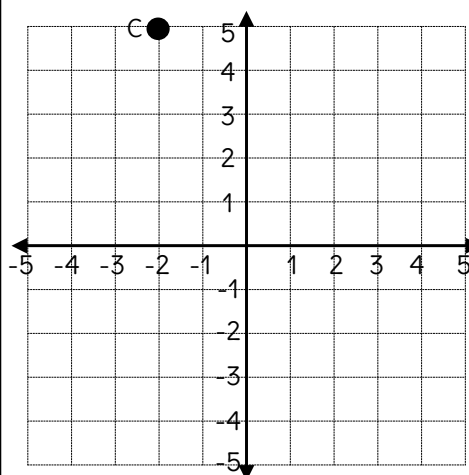
Original Coordinates

E(,)

Rotated Coordinates

E(,)

5) 270° counterclockwise rotation



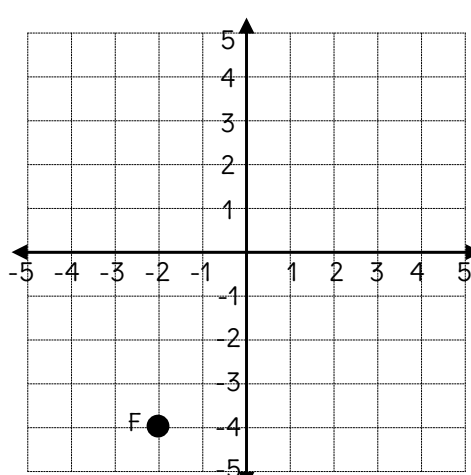
Original Coordinates

C(,)

Rotated Coordinates

C(,)

6) 180° rotation



Original Coordinates

F(,)

Rotated Coordinates

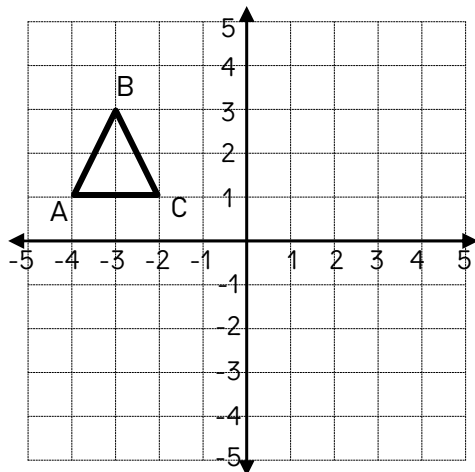
F(,)

Rotating Shapes

Questions

Graph the new position of each shape after the given rotation

1) 90° clockwise rotation



Original Coordinates

A(,)

B(,)

C(,)

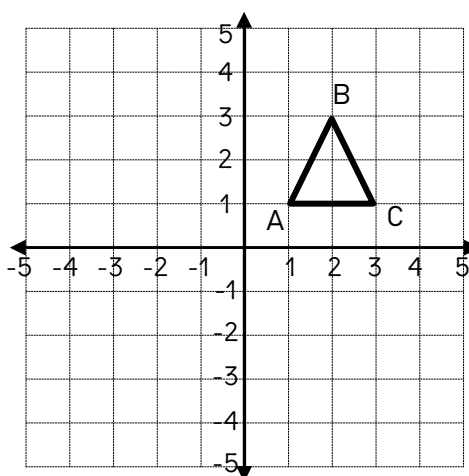
Rotated Coordinates

A(,)

B(,)

C(,)

2) 90° counterclockwise rotation



Original Coordinates

A(,)

B(,)

C(,)

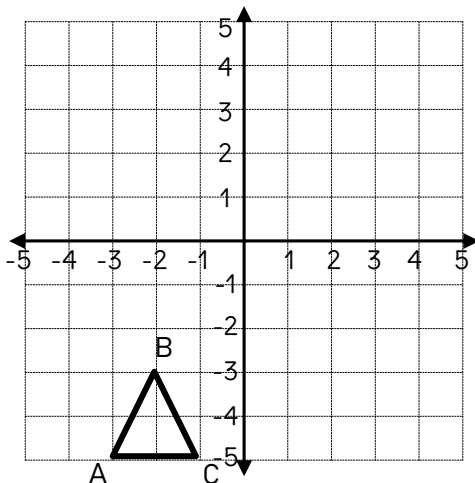
Rotated Coordinates

A(,)

B(,)

C(,)

3) 180° rotation



Original Coordinates

A(,)

B(,)

C(,)

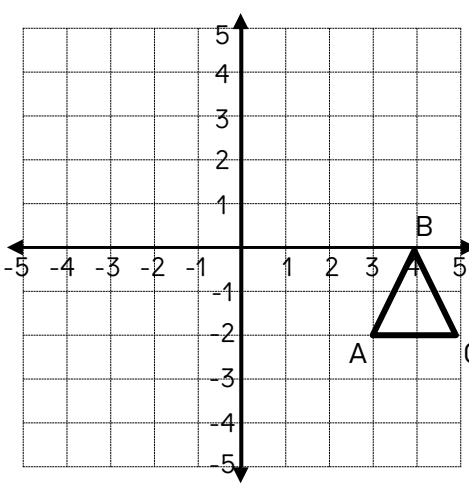
Rotated Coordinates

A(,)

B(,)

C(,)

4) 270° clockwise rotation



Original Coordinates

A(,)

B(,)

C(,)

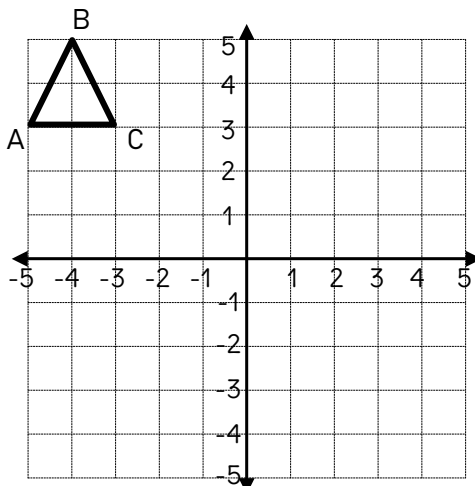
Rotated Coordinates

A(,)

B(,)

C(,)

5) 90° clockwise rotation



Original Coordinates

A(,)

B(,)

C(,)

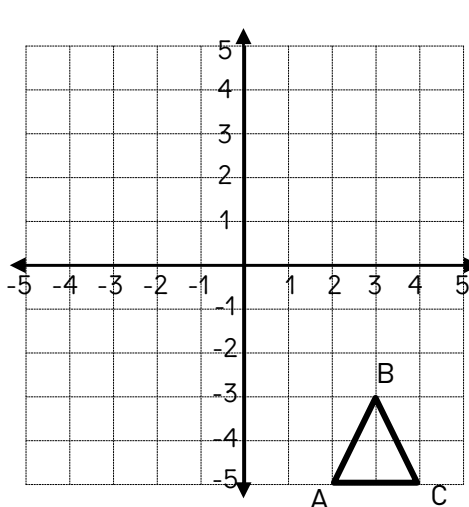
Rotated Coordinates

A(,)

B(,)

C(,)

6) 90° counterclockwise rotation



Original Coordinates

A(,)

B(,)

C(,)

Rotated Coordinates

A(,)

B(,)

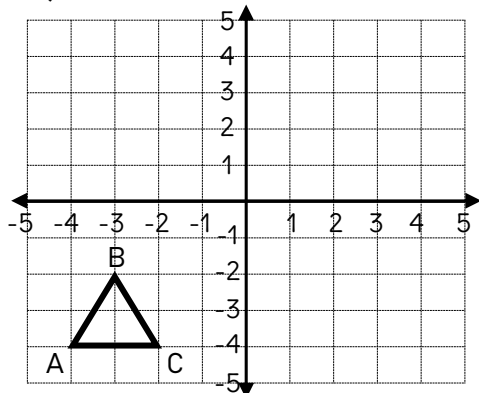
C(,)

Rotating Shapes

Questions

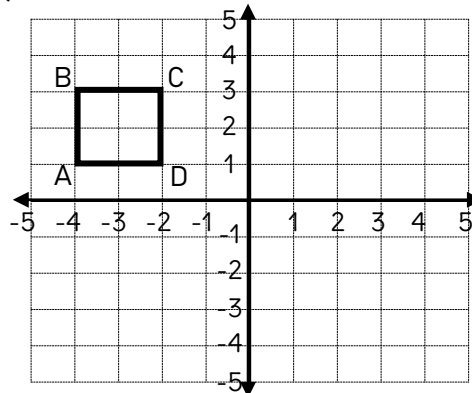
Graph the new position of each shape after the given rotation

1) 180° rotation



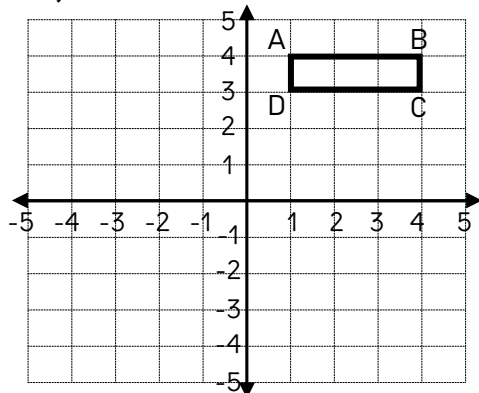
Original	A(,)	B(,)	C(,)
Rotated	A(,)	B(,)	C(,)

2) 90° counterclockwise rotation



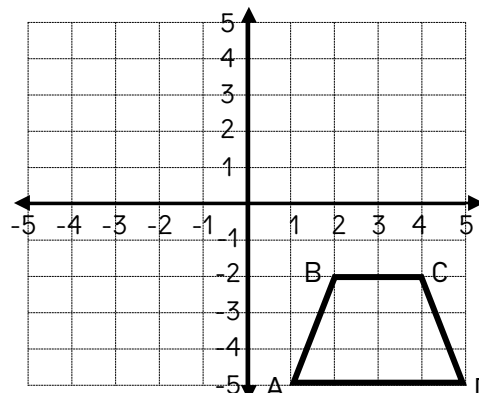
Original	A(,)	B(,)	C(,)	D(,)
Rotated	A(,)	B(,)	C(,)	D(,)

3) 90° clockwise rotation



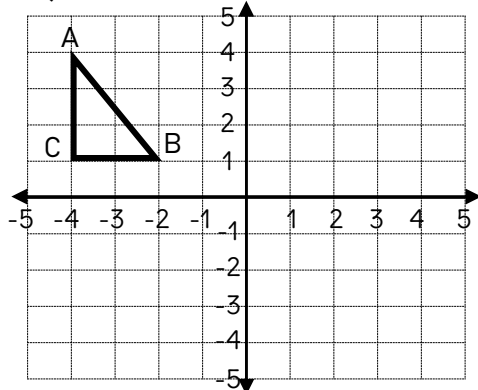
Original	A(,)	B(,)	C(,)	D(,)
Rotated	A(,)	B(,)	C(,)	D(,)

4) 90° counterclockwise rotation



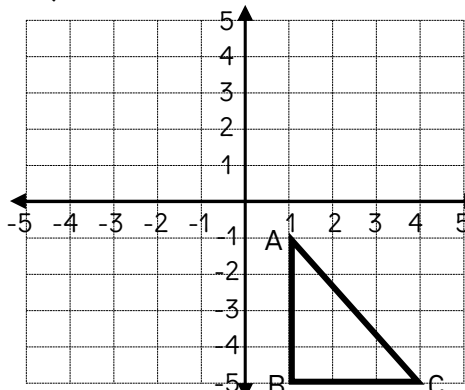
Original	A(,)	B(,)	C(,)	D(,)
Rotated	A(,)	B(,)	C(,)	D(,)

5) 270° clockwise rotation



Original	A(,)	B(,)	C(,)
Rotated	A(,)	B(,)	C(,)

6) 90° counterclockwise rotation



Original	A(,)	B(,)	C(,)
Rotated	A(,)	B(,)	C(,)

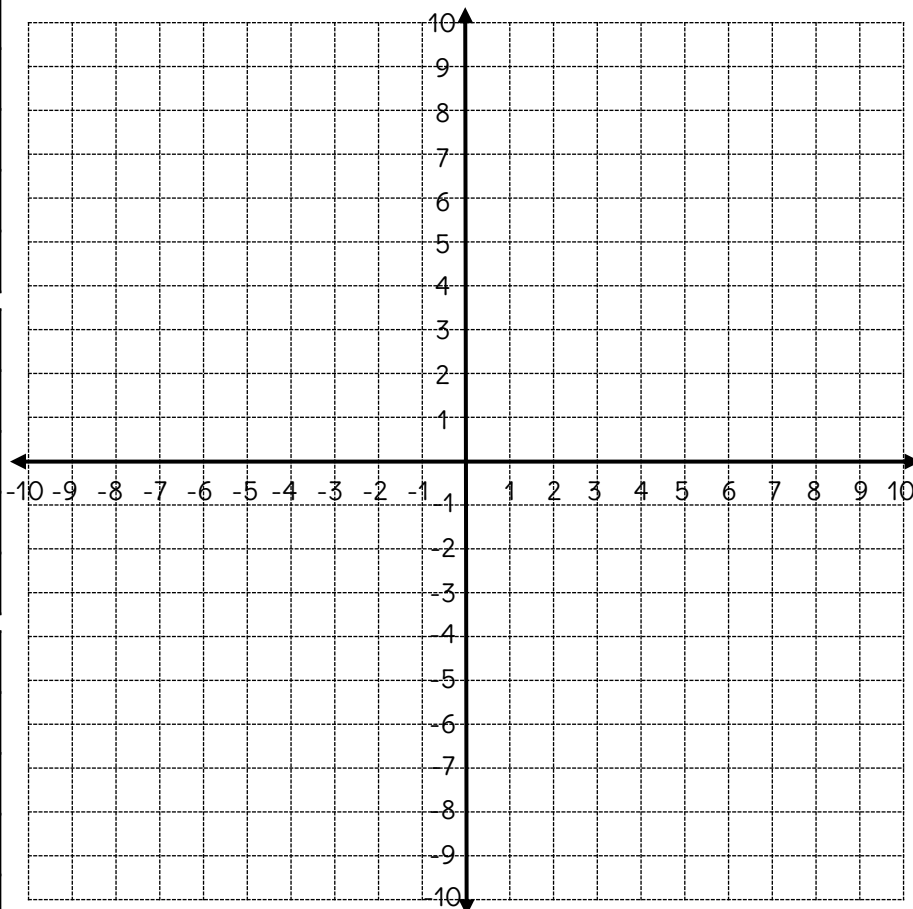
Rotations - Coordinates

Part 1 Draw the shapes using the coordinates provided. Then rotate the shape about the origin

Shape A
P(8,4), Q(5,7), R(4,3)
90° counterclockwise rotation
New Coordinates
P(,), Q(,), R(,)

Shape B
F(-8,8), G(-9,5), H(-2,5)
180° rotation
New Coordinates
F(,), G(,), H(,)

Shape C
J(-1,-8), K(-4,-6), L(-1,-3)
270° counterclockwise rotation
New Coordinates
J(,), K(,), L(,)



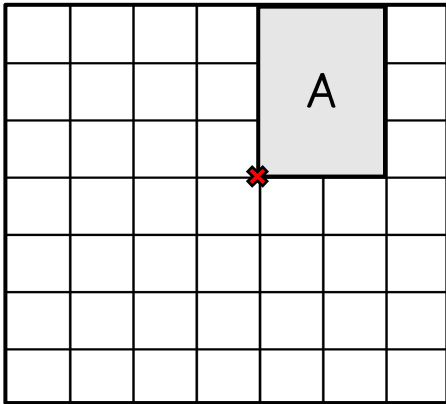
Part 2 Give the coordinates of each point after the rotations

	Original Coordinate	Rotations across the line...	New Coordinates
1)	P(5, 4)	90° counterclockwise rotation	P(-4, 5)
2)	S(3, -6)	180° rotation	
3)	Q(-4, 9)	360° rotation	
4)	P(-7, -11)	270° counterclockwise rotation	
5)	T(-5, 1) Y(-4, -7)	90° clockwise rotation	
6)	S(-7, -5) R(8, 2)	180° rotation	
7)	N(-5, 8) K(4, -9)	270° clockwise rotation	
8)	P(3, -5) E(-6, 2)	180° rotation	

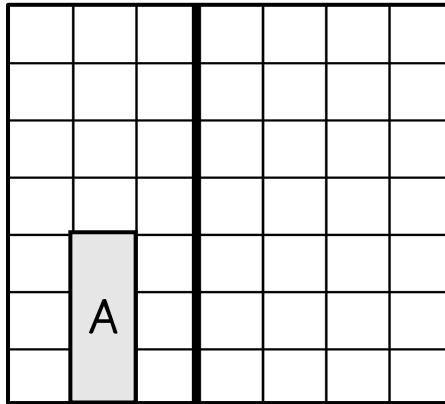
Performing Multiple Transformations

Questions

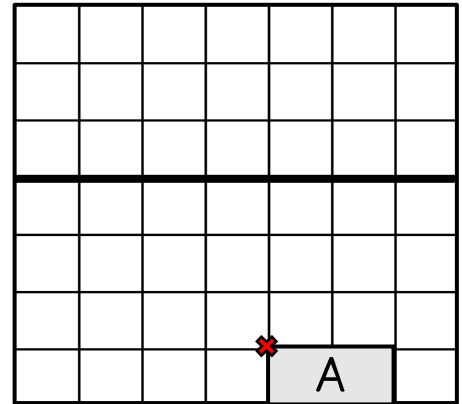
Complete the following combination of transformations



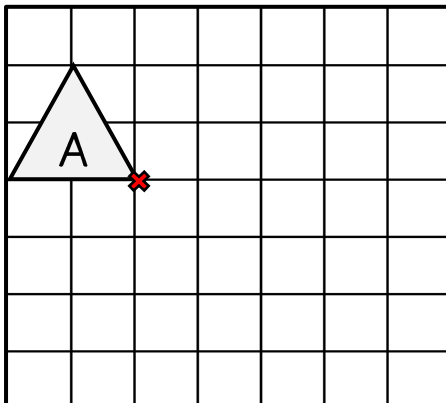
1) 180° rotation, translate down 1



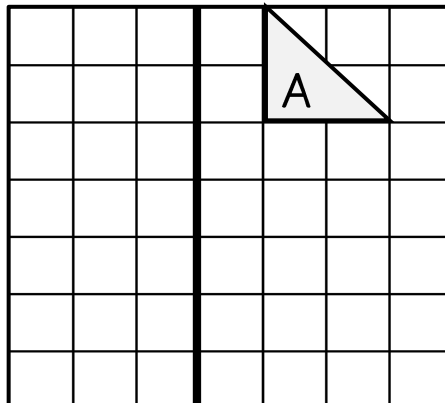
2) Reflect and translate up 3



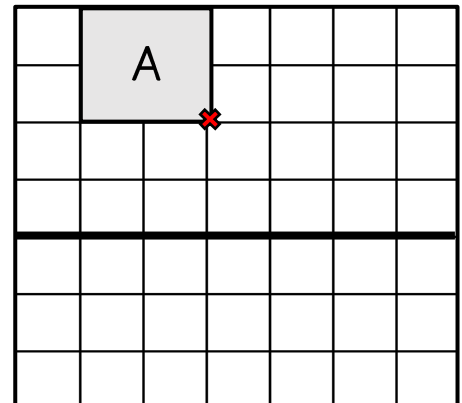
3) rotate 90° counterclockwise and reflect



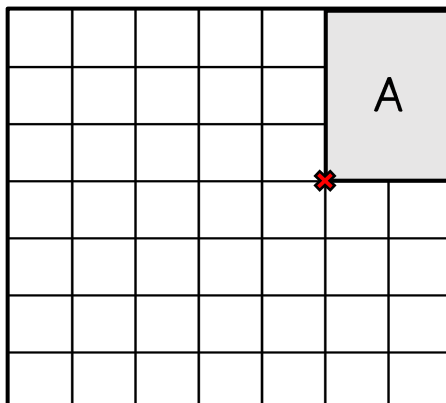
4) 90° clockwise rotation, translate right 3



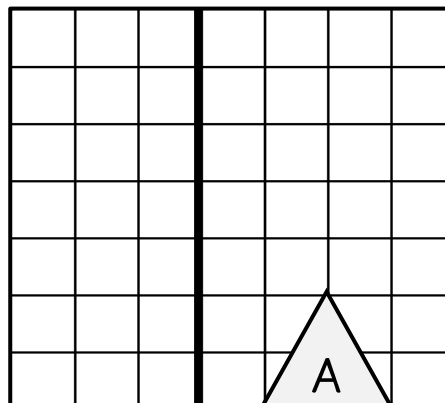
5) Translate down 5 and reflect



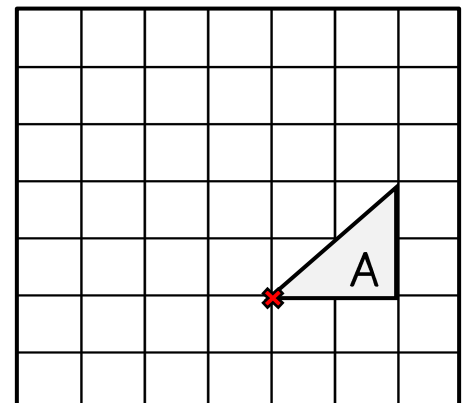
6) rotate 180° counterclockwise and reflect



7) 180° rotation, translate left 2



8) Reflect and translate up 5

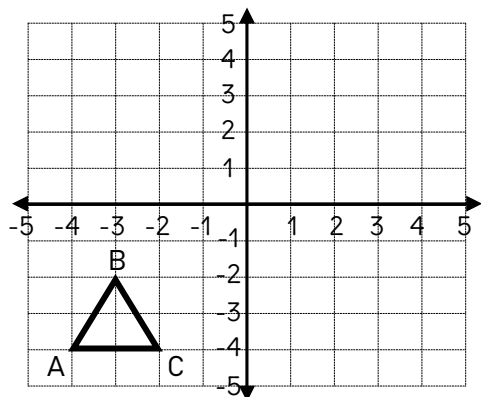


9) Rotate 90° counterclockwise and translate up 4

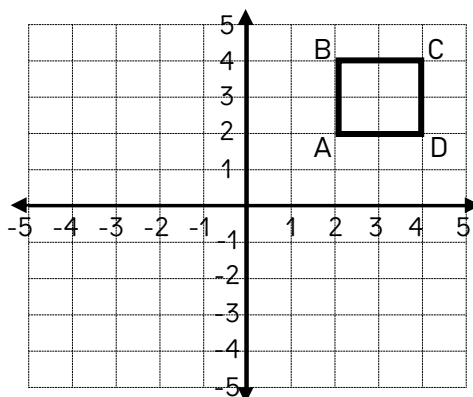
Performing Multiple Transformations

Questions

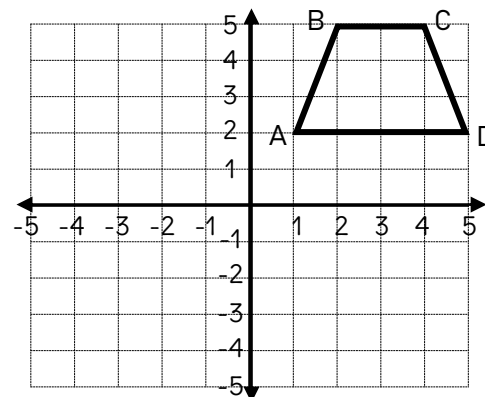
Complete the following combination of transformations



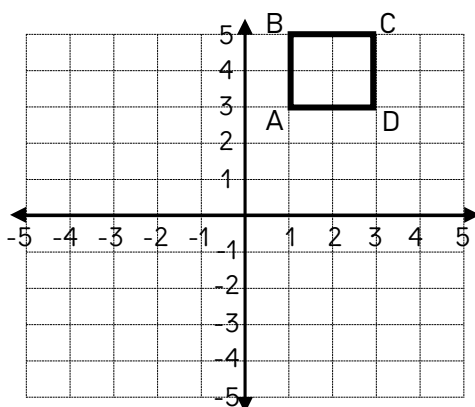
1) 180° rotation, translate down 3



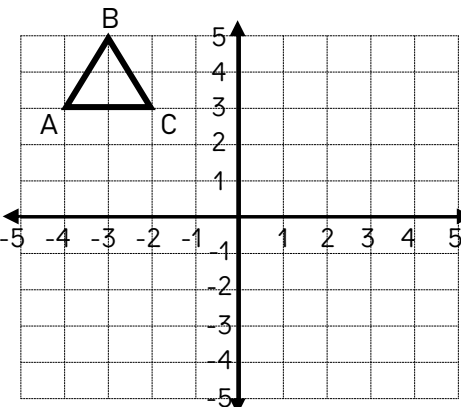
2) Reflect across the x-axis and translate left 4



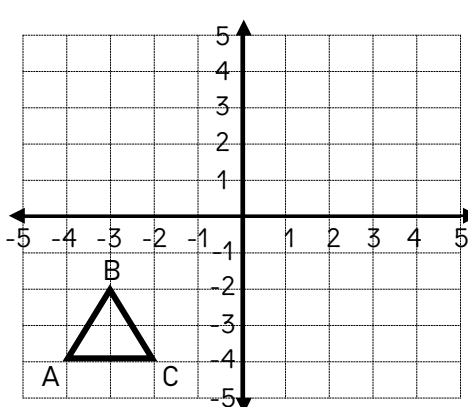
3) rotate 90° clockwise and reflect across the y-axis



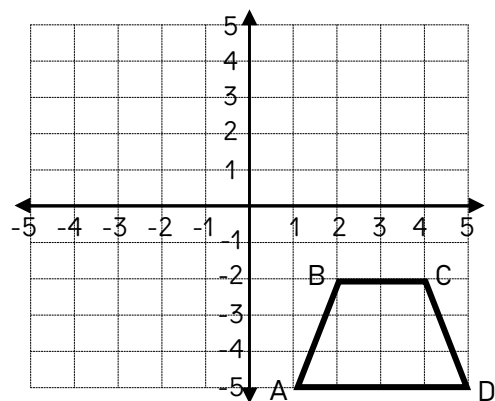
4) 90° counterclockwise rotation, translate right 3



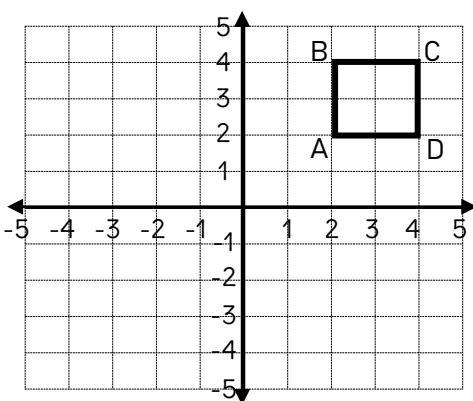
5) Translate down 3 and reflect across the y-axis



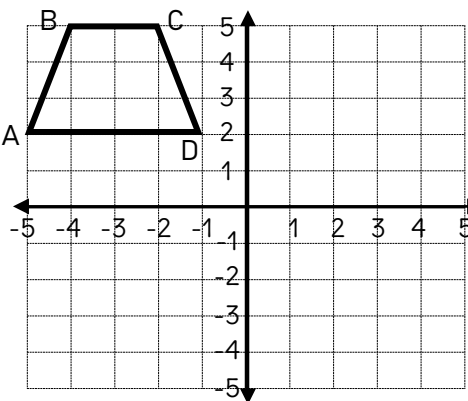
6) Reflect across the y-axis and translate up 4



7) 180° rotation, translate down 5

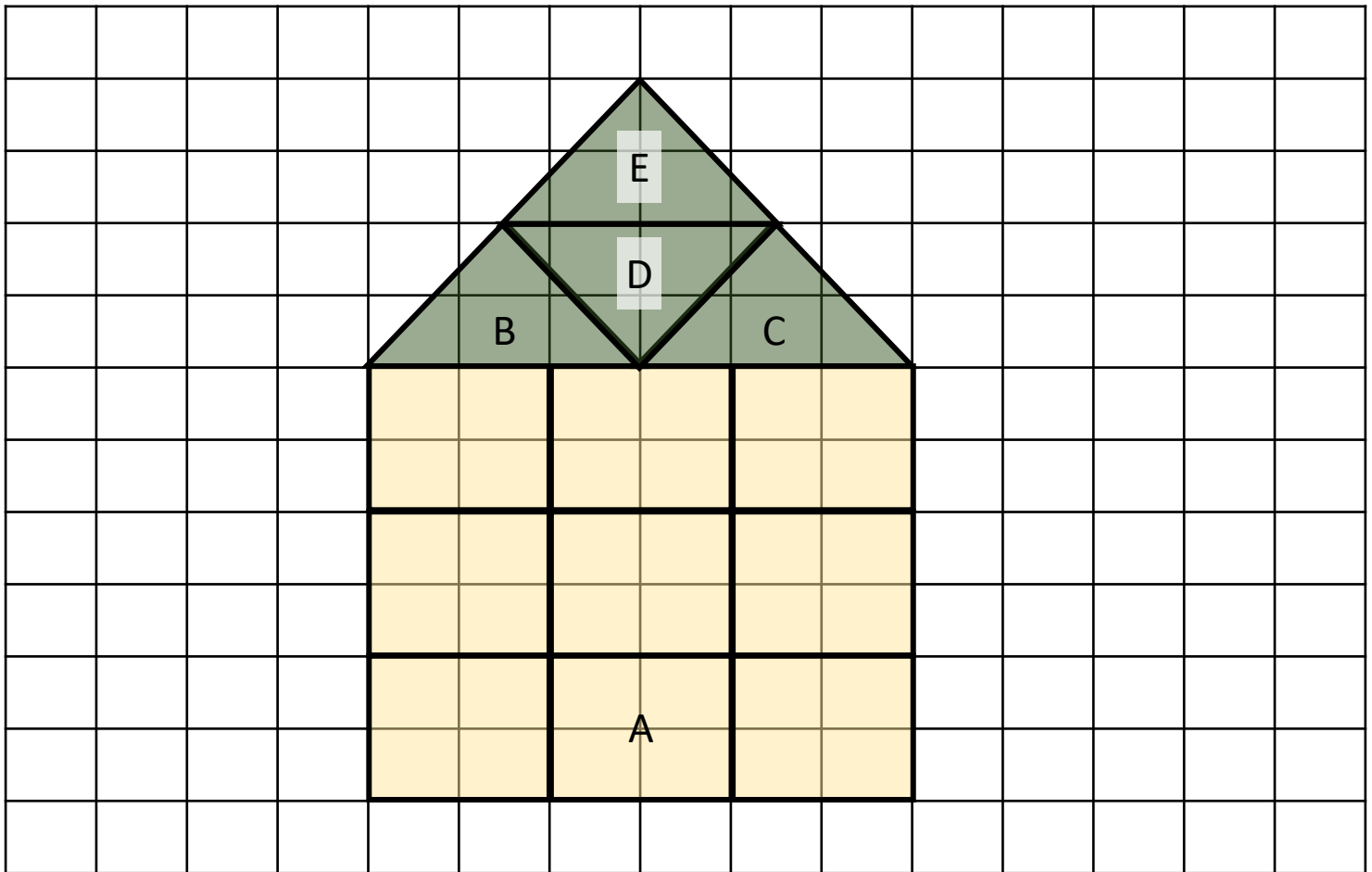


8) Reflect across the x-axis and translate left 6



9) Rotate 90° clockwise and reflect across the x-axis

Describing Transformations in a Design



Questions

Answer the questions below

1) Which shape is A?

2) Which transformation was used with shape A?

3) Which shape is B, C, D, and E?

3) Which transformation was used to move shape B to C?

4) Which two transformations were used to move shape C to D?

1) _____

2) _____

5) Which transformation was used to move shape D to E?

Name: _____

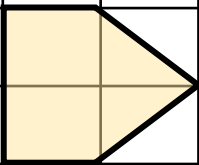
110

Curriculum Connection
SS.5

Create a Design Using Transformations

Instructions

- 1) Transform copies of the shape below to create a design
- 2) Describe the transformations at the bottom of the page



Description

Describe which transformations you performed to make your design

Name: _____

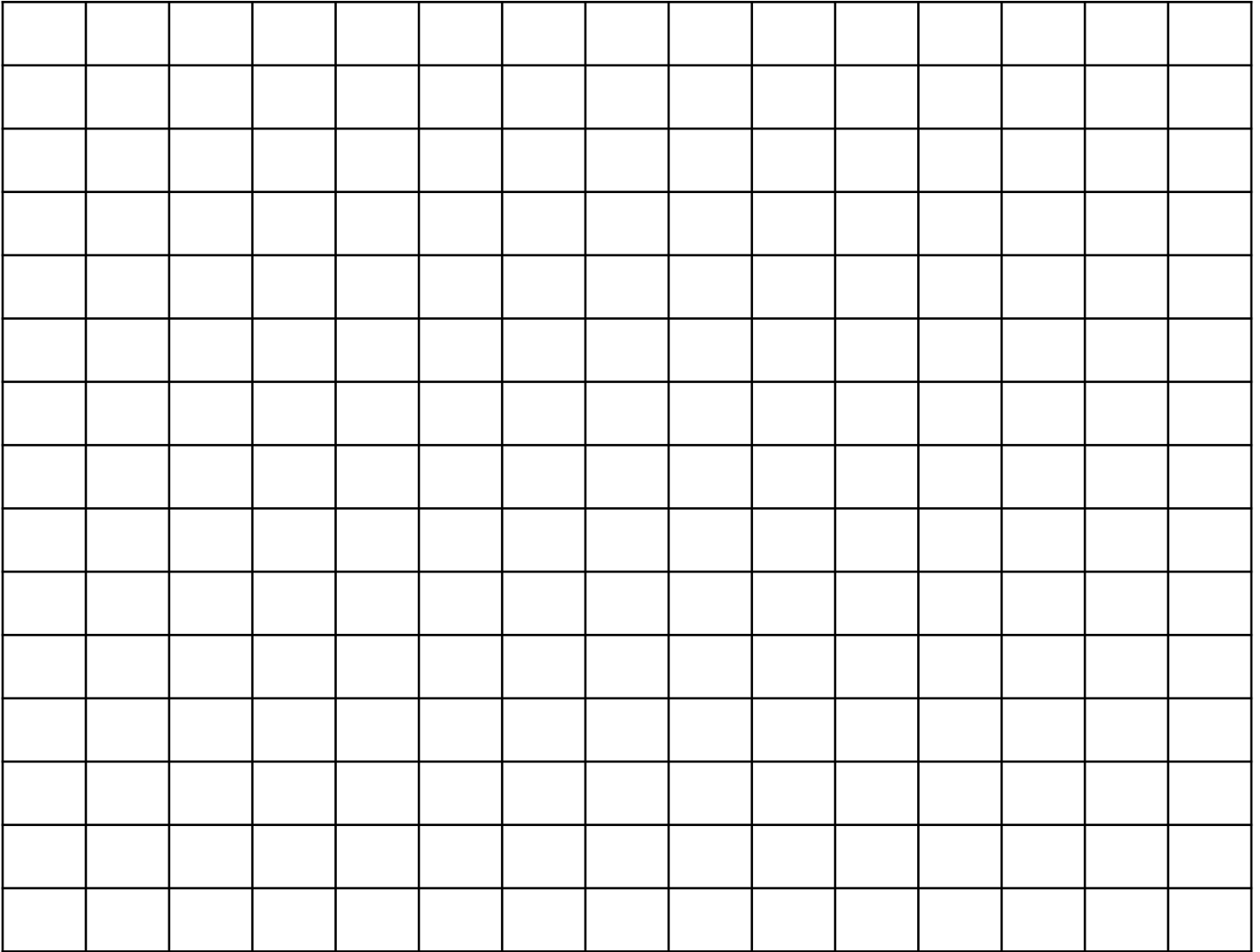
111

Curriculum Connection
SS.5

Create a Design Using Transformations

Instructions

- 1) Draw a shape on the grid paper below
- 2) Transform copies of the shape to create a design
- 3) Describe the transformations at the bottom of the page



Description

Describe which transformations you performed to make your design

Unit Test

Geometric Constructions & Transformations

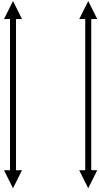
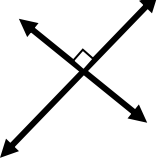
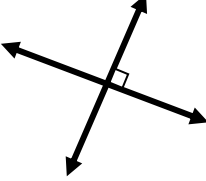
Part 1

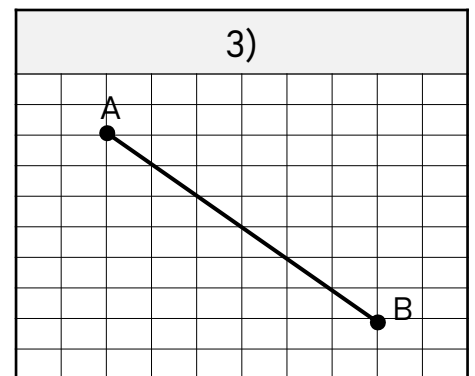
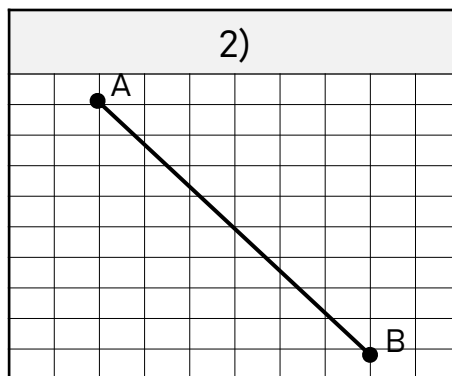
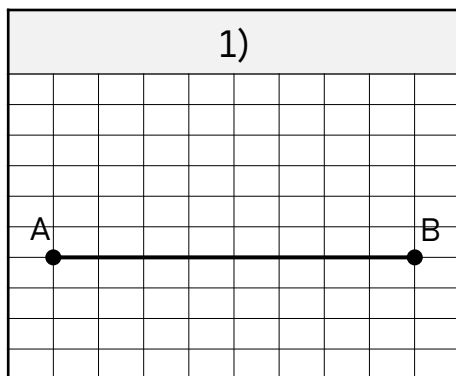
Construct a ray, line, point, and line segment. Label each.

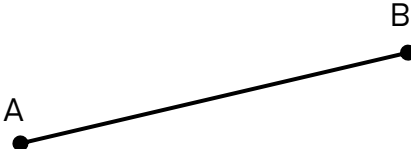
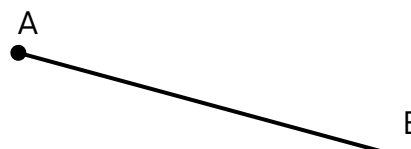
1)	2)	3)	4)
Line Segment – AB	Point C	Line – QR	Ray – MN

Part 2

Label the lines parallel, perpendicular, or intersecting

1) 	2) 	3) 	4) 

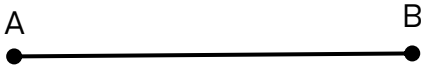
Part 3Construct perpendicular lines of the line segments $\overline{AB}$ **Part 4**Construct perpendicular lines of the line segments $\overline{AB}$

1) 	2) 
--	---

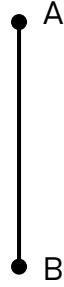
Part 5

Construct parallel lines of the line segment $\overleftrightarrow{AB}$

1)



2)



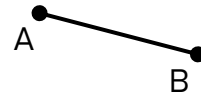
Part 6

Use a compass to construct a perpendicular bisector of the line segment $\overleftrightarrow{AB}$

1)



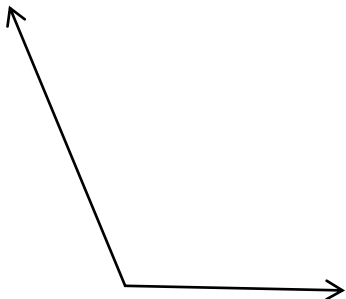
2)



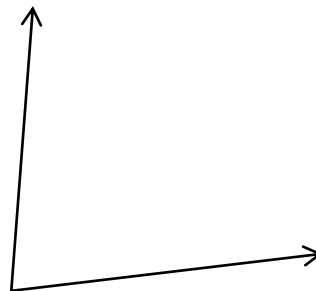
Part 7

Construct an angle bisector of the angle below using a compass

1)



2)



Part 8

Write which quadrant the points would be found in

Coordinates (x, y)	Quadrant (I, II, III, IV)
(4, -3)	
(-5, -4)	
(2, 5)	
(-2, 3)	

Part 9

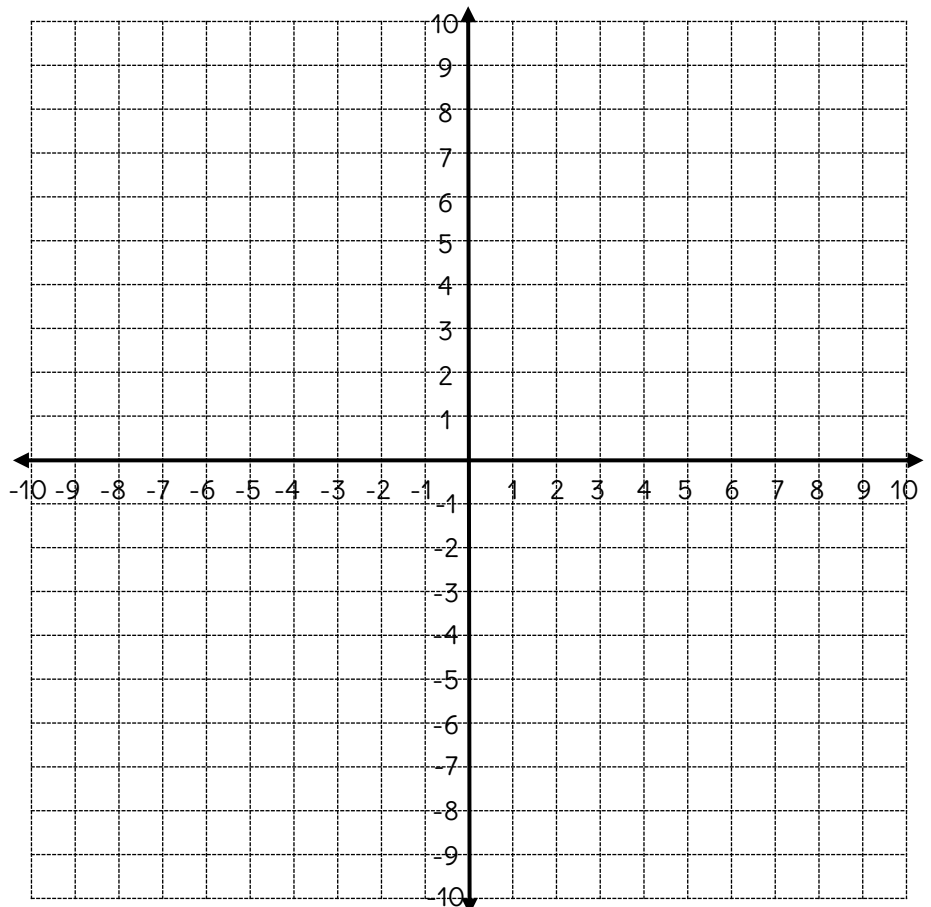
Which quadrant number is associated with the descriptions below

	Description	Quadrant
1)	Both positive values	
2)	Both negative values	
3)	An x positive value and y negative value	
4)	An x negative value and y positive value	

Part 10

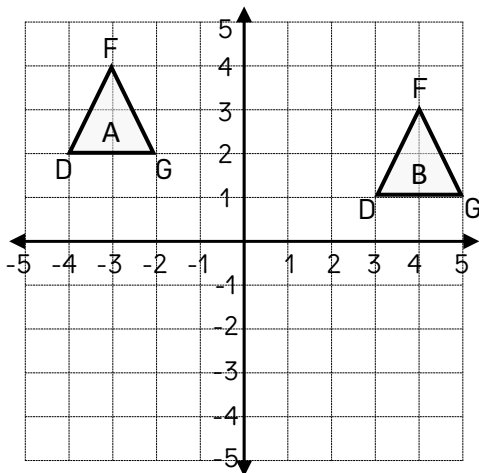
Plot the points of the coordinates on the cartesian plane

Letter	Coordinates (x, y)
A	(-3, 5)
B	(-8, 6)
C	(9, -4)
D	(7, -3)
E	(-2, -1)
F	(-7, 3)
G	(8, 10)
H	(-4, 1)
I	(2, -6)
J	(0, -5)



Part 11

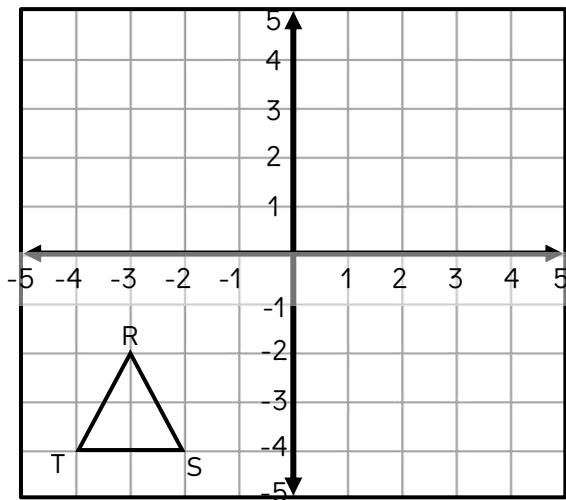
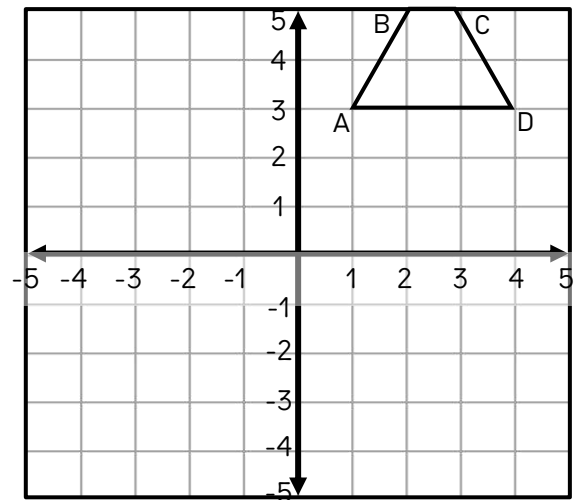
1) Fill in the coordinates 2) Describe the translation 3) Translate shape C



Coordinates A	Coordinates B
Describe the translation	
Translate Shape C from Shape B Left 3 units and down 4 units	Coordinates C

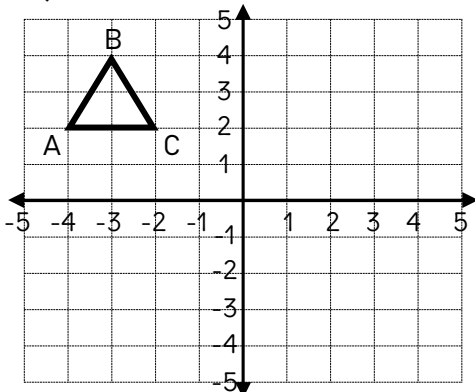
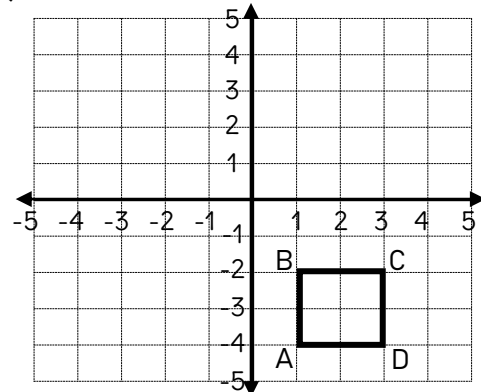
Part 12

Graph the new position of each shape after the given reflection

1) Reflection across the line $y = -1$ 2) Reflection across the line $x = 1$ 

Part 13

Graph the new position of each shape after the given rotation

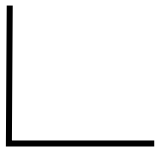
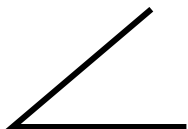
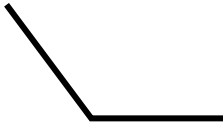
1) 180° rotation2) 90° counterclockwise rotation

Original	A(,)	B(,)	C(,)
Rotated	A(,)	B(,)	C(,)

Original	A(,)	B(,)	C(,)	D(,)
Rotated	A(,)	B(,)	C(,)	D(,)

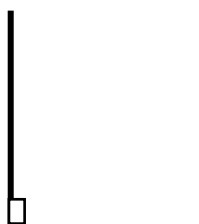
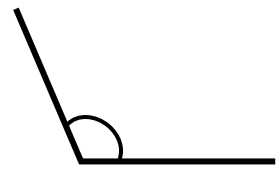
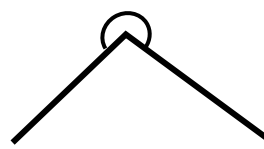
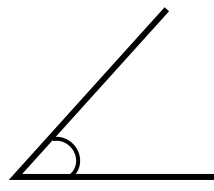
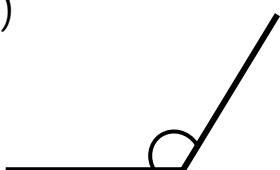
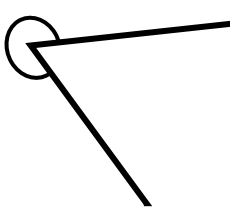
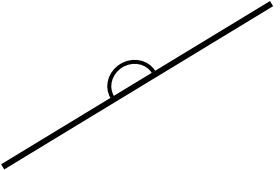
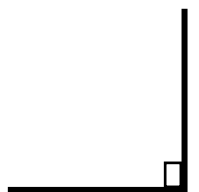
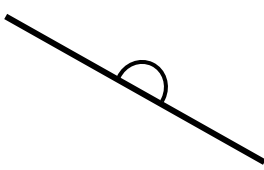
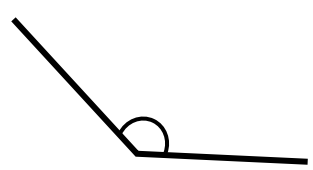
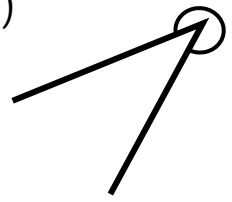
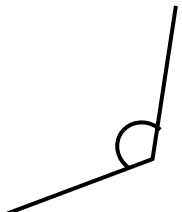
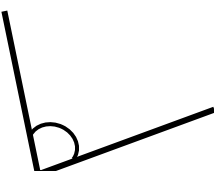
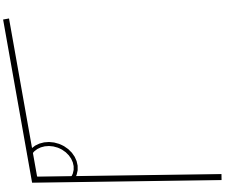
ANSWER PAGES

Naming Angles - Right, Obtuse, Acute, Straight, and Reflex

Right Angle - 90°	Acute Angle - smaller than 90°	Obtuse Angle - larger than 90°	Straight Angle - 180°	Reflex Angle - larger than 180°
				

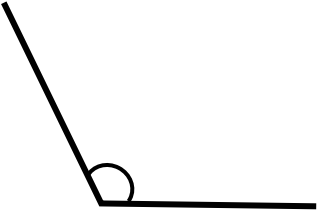
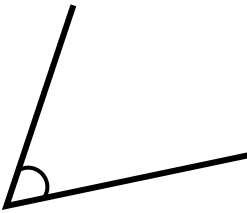
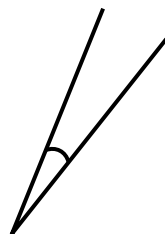
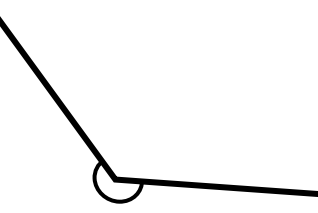
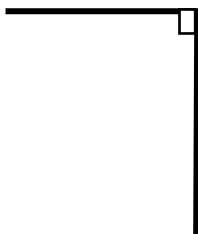
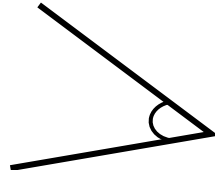
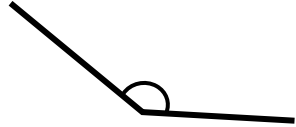
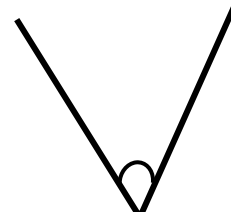
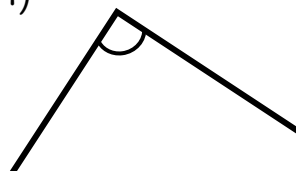
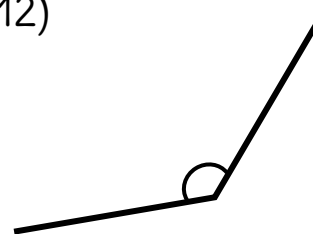
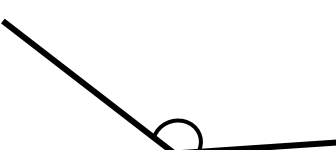
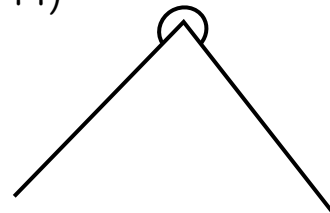
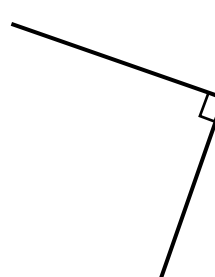
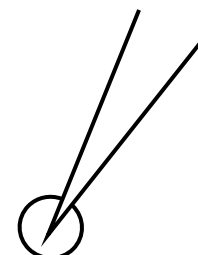
Questions

Label the angle - straight, acute, obtuse, right, or reflex

1) 	2) 	3) 	4) 
right	Obtuse	Reflex	Reflex
5) 	6) 	7) 	8) 
Acute	Obtuse	Reflex	Straight
9) 	10) 	11) 	12) 
right	Straight	Obtuse	Reflex
13) 	14) 	15) 	16) 
Obtuse	Acute	Obtuse	Reflex

Naming Angles - Right, Obtuse, Acute, and Reflex**Questions**

Label the angle – acute, obtuse, right, or reflex

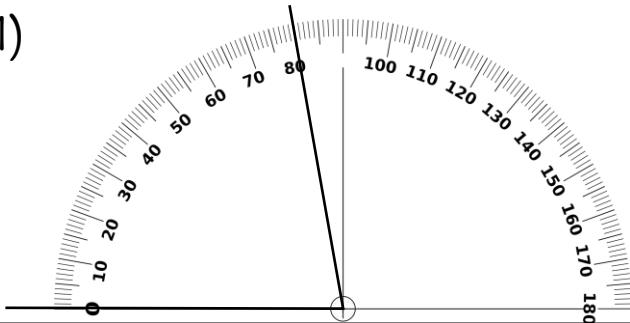
1) 	2) 	3) 	4) 
right acute obtuse reflex	right acute obtuse reflex	right acute obtuse reflex	right acute obtuse reflex
5) 	6) 	7) 	8) 
right acute obtuse reflex	right acute obtuse reflex	right acute obtuse reflex	right acute obtuse reflex
9) 	10) 	11) 	12) 
right acute obtuse reflex	right acute obtuse reflex	right acute obtuse reflex	right acute obtuse reflex
13) 	14) 	15) 	16) 
right acute obtuse reflex	right acute obtuse reflex	right acute obtuse reflex	right acute obtuse reflex

Measuring Angles - Printed Protractor

Questions

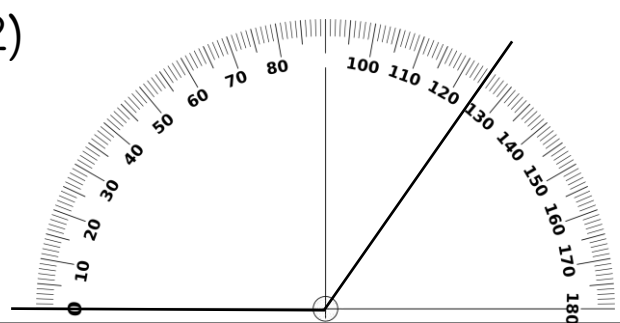
Measure the angles and label them acute, right or obtuse

1)



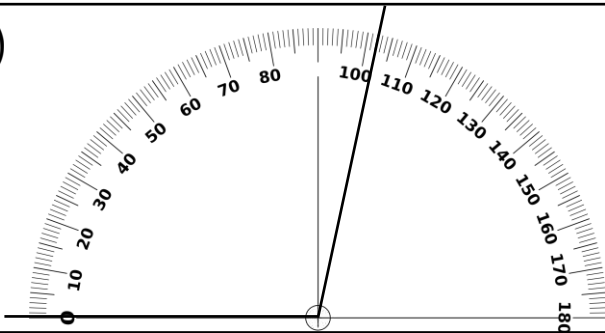
Angle = 80 Type of Angle = Acute

2)



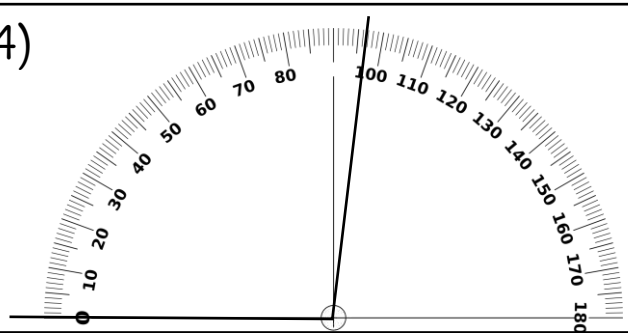
Angle = 125 Type of Angle = Obtuse

3)



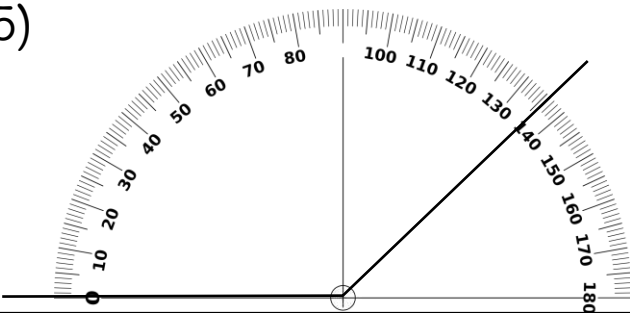
Angle = 112 Type of Angle = Obtuse

4)



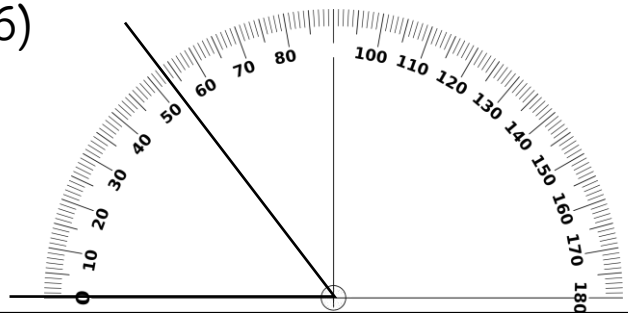
Angle = 97 Type of Angle = Obtuse

5)



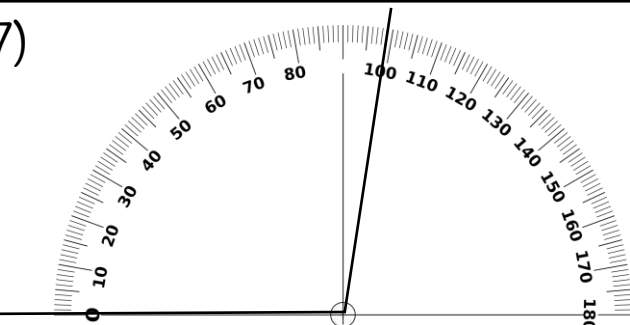
Angle = 136 Type of Angle = Obtuse

6)



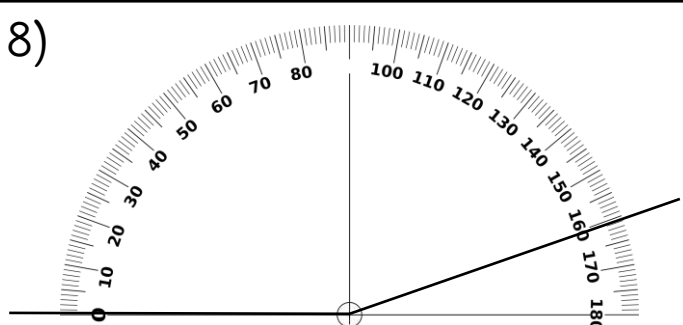
Angle = 53 Type of Angle = Acute

7)



Angle = 99 Type of Angle = Obtuse

8)



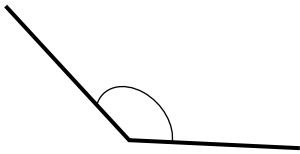
Angle = 161 Type of Angle = Obtuse

Measuring Angles Up To 180°

Questions

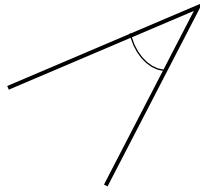
Measure the angles and label them acute, right, or obtuse

1)



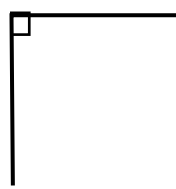
135 - Obtuse

2)



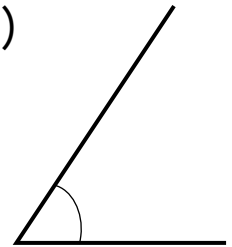
40 - Acute

3)



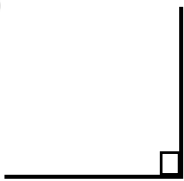
90 - Right

4)



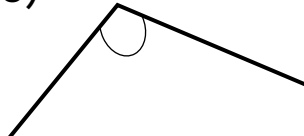
56 - Acute

5)



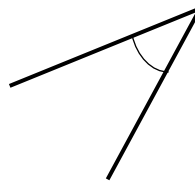
90 - Right

6)



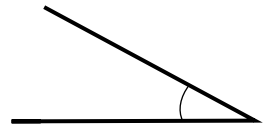
105 - Obtuse

7)



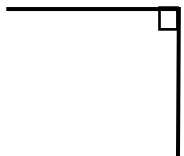
40 - Acute

8)



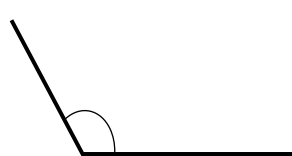
8 - Acute

9)



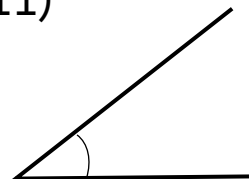
90 - Right

10)



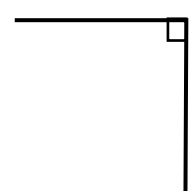
119 - Obtuse

11)



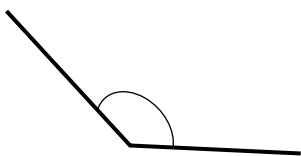
38 - Acute

12)



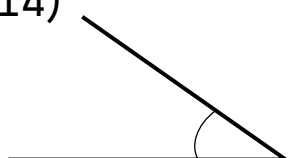
90 - Right

13)



136 - Obtuse

14)



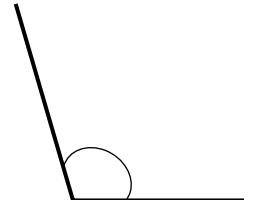
35 - Acute

15)



139 - Obtuse

16)

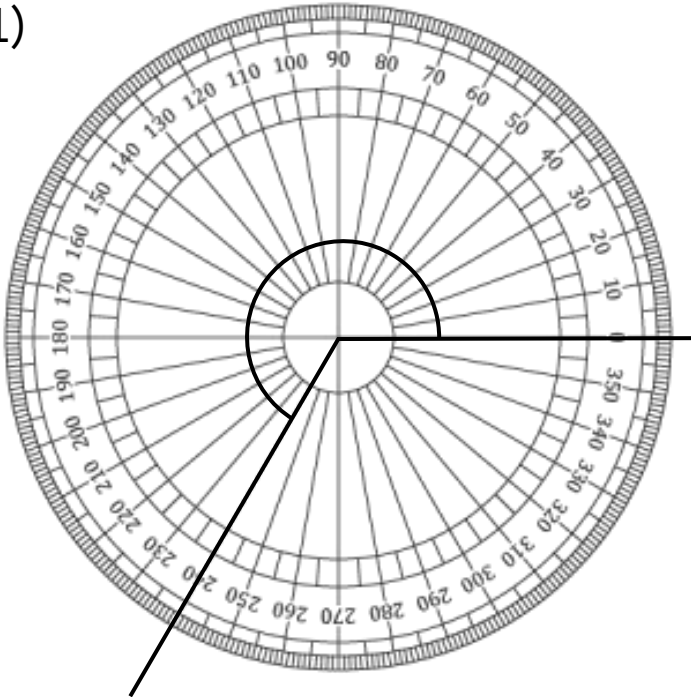


105 - Obtuse

Using Printed Protractor - Angles Up To 360°**Questions**

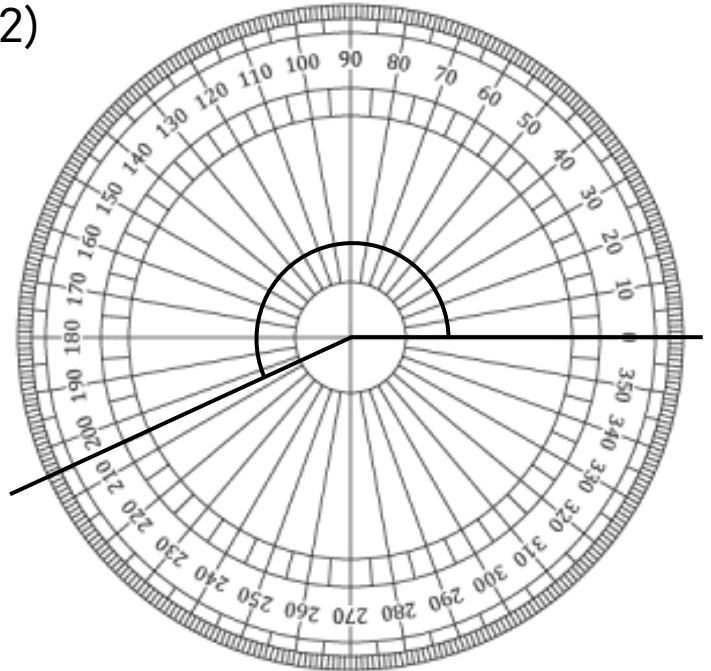
Measure the angles below using the circular protractor

1)



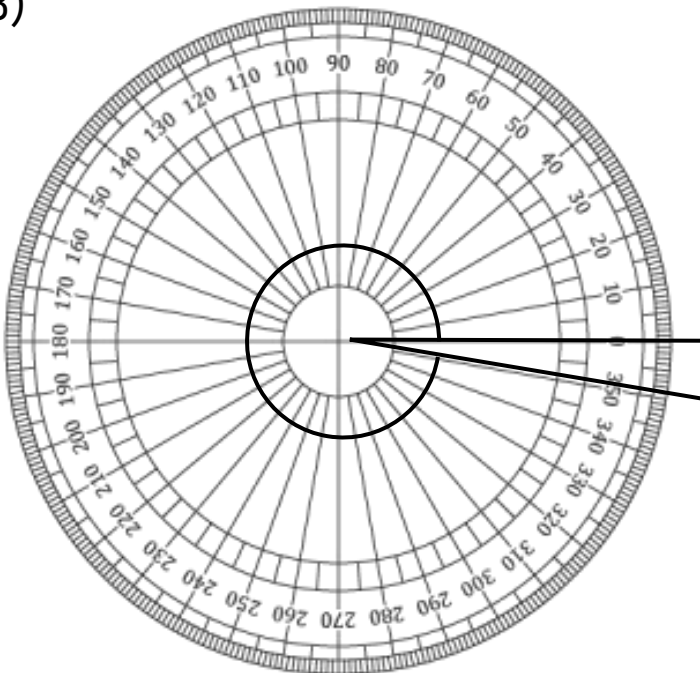
Angle = 240 Type of Angle = Reflex

2)



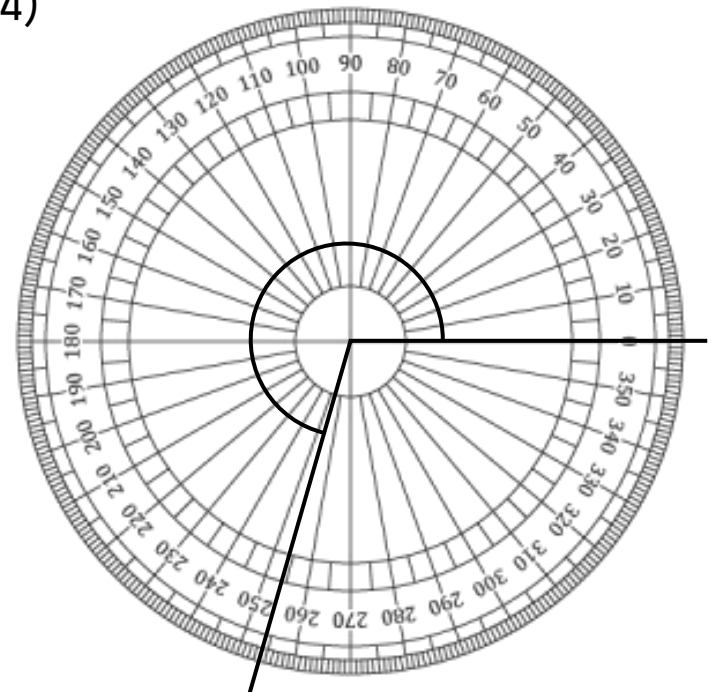
Angle = 205 Type of Angle = Reflex

3)



Angle = 351 Type of Angle = Reflex

4)

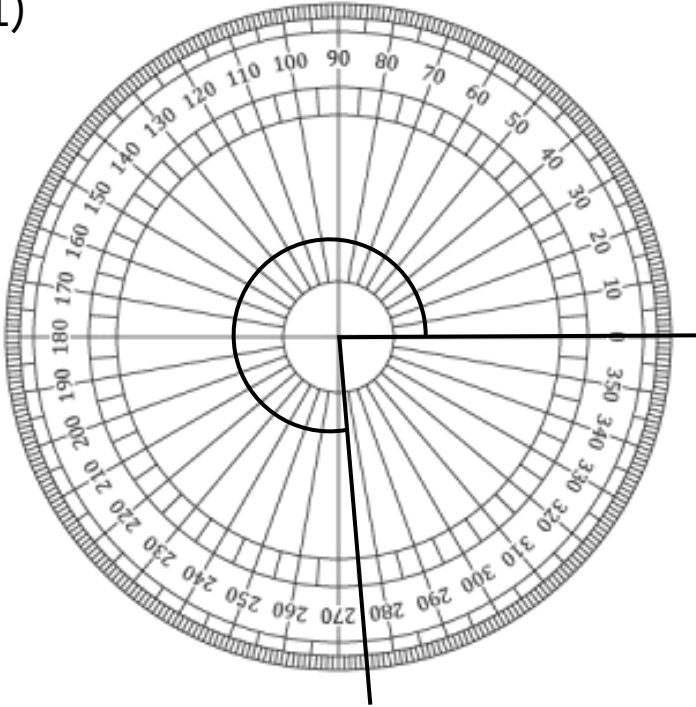


Angle = 254 Type of Angle = Reflex

Using Printed Protractor - Angles Up To 360°**Questions**

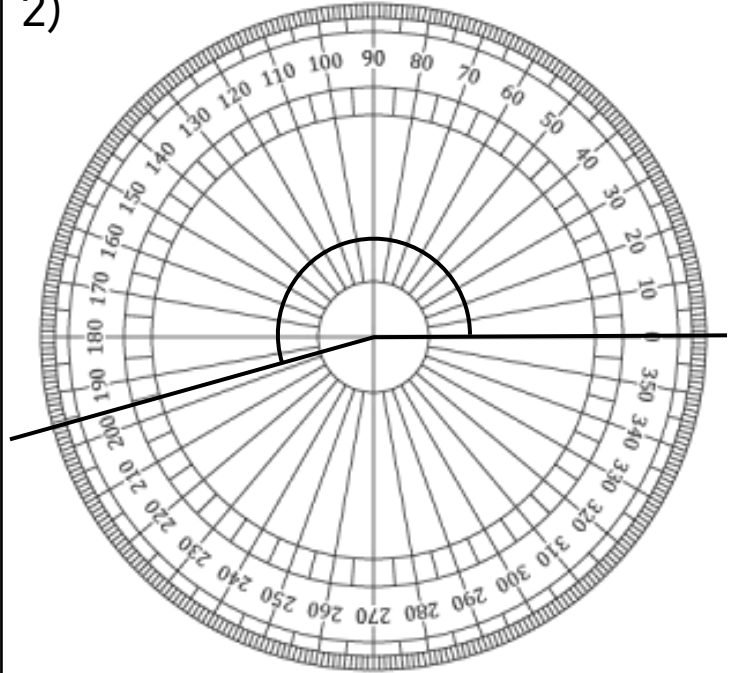
Measure the angles below using the circular protractor

1)



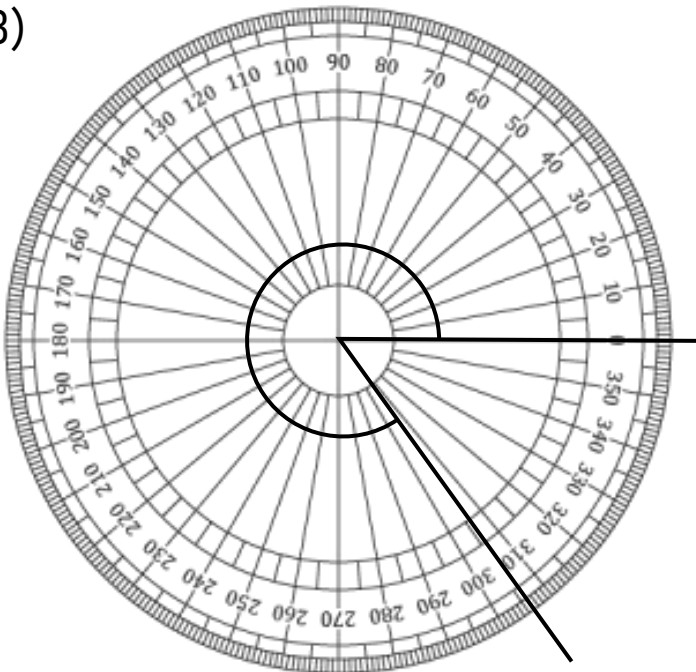
Angle = 275 Type of Angle = Reflex

2)



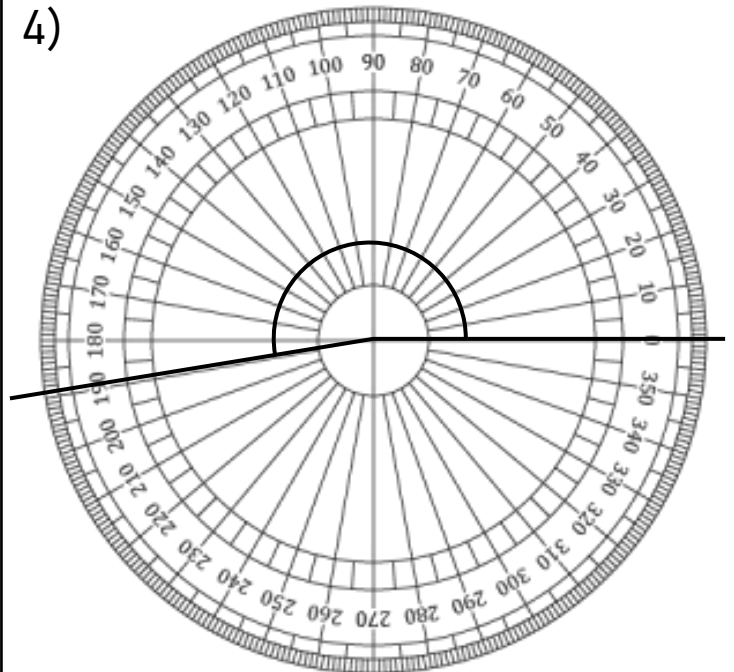
Angle = 196 Type of Angle = Reflex

3)



Angle = 306 Type of Angle = Reflex

4)



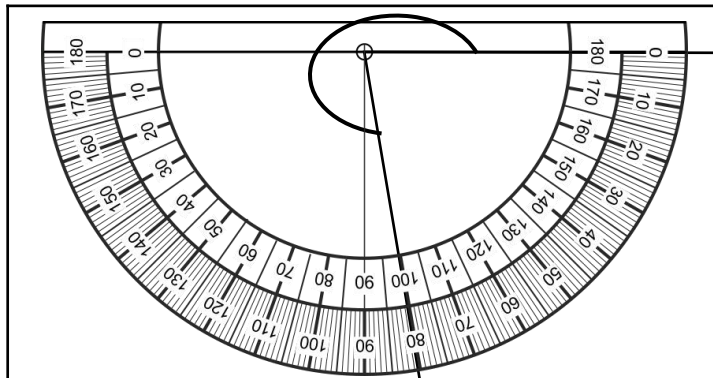
Angle = 189 Type of Angle = Reflex

Measuring Angles Up To 360°

We can measure reflex angles that are larger than 180° by using a circular protractor or a semi-circular protractor.

When using a semi-protractor, you can use one of two strategies:

- 1) Measure the angle starting with 180° and add 180°
- 2) Measure the remaining angle from 0° and subtract 360°



Solution

Strategy 1

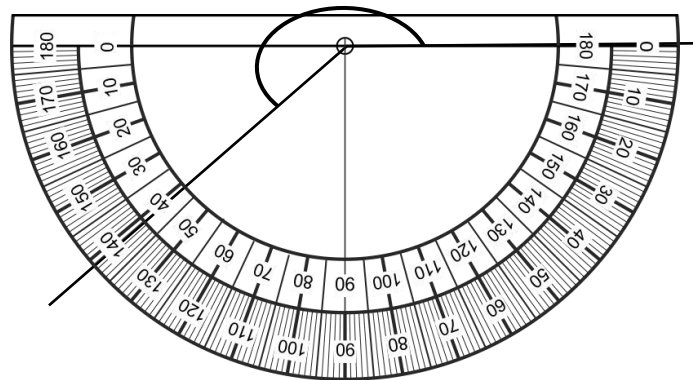
$$180 + 100 = 280$$

Strategy 2

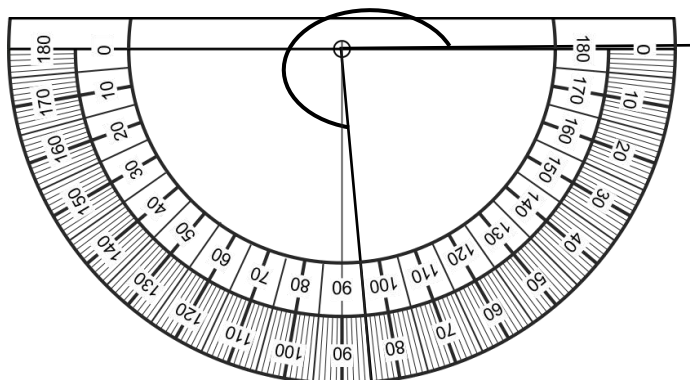
$$360 - 80 = 280$$

Questions

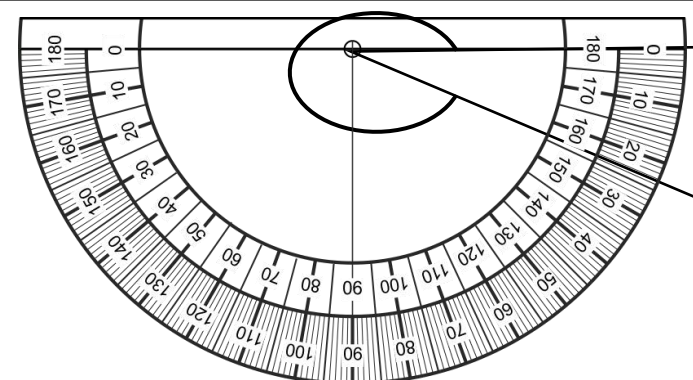
Measure the reflex angles below



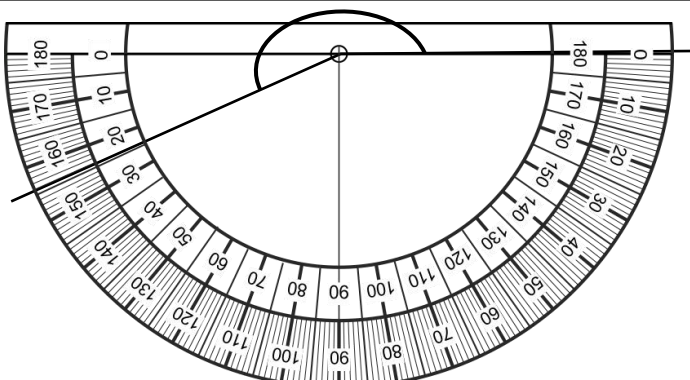
1) Angle Size = **221**



2) Angle Size = **275**



3) Angle Size = **337**

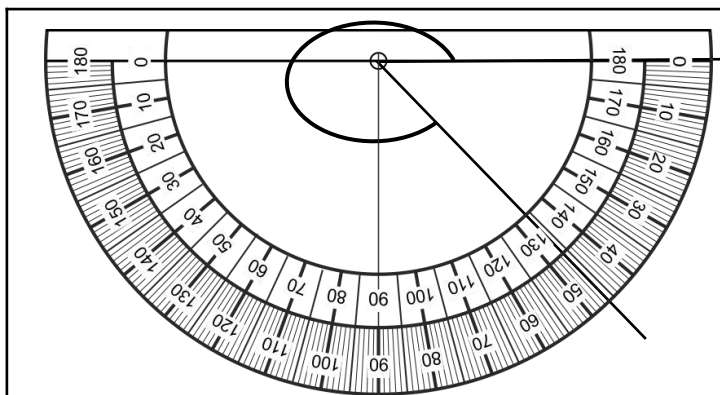


4) Angle Size = **204**

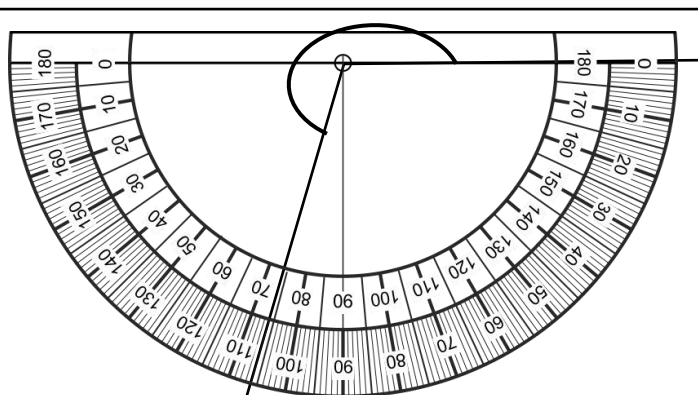
Measuring Angles Up To 360°

Questions

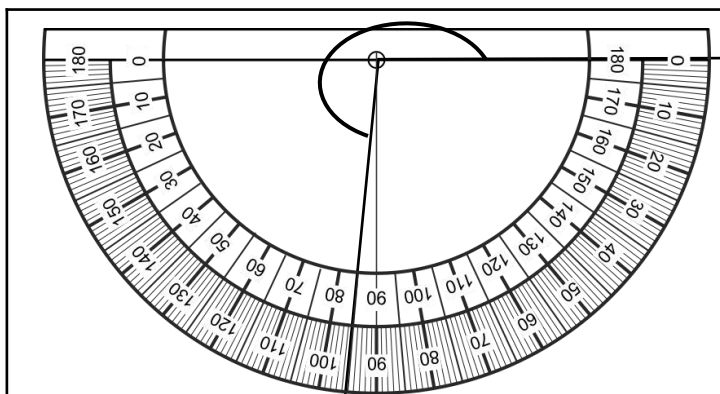
Measure the reflex angles below



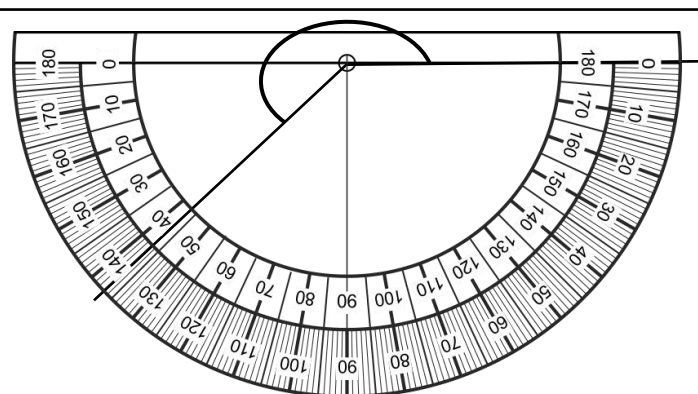
1) Angle Size = 315



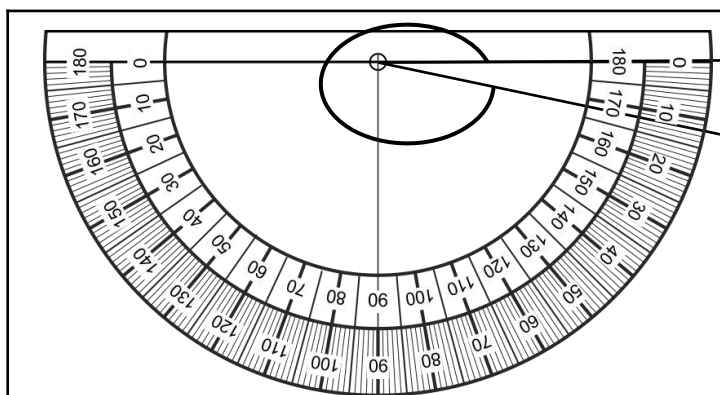
2) Angle Size = 253



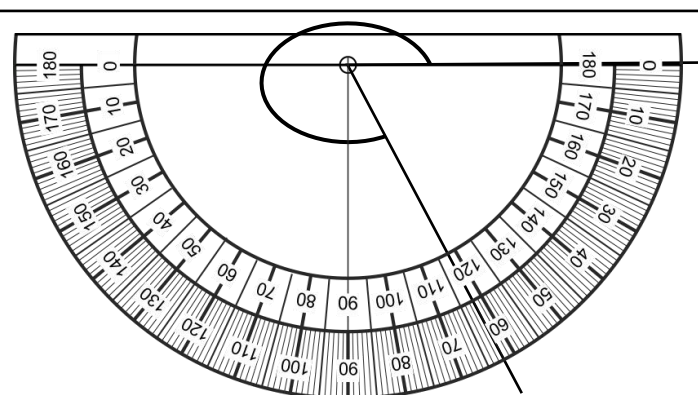
3) Angle Size = 264



4) Angle Size = 223



5) Angle Size = 348

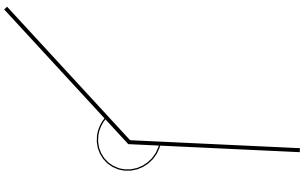


6) Angle Size = 298

Measuring Angles Up To 360° **Questions**

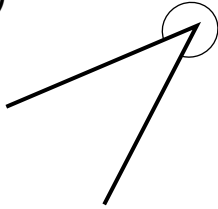
Measure the angles below

1)



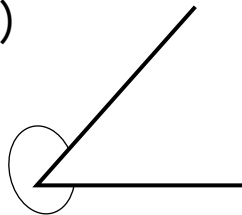
225

2)



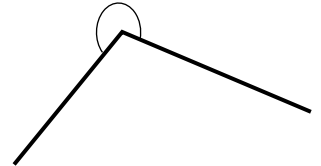
320

3)



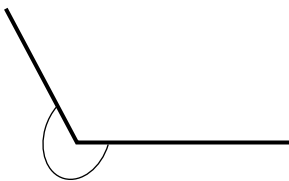
311

4)



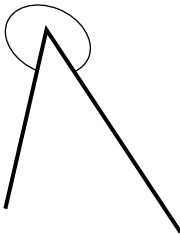
253

5)



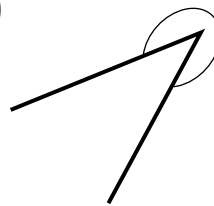
241

6)



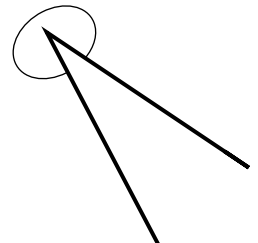
313

7)



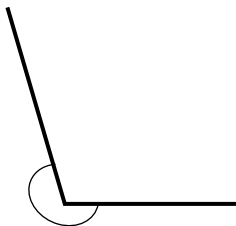
320

8)



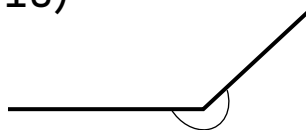
331

9)



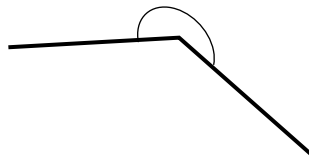
253

10)



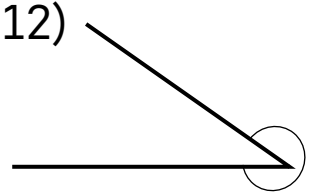
223

11)



224

12)



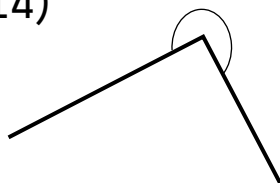
325

13)



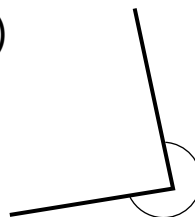
196

14)



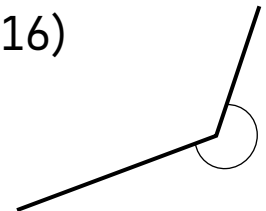
270

15)



273

16)

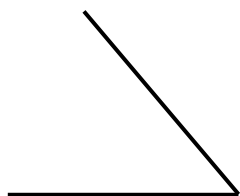


231

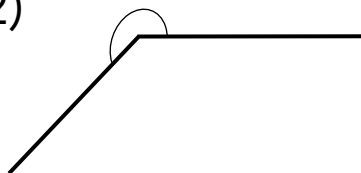
Constructing Angles - Estimating - Multiple Choice**Questions**

Circle which angle you think it is. Do not use a protractor.

1)

a) $\angle = 95^\circ$ b) $\angle = 50^\circ$ c) $\angle = 110^\circ$ d) $\angle = 160^\circ$

2)

a) $\angle = 95^\circ$ b) $\angle = 100^\circ$ c) $\angle = 225^\circ$ d) $\angle = 290^\circ$

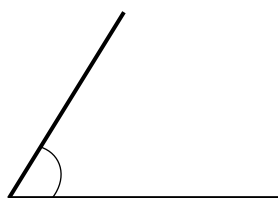
3)

a) $\angle = 171^\circ$ b) $\angle = 9^\circ$ c) $\angle = 50^\circ$ d) $\angle = 85^\circ$

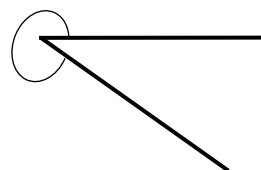
4)

a) $\angle = 168^\circ$ b) $\angle = 50^\circ$ c) $\angle = 120^\circ$ d) $\angle = 10^\circ$

5)

a) $\angle = 60^\circ$ b) $\angle = 120^\circ$ c) $\angle = 10^\circ$ d) $\angle = 160^\circ$

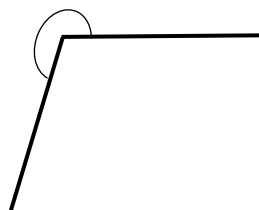
6)

a) $\angle = 90^\circ$ b) $\angle = 180^\circ$ c) $\angle = 270^\circ$ d) $\angle = 325^\circ$

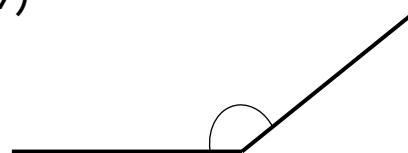
7)

a) $\angle = 50^\circ$ b) $\angle = 160^\circ$ c) $\angle = 20^\circ$ d) $\angle = 100^\circ$

8)

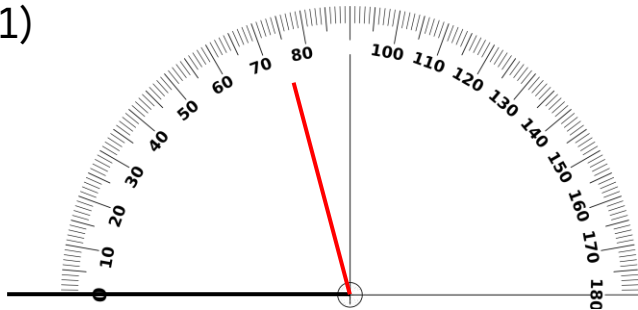
a) $\angle = 75^\circ$ b) $\angle = 190^\circ$ c) $\angle = 255^\circ$ d) $\angle = 355^\circ$

9)

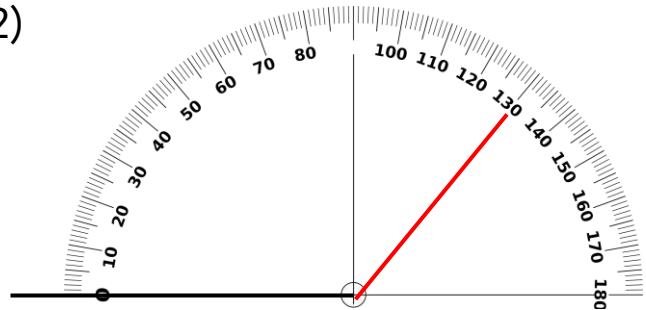
a) $\angle = 40^\circ$ b) $\angle = 30^\circ$ c) $\angle = 140^\circ$ d) $\angle = 170^\circ$

Construction Angles Up To 180°**Questions**Construct the angles and label them acute, right or obtuse

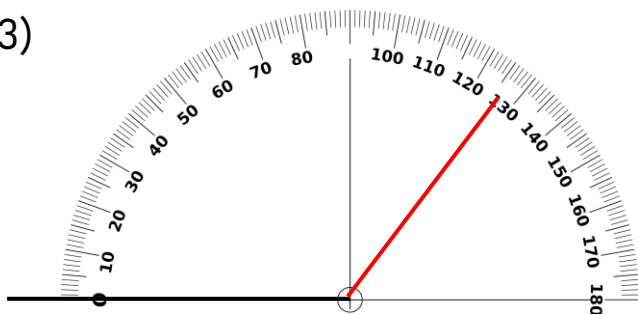
1)

 $\angle = 75^\circ$ Type of Angle = acute

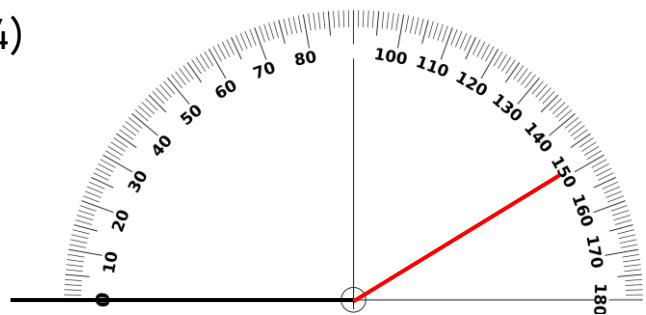
2)

 $\angle = 130^\circ$ Type of Angle = obtuse

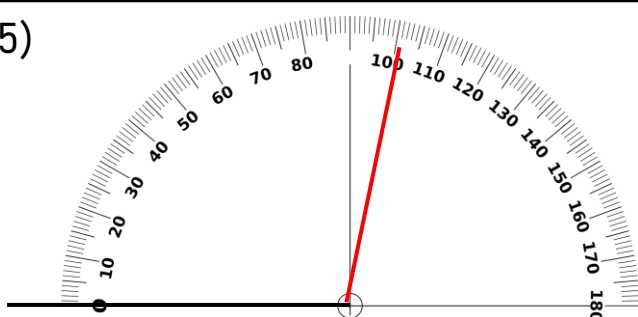
3)

 $\angle = 126^\circ$ Type of Angle = obtuse

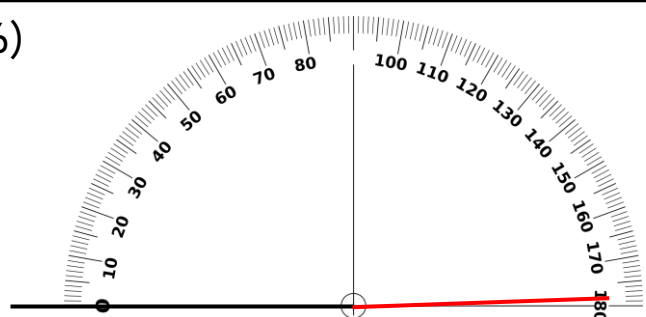
4)

 $\angle = 148^\circ$ Type of Angle = obtuse

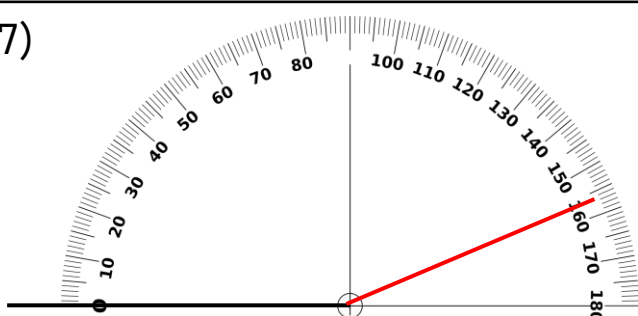
5)

 $\angle = 101^\circ$ Type of Angle = obtuse

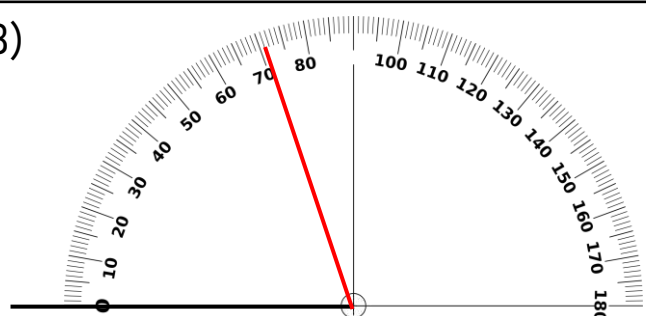
6)

 $\angle = 178^\circ$ Type of Angle = obtuse

7)

 $\angle = 156^\circ$ Type of Angle = obtuse

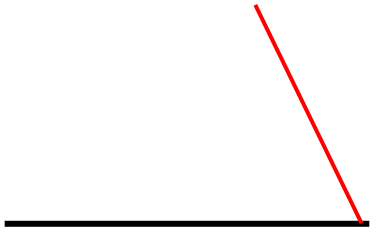
8)

 $\angle = 71^\circ$ Type of Angle = acute

Contraction Angles Up To 180°**Part 1**

Use a protractor to draw the angles below using the line provided

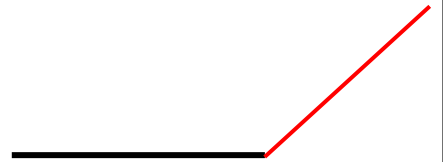
1)

 $\angle = 65^\circ$

2)

 $\angle = 93^\circ$

3)

 $\angle = 137^\circ$ **Part 2**

Use a protractor to draw the angles below

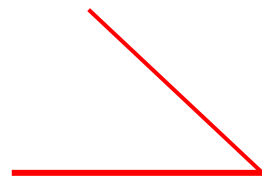
1)

 $\angle = 172^\circ$

2)

 $\angle = 117^\circ$

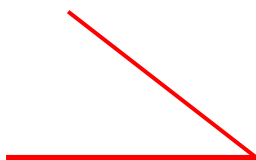
3)

 $\angle = 42^\circ$

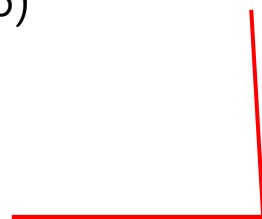
4)

 $\angle = 164^\circ$

5)

 $\angle = 38^\circ$

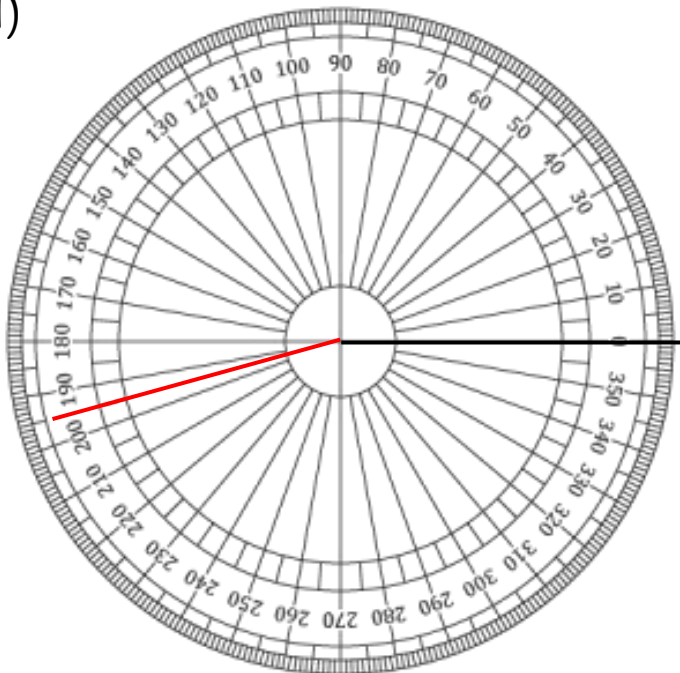
6)

 $\angle = 87^\circ$

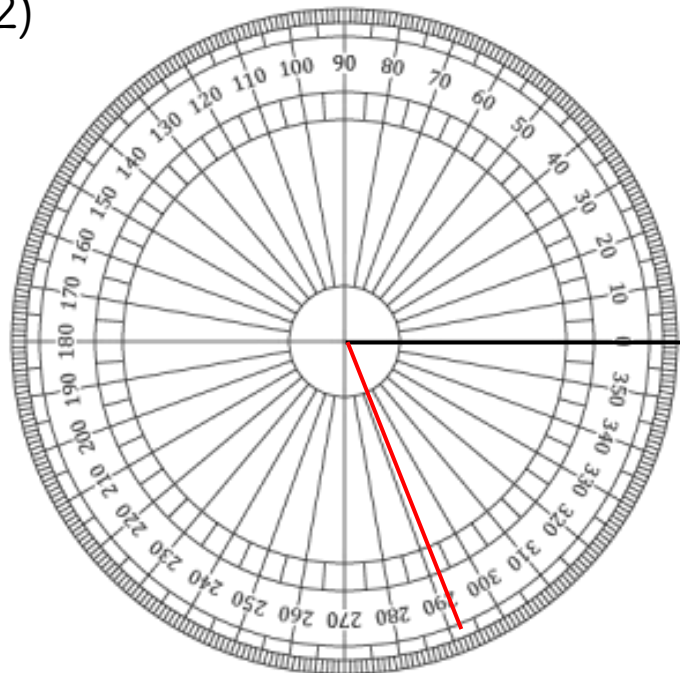
Construction Angles Up To 360°**Questions**

Construct the angles below

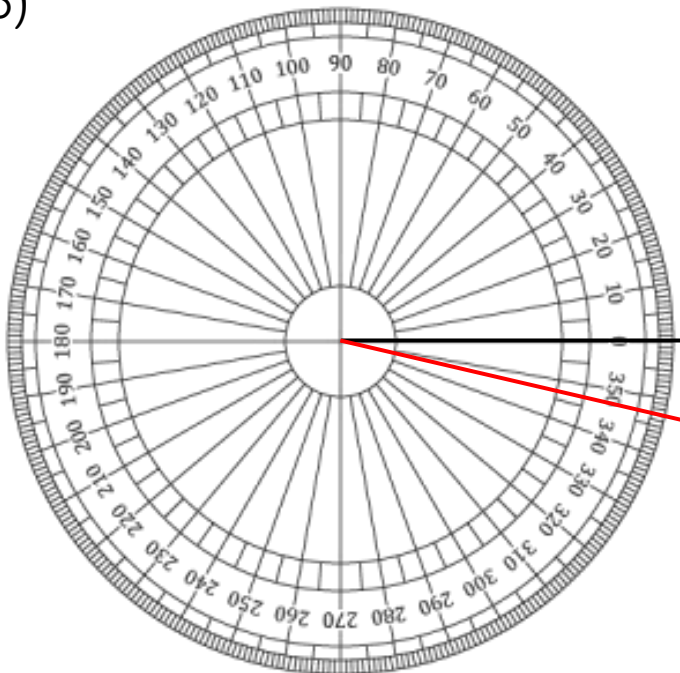
1)

Angle = 195°

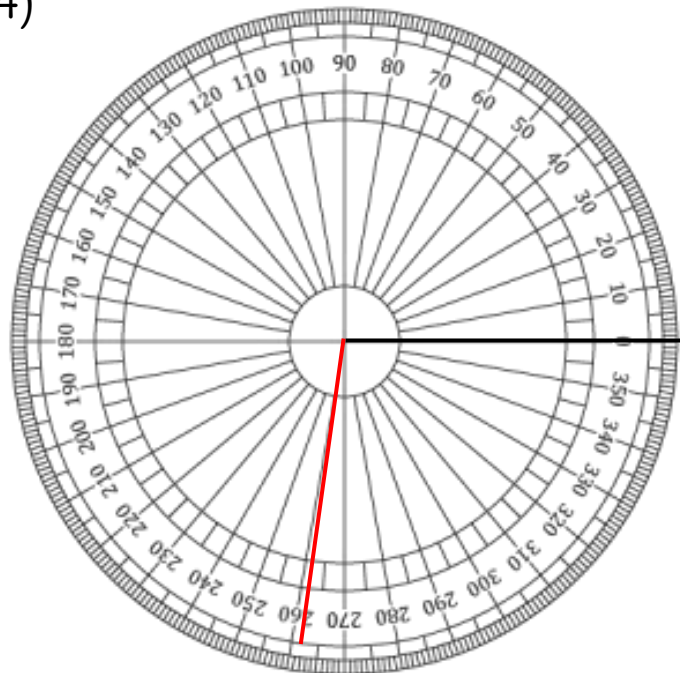
2)

Angle = 292°

3)

Angle = 347°

4)

Angle = 262°

Construction Angles Up To 360°

Part 1

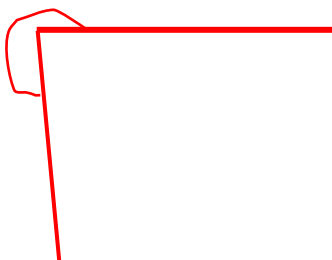
Use a protractor to draw the angles below using the line provided

1)



$$\angle = 200^\circ$$

2)



$$\angle = 275^\circ$$

3)

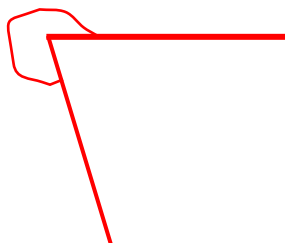


$$\angle = 350^\circ$$

Part 2

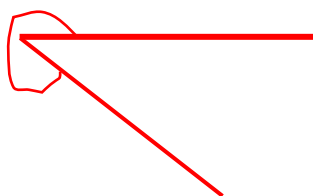
Use a protractor to draw the angles below

1)



$$\angle = 287^\circ$$

2)



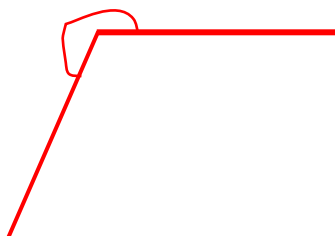
$$\angle = 322^\circ$$

3)



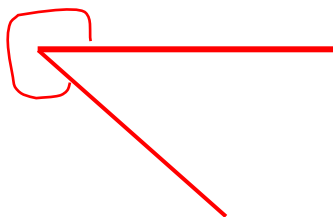
$$\angle = 196^\circ$$

4)



$$\angle = 248^\circ$$

5)



$$\angle = 318^\circ$$

6)

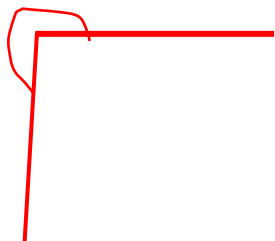


$$\angle = 264^\circ$$

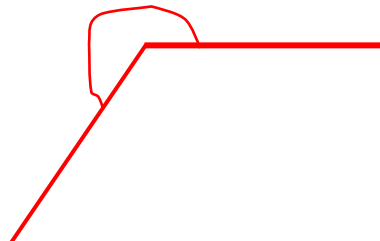
Construction Angles Up To 360°**Practice**

Use a protractor to draw the angles below

1)

 $\angle = 267^\circ$

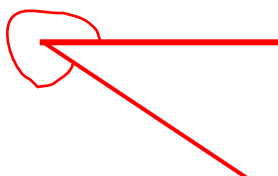
2)

 $\angle = 236^\circ$

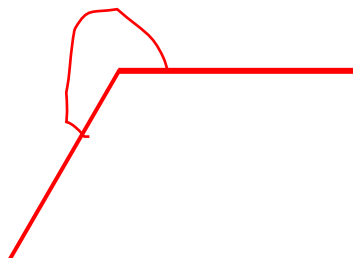
3)

 $\angle = 184^\circ$

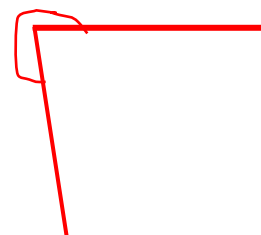
4)

 $\angle = 326^\circ$

5)

 $\angle = 241^\circ$

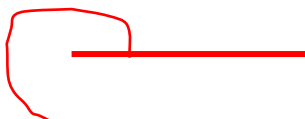
6)

 $\angle = 279^\circ$

7)

 $\angle = 351^\circ$

8)

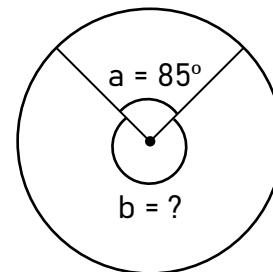
 $\angle = 249^\circ$

9)

 $\angle = 355^\circ$

Introduction to Central Angles

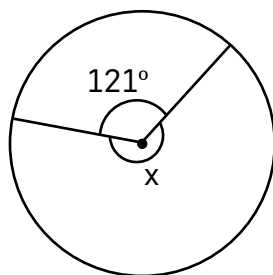
A **central angle** is an angle with a vertex at the centre of a circle. Both angles a and b in the example are central angles. The sum of all central angles need to equal 360° . Therefore, if angle a = 85° , then angle b would equal 275° ($360 - 85$).



Practice

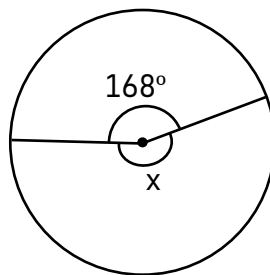
Determine the value of angle x

1)



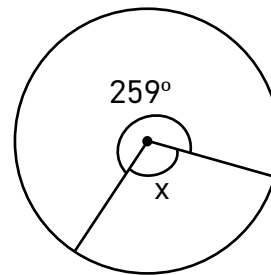
$$\angle x = 239^\circ$$

2)



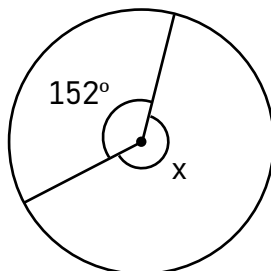
$$\angle x = 192^\circ$$

3)



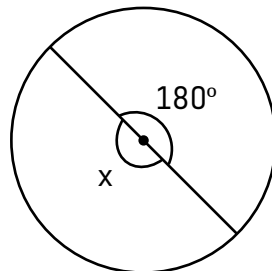
$$\angle x = 101^\circ$$

4)



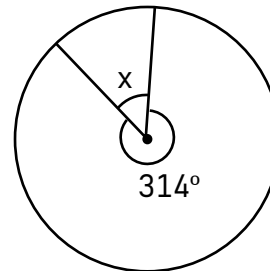
$$\angle x = 208^\circ$$

5)



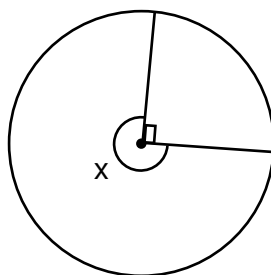
$$\angle x = 180^\circ$$

6)



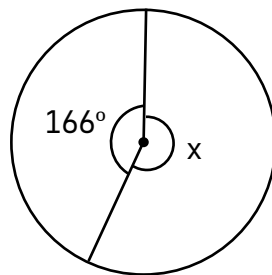
$$\angle x = 46^\circ$$

7)



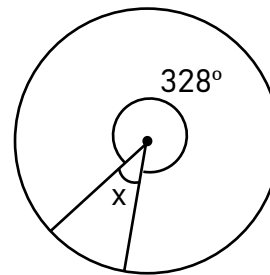
$$\angle x = 270^\circ$$

8)



$$\angle x = 194^\circ$$

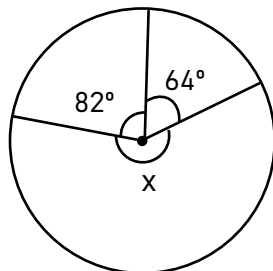
9)



$$\angle x = 32^\circ$$

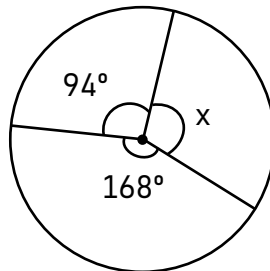
Finding the Missing Angle - Central Angles**Practice**Determine the value of angle x

1)



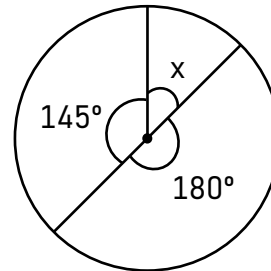
$\angle x = 214^\circ$

2)



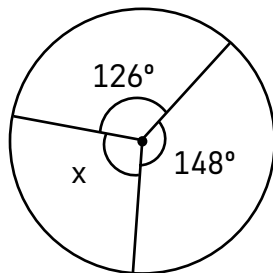
$\angle x = 98^\circ$

3)



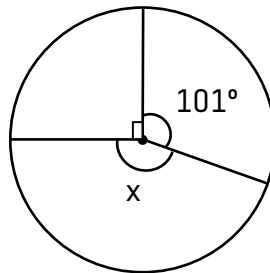
$\angle x = 35^\circ$

4)



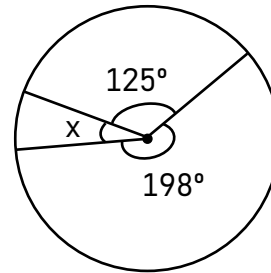
$\angle x = 86^\circ$

5)



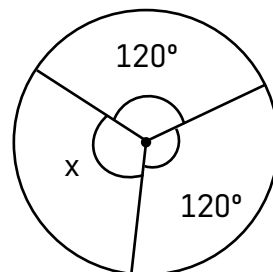
$\angle x = 169^\circ$

6)



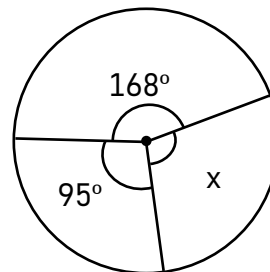
$\angle x = 37^\circ$

7)



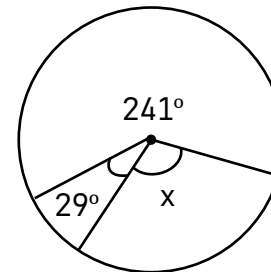
$\angle x = 120^\circ$

8)



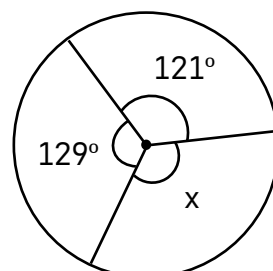
$\angle x = 97^\circ$

9)



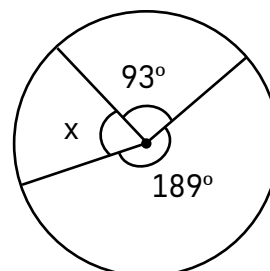
$\angle x = 90^\circ$

10)



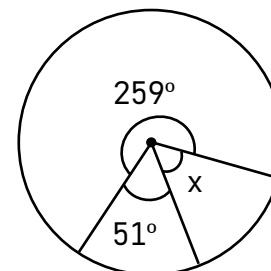
$\angle x = 110^\circ$

11)



$\angle x = 78^\circ$

12)



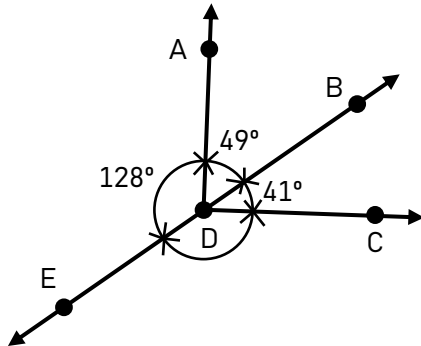
$\angle x = 50^\circ$

Finding the Missing Angle - Central Angles

Practice

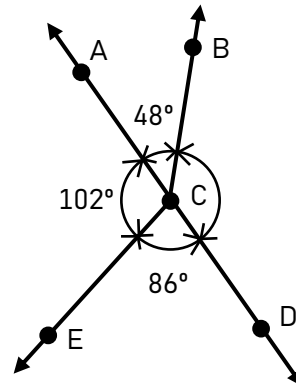
Find the missing angles below

1)



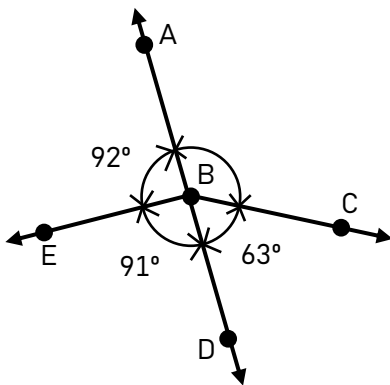
$$\angle CDE = 142^\circ$$

2)



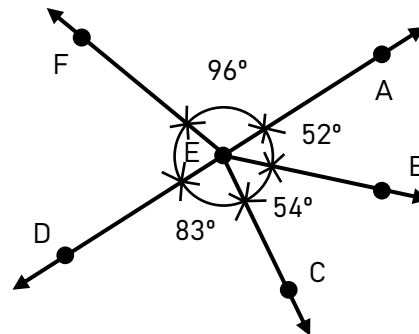
$$\angle BCD = 124^\circ$$

3)



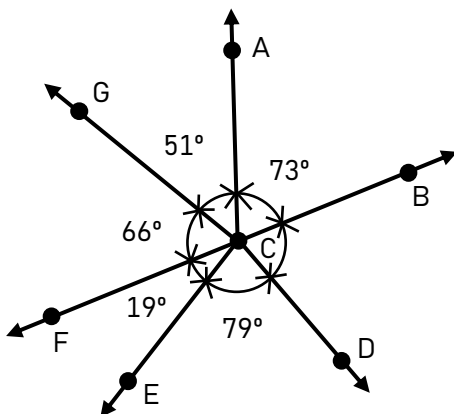
$$\angle ABC = 114^\circ$$

4)



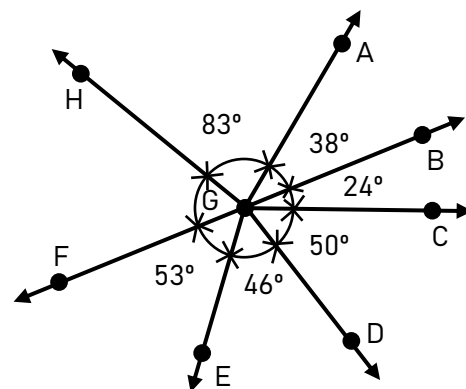
$$\angle FED = 75^\circ$$

5)



$$\angle BCD = 72^\circ$$

6)



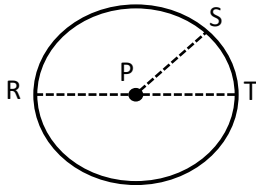
$$\angle FGH = 66^\circ$$

Intro - Radius and Diameter

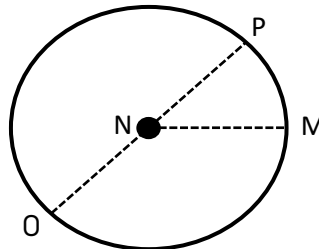
Questions

Identify the elements for each question. The first one is done for you

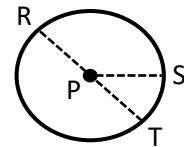
1)

Centre = PRadius = PS, PT, PRDiameter = RT

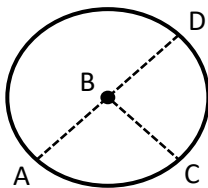
2)

Centre = NRadius = NP, NO, NMDiameter = PO

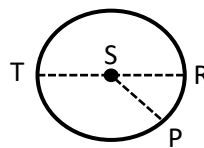
3)

Centre = PRadius = PR, PS, PTDiameter = TR

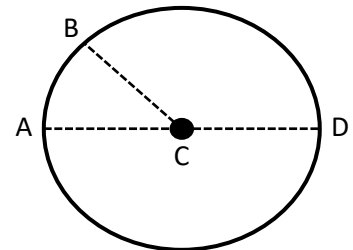
4)

Centre = BRadius = BD, BC, BADiameter = AD

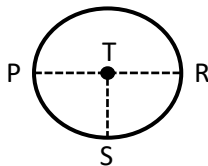
5)

Centre = SRadius = SR, SP, STDiameter = TR

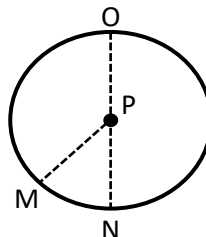
6)

Centre = CRadius = CD, CA, CBDiameter = AD

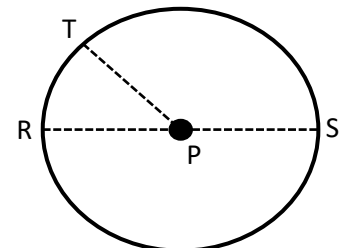
7)

Centre = TRadius = TR, TS, TPDiameter = PR

8)

Centre = PRadius = PO, PN, PMDiameter = NO

9)

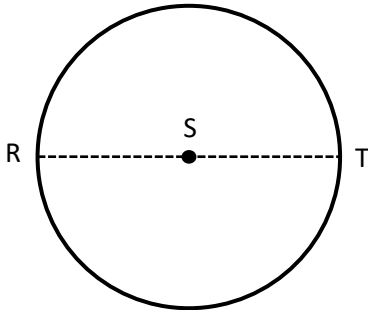
Centre = PRadius = PS, PR, PTDiameter = RS

Relationship Between Radius and Diameter

The distance from any point on the outside of a circle to its centre is always the same. This distance is a circle's radius (r).

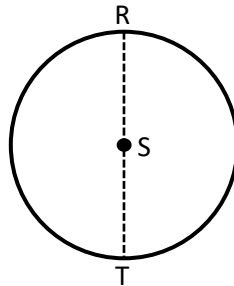
Part 1 Use a ruler to measure the line segments. Is the radius related to the diameter?

1)



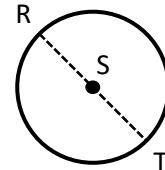
- a) $SR = 2\text{cm}$ (radius)
 b) $ST = 2\text{cm}$ (radius)
 c) $RT = 4\text{cm}$ (diameter)

2)



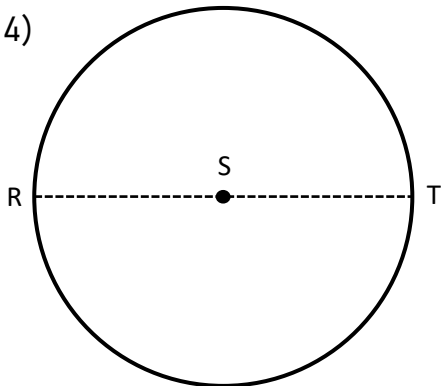
- a) $SR = 1.5\text{cm}$ (radius)
 b) $ST = 1.5\text{cm}$ (radius)
 c) $RT = 3\text{cm}$ (diameter)

3)



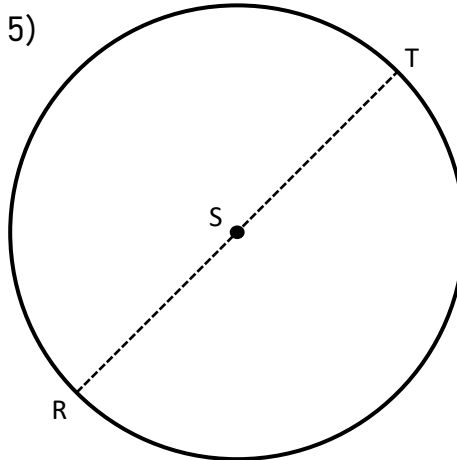
- a) $SR = 1\text{cm}$ (radius)
 b) $ST = 1\text{cm}$ (radius)
 c) $RT = 2\text{cm}$ (diameter)

4)



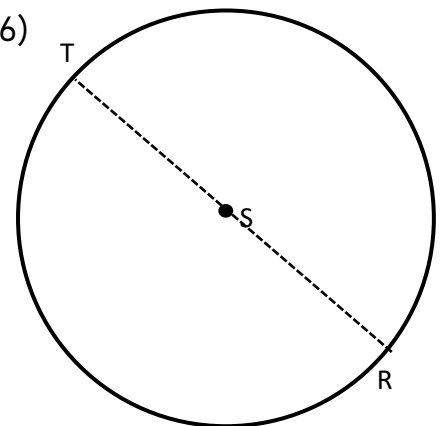
- a) $SR = 2.5\text{cm}$ (radius)
 b) $ST = 2.5\text{cm}$ (radius)
 c) $RT = 5\text{cm}$ (diameter)

5)



- a) $SR = 3\text{cm}$ (radius)
 b) $ST = 3\text{cm}$ (radius)
 c) $RT = 6\text{cm}$ (diameter)

6)



- a) $SR = 2.75\text{cm}$ (radius)
 b) $ST = 2.75\text{cm}$ (radius)
 c) $RT = 5.5\text{cm}$ (diameter)

Part 2 Answer the questions below

Question	Formula
1) If you know the length of the radius, how could you use it to determine the length of the diameter? Write a formula for calculating diameter.	$d = 2r$
2) Write a formula for calculating the radius of a circle if you have the diameter.	$r = d \div 2$

Calculating Radius and Diameter

Calculating Radius Formula

$$r = \frac{d}{2} \quad \text{or} \quad r = d \div 2$$

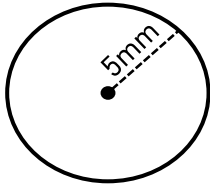
Calculating Diameter Formula

$$d = 2r \quad \text{or} \quad d = r \times 2$$

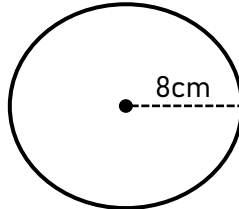
Questions

Find the radius and diameter of each circle below

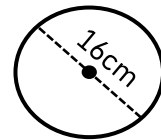
1)

Radius = 5mmDiameter = 10mm

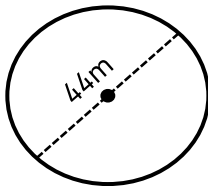
2)

Radius = 8cmDiameter = 16cm

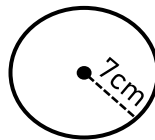
3)

Radius = 8cmDiameter = 16cm

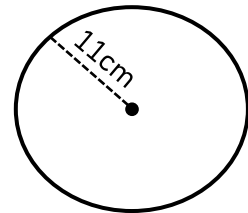
4)

Radius = 22mDiameter = 44m

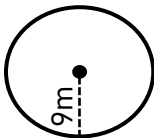
5)

Radius = 7cmDiameter = 14cm

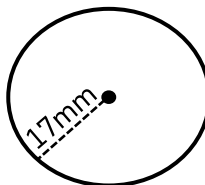
6)

Radius = 11cmDiameter = 22cm

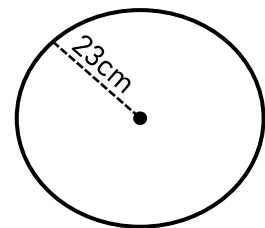
7)

Radius = 9mDiameter = 18m

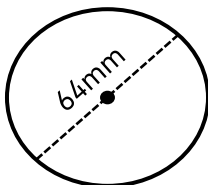
8)

Radius = 17mmDiameter = 34mm

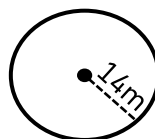
9)

Radius = 23cmDiameter = 46cm

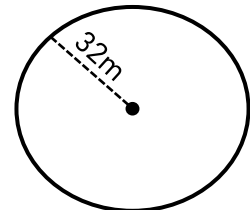
10)

Radius = 32mmDiameter = 64mm

11)

Radius = 14mDiameter = 28m

12)

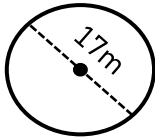
Radius = 32mDiameter = 64m

Calculating Radius and Diameter

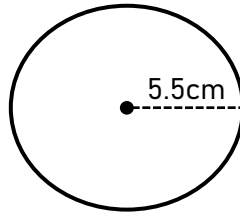
Part 1

Find the radius and diameter of each circle below

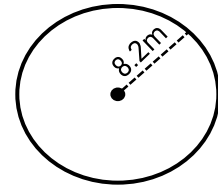
1)

Radius = 8.5mDiameter = 17m

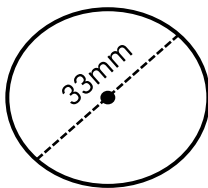
2)

Radius = 5.5cmDiameter = 11cm

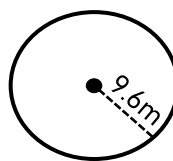
3)

Radius = 8.2mDiameter = 16.4m

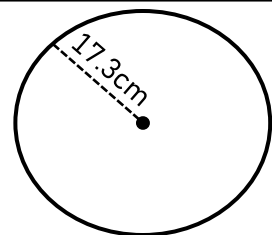
4)

Radius = 16.5mmDiameter = 33mm

5)

Radius = 9.6mDiameter = 19.2m

6)

Radius = 17.3cmDiameter = 34.6cm

Part 2

Fill in the blanks below

	Radius	Diameter
1)	7cm	<u>14cm</u>
2)	<u>14mm</u>	28mm
3)	<u>17.5m</u>	35m
4)	19cm	<u>38cm</u>
5)	<u>26.5mm</u>	53mm

	Radius	Diameter
6)	5.5km	<u>11km</u>
7)	13.5m	<u>27m</u>
8)	<u>38.5cm</u>	77cm
9)	<u>42.5mm</u>	85mm
10)	62.2cm	<u>124.4cm</u>

Part 3

Answer the word problems below

1)	A pizza has slice is 12cm long. What is the width of the entire pizza?	<u>24cm</u>
2)	A circular pool is 13m long across the middle of the pool. How far is the middle of the pool from the side?	<u>6.5m</u>

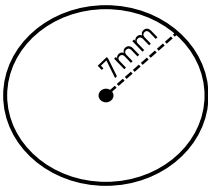
Estimating Circumference

The perimeter of a circle is called its circumference (c). The circumference is a little more than 3 times the length of the diameter. When we do not need a precise calculation of circumference, we can estimate by multiplying the diameter by 3. We may estimate the circumference of a pizza to know how large a box we need.

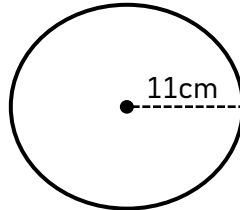
Part 1

Estimate the circumference of the circles below

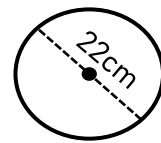
1)

Radius = 7mmDiameter = 14mmCircumference = 42mm

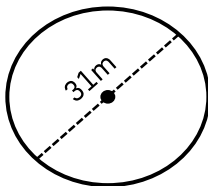
2)

Radius = 11cmDiameter = 22cmCircumference = 66cm

3)

Radius = 11cmDiameter = 22cmCircumference = 66cm

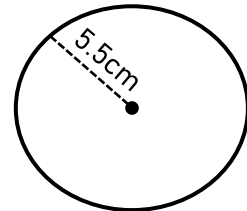
4)

Radius = 15.5mDiameter = 31mCircumference = 93m

5)

Radius = 7.2mDiameter = 14.4mCircumference = 43.2m

6)

Radius = 5.5cmDiameter = 11cmCircumference = 33cm

Part 2

Answer the word problems below

1)

Chase is drawing a circular logo. He needs the logo to be approximately 18cm in circumference. What will the radius of the logo be?

3cm

2)

Leon is building a deck around his pool. He needs an estimate of the circumference of his pool, so he knows how much wood to buy. The radius of the pool is 3.3m. What is an estimate of the circumference?

9.9m

Calculating Circumference

The circumference of a circle is slightly more than 3 times the length of the diameter, or a little more than 6 times the length of the radius. When we need to calculate the circumference of a circle more precisely, we use pi (π). Pi is equal to approximately 3.14, but it is an irrational number, meaning it never ends!



Calculating Circumference (Diameter)

$$c = \pi d \quad \text{or} \quad c = \pi \times d$$

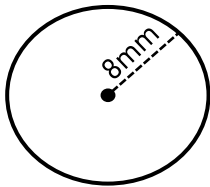
Calculating Circumference (Radius)

$$c = 2\pi r \quad \text{or} \quad c = 2 \times \pi \times r$$

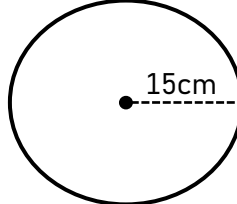
Practice

Calculate the circumference of the circles below

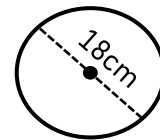
1)

Radius = 8mmDiameter = 16mmCircumference = 50.24mm

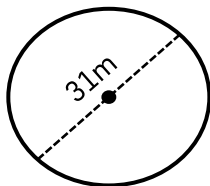
2)

Radius = 15cmDiameter = 30cmCircumference = 94.2cm

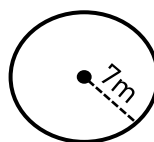
3)

Radius = 18cmDiameter = 36cmCircumference = 113.04cm

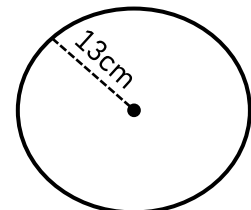
4)

Radius = 15.5mDiameter = 31mCircumference = 97.34m

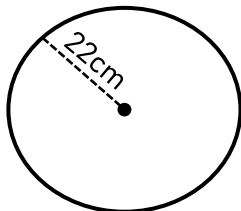
5)

Radius = 7mDiameter = 14mCircumference = 43.96m

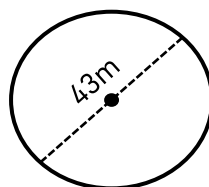
6)

Radius = 13cmDiameter = 26cmCircumference = 81.64cm

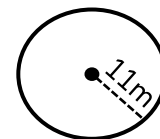
7)

Radius = 22cmDiameter = 44cmCircumference = 138.16cm

8)

Radius = 21.5mDiameter = 43mCircumference = 135.02m

9)

Radius = 11mDiameter = 22mCircumference = 69.08m

Calculating Circumference

Calculating Circumference (Diameter)

$$c = \pi d \quad \text{or} \quad c = \pi \times d$$

Calculating Circumference (Radius)

$$c = 2\pi r \quad \text{or} \quad c = 2 \times \pi \times r$$

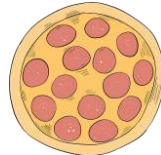
Part 1

Fill in the table with the missing information

	Radius	Diameter	Circumference
1)	6cm	12cm	37.7cm
2)	17m	34m	106.8m
3)	11m	22m	69.1m
4)	23cm	46cm	144.5cm
5)	16mm	32mm	100.5mm
6)	16.5m	33m	103.7m
7)	2.5km	5km	15.7km
8)	6.8m	13.6m	42.7m
9)	7.9m	15.8m	49.6m
10)	24.3mm	48.6mm	152.7mm

Part 2

Answer the word problems below

1)	Harrison is deciding which pizza to buy. He has two options. Option A: Pizza with the radius of 18cm Option B: Pizza with a circumference of 106cm Which pizza is larger?		Option A Circumference = 113cm
2)	You need to wrap a label around a can. If the diameter of the can is 9.5cm, what length does the label need to be?		29.9cm – rounded up
3)	Alexa needs to wrap a cake she made with a ribbon. The cake has a radius of 12.5cm. How long does the ribbon need to be?		78.6cm rounded up

Circumference Word Problems

Questions

Answer the word problems below

1)

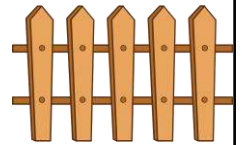
An asteroid hit the moon and created a massive round crater. Scientists measured the diameter of the crater as 31.2km. What is the circumference of the crater?

98km

2)

George is building a fence around his circular yard. His house is in the centre of the yard. The distance from his house to the edge of the yard is 15.5 metres.

a) What is the perimeter of his yard?

97.4cm

b) If 1 metre of fencing costs \$8.60, how much will his fence cost him?

\$837.64

3)

Mark can run 100m in 14 seconds. He is at a new circular track and is trying to figure out how long it will take him to run 4 laps. The track has a diameter of 16m.

a) What distance is the track?

50m

b) Approximately how long will it take him to run around the track four times?

28 seconds

4)

The radius of your bicycle wheel is 40cm.

a) How far will your bike move in one turn of your wheel?

251.3cm

a) Neill thinks it will take around 3 rotations of the wheel to move 1m. Dane thinks it will take around 4. Who is correct?

Dane is correct, it will take around 4 rotations.

Circumference, Radius, and Diameter

We can calculate the diameter and radius of a circle by using the circumference. Use the formulas below to find the missing information.

Calculating Diameter (Circumference)

$$d = \frac{c}{\pi} \quad \text{or} \quad d = c \div \pi$$

Calculating Radius (Circumference)

$$r = \frac{c}{\pi} \div 2$$

Practice

Calculate the diameter and radius. Round to the nearest tenth

	Circumference	Diameter	Radius
1)	28 mm	8.9 mm	4.5 mm
2)	15 cm	4.8cm	2.4cm
3)	36 m	11.5m	5.75m
4)	47 cm	15cm	7.5cm
5)	55 m	17.5m	8.75m
6)	32 mm	10.2mm	5.1mm
7)	59 km	18.8km	9.4km
8)	64 m	20.4m	10.2m
9)	71 cm	22.6cm	11.3cm
10)	68 mm	21.6mm	10.8mm

Part 2

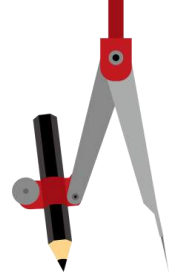
Answer the word problems below



	Questions	Answer
1)	The circumference of a bicycle wheel is 44cm. What is the diameter?	14cm
2)	A donut has a circumference of 12cm. What is the radius?	1.9cm
3)	A 20cm wire is bent into a circle. What is the diameter of the circle?	6.4cm
4)	A pizza has a circumference of 1m. What is the radius of the pizza in centimeters?	16cm

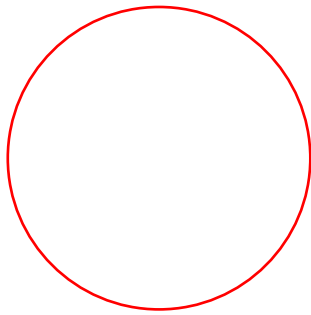
Drawing Circles Using Radius and Diameter

A circle is a shape that has all points in a plane that are equal distance from the centre point. Therefore, an oval is not a circle. We can draw a circle by using a tool called a compass.

**Draw**

Use a compass and a ruler to draw circles below

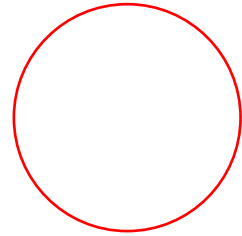
1)



Radius = 2cm

Diameter = 4cm

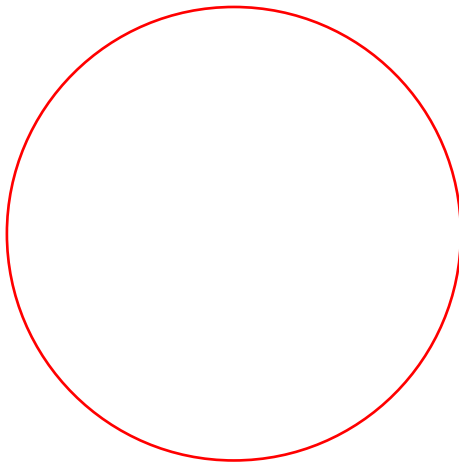
2)



Radius = 1.5cm

Diameter = 3cm

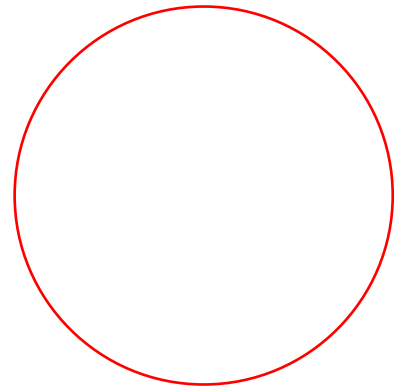
3)



Radius = 3cm

Diameter = 6cm

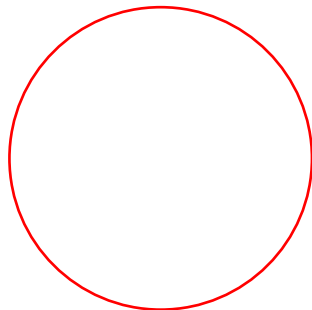
4)



Radius = 2.5cm

Diameter = 5cm

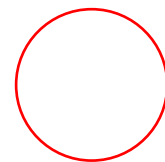
5)



Radius = 20mm

Diameter = 40mm

6)



Radius = 1cm

Diameter = 2cm

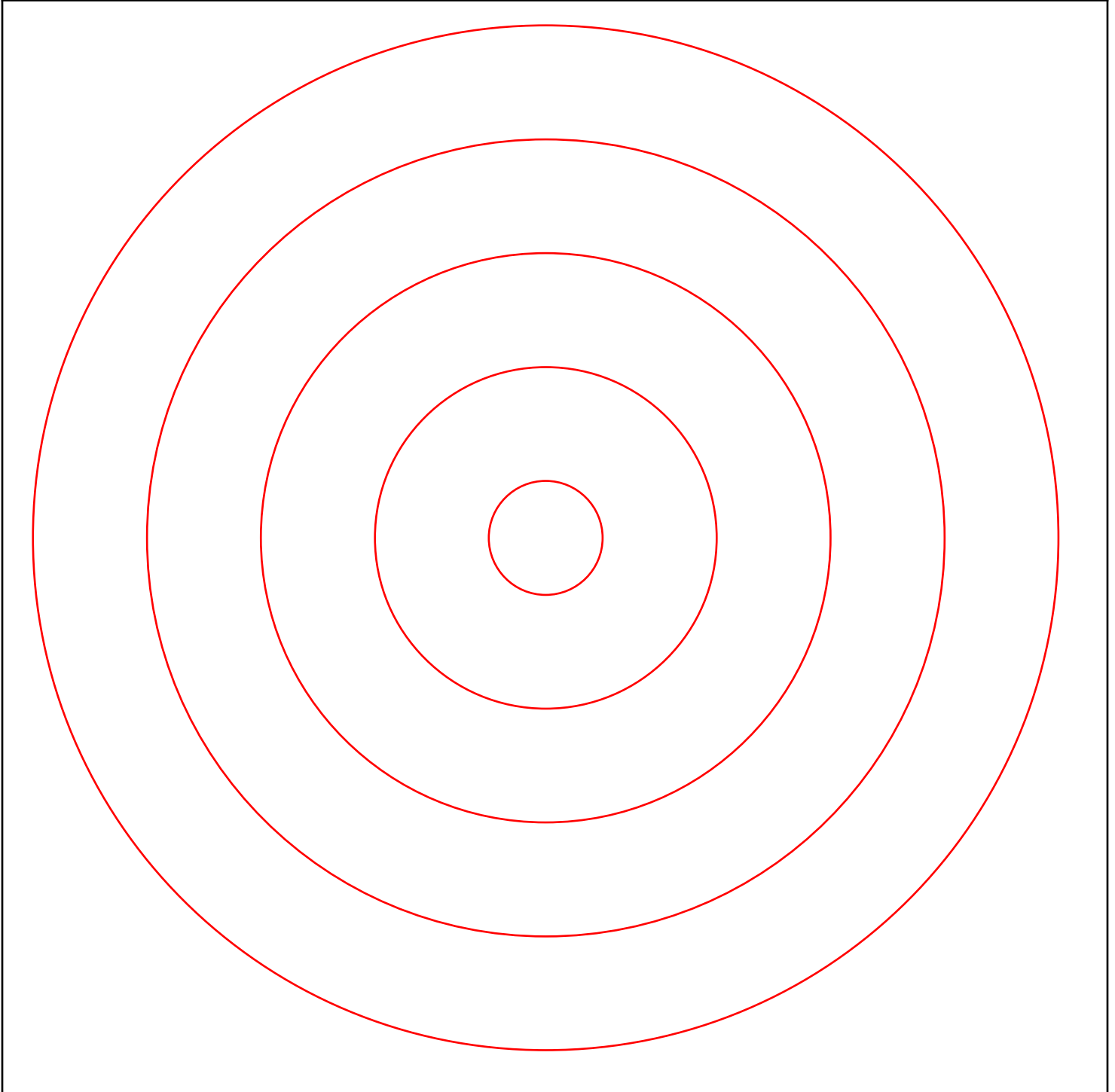
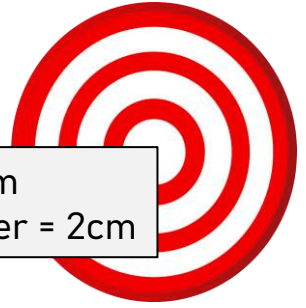
Drawing Circles Using Radius and Diameter

Draw

Draw a target using the measurements below

- 1) Outside circle – radius = 9cm
- 2) Next circle – diameter = 14cm
- 3) Next circle – radius = 5cm

- 5) Next circle – radius = 3cm
- 6) Smallest circle – diameter = 2cm



Drawing Circles Using Circumference

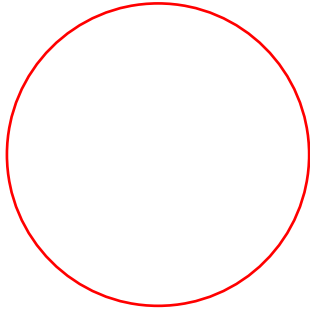
We can draw a circle if we know the radius, diameter, or circumference. Use the formula for calculating radius so you can set your compass to the right length.

Calculating Radius

$$r = \frac{c}{\pi} \div 2$$

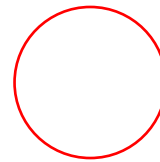
Draw Use a compass and a ruler to draw circles below. Round to the nearest tenth

1)



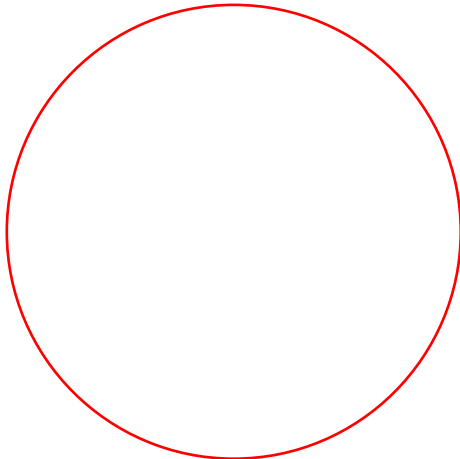
Circumference = 12.5cm

2)



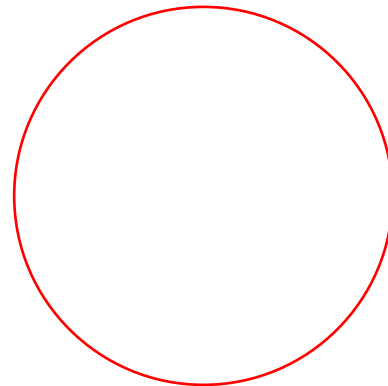
Circumference = 62.8mm

3)



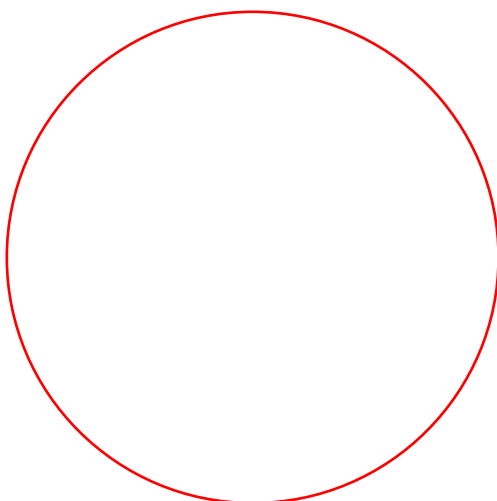
Circumference = 19cm

4)



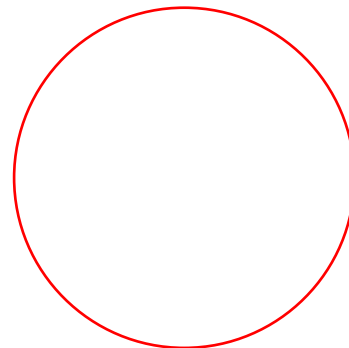
Circumference = 15.7cm

5)



Circumference = 20.4cm

6)

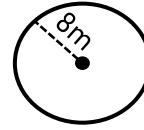


Circumference = 14.1cm

Area of a Circle - Radius

The area of a circle is the region inside the circle. We can calculate the area of a circle by using its radius. For most calculations, we can use 3.14 for pi. The formula is $\pi \times \text{radius}^2$. We can write this as $a = \pi r^2$

Calculating Area Using Radius



$$a = \pi r^2$$

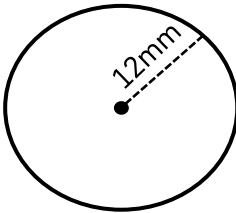
$$a = \pi \times 8 \times 8$$

$$a = 200.96\text{m}^2$$

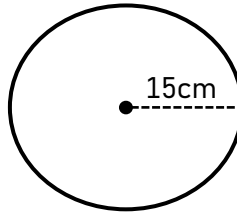
Practice

Calculate the area of the circles using the radius

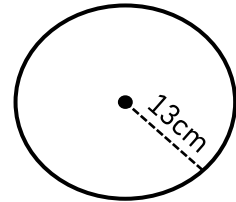
1)

Radius = 12mmArea = 452mm²

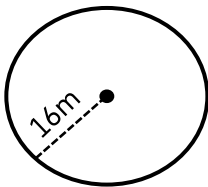
2)

Radius = 15cmArea = 706.9cm²

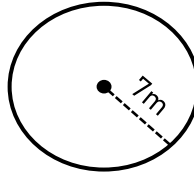
3)

Radius = 13cmArea = 530.9cm²

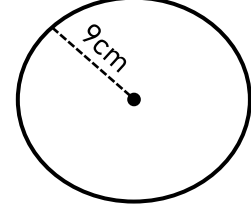
4)

Radius = 16mArea = 804.2m²

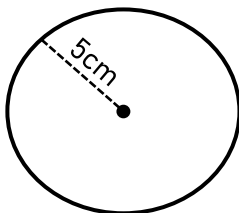
5)

Radius = 7mArea = 153.9m²

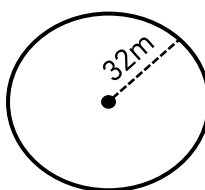
6)

Radius = 9cmArea = 254.5cm²

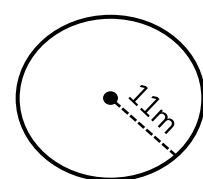
7)

Radius = 5cmArea = 78.5cm²

9)

Radius = 32mArea = 3217m²

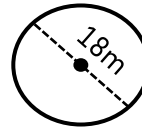
10)

Radius = 11mArea = 380.1m²

Area of a Circle - Diameter

When we know the diameter of a circle, we can divide it by two to get the radius. Once we have the radius, we can use it to calculate the area of a circle using the formula: $a = \pi r^2$

Calculating Area Using Diameter



$$a = \pi r^2$$

$$\text{diameter} = 18, \text{radius} = 9$$

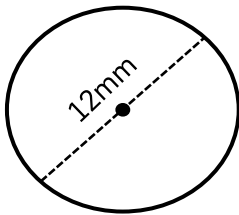
$$a = \pi \times 9 \times 9$$

$$a = 254.34\text{m}^2$$

Practice

Calculate the area of the circles using the radius

1)

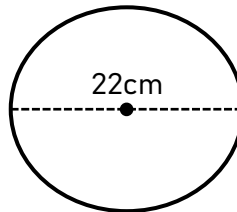


$$\text{Diameter} = 12\text{mm}$$

$$\text{Radius} = 6\text{mm}$$

$$\text{Area} = 113.1\text{mm}^2$$

2)

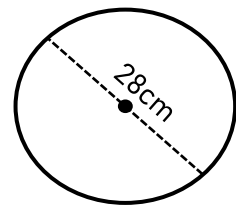


$$\text{Diameter} = 22\text{cm}$$

$$\text{Radius} = 11\text{cm}$$

$$\text{Area} = 380.1\text{cm}^2$$

3)

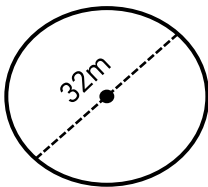


$$\text{Diameter} = 28\text{cm}$$

$$\text{Radius} = 14\text{cm}$$

$$\text{Area} = 615.8\text{cm}^2$$

4)

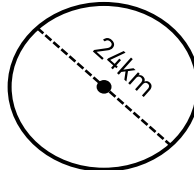


$$\text{Diameter} = 32\text{m}$$

$$\text{Radius} = 16\text{m}$$

$$\text{Area} = 804.2\text{m}^2$$

5)

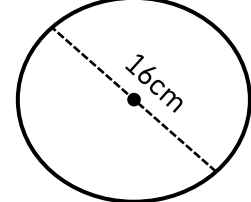


$$\text{Diameter} = 24\text{km}$$

$$\text{Radius} = 12\text{km}$$

$$\text{Area} = 452.4\text{km}^2$$

6)



$$\text{Diameter} = 16\text{cm}$$

$$\text{Radius} = 8\text{cm}$$

$$\text{Area} = 201.1\text{cm}^2$$

Word Problems

Solve the problems below



	Questions	Answer
1)	A dinner plate has a diameter of 14cm. What is the area of the plate?	153.9cm ²
2)	A circular table is 1.2 metres wide. What is the area of the table in centimetres?	11 310m ²

Calculating Area of a Circle - Circumference

We can calculate the radius of a circle by using the circumference. Once we have the radius of a circle, we can figure out its area.

Calculating Radius From Circumference

$$r = \frac{c}{\pi} \div 2$$

Calculating Area Using Radius

$$a = \pi r^2$$

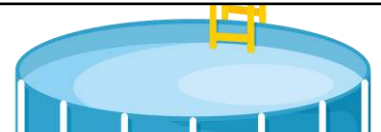
Practice

Calculate the diameter and radius. Round to the nearest tenth

	Circumference	Radius	Area
1)	12 mm	1.9 mm	11.3 mm ²
2)	18 cm	2.86cm	25.8cm ²
3)	22 m	3.5m	38.5m ²
4)	42 cm	6.7cm	140.4cm ²
5)	36 m	5.7m	103.1m ²
6)	58 mm	9.2mm	267.7mm ²
7)	55 km	8.8km	240.7km ²
8)	17 m	2.7m	23m ²
9)	63 cm	10cm	315.8cm ²
10)	76 mm	12.1mm	460mm ²

Part 2

Answer the word problems below



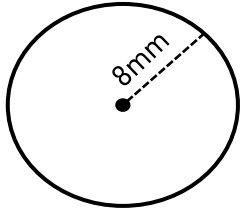
	Questions	Answer
1)	A pool has a perimeter of 15m. What is the area inside the pool?	17.9m ²
2)	A ribbon that wraps around a circular present is 42cm. What is the area of the present?	140.4cm ²
3)	The city of Williamsport is building a circular track. The track is 400m long. What will the area inside the track be?	12 732.4m ²

Circles - Mixed Review

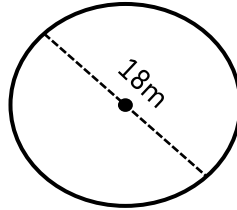
Practice

Fill in the blanks below

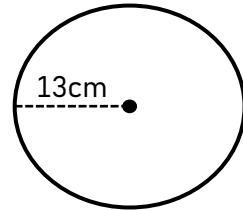
1)

Radius = 8mmDiameter = 16mmCircumference = 50.3mmArea = 201.1mm²

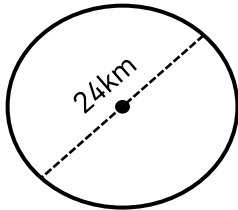
2)

Radius = 9mDiameter = 18mCircumference = 56.5mArea = 254.5m²

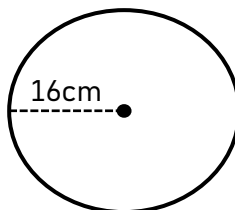
3)

Radius = 13cmDiameter = 26cmCircumference = 81.7cmArea = 531cm²

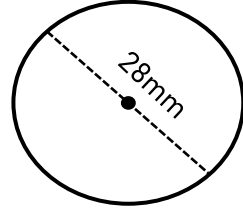
4)

Radius = 12kmDiameter = 24kmCircumference = 75.4kmArea = 452.4km²

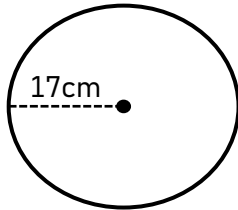
5)

Radius = 16cmDiameter = 32cmCircumference = 100.5cmArea = 804.2cm²

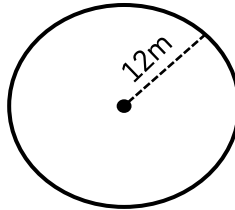
6)

Radius = 14mmDiameter = 28mmCircumference = 88mmArea = 615.8mm²

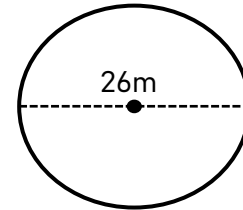
7)

Radius = 17cmDiameter = 34cmCircumference = 106.8cmArea = 907.9cm²

8)

Radius = 12mDiameter = 24mCircumference = 75.4mArea = 452.4m²

9)

Radius = 13mDiameter = 26mCircumference = 81.7mArea = 530.9m²

Circles - Word Problems

Questions

Answer the word problems below

1)	A dinner plate has a diameter of 18cm. What is the area of the dinner plate? 254.5cm²
2)	A circular golf green has an area of 15m ² . What is the diameter of the green? 4.4m 
3)	A dog is put on an 8m leash in the middle of its yard. It goes to the end of its leash and runs in a circle. What is the area the dog can play in? 201.1m²
4)	The largest living tree in the world has a circumference of 36m. What is the diameter of the tree? 11.5m 
5)	A hula hoop has a diameter of 1.2m. What is the perimeter of the hula hoop in centimetres? 3.8m
6)	A steel rod is bent into a circle. The circle now has a circumference of 19cm. What is the area inside the circle? 28.7cm²
7)	A storm is expected to hit 8km in every direction from the center of a town. What is the area that the storm will affect? 201.1km² 

Circles - Basketball Word Problem

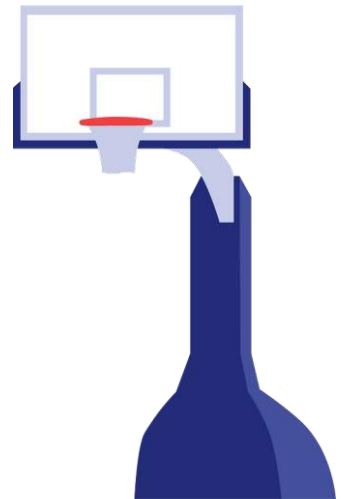
Questions

Answer the word problems below

A basketball hoop has a circumference of 145cm. A standard NBA basketball has a circumference of 75cm.

- a) Can 2 NBA basketballs fit through the hoop at the same time?

The diameter of a hoop is 46.15cm. The diameter of a ball is 23.9cm. Therefore, a hoop could not fit two basketballs.

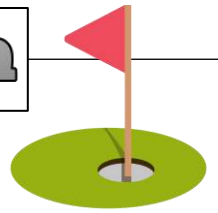


- b) A WNBA basketball has a circumference of 72cm. Will 2 WNBA basketballs fit through the hoop at the same time?

A WNBA ball has a diameter of 22.9cm. Since a hoop is 46.15cm wide, two WNBA balls could fit through a hoop at the same time.



Circles - Putting Word Problem



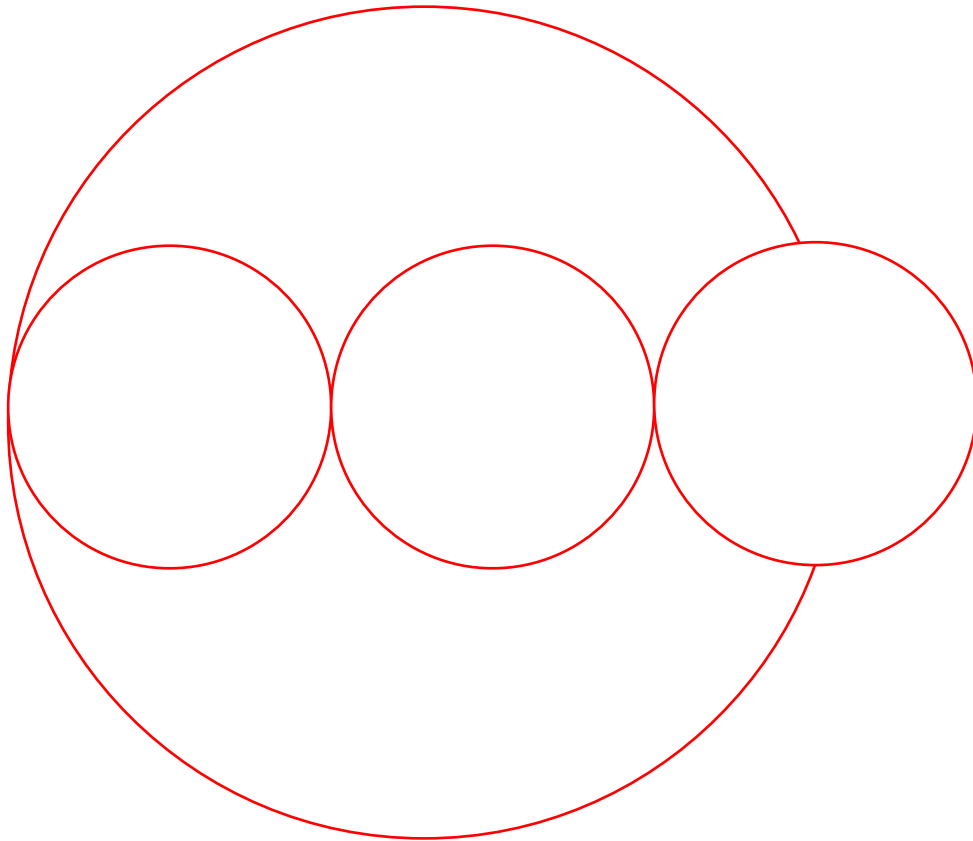
Questions

Answer the word problems below

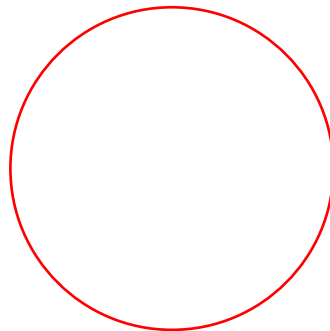


A golf hole has a diameter of 11cm.

- a) Draw a golf hole below using a compass and the proper measurements.



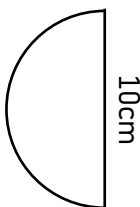
- b) A golf ball has a circumference of 13.4cm. Draw a golf ball below using the proper measurements.



- c) Will 2 or 3 golf balls fit in a line across the middle of a golf hole? Explain.
From the illustration above, you can see that only 2 golf balls will fit

Semi-Circles

A semi-circle is half of a circle. If we can find the area of a full-circle, we can divide it by two to find the area of a semi-circle.



Calculating Area of Semi-Circle

$$a = \pi r^2 \div 2$$

$$\text{diameter} = 10, \text{radius} = 5$$

$$a = 3.14 \times 5 \times 5 \div 2$$

$$a = 78.5\text{cm}^2 \div 2$$

$$\text{area of semi-circle} = 39.25\text{cm}^2$$

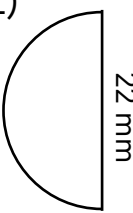
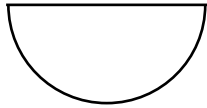
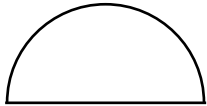
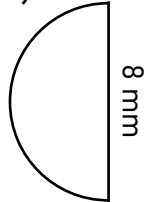
Part 1

Fill in the table below

	Diameter	Radius	Area of Full Circle	Area of Semi-Circle
1)	6 cm	3cm	28.3cm ²	14.15cm ²
2)	4 km	2km	12.5km ²	6.25km ²
3)	24 m	12m	452.4m ²	226.2m ²
4)	10 mm	5mm	78.5mm ²	39.25mm ²
5)	16 m	8m	201.1m ²	100.75m ²
6)	30 cm	15cm	706.9cm ²	353.45cm ²

Part 2

Calculate the area of the semi-circles

1)  22 mm 190.05mm ²	2)  14 cm 76.95cm ²	3)  18 m 127.25m ²
4)  26 cm 265.45cm ²	5)  8 mm 25.15mm ²	6)  32 m 402.13m ²

Semi-Circles - Word Problems

Questions

Answer the word problems below

1)

A semi-circle shaped rug has a diameter of 44cm. What is the area of the rug?

$$1520.53\text{cm}^2/2$$

$$=760.27\text{cm}^2$$

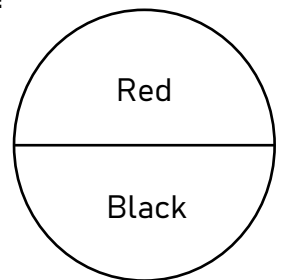


2)

A circular spinner has 2 sections, half red and half green. The spinner has a radius of 8cm. What is the area of the red side of the spinner?

$$201.1\text{cm}^2/2$$

$$=100.55\text{cm}^2$$

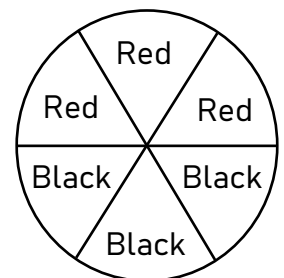


3)

A circular spinner has 6 sections. Half are red and half are black. If the diameter of the spinner is 18cm, what is the area of one section of the spinner?

$$254.47\text{cm}^2/6$$

$$=42.41\text{cm}^2$$

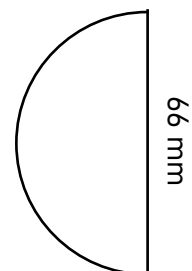


4)

A semi-circle window has a diameter of 66cm. What is the area of the window?

$$3421.19\text{cm}^2/2$$

$$1710.6\text{cm}^2$$



Quiz - Circles

Part 1

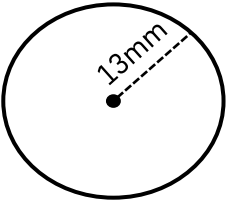
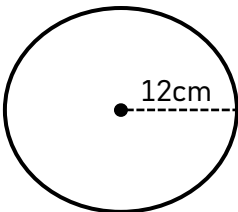
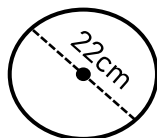
Fill in the blanks below

	Radius	Diameter
1)	12 cm	24 cm
2)	8.5 mm	17 mm
3)	22.5 m	45 m

	Radius	Diameter
4)	7.5 km	15 km
5)	22.5 m	45 m
6)	44 cm	88 cm

Part 2

Fill in the blanks

1)  Radius = <u>13mm</u> Diameter = <u>26mm</u> Circumference = <u>81.7mm</u>	2)  Radius = <u>12cm</u> Diameter = <u>24cm</u> Circumference = <u>75.4cm</u>	3)  Radius = <u>11cm</u> Diameter = <u>22cm</u> Circumference = <u>69.12cm</u>
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Part 3

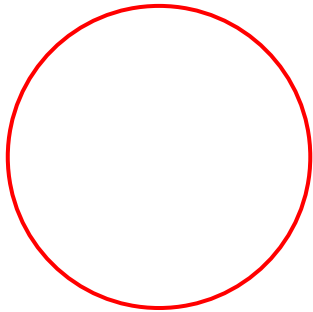
Calculate the diameter and radius. Round to the nearest tenth

	Radius	Diameter	Circumference
1)	5 mm	10 mm	31.4 mm
2)	8 m	16 m	50.3 m
3)	3.5 cm	7 cm	22 cm
4)	32 mm	64 mm	201.1 mm
5)	8.75 m	17.5 m	55 m

Part 4

Use a compass and a ruler to draw circles below

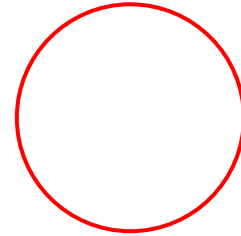
1)



Radius = 2cm

Diameter = 4cm

2)



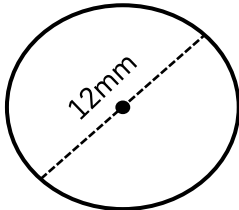
Radius = 1.5

Diameter = 3cm

Part 5

Calculate the area of the circles

1)

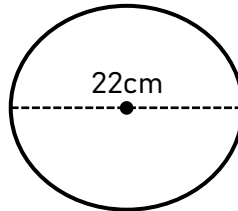


Diameter = 12mm

Radius = 6mm

Area = 113.1mm²

2)

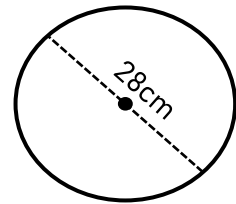


Diameter = 22cm

Radius = 11cm

Area = 380.1cm²

3)



Diameter = 28cm

Radius = 14cm

Area = 615.8cm²

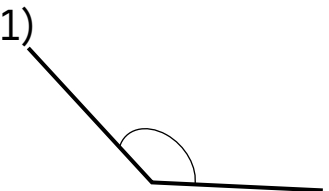
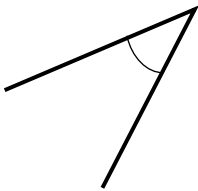
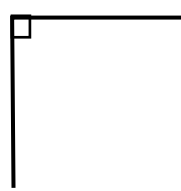
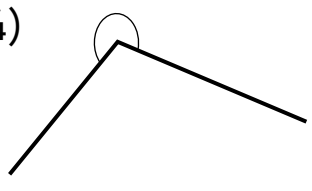
Part 6

Solve the problems below

	Questions	Answer
1)	The distance around a carousel is 18m. What is its radius? 	2.9m
2)	A dog has its leash tied to a stake in a backyard. The dog's leash is 6.5 metres long. How much area can the dog play in?	132.7cm ²
3)	The diameter of a wheel on a car is 25 centimetres. How far does the car move with one rotation of the wheel? 	78.5cm

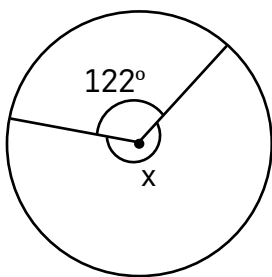
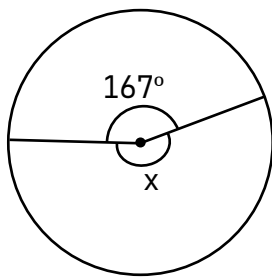
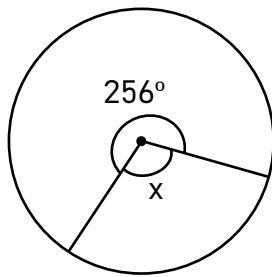
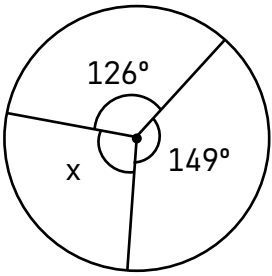
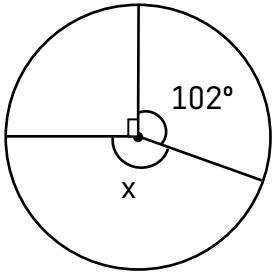
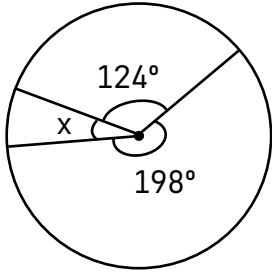
Part 7

Measure the angles and label them acute, right, obtuse, or reflex

1) 	2) 	3) 	4) 
Obtuse	Acute	Right	Reflex

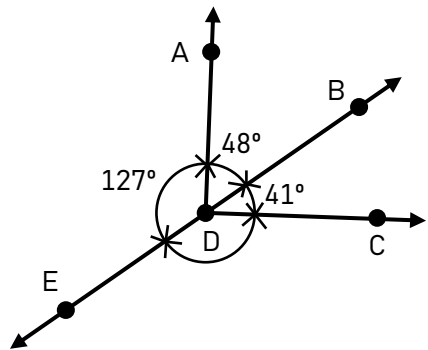
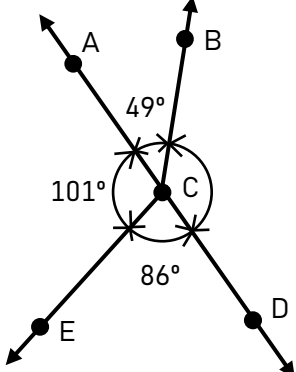
Part 8

Determine the value of angle x

1) 	2) 	3) 
$\angle x = 238^\circ$	$\angle x = 193^\circ$	$\angle x = 104^\circ$
4) 	5) 	6) 
$\angle x = 85^\circ$	$\angle x = 168^\circ$	$\angle x = 38^\circ$

Part 9

Find the missing angles below

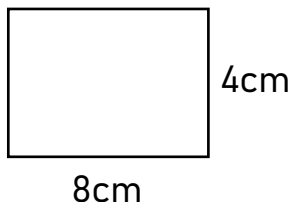
1) 	2) 
$\angle CDE = 144^\circ$	$\angle BCD = 124^\circ$

Finding the Area of Rectangles

QuestionsFind the area ($A = b \times h$)

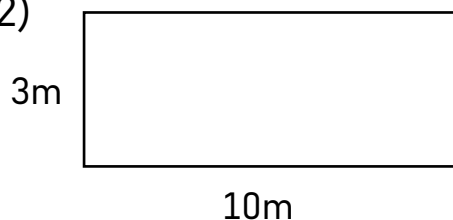
*Not to Scale

1)



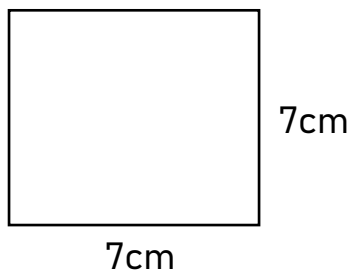
Area = 32cm^2

2)



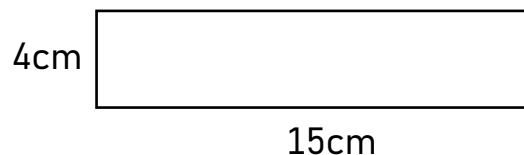
Area = 30m^2

3)



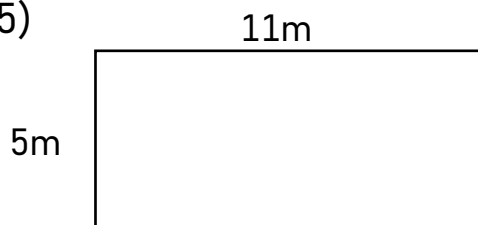
Area = 49cm^2

4)



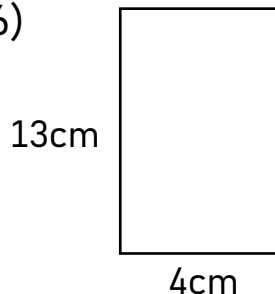
Area = 60cm^2

5)



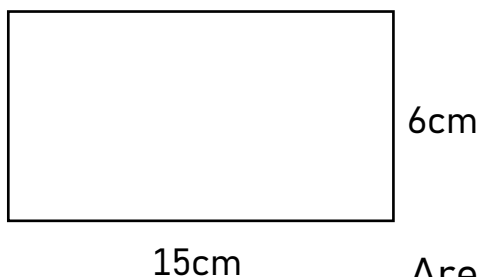
Area = 55m^2

6)



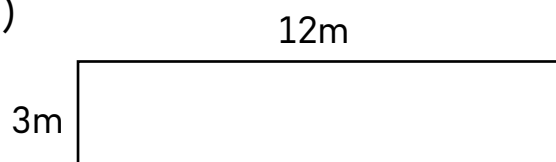
Area = 52cm^2

7)



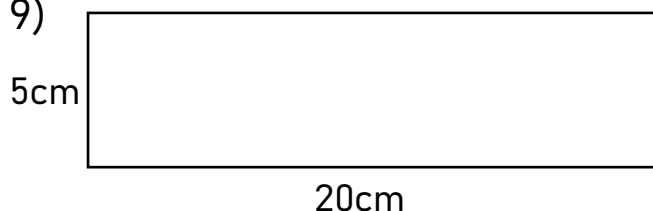
Area = 90cm^2

8)



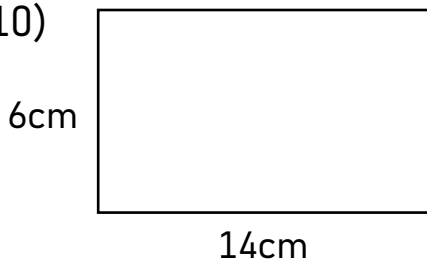
Area = 36m^2

9)



Area = 100cm^2

10)



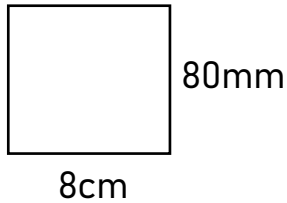
Area = 84cm^2

Finding the Area of Rectangles

Questions

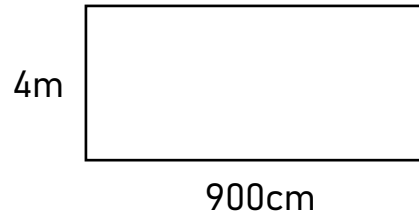
Write the area as any metric unit of measurement

1)



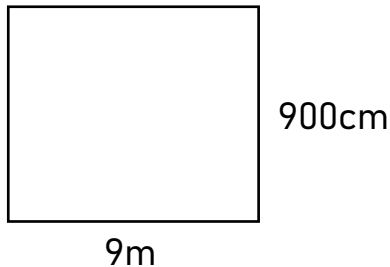
Area = 64 cm^2

2)



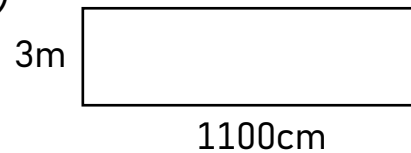
Area = 36 m^2

3)



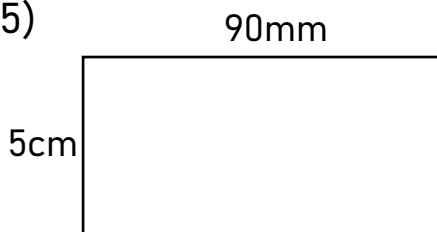
Area = 81 m^2

4)



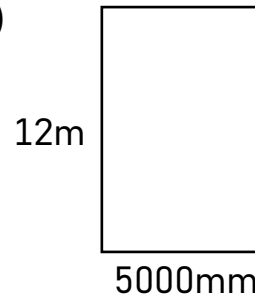
Area = 33 m^2

5)



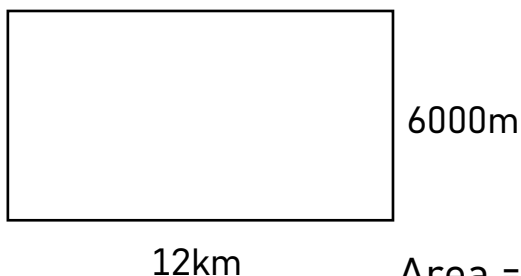
Area = 45 cm^2

6)



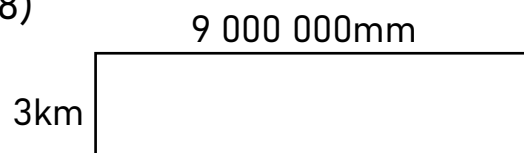
Area = 60 m^2

7)



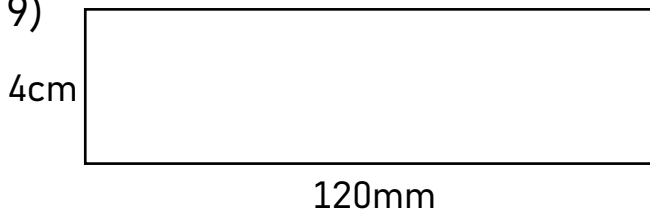
Area = 72 km^2

8)



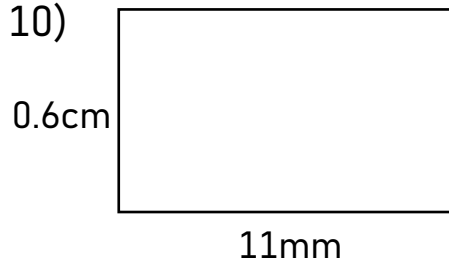
Area = 27 km^2

9)



Area = 48 cm^2

10)



Area = 66 mm^2

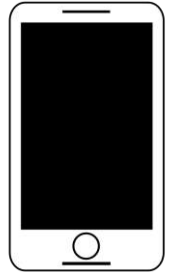
Area Word Problems

Questions

Draw a picture of the problem and then find the area

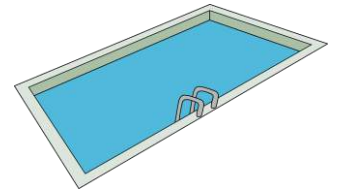
1) A phone is 11cm by 60mm. What is the area of the phone?

66 m²



2) A pool is 12m by 400cm. What is the area of the pool?

48 m²



4) A candy wrapper is 40mm wide and 0.10m long. What is the area of the wrapper in cm?

40 cm²



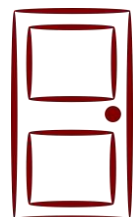
4) The front of a square box is 12cm wide. What is the area of the side of the box?

144 cm²



5) A door is 3m by 150cm. What is the area of the door?

4.5 m²



Finding the Missing Information

Questions

Find the missing value ($A = b \times h$)

1)

11m

 $A = 44\text{m}^2$ Base = 11mHeight = 4mArea = 44m²

2)

1m

 $A = 14\text{m}^2$ Base = 14mHeight = 1mArea = 14m²

3)

7cm

 $A = 63\text{cm}^2$ Base = 9cmHeight = 7cmArea = 63cm²

4)

4m

 $A = 48\text{m}^2$ Base = 12mHeight = 4mArea = 48m²

5)

3cm

 $A = 27\text{cm}^2$ Base = 9cmHeight = 3cmArea = 27cm²

6)

 $A = 77\text{cm}^2$

11cm

Base = 11cmHeight = 7cmArea = 77cm²

7)

 $A = 45\text{cm}^2$

5cm

Base = 5cmHeight = 9cmArea = 45cm²

8)

 $A = 72\text{cm}^2$

8cm

Base = 8cmHeight = 9cmArea = 72cm²

9)

9cm

 $A = 45\text{cm}^2$ Base = 5cmHeight = 9cmArea = 45cm²

10)

 $A = 56\text{cm}^2$

8cm

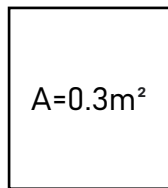
Base = 8cmHeight = 7cmArea = 56cm²

Finding the Missing Information

Questions

Find the missing value ($A = b \times h$)

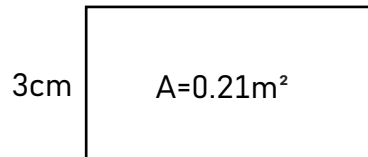
1)



5cm

Base = 5cmHeight = 6cmArea = 30cm²

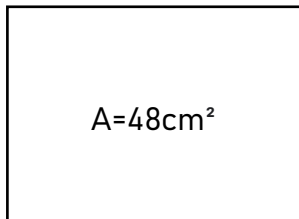
2)



3cm

Base = 7cmHeight = 3cmArea = 21cm²

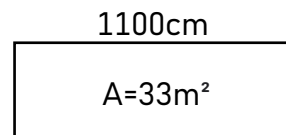
3)



80mm

Base = 8cmHeight = 6cmArea = 48cm²

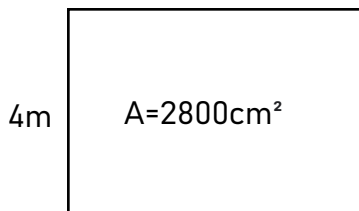
4)



1100cm

Base = 11mHeight = 3mArea = 33m²

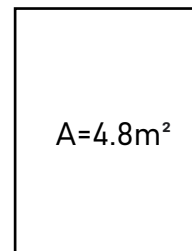
5)



4m

Base = 7mHeight = 4mArea = 28m²

6)

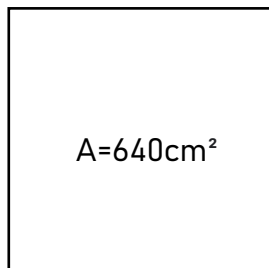


A=4.8m²

400mm

Base = 4mHeight = 12mArea = 4.8m²

7)

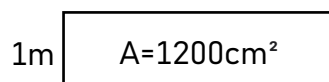


A=640cm²

80mm

Base = 8cmHeight = 8cmArea = 64cm²

8)

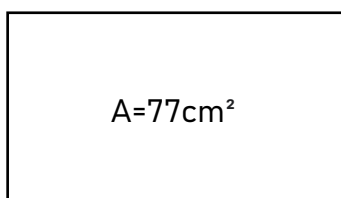


1m

A=1200cm²

Base = 12mHeight = 1mArea = 12m²

9)

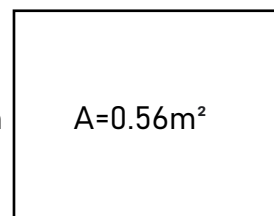


A=77cm²

110mm

Base = 11cmHeight = 7cmArea = 77cm²

10)



7cm

A=0.56m²

Base = 8cmHeight = 7cmArea = 56cm²

Finding the Missing Information - Word Problems**Questions**

Use the information you have to find the missing height or base

1) A piece of paper has an area of 88cm^2 . The base of the paper is 8cm. What is the height of the paper?

11cm



2) Jack's yard has an area of 56m^2 . The height of the yard is 8m. What is the base?

7m



3) A bus has an area of 24m^2 . The height of the bus is 3m. What is the base?

8m^2



4) A square poster has an area of 36cm^2 . What is the base and the height?

6cm



5) A cookie sheet has an area of 72cm^2 . The base of the sheet is 9cm. What is the height of the cookie sheet?

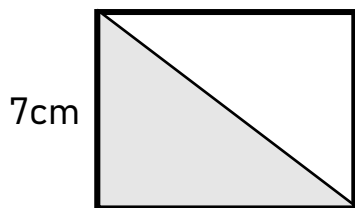
8cm



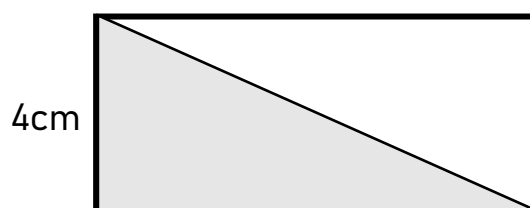
Introduction - Area of a Triangle**Questions**

Find the area of the rectangles and triangles below

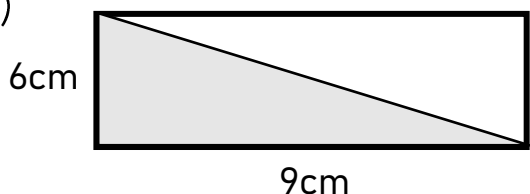
1)

Area of a rectangle = 56 cm²Area of a triangle = 28 cm²

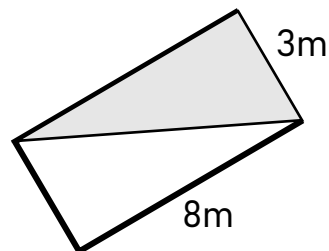
2)

Area of a rectangle = 28 cm²Area of a triangle = 14 cm²

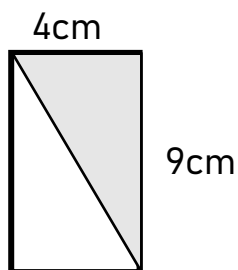
3)

Area of a rectangle = 54 cm²Area of a triangle = 27 cm²

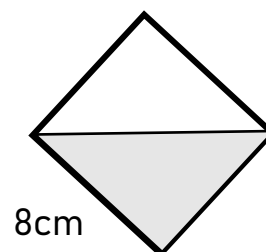
4)

Area of a rectangle = 24 m²Area of a triangle = 12 m²

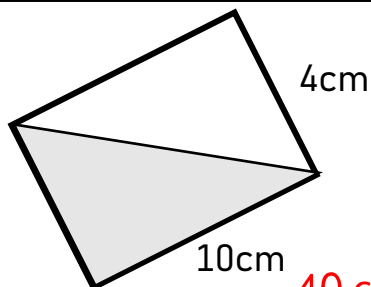
5)

Area of a rectangle = 36 cm²Area of a triangle = 18 cm²

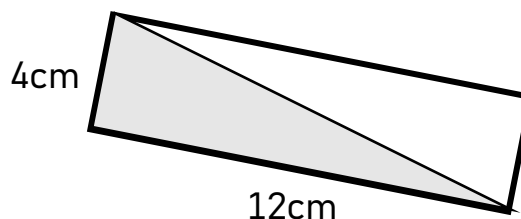
6)

Area of a square = 64 cm²Area of a square = 32 cm²

7)

Area of a rectangle = 40 cm²Area of a triangle = 20 cm²

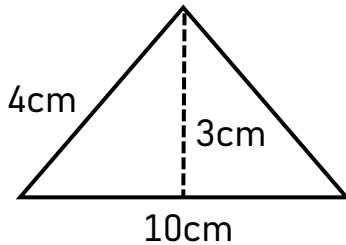
8)

Area of a rectangle = 48 cm²Area of a triangle = 24 cm²

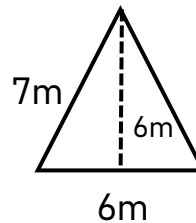
Area of a Triangle

QuestionsFind the area of the triangles below ($A = b \times h \div 2$)

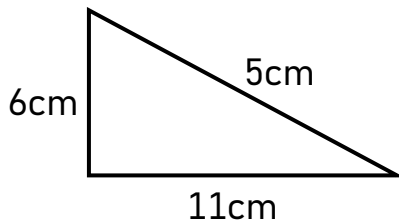
1)

Area = 15 cm²

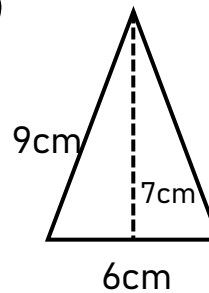
2)

Area = 18 m²

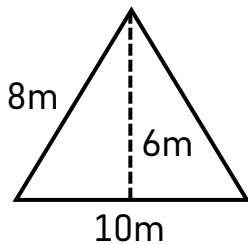
3)

Area = 33 cm²

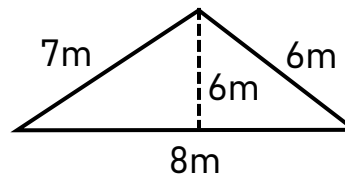
4)

Area = 21 cm²

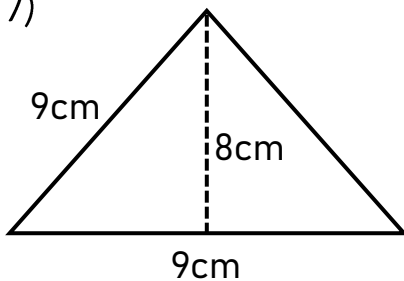
5)

Area = 30 m²

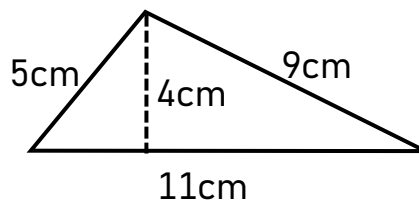
6)

Area = 24 m²

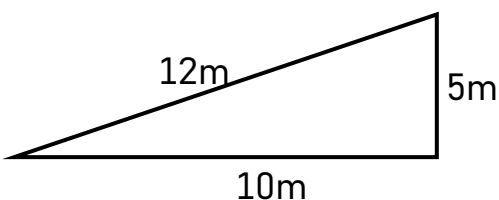
7)

Area = 36 cm²

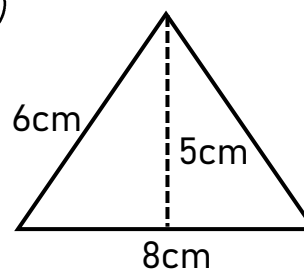
8)

Area = 22 cm²

9)

Area = 25 m²

10)

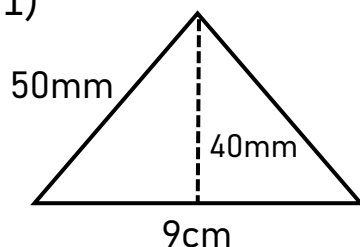
Area = 20 cm²

Area of a Triangle

Part 1

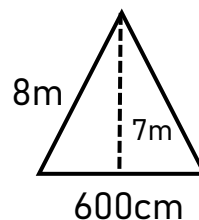
Find the area of the triangles below ($A = b \times h \div 2$)

1)



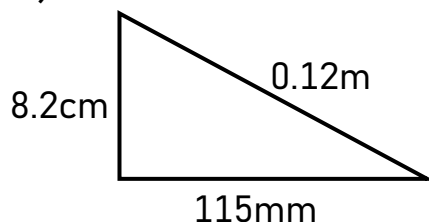
Area = 18cm^2

2)



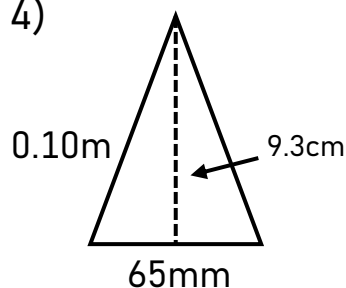
Area = 21m^2

3)



Area = 47.15cm^2

4)

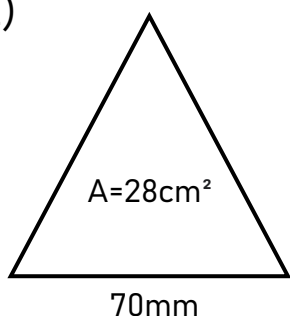


Area = 30.225cm^2

Part 2

Find the missing value

1)

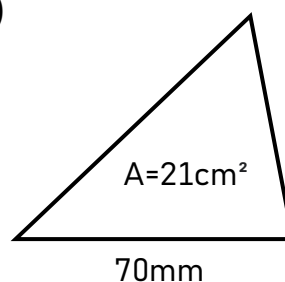


Base = 7cm

Height = 8cm

Area = 28cm^2

2)

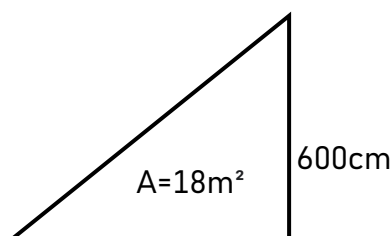


Base = 7cm

Height = 6cm

Area = 21cm^2

3)

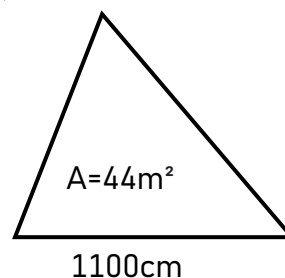


Base = 6m

Height = 6m

Area = 18m^2

4)



Base = 11m

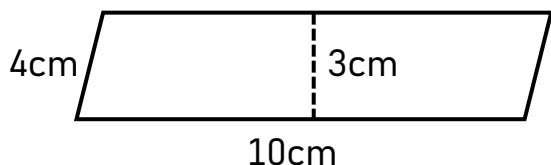
Height = 8m

Area = 44m^2

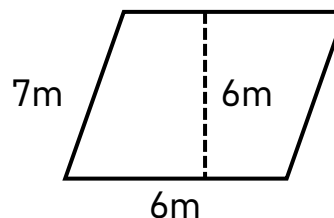
Perimeter and Area of Parallelograms

QuestionsFind the perimeter and area of the parallelograms below ($A = b \times h$)

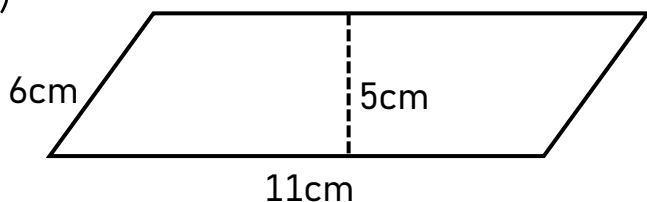
1)

Perimeter = 28 cm Area = 30 cm²

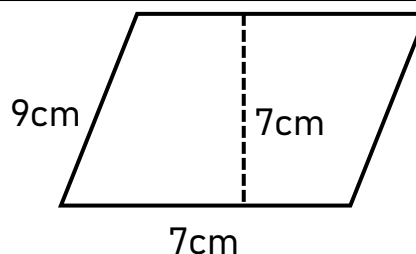
2)

Perimeter = 26 m Area = 36 m²

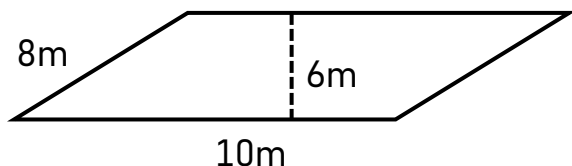
3)

Perimeter = 34 cm Area = 55 cm²

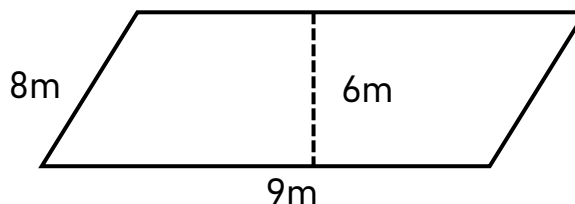
4)

Perimeter = 32 cm Area = 49 cm²

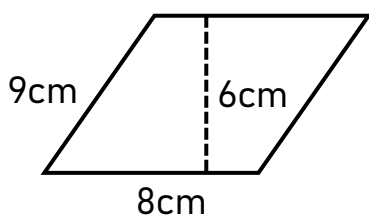
5)

Perimeter = 36 m Area = 60 m²

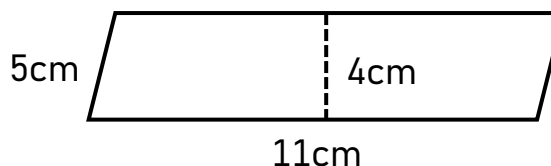
6)

Perimeter = 34 m Area = 54 m²

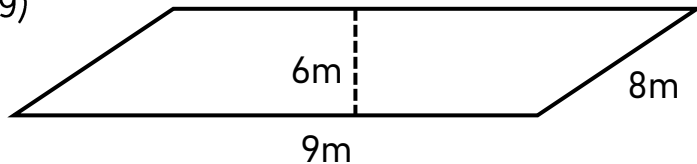
7)

Perimeter = 34 cm Area = 48 cm²

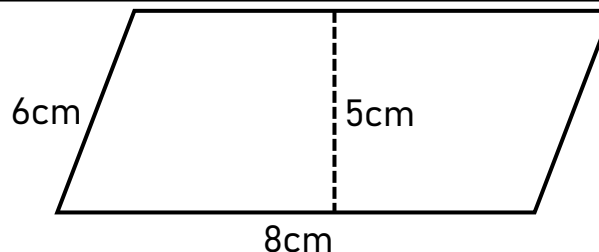
8)

Perimeter = 32 cm Area = 44 cm²

9)

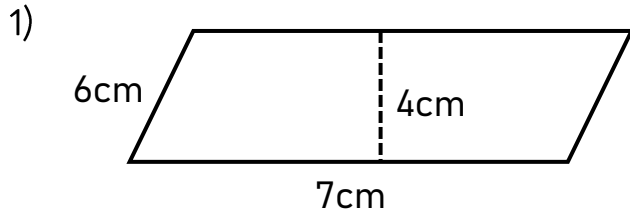
Perimeter = 34 m Area = 54 m²

10)

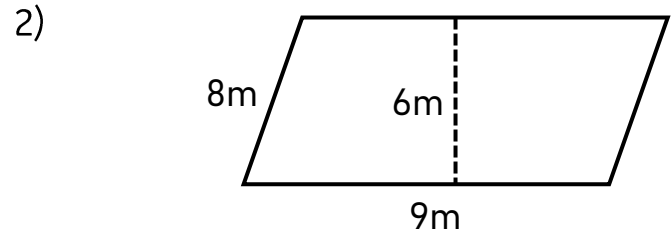
Perimeter = 28 cm Area = 40 cm²

Perimeter and Area of Parallelograms

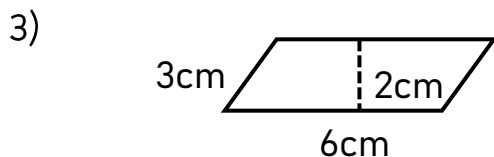
Part 1

Find the perimeter and area of the parallelograms below ($A = b \times h$)

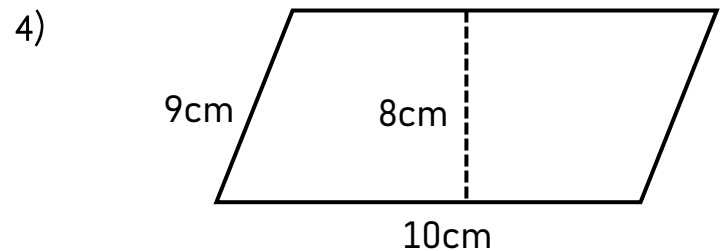
Perimeter = 26 cm Area = 28 cm²



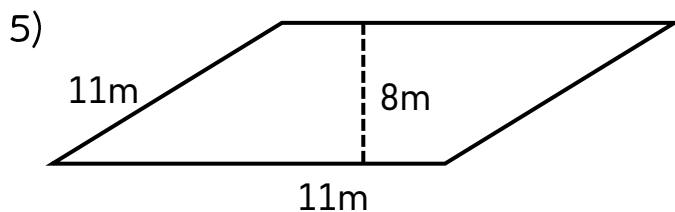
Perimeter = 34 m Area = 54 m²



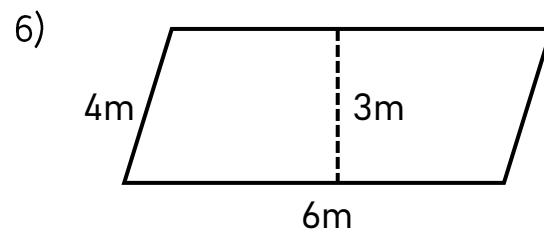
Perimeter = 18 cm Area = 12 cm²



Perimeter = 38 cm Area = 80 cm²



Perimeter = 44 m Area = 88 m²



Perimeter = 20 m Area = 18 m²

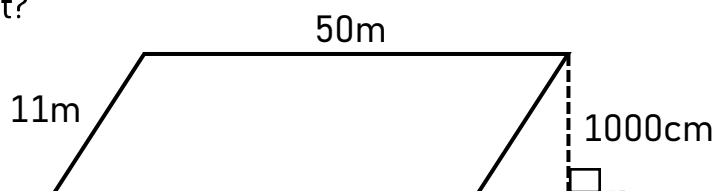
Part 2

Answer the word problems below

- 1) A parallelogram has a top side length of 12cm. The height of the parallelogram is 7cm. What is the area of the parallelogram?

84 cm²

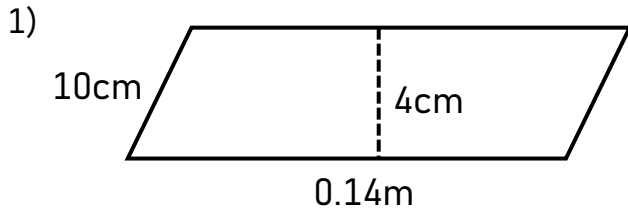
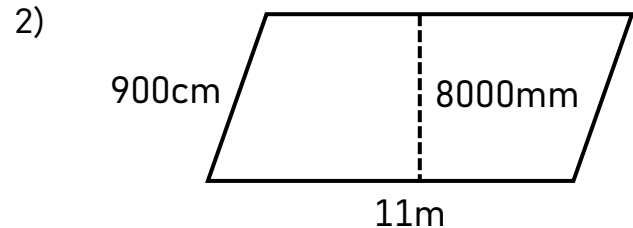
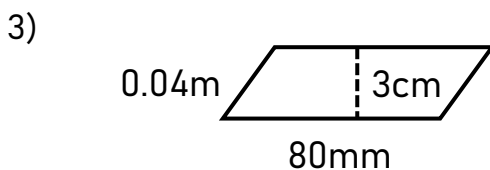
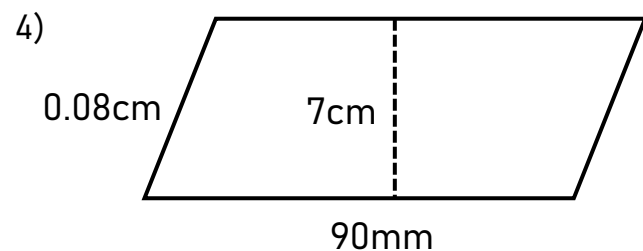
- 2) A parking lot is constructed in the shape of a parallelogram. What is the area of the parking lot?



110 m²

Perimeter and Area of Parallelograms

Part 1

Find the perimeter and area of the parallelograms below ($A = b \times h$)Perimeter = 48cm Area = 56cm²Perimeter = 40m Area = 88m²Perimeter = 24cm Area = 24cm²Perimeter = 34cm Area = 63cm²

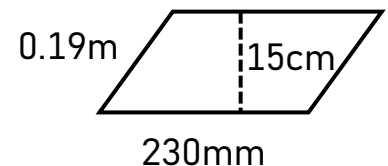
Part 2

Answer the word problems below

A bathroom is being tiled with parallelogram shaped tiles. The dimensions of the tiles are below.

1) What is the area of the parallelogram?

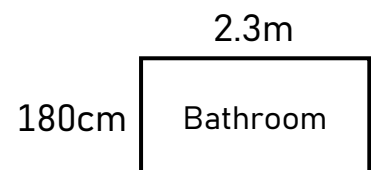
345cm²



2) The dimensions of the bathroom are displayed below.

a) What is the area of the bathroom?

44,400cm²



b) How many tiles will fit in the bathroom?

44,400 / 345 = 120 tiles

Area of a Triangle/Parallelogram Word Problems**Questions**

Draw a picture of the problem and then find the area

1) Jake is building a triangular garden. He needs to know how much fertilizer he needs to cover the space. If the garden has a base of 500cm and a height of 4m, what is the area of the garden in metres?

$$5\text{m} \times 4\text{m} = 20\text{m}/2 = \underline{10\text{m}^2}$$



2) A farmer is buying seed for his farmland. His land is shaped like a parallelogram. It has a base of 5000cm and a height of 10m. The sides of the garden are 2000cm. What is the area of his farmland in metres?

$$\underline{50 \times 10 = 500\text{m}^2}$$

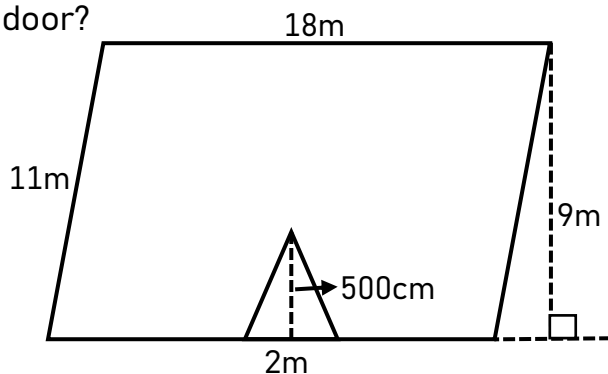


3) Christina is painting her triangular artwork. The artwork has a base of 14cm and a height of 80mm. What is the area of her artwork in millimetres?

$$\underline{140\text{mm} \times 80\text{mm} = 5600\text{mm}^2}$$



4) Harold is building a unique house. The shape of the front of the house is a parallelogram. It will have a triangular door cut out of it. What is the area of the front of his house without the door?



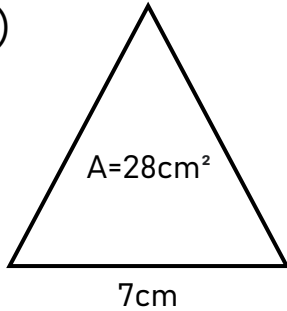
$$\begin{aligned} 18\text{m} \times 9\text{m} &= 162\text{m}^2 \\ 5 \times 2 &= 10\text{m}^2/2 = 5\text{m}^2 \\ \underline{162 - 5} &= 157 \end{aligned}$$

Finding the Missing Information

Questions

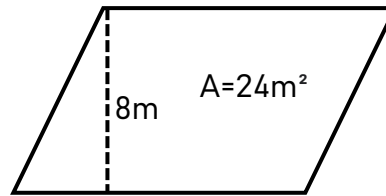
Find the missing value ($A = b \times h$)

1)



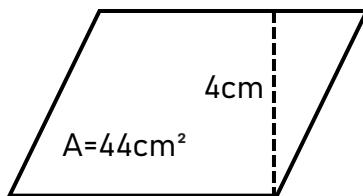
Base = 7cm
 Height = 8cm
 Area = 28cm^2

2)



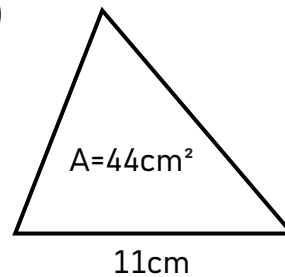
Base = 6m
 Height = 8m
 Area = 24m^2

3)



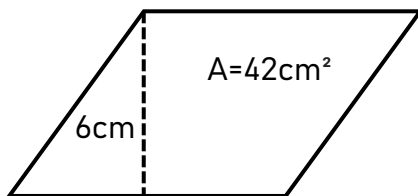
Base = 22cm
 Height = 4cm
 Area = 44cm^2

4)



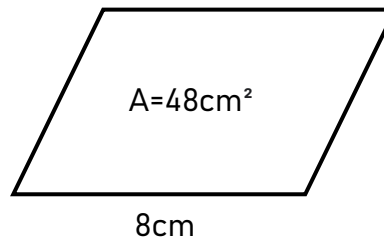
Base = 11cm
 Height = 8cm
 Area = 44cm^2

5)



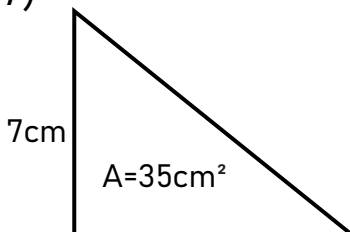
Base = 14cm
 Height = 6cm
 Area = 42cm^2

6)



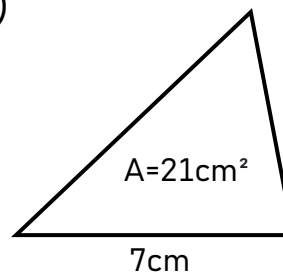
Base = 8cm
 Height =
 Area = 48cm^2

7)



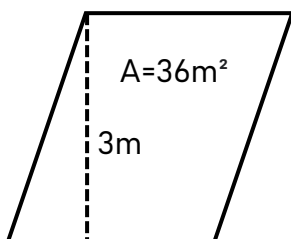
Base = 10cm
 Height = 7cm
 Area = 35cm^2

8)



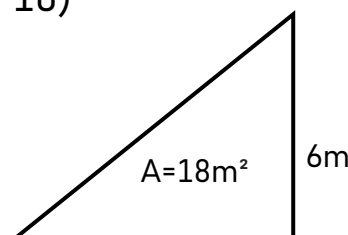
Base = 7cm
 Height = 6cm
 Area = 21cm^2

9)



Base = 24m
 Height = 3m
 Area = 36m^2

10)

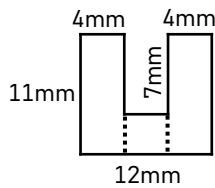


Base = 6m
 Height = 6m
 Area = 18m^2

Area of Composite Polygons

Find the area of the polygons below by splitting them into separate shapes.

Example



Area = area of rectangle 1 + area of rectangle 2 + area of rectangle 3

Rectangle 1:
 $A = 11 \times 4$
 $A = 44 \text{ mm}^2$

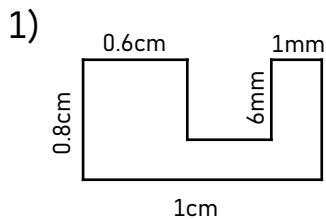
Rectangle 2:
 $A = 4 \times 4$
 $A = 16 \text{ mm}^2$

Rectangle 3:
 $A = 4 \times 11$
 $A = 44 \text{ mm}^2$

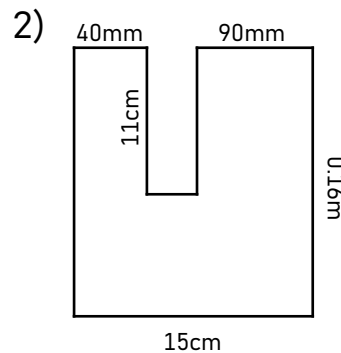
Area = $44 + 44 + 16$
 $A = 104 \text{ mm}^2$

Questions

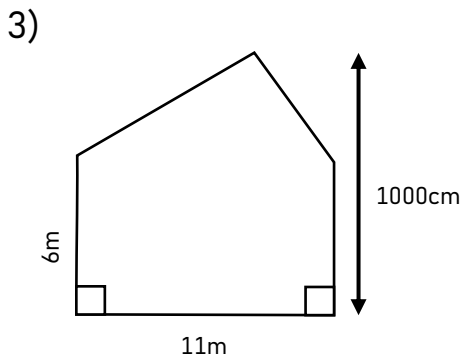
Find the area of the composite polygons below



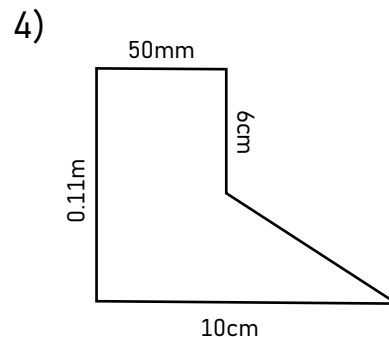
Area = 62 mm^2



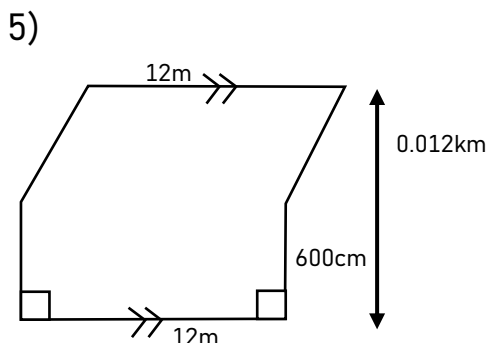
Area = 218 cm^2



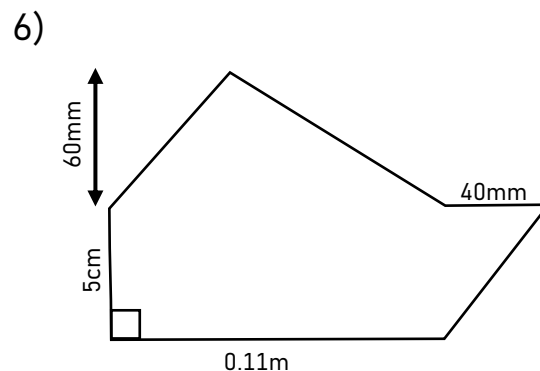
Area = 88 cm^2



Area = 67.5 cm^2



Area = 144 cm^2



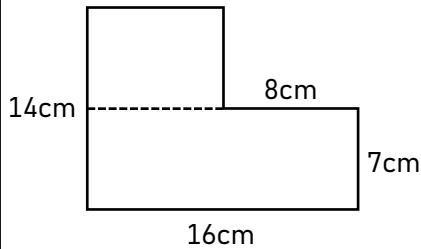
Area = 108 cm^2

Area of Composite Polygons

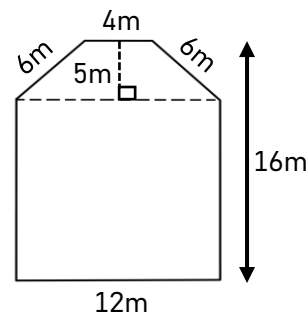
Questions

Find the area of each composite shape

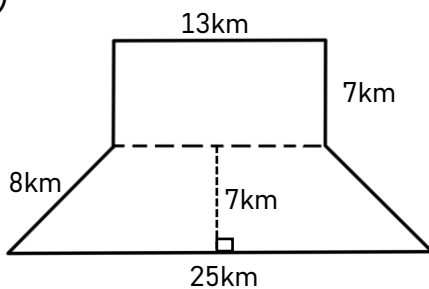
1)

Perimeter: 60 cmArea: 168 cm²

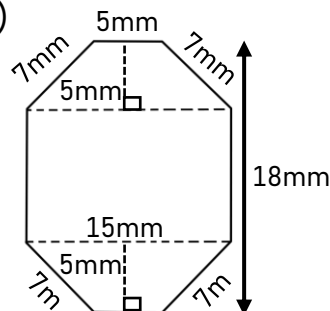
2)

Perimeter: 60 mArea: 232 m²

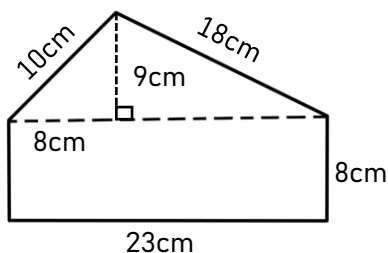
3)

Perimeter: 68 kmArea: 224 km²

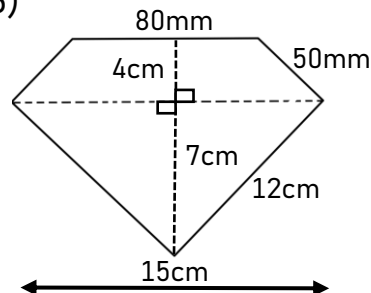
4)

Perimeter: 54 mmArea: 495 mm²

5)

Perimeter: 67 cmArea: 287.5 cm²

6)

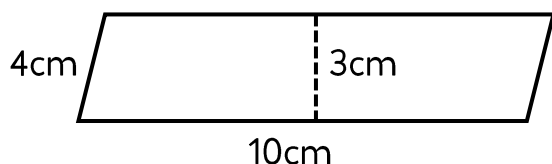
Perimeter: 42 cmArea: 292.5 cm²

Area Quiz - Triangles and Parallelograms

Part 1

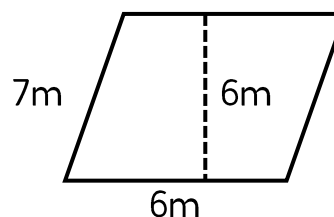
Find the area of the parallelograms below

1)



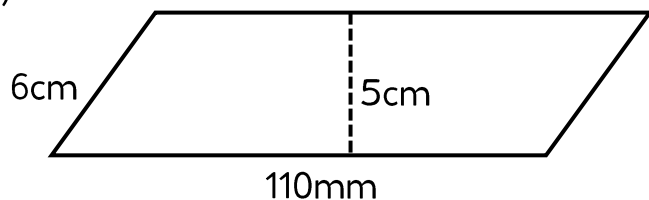
Area = $\underline{30\text{cm}^2}$

2)



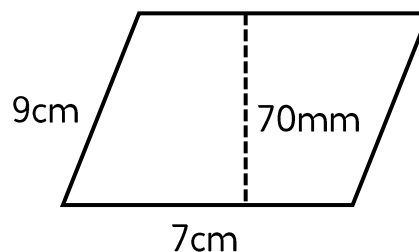
Area = $\underline{36\text{m}^2}$

3)



Area = $\underline{55\text{cm}^2}$

4)

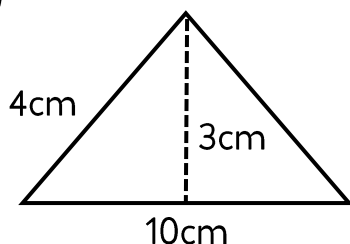


Area = $\underline{49\text{cm}^2}$

Part 2

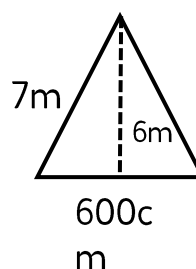
Find the area of the triangles below

1)



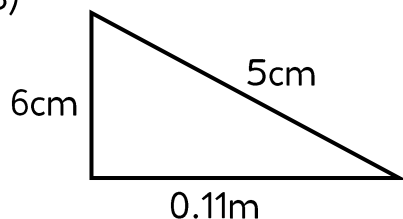
Area = $\underline{15\text{cm}^2}$

2)



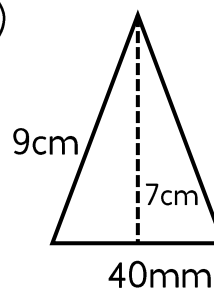
Area = $\underline{18\text{cm}^2}$

3)



Area = $\underline{33\text{cm}^2}$

4)

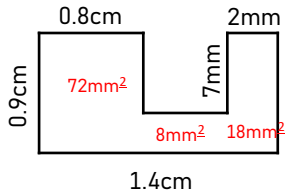


Area = $\underline{14\text{cm}^2}$

Part 3

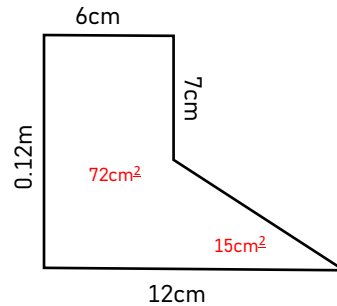
Find the area of the composite polygons below

1)



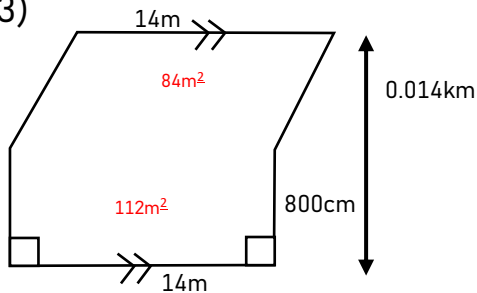
Area = 98mm²

2)



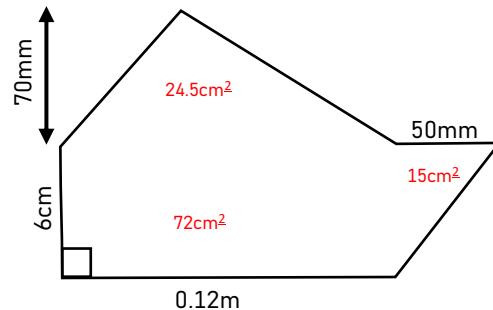
Area = 88cm²

3)



Area = 196m²

4)



Area = 111.5cm²

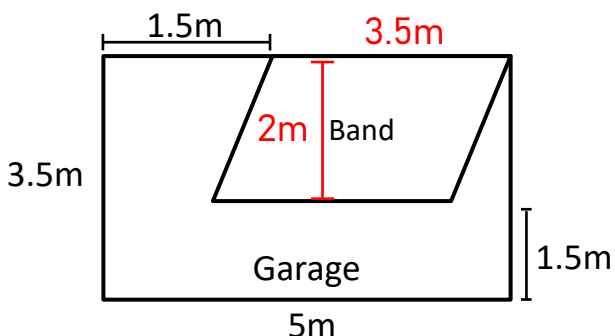
Part 4

Solve the word problems below. Make sure to show your work

1) Jeremy's triangular picture frame has a base of 10cm and a height of 0.12m. What is the area of the triangular frame?

60cm²

2) Brian and his garage band practice playing in his garage. He has a lot of stuff in his garage, so he taped off some area for them to play. The dimensions of his garage and area they play in is displayed in the diagram. What is the area of the space the band plays in?



7m²

Lines, Rays, and Line Segments

Point

A

A **point** is a dot.
We often name
points with a
capital letter

Line

A B

A **line** is straight and goes on forever in both directions (arrows). Lines can have points on them ($\overleftrightarrow{AB}$ or $\overleftrightarrow{BA}$)

Ray

D E

A **ray** is a straight path that goes on forever in one direction (1 arrow). The ray above is $\overrightarrow{DE}$.

Line Segment

D E

A **line segment** is a straight line between two points. The line segment above is $\overline{DE}$ or $\overline{ED}$.

Part 1

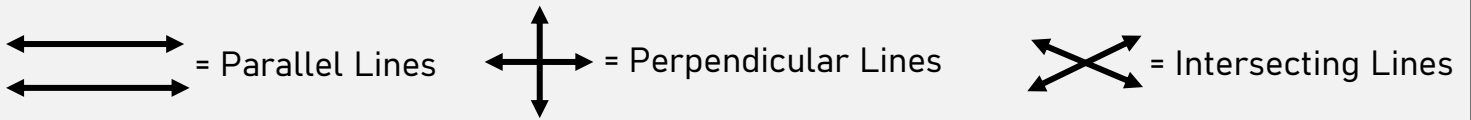
Label whether the example is a point, line, ray or line segment

1) 	2) 	3) 	4)
Line JK or KJ $\overleftrightarrow{JK}$ or $\overleftrightarrow{KJ}$	Ray PQ	Line Segment ST or TS	Line MN or NM
5) 	6) 	7) 	8)
Line Segment ST or TS	Point K	Line BC or CB	Line Segment FG or GF
9) 	10) 	11) 	12)
Ray JK	Line RS or SR	Line Segment VW or WV	Point Y

Part 2

Construct a ray, line, point, and line segment. Label each.

1) 	2) 	3) 	4)
Line Segment - AB	Point C	Line - QR	Ray - MN

Parallel, Perpendicular and Intersecting Lines**Part 1**

Label the lines parallel, perpendicular, or intersecting

1) 	2) 	3) 	4)
parallel	perpendicular	intersecting	perpendicular
5) 	6) 	7) 	8)
perpendicular	parallel	intersecting	perpendicular

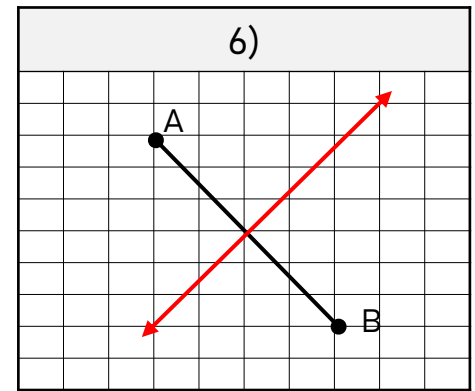
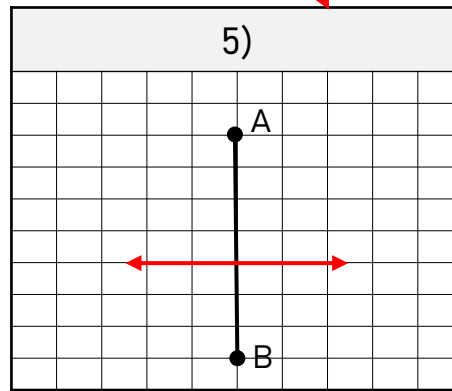
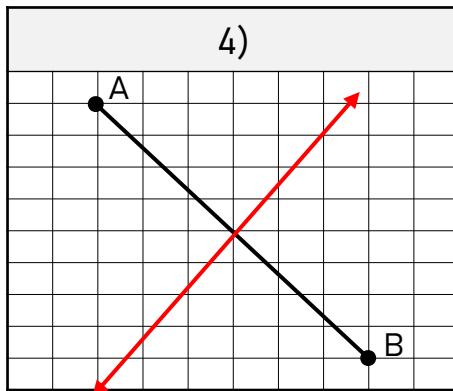
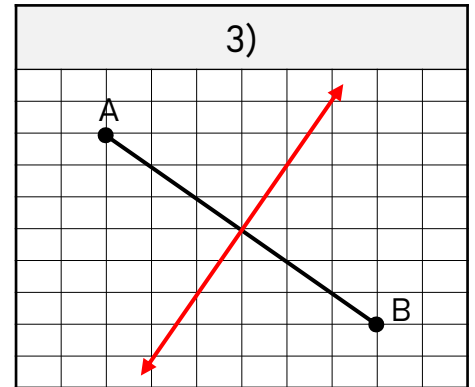
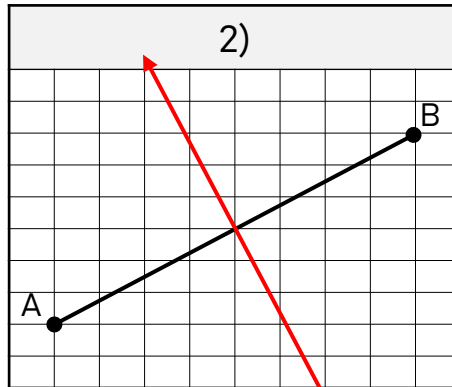
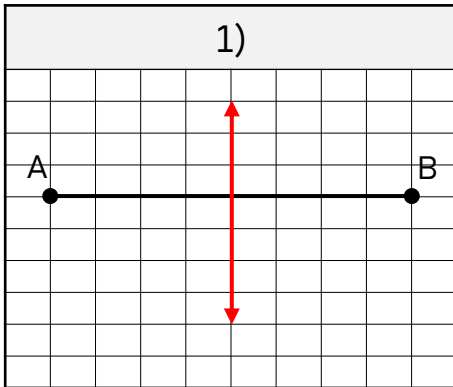
Part 2

Draw a second line that is intersecting, perpendicular, or parallel to the other line

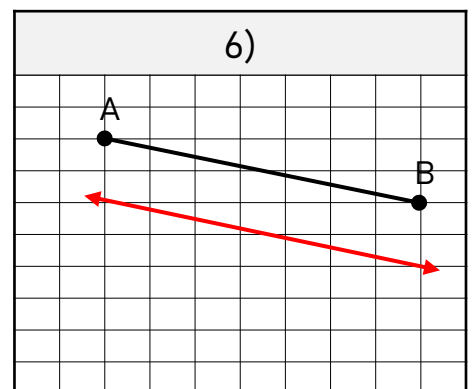
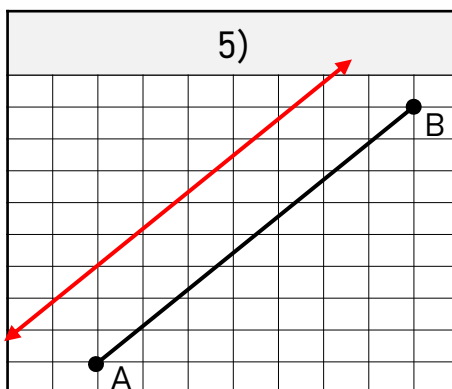
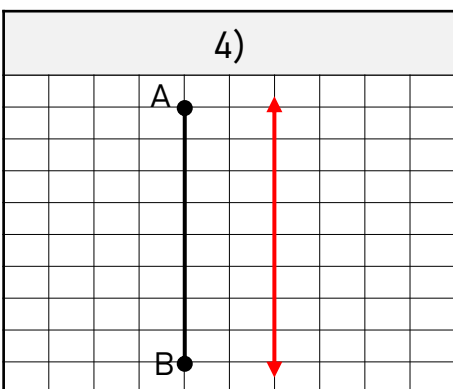
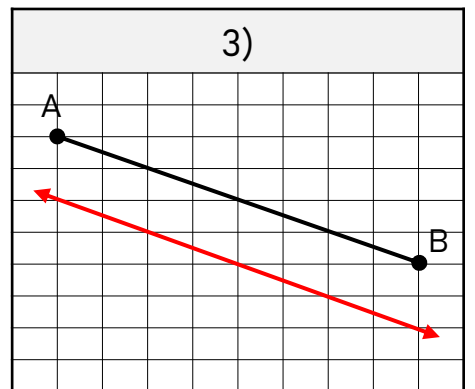
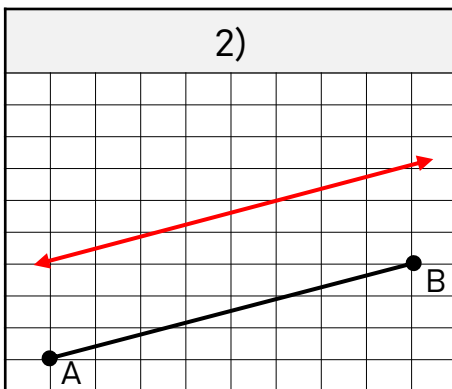
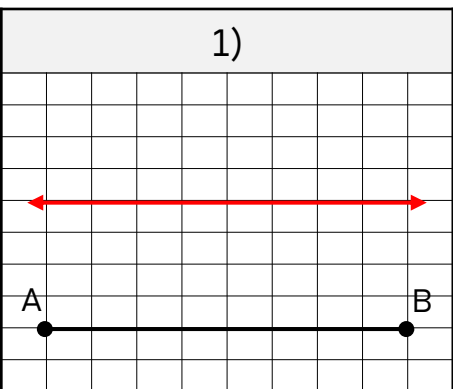
1) 	2) 	3) 	4)
Perpendicular	Parallel	Intersecting	Parallel
5) 	6) 	7) 	8)
Intersecting	Perpendicular	Intersecting	Parallel

Perpendicular and Parallel Line Segments

Part 1

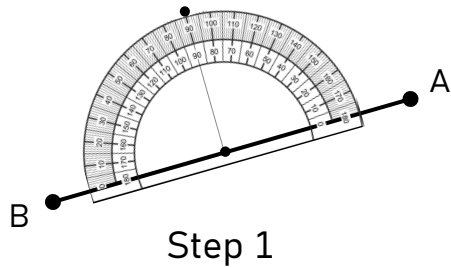
Construct perpendicular lines of the line segments $\overleftrightarrow{AB}$ 

Part 2

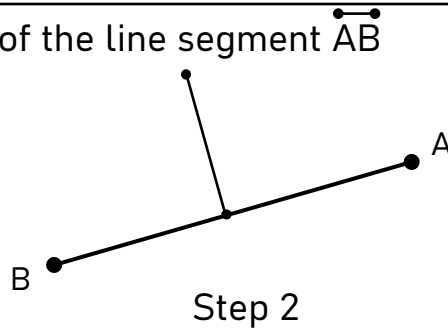
Construct parallel lines of the line segments $\overleftrightarrow{AB}$ 

Perpendicular Line Segments

Example - perpendicular line of the line segment $\overline{AB}$



Step 1



Step 2

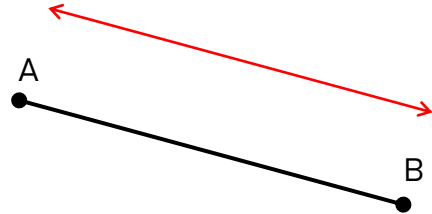
Questions

Construct perpendicular lines of the line segments $\overline{AB}$

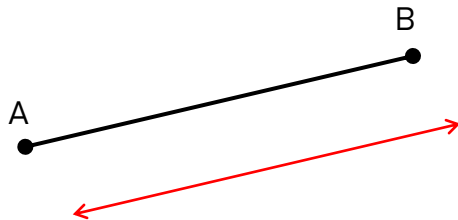
1)



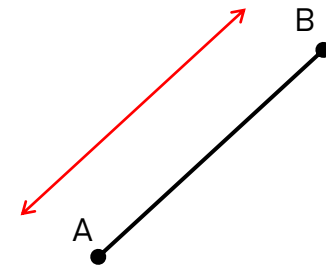
2)



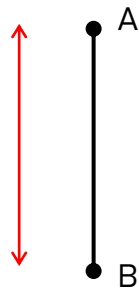
3)



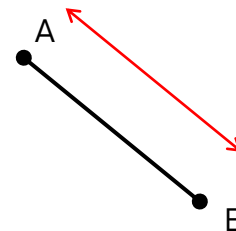
4)



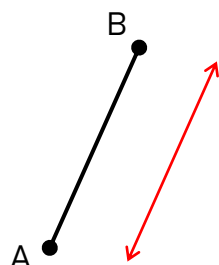
5)



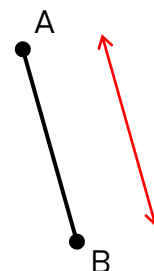
6)



7)

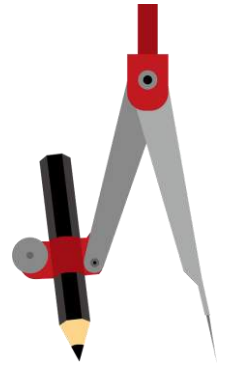
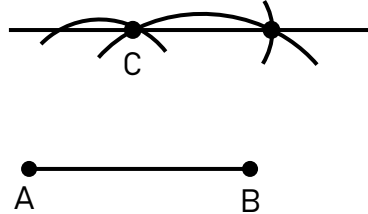


8)



Parallel Line Segments

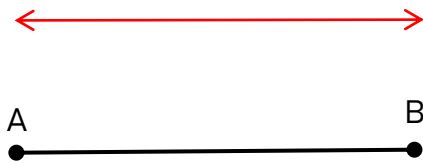
Use a compass to draw an arc from points A, B, and C.



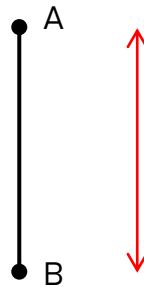
Questions

Construct parallel lines of the line segments $\overline{AB}$

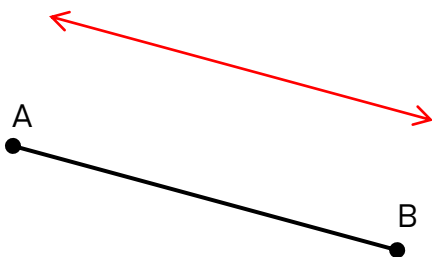
1)



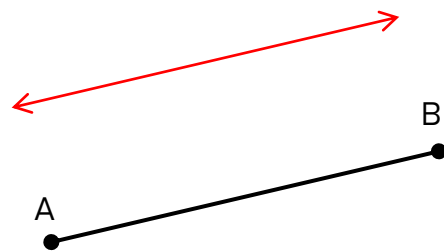
2)



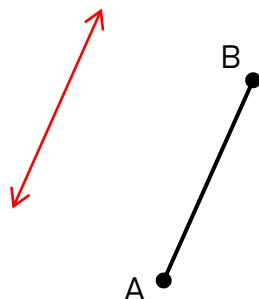
3)



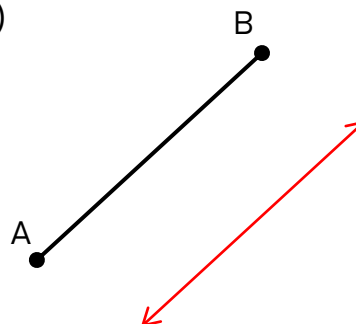
4)



5)



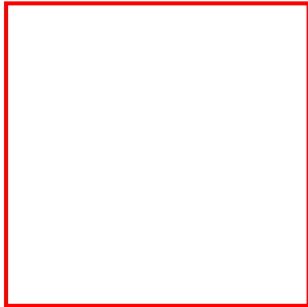
6)



Constructing Quadrilaterals - Parallel and Perpendicular Lines**Questions**

Construct the quadrilaterals below using parallel and perpendicular lines

1)



Square

2)



Rectangle

3)



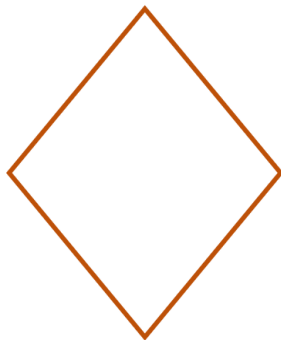
Parallelogram (2 sets of parallel lines)

4)



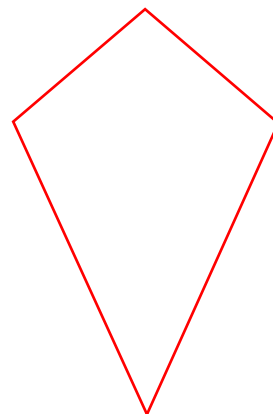
Trapezoid (bases have parallel lines)

5)



Rhombus (parallel opposite sides)

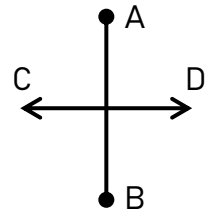
6)



Kite (diagonal lines are perpendicular)

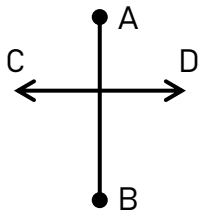
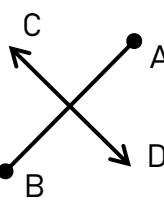
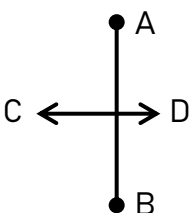
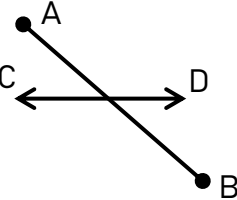
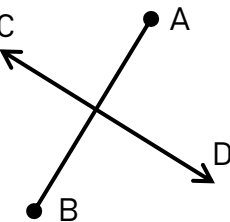
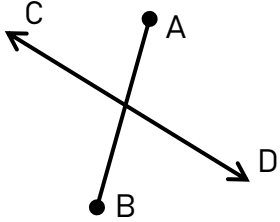
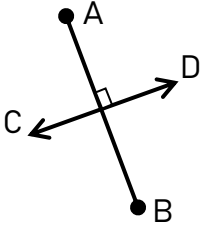
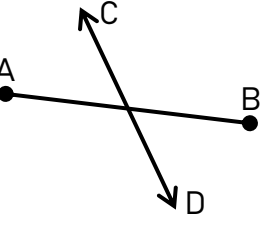
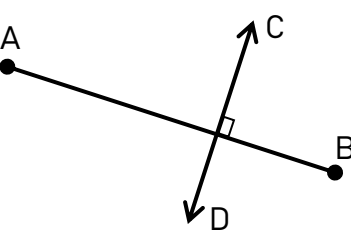
Perpendicular Bisector

A **perpendicular bisector** is a line that cuts a line segment into two equal parts at 90° . This means the new line is **perpendicular** to the other line and it passes through the **middle** of the other line.



Part 1

Is the line $\overleftrightarrow{CD}$ a perpendicular bisector of the line segment?

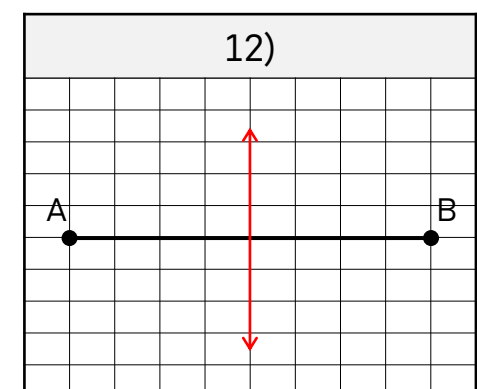
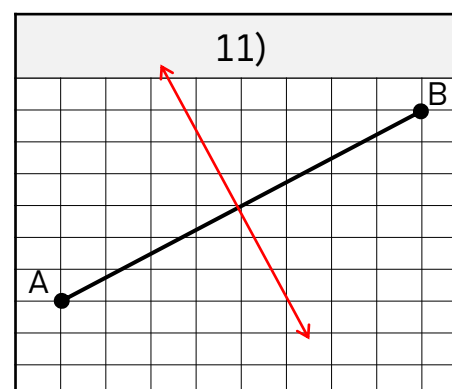
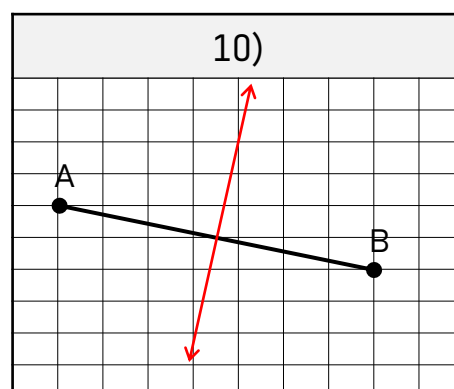
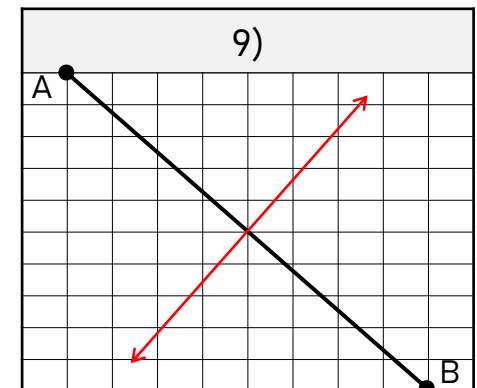
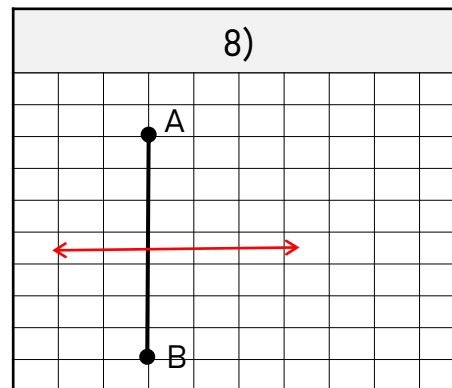
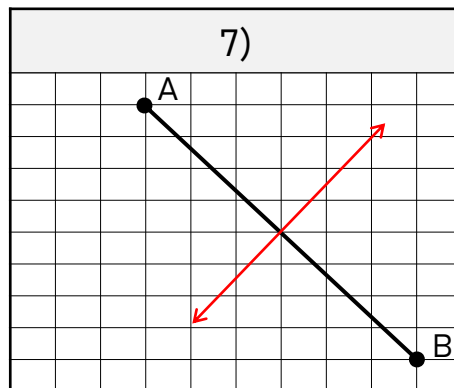
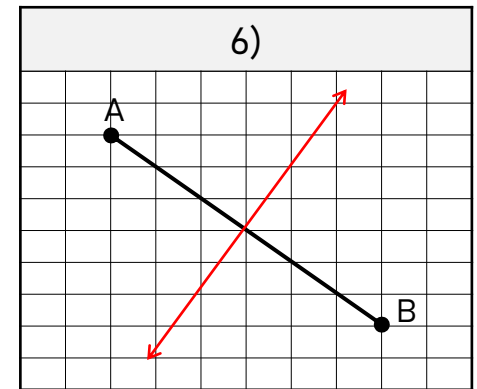
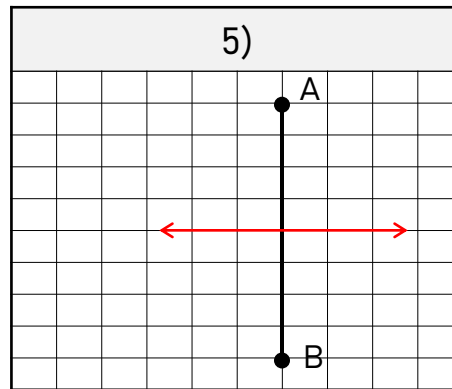
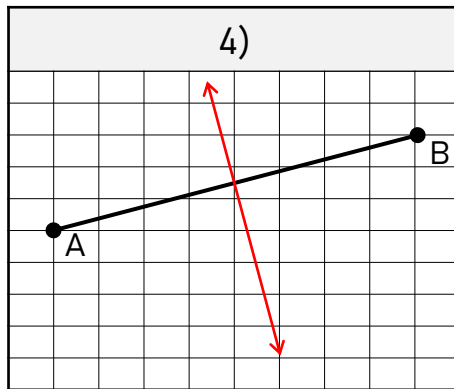
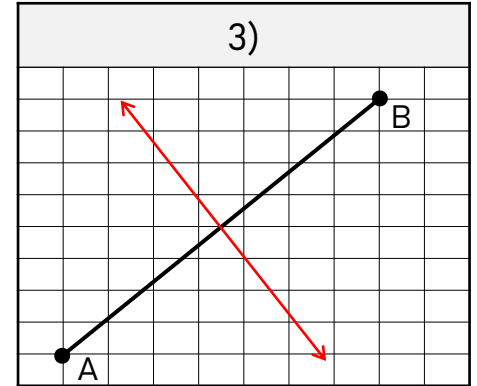
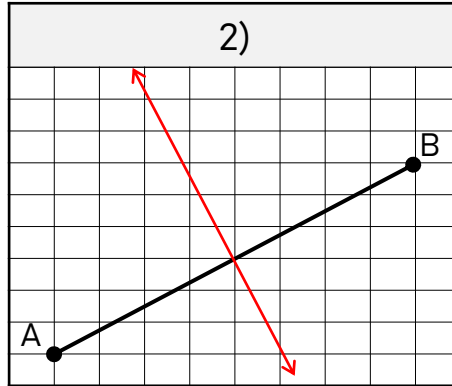
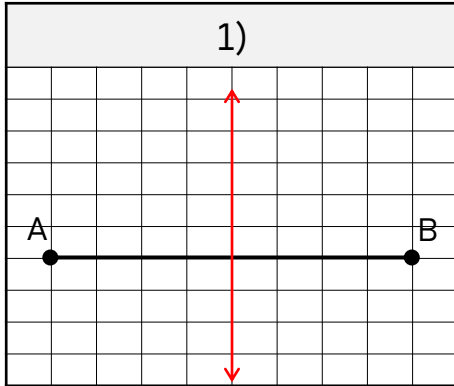
1) 	2) 	3) 
☒ Yes No	☒ Yes No	☒ Yes No
4) 	5) 	6) 
Yes ☒ No	☒ Yes No	Yes ☒ No
7) 	8) 	9) 
☒ Yes No	Yes ☒ No	☒ Yes No

Part 2

Write what the terms below mean in your own words

Term	Definition
Perpendicular	A line that is at an angle of 90° to a given line
Midpoint	The middle of a line

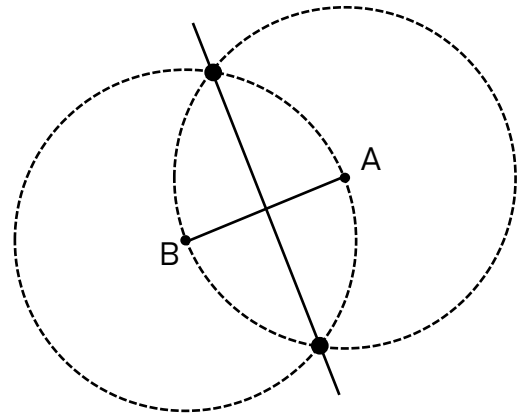
Perpendicular Bisector

DirectionsConstruct a perpendicular bisector of the line segment $\overline{AB}$ 

Perpendicular Bisector

Example - Perpendicular line bisector of the line segment AB

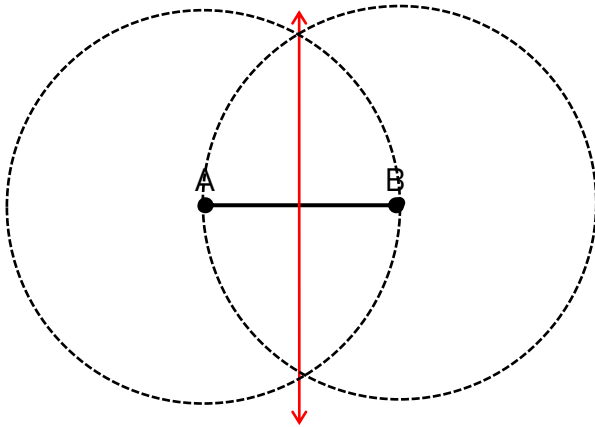
- Use a compass to sketch a circle around point A
- Use a compass to sketch a circle around point B
- Where the circles intersect, place a point
- Connect the two points to finish constructing your perpendicular bisector



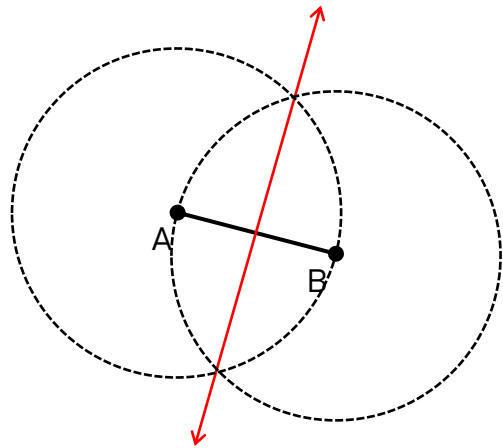
Questions

Construct perpendicular bisectors of the line segment $\overline{AB}$

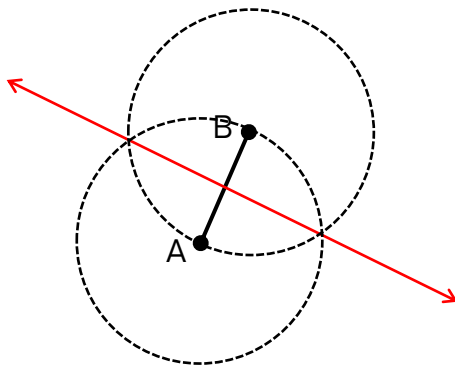
1)



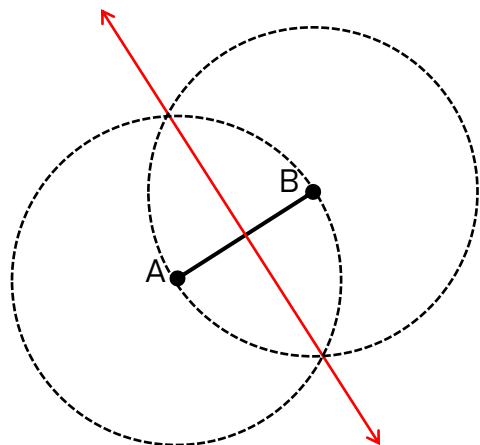
2)



3)



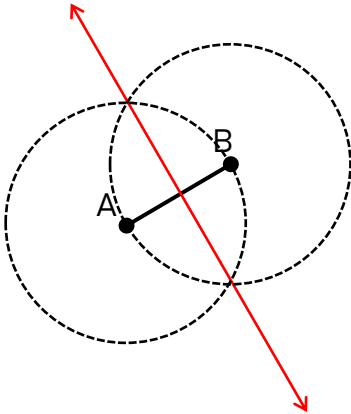
4)



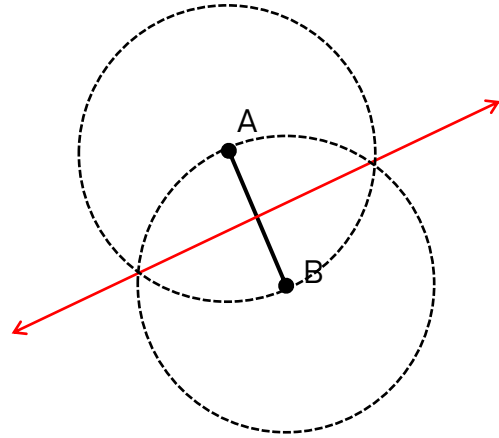
Perpendicular Bisector

QuestionsConstruct perpendicular bisectors of the line segment $\overline{AB}$

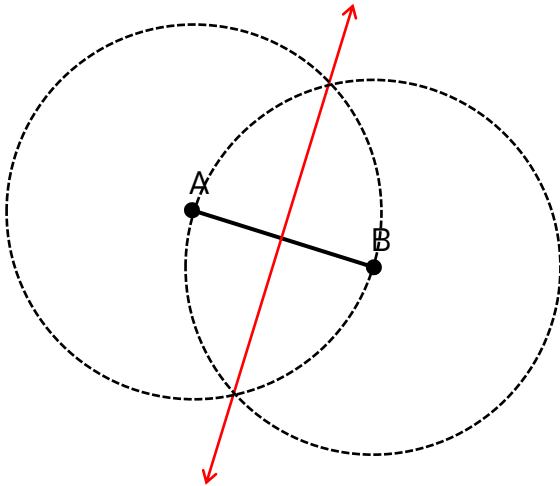
1)



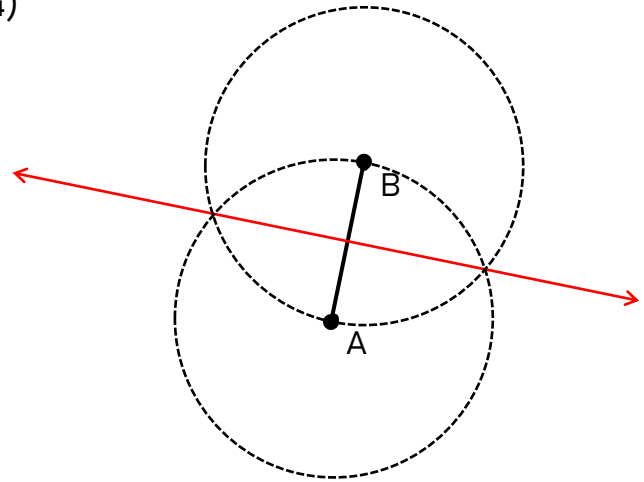
2)



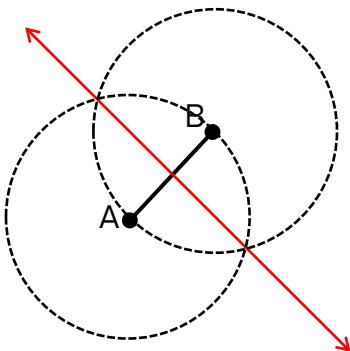
3)



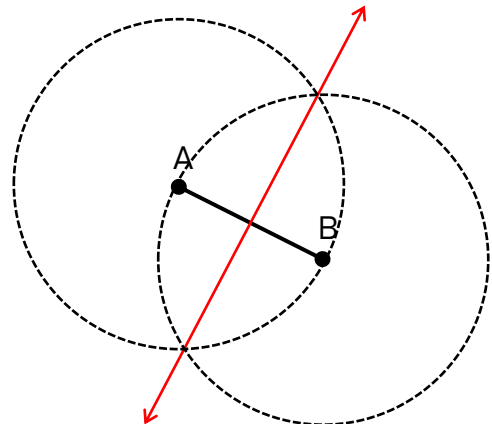
4)



5)

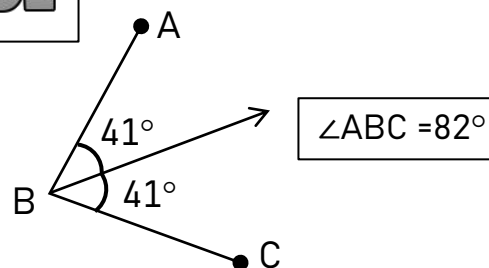


6)



Angle Bisector

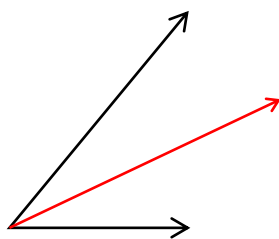
An **angle bisector** is a line that cuts an angle into two identical (congruent) parts. For example, if we construct an angle bisector on a 90° angle, we will have two 45° angles.



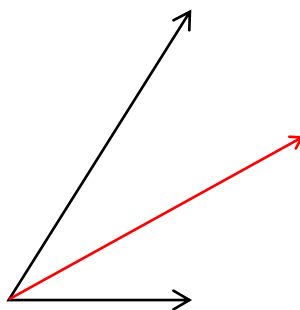
Directions

Construct an angle bisector of the angles below using a protractor

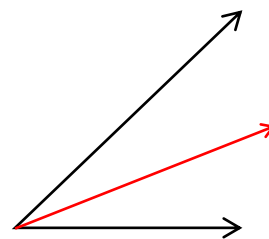
1)



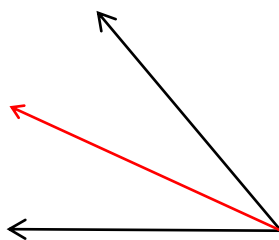
2)



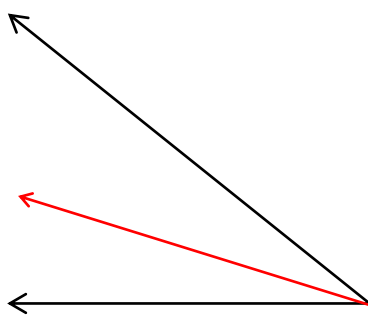
3)



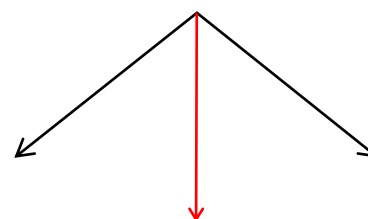
4)



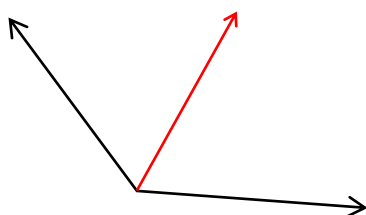
5)



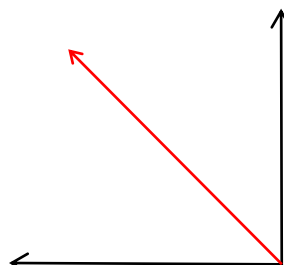
6)



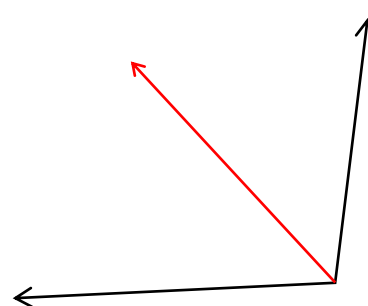
7)



8)



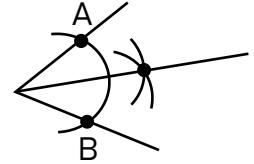
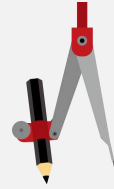
9)



Angle Bisector

We can also use a compass to find an angle bisector.

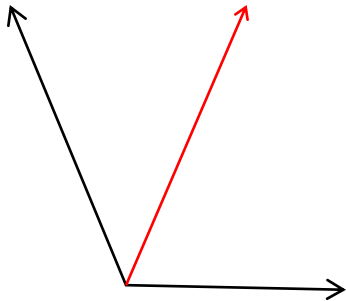
- Draw an arc using point A as the anchor point
- Draw an arc using point B as the anchor point
- Place a point where your two arcs intersect
- Draw a line from the vertex to your new point



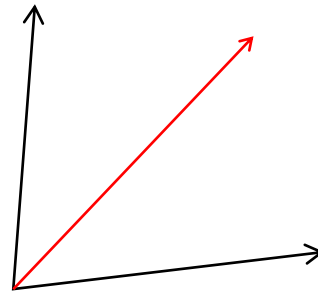
Directions

Construct an angle bisector of the angles below using a compass

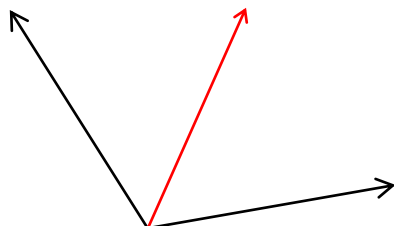
1)



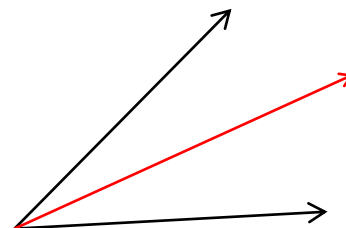
2)



3)



4)

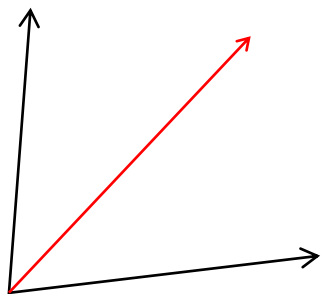


Angle Bisector

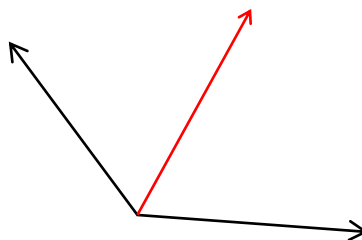
Directions

Construct an angle bisector of the angles below using a compass

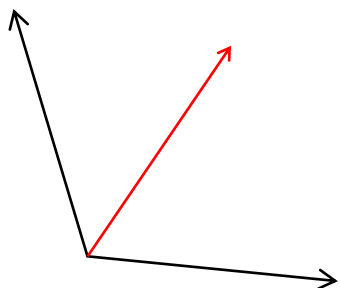
1)



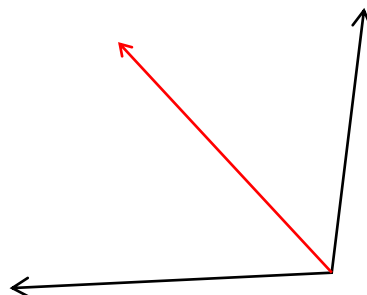
2)



3)



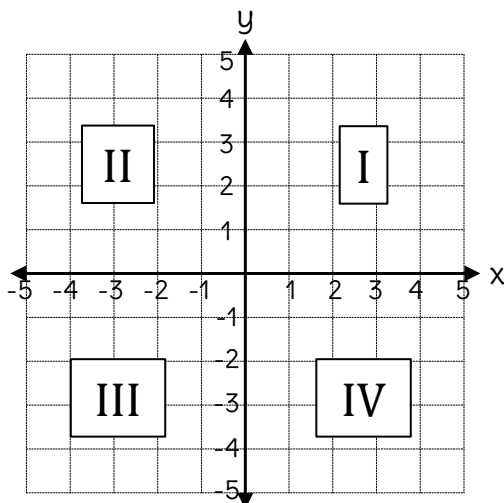
4)



Four Quadrants - Cartesian Plane

Part 1

Write which quadrant the points would be found



Coordinates (x, y)	Quadrant
(2, -4)	IV
(5, 4)	I
(-4, -5)	III
(-2, 3)	II
(5, 2)	I

Part 2

Write your own coordinates for a point that could be found in the quadrant

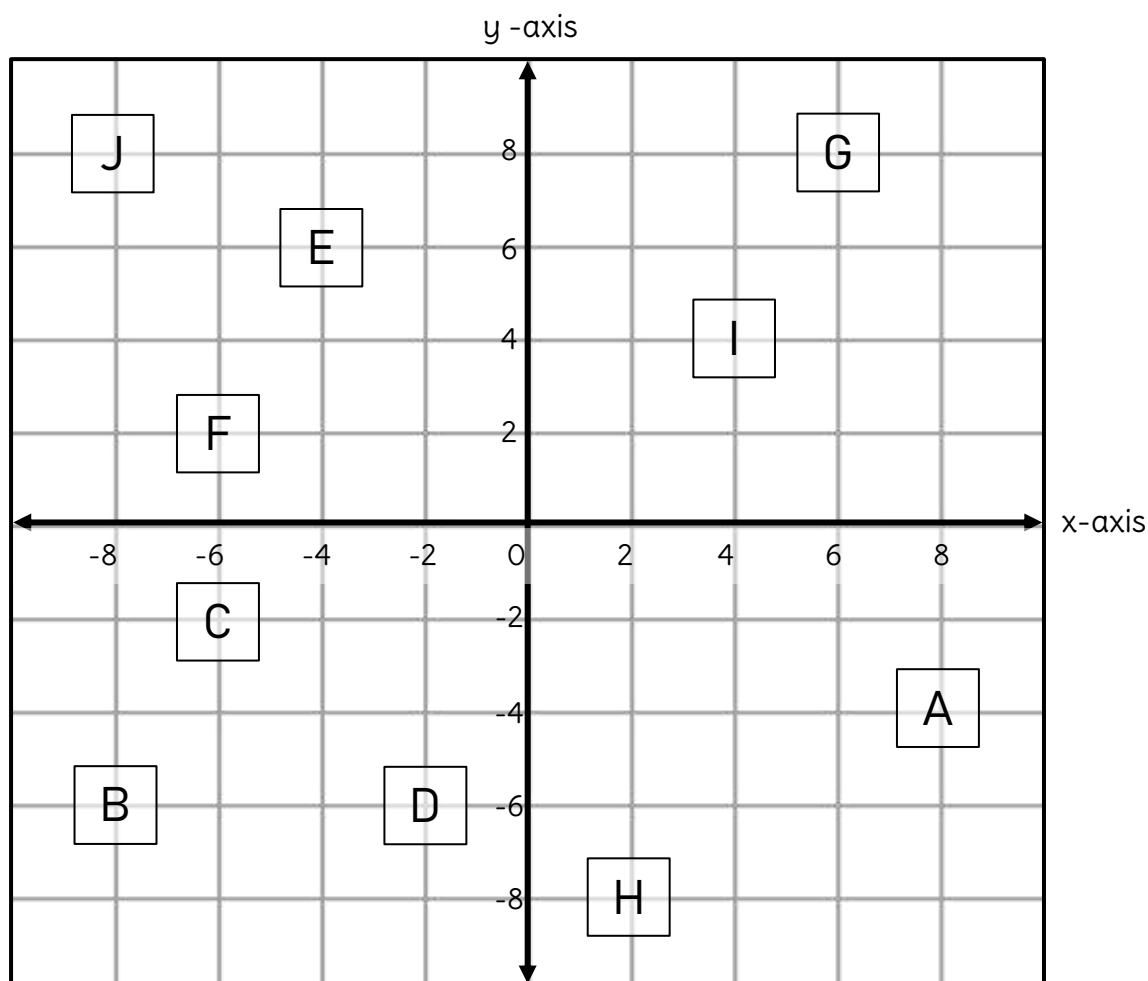
Quadrant	Coordinates (x, y)
Quadrant I	
Quadrant II	
Quadrant III	
Quadrant IV	
Quadrant I	
Quadrant II	
Quadrant III	
Quadrant IV	
Quadrant I	

Answers will vary

Part 3

Which quadrant number is associated with the descriptions below

	Description	Quadrant
1)	Both positive values	I
2)	Both negative values	III
3)	An x positive value and y negative value	IV
4)	An x negative value and y positive value	II

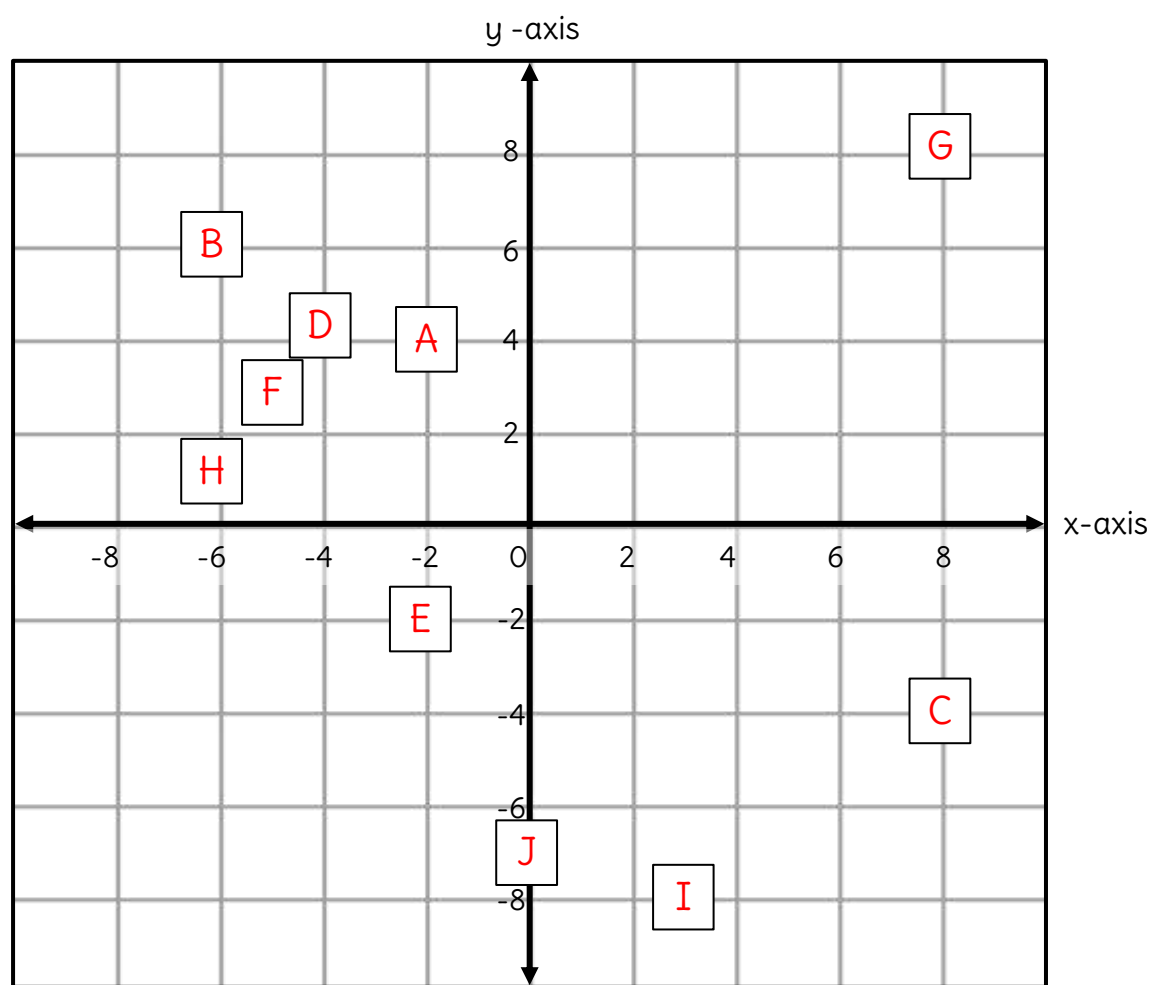
Using 4 Quadrants on a Cartesian Plane**Questions**

Write the coordinates for each object on the cartesian plane

Symbol	Coordinates (x, y)
A	(8, -4)
B	(-8, -6)
C	(-6, -2)
D	(-2, -6)
E	(-4, 6)

Symbol	Coordinates (x, y)
F	(-6, 2)
G	(6, 8)
H	(2, -8)
I	(4, 4)
J	(-8, 8)

Using 4 Quadrants on a Cartesian Plane



Questions Write the letters on the grid according to the coordinates

Letter	Coordinates (x, y)	Letter	Coordinates (x, y)
A	(-2, 4)	F	(-5, 3)
B	(-6, 6)	G	(8, 8)
C	(8, -4)	H	(-6, 1)
D	(7, 4)	I	(3, -8)
E	(-2, -2)	J	(0, -7)

Plotting Ordered Pairs on Cartesian Plane

Directions

Plot the ordered pairs on the cartesian plane

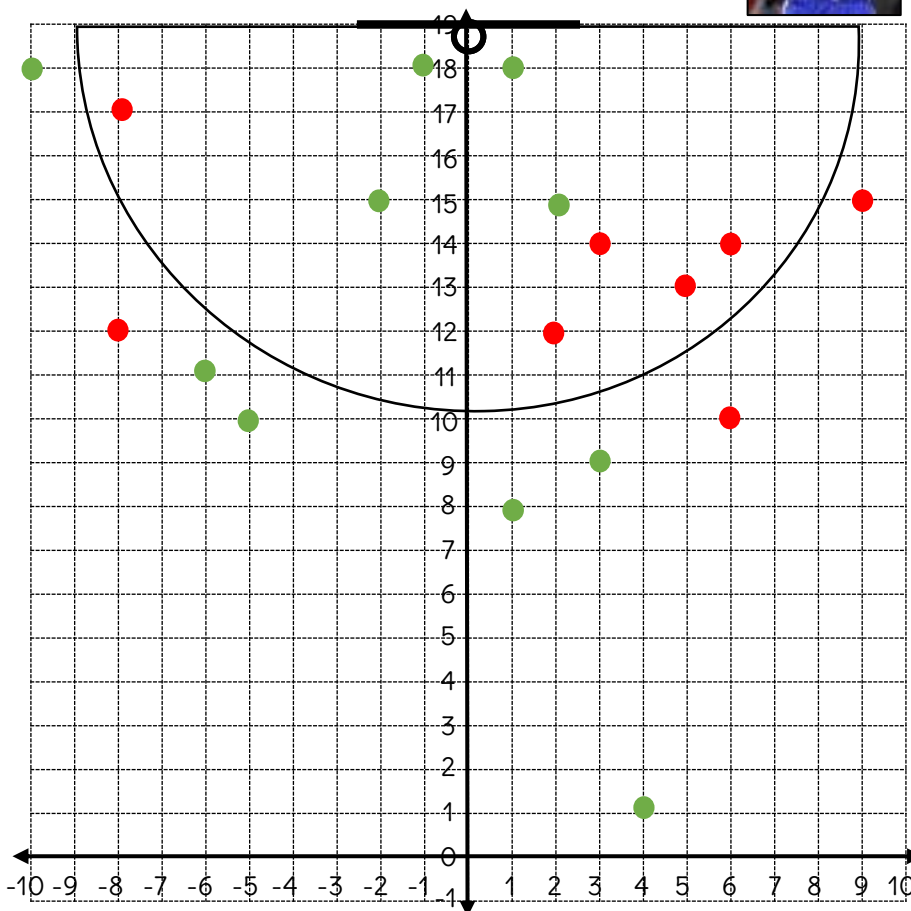


Steph Curry is a tremendous shooter. His shot attempts and shot makes from his last game have been displayed in the table below. The coordinates for each shot show where Curry made or missed from.

If the shot is made, plot a green dot using the coordinates.

If the shot is missed, plot a red dot using the coordinates.

Shot Make	Shot Miss
(3, 9)	(2, 12)
(-5, 10)	(5, 13)
(1, 8)	(3, 14)
(-10, 18)	(-8, 17)
(-1, 18)	(6, 10)
(4, 1)	(-8, 12)
(2, 15)	(9, 15)
(-6, 11)	(6, 14)
(-2, 15)	
(1, 18)	



Questions

Answer the questions below

Questions	Answers
1) What was Curry's field goal percentage? (#Makes/#Total Shots)	$10/18 = 55.6\%$
2) What was Curry's 3-point percentage? (#3-Point Makes/#Total 3-Point Shots)	$6/9 = 66.7\%$
3) How many points did Curry have?	26 points
4) Curry has asked you where he should shoot from. Use the coordinates you plotted to give him at least 2 tips.	Shoot more threes, less long two pointers. Shoot more layups

Plotting Ordered Pairs on Cartesian Plane

Directions Plot the ordered pairs on the cartesian plane

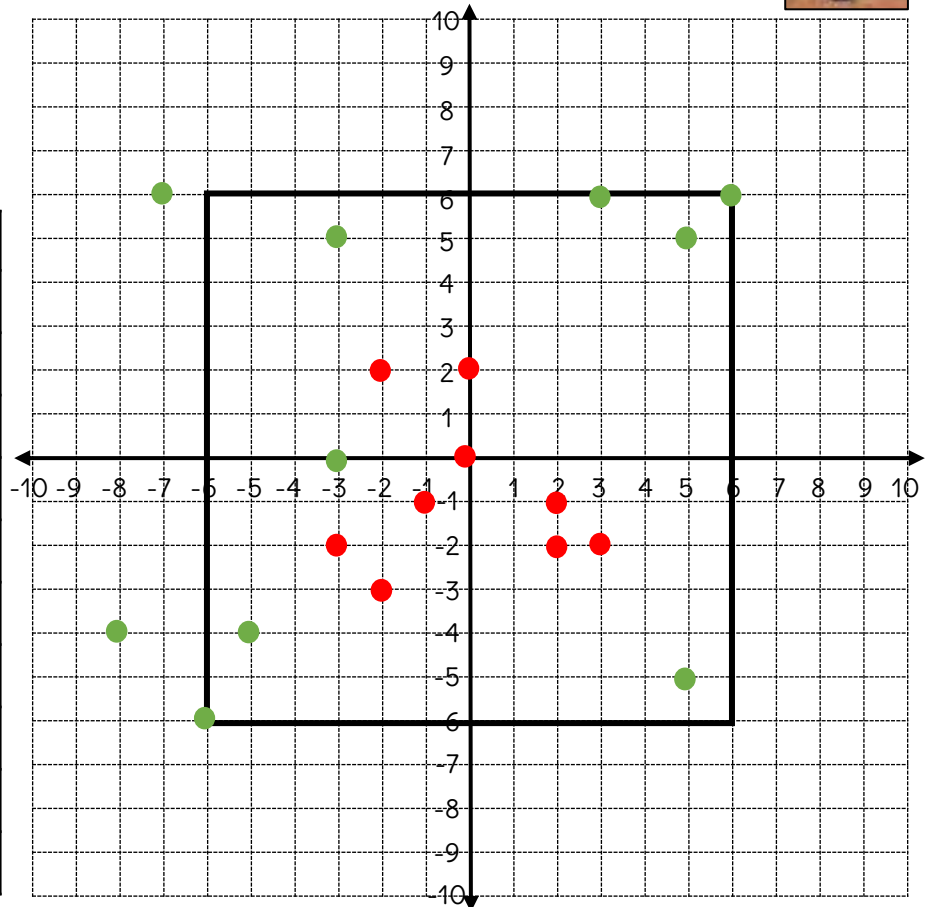
Robbie Ray pitches for the Blue Jays. He only pitched 3 innings last game. His strikes and pitches that resulted in a hit are recorded in the table. Where he threw each pitch has been displayed using coordinates.

If the pitch is a strike, plot a green dot using the coordinates

If the pitch is hit, plot a red dot using the coordinates.



Strikes	Hits
$(-3, 0)$	$(0, 0)$
$(-6, -6)$	$(0, 2)$
$(5, -5)$	$(-1, -1)$
$(3, 6)$	$(-2, 2)$
$(-7, 6)$	$(2, -1)$
$(6, 6)$	$(-3, -2)$
$(-5, -4)$	$(3, -2)$
$(-8, -4)$	$(-2, -3)$
$(5, 5)$	$(2, -2)$
$(-3, 5)$	



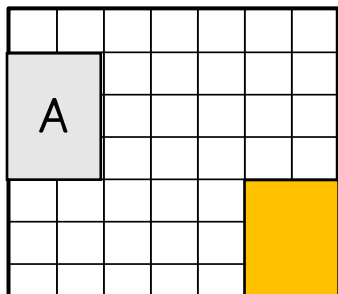
Questions Answer the questions below

Questions	Answers
1) How many strikes did Ray throw?	10
2) How many hits did he give up?	9
3) How many pitches did he make in the upper part of the strike zone?	6
4) How many strikes did Ray throw out of the strike zone?	2
5) Ray has asked you where he should throw his pitches. Use the coordinates you plotted to give him at least 2 tips.	Around the outside of the strike zone and in the upper part of the strike zone.

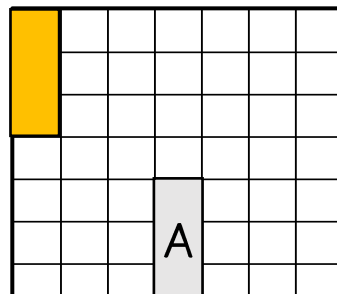
Transformations - Translations

Part 1

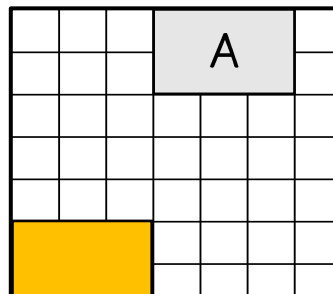
Describe the translations below. Shape A is the original object



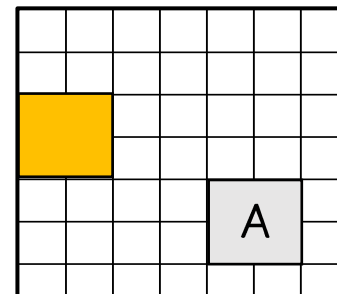
1) down 3, right 5



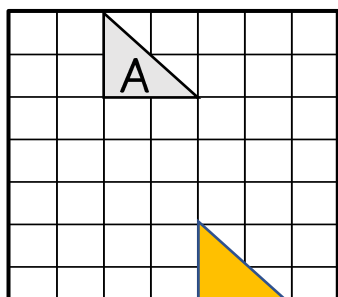
2) Up 4, left 3



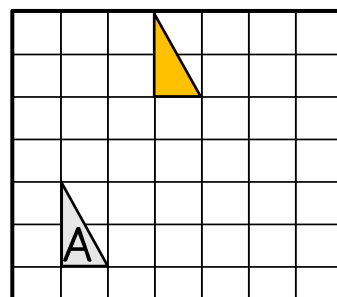
3) Down 5, left 3



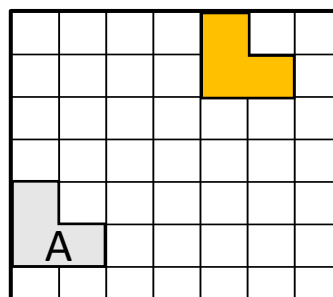
4) Left 4, up 2



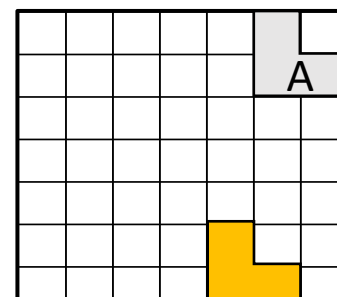
5) Down 5, right 2



6) Up 4, right 2



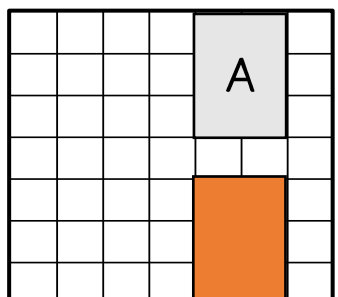
7) Up 4, right 4



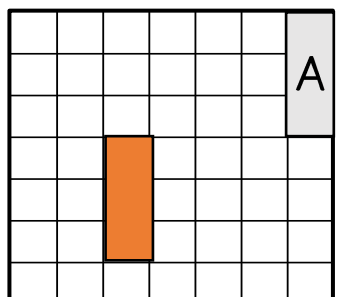
8) Down 5, left 1

Part 2

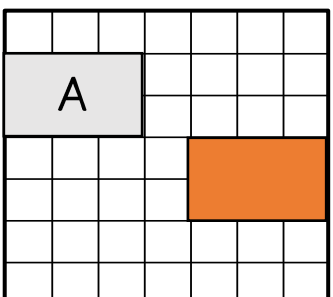
Draw the translations below



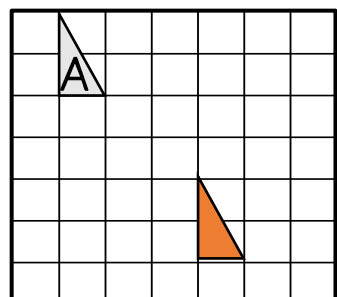
1) 4↓



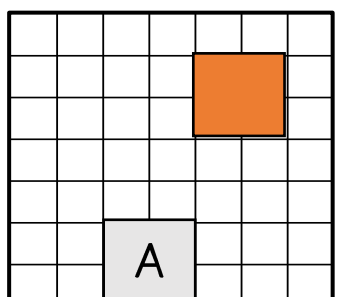
2) 3↓, 4←



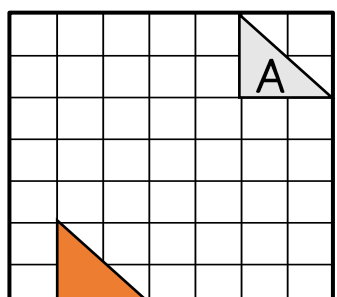
3) 2↓, 4→



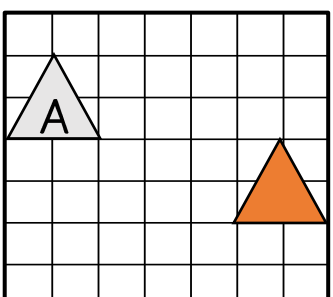
4) 4↓, 3→



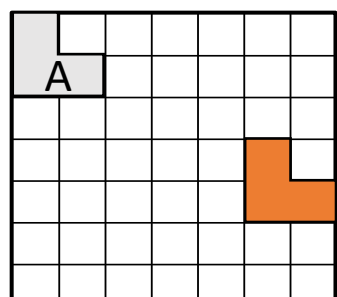
5) 4↑, 2→



6) 5↓, 4←



7) 2↓, 5→

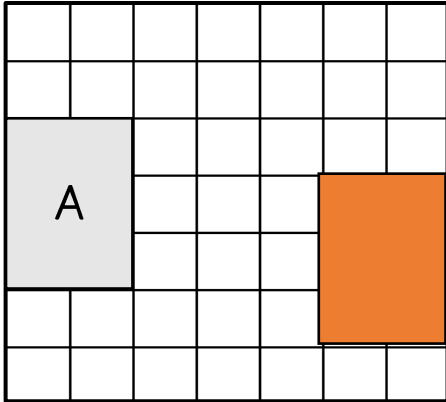
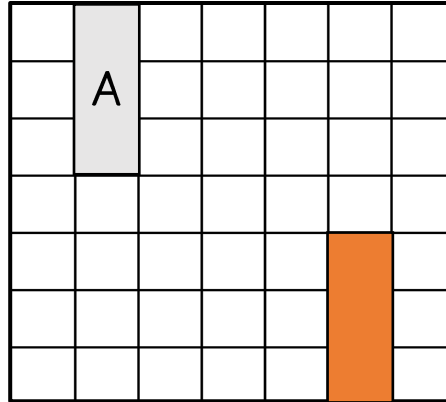
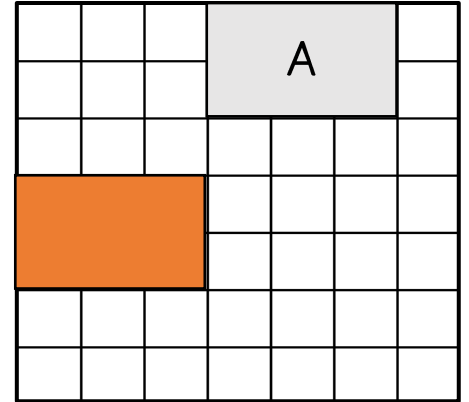
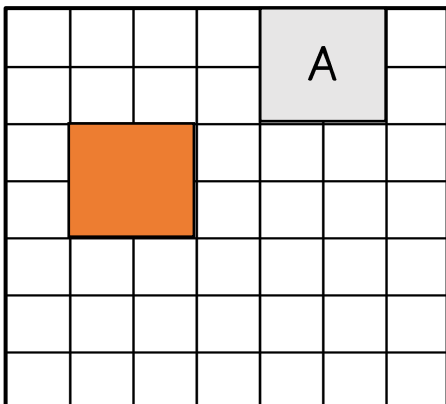
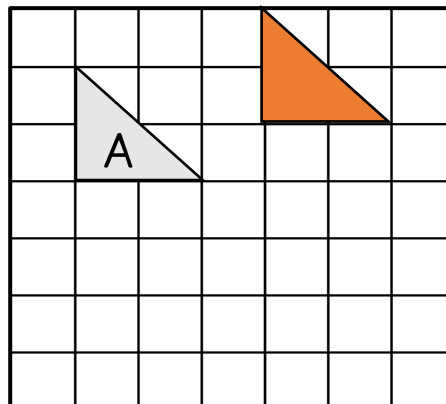
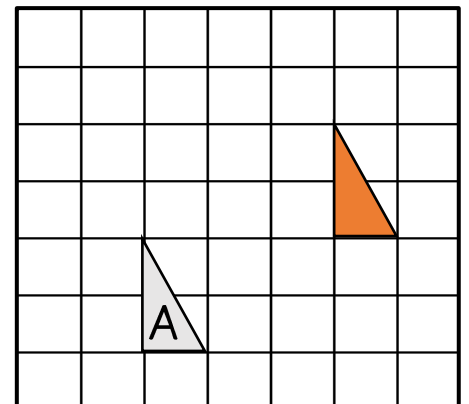
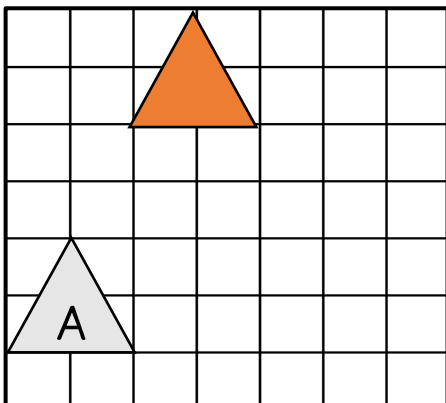
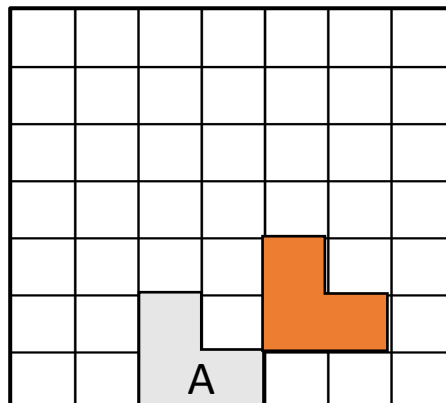
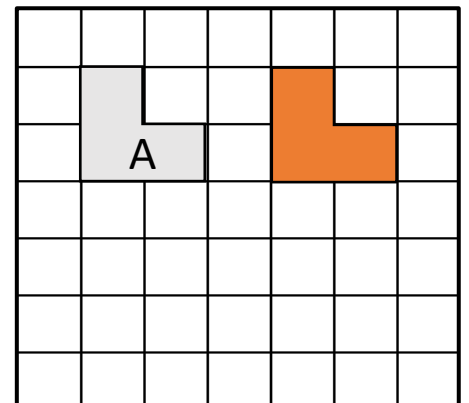


8) 3↓, 5→

Performing Translations

Questions

Draw the new shape after reading the 3 steps

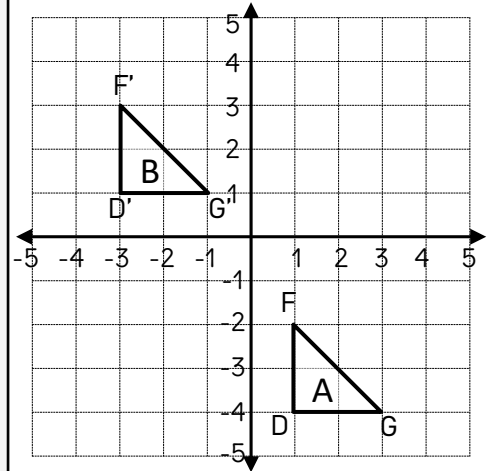
1) $2\uparrow, 5\rightarrow, 3\downarrow$ 2) $3\downarrow, 4\rightarrow, 1\downarrow$ 3) $1\downarrow, 3\leftarrow, 2\downarrow$ 4) $4\downarrow, 3\leftarrow, 2\uparrow$ 5) $3\downarrow, 3\rightarrow, 4\uparrow$ 6) $4\uparrow, 3\rightarrow, 2\downarrow$ 7) $4\uparrow, 3\rightarrow, 1\leftarrow$ 8) $5\uparrow, 2\rightarrow, 4\downarrow$ 9) $3\downarrow, 3\rightarrow, 3\uparrow$

Translations - Mapping Rules

Mapping Rules for Translations

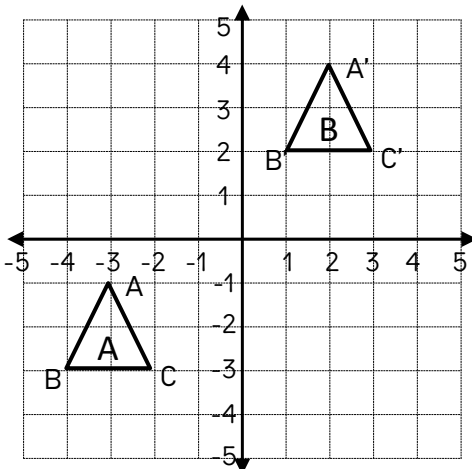
Each point on a shape slides according to the mapping rule.
The rule is $(x, y) \rightarrow (x + a, y + b)$

- 1) Choose 1 coordinate from the shape to translate
- 2) We need to move the x coordinate -4 spaces to the left. This means we subtract 4.
- 3) We need to move the y coordinate +5 spaces up. This means we add 5.
- 4) The **mapping rule** is: $(x, y) \rightarrow (x - 4, y + 5)$
- 5) Remember: if we move to the left or down, we are adding a negative number (subtracting) and if we move right or up, we are adding a positive number.

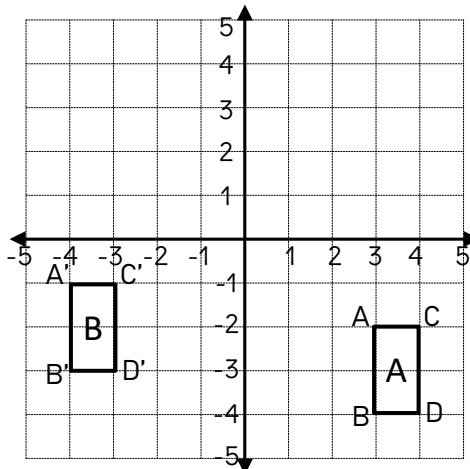


Questions

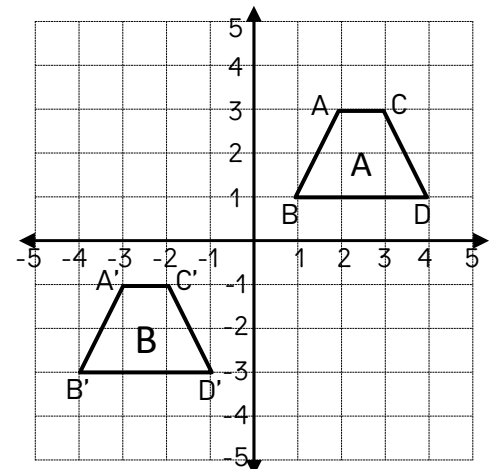
Fill in the mapping rule that translates figure A to figure B



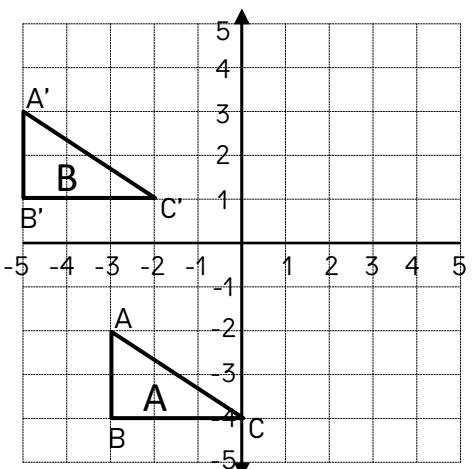
Mapping Rule $(x \boxed{+} 4, y \boxed{+} 5)$



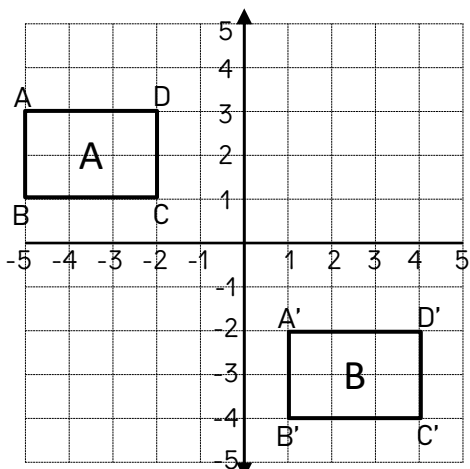
Mapping Rule $(x \boxed{-} 6, y \boxed{+} 1)$



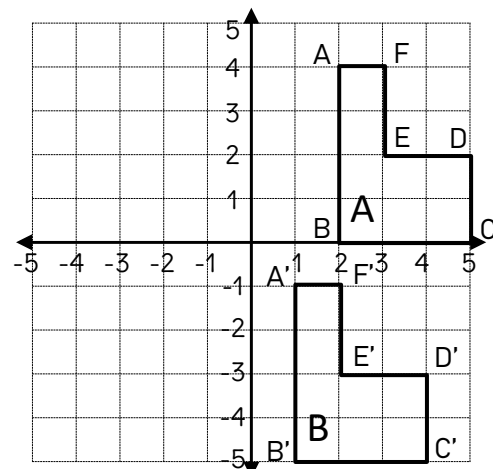
Mapping Rule $(x \boxed{-} 4, y \boxed{-} 4)$



Mapping Rule $(x \boxed{-} 2, y \boxed{+} 5)$



Mapping Rule $(x \boxed{+} 2, y \boxed{-} 5)$

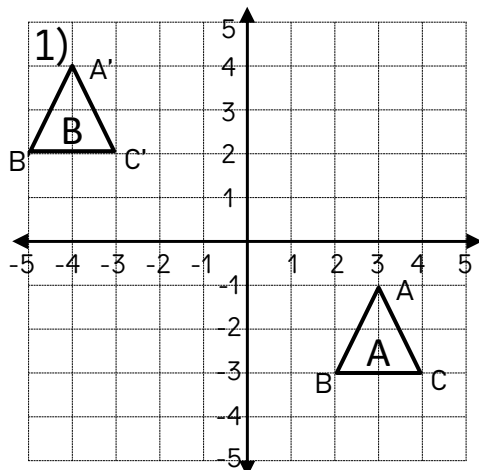


Mapping Rule $(x \boxed{-} 4, y \boxed{-} 5)$

Translations - Mapping Rules

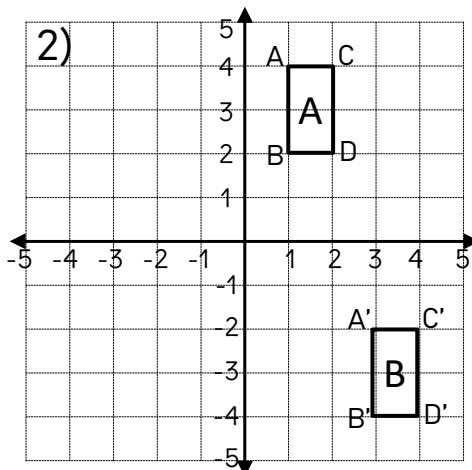
Questions

Fill in the mapping rule



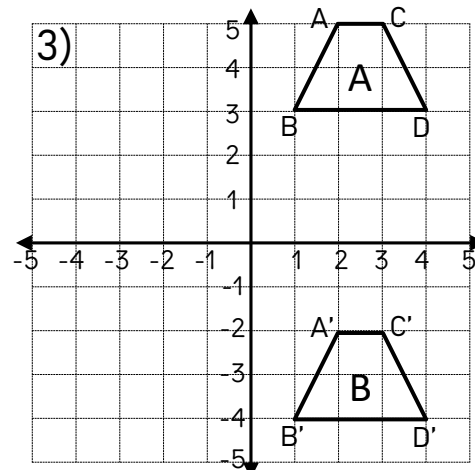
Mapping Rule

$(x - 7, y + 5)$



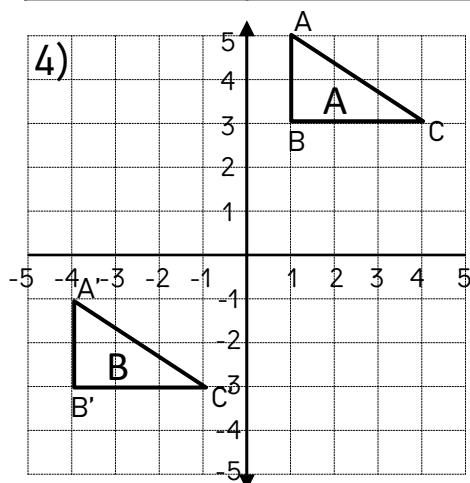
Mapping Rule

$(x + 2, y - 6)$



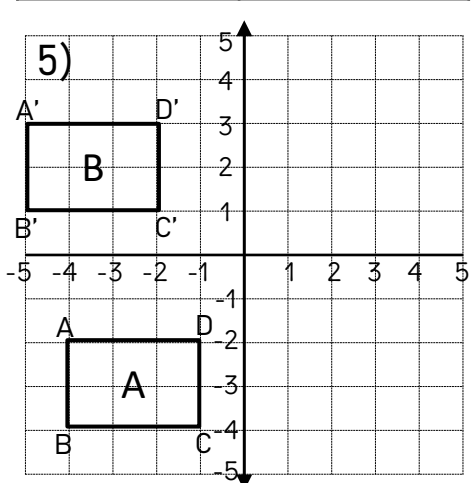
Mapping Rule

$(x, y - 7)$



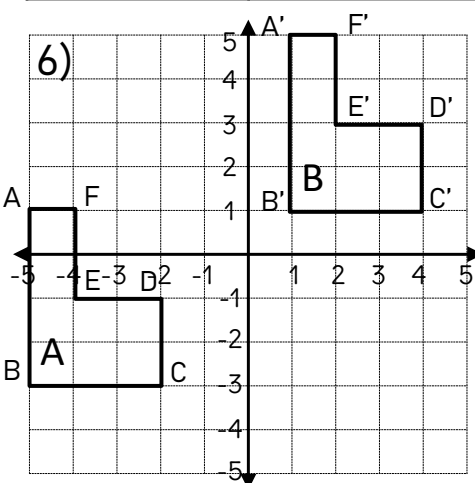
Mapping Rule

$(x - 5, y - 6)$



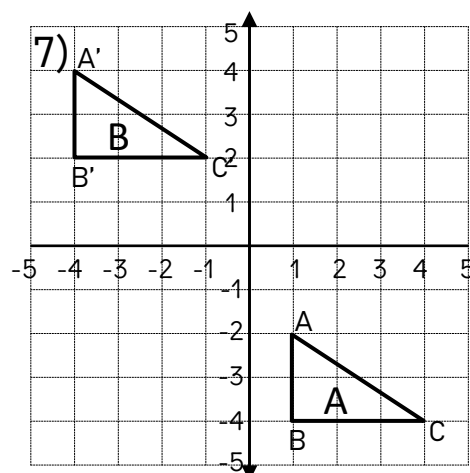
Mapping Rule

$(x - 1, y + 5)$



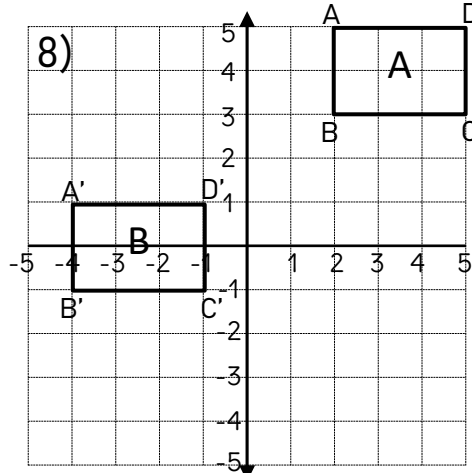
Mapping Rule

$(x + 6, y + 4)$



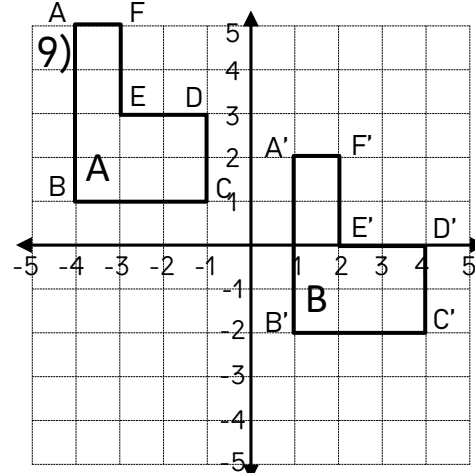
Mapping Rule

$(x - 5, y + 6)$



Mapping Rule

$(x - 6, y - 4)$



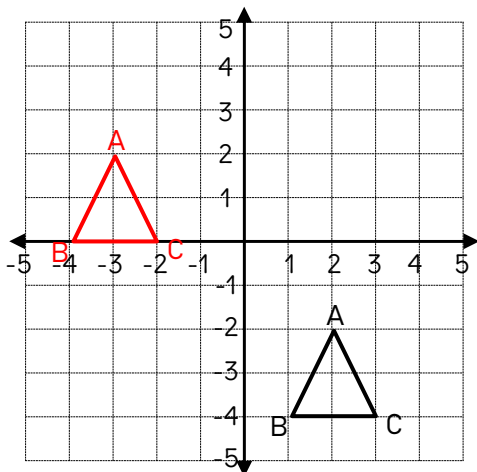
Mapping Rule

$(x + 5, y - 3)$

Translations - Mapping Rules

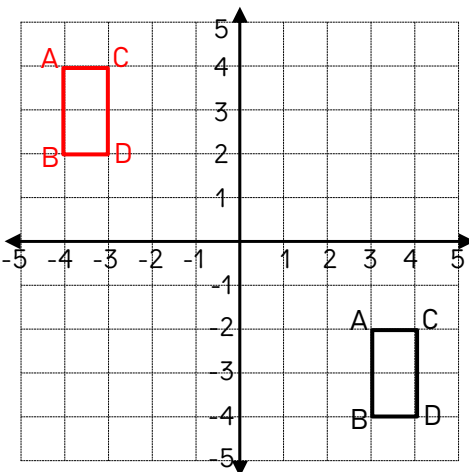
Questions

Translate the shape using the mapping rule



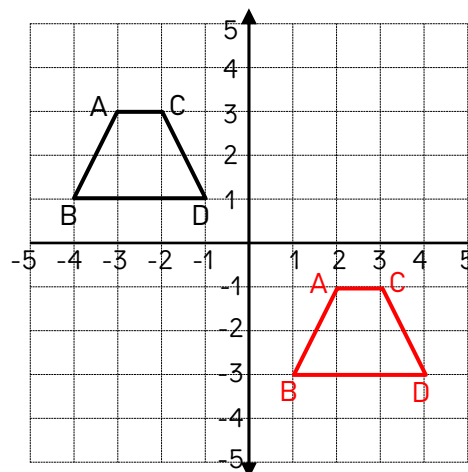
Mapping Rule

$$(x - 5, y + 4)$$



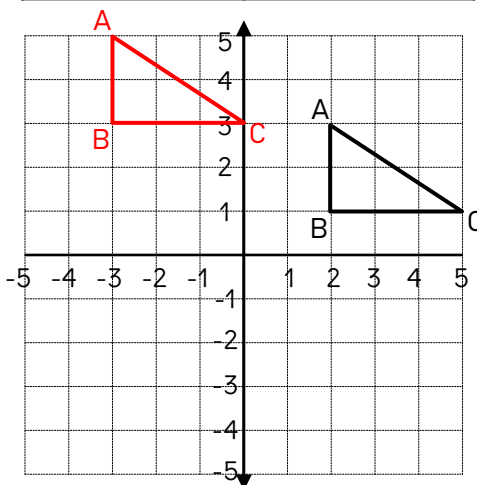
Mapping Rule

$$(x - 7, y + 6)$$



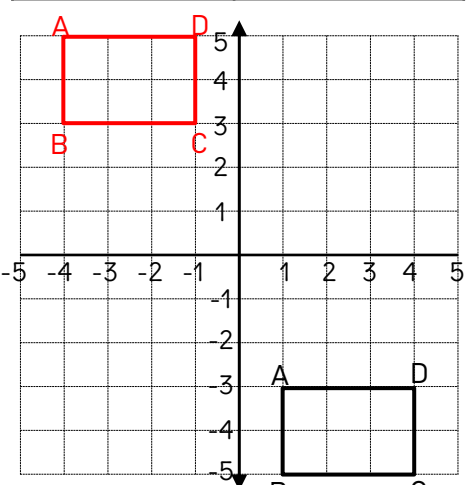
Mapping Rule

$$(x + 5, y - 4)$$



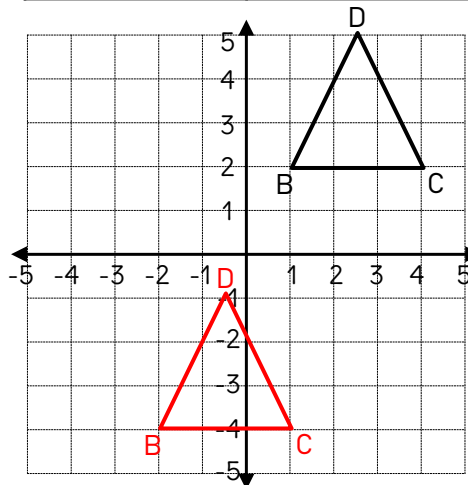
Mapping Rule

$$(x - 5, y + 2)$$



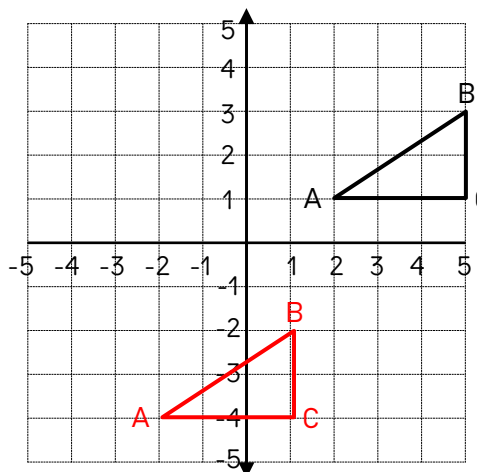
Mapping Rule

$$(x - 5, y + 8)$$



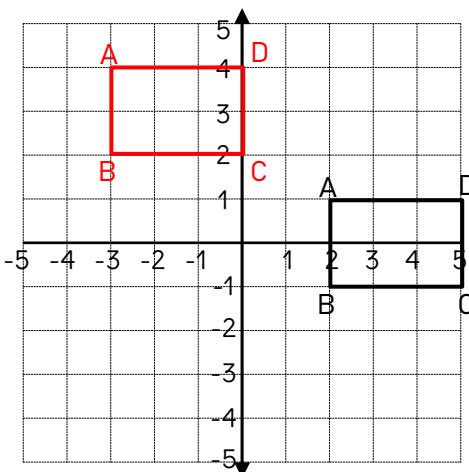
Mapping Rule

$$(x - 3, y - 6)$$



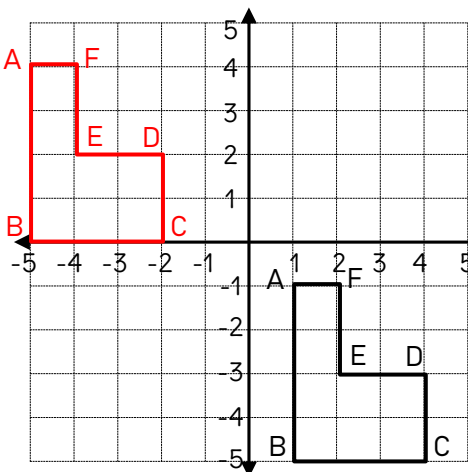
Mapping Rule

$$(x - 4, y - 5)$$



Mapping Rule

$$(x - 5, y + 3)$$



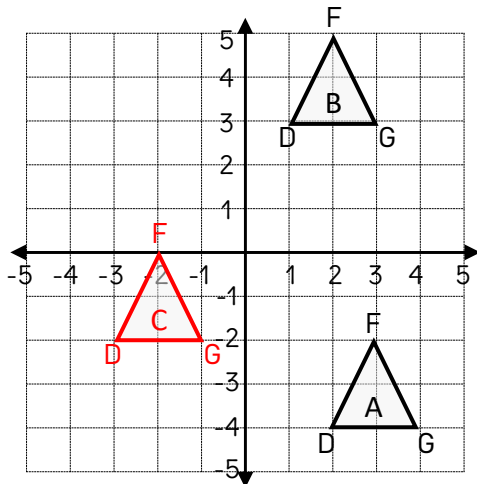
Mapping Rule

$$(x - 6, y + 5)$$

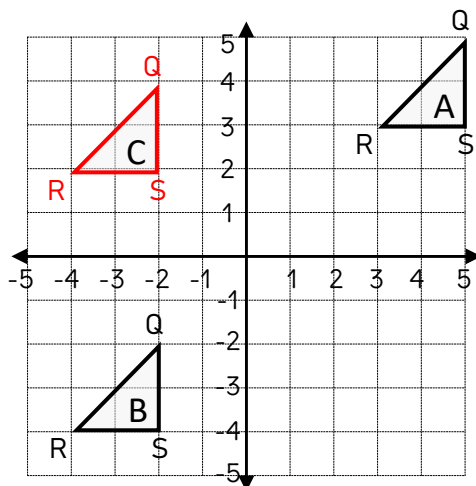
Transformations - Translations

Questions

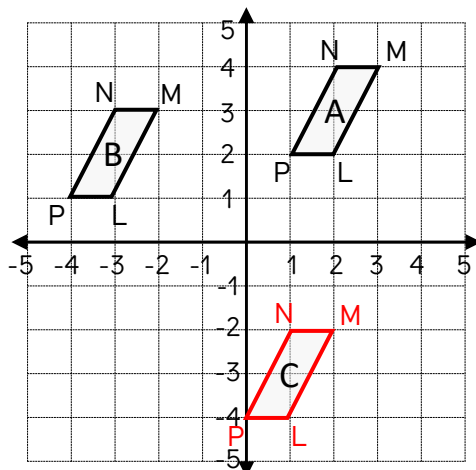
1) Fill in the coordinates 2) Describe the translation 3) Translate shape C



Coordinates A	Coordinates B
D(2,-4), F(3,-2), G(4,-4)	D(1,3), F(2,5), G(3,3)
Mapping Rule $(x, y) \rightarrow (x, y) \rightarrow (x + a, y + b)$	
$(x - 1, y + 7)$	
Translate Shape B to Shape C $(x - 4, y - 5)$	Coordinates C D(-3,-2) F(-2,0) G(-1,-2)



Coordinates A	Coordinates B
R(3,3), S(5,3), Q(5,5)	R(-4,-4), S(-2,-4), Q(-2,-2)
Mapping Rule $(x, y) \rightarrow (x, y) \rightarrow (x + a, y + b)$	
$(x - 7, y - 7)$	
Translate Shape B to Shape C $(x, y + 6)$	Coordinates C R(-4,2), S(-2,2), Q(-2,4)



Coordinates A	Coordinates B
P(1,2), L(2,2), N(2,4), M(3,4)	P(-4,1), L(-3,1), N(-3,3), M(-2,3)
Mapping Rule $(x, y) \rightarrow (x, y) \rightarrow (x + a, y + b)$	
$(x - 5, y - 1)$	
Translate Shape B to Shape C $(x + 4, y - 5)$	Coordinates C P(0,-4), L(1,-4), N(1,-2), M(2,-2)

Translations - New Coordinates

Part 1 Draw the shapes using the coordinates provided. Then translate the shape

Shape A

P(2,5), Q(2,1), R(8,3), S(9,5)

Translate the shape A

$(x - 3, y - 5)$

Shape B

F(-9,4), G(-6,5), H(-6,2)

Translate the shape B

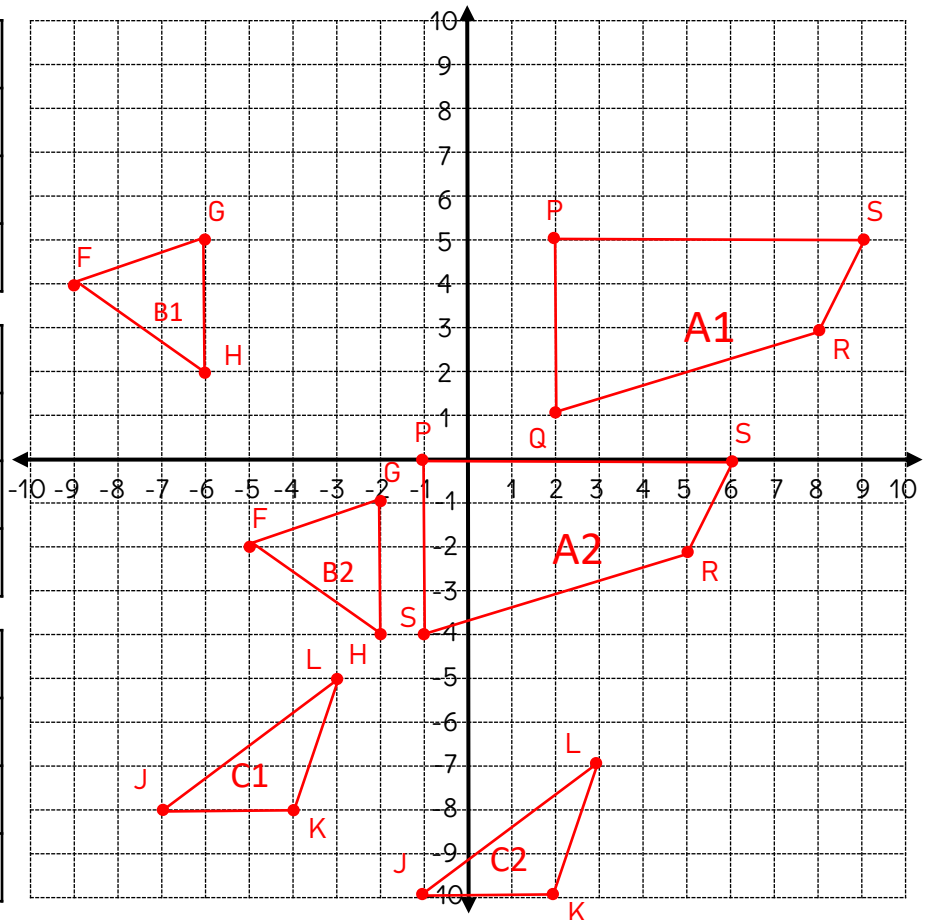
$(x + 4, y - 6)$

Shape C

J(-7,-8), K(-4,-8), L(-3,-5)

Translate the shape C

$(x + 6, y - 2)$



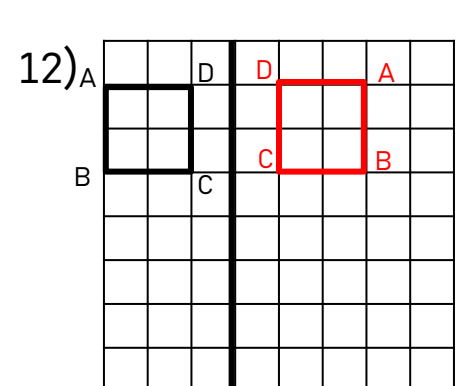
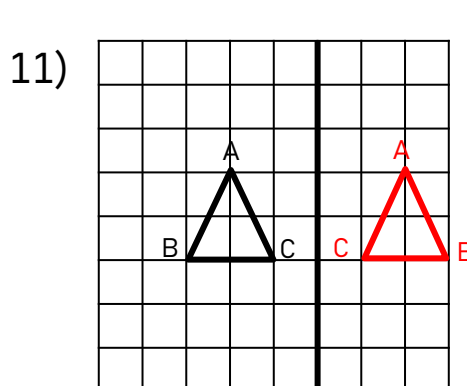
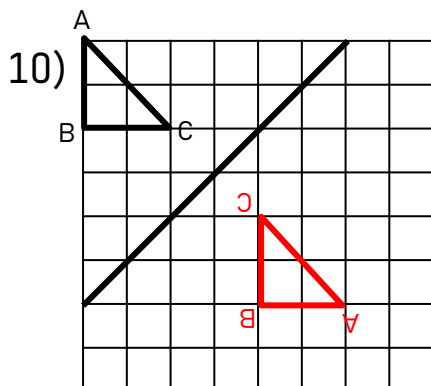
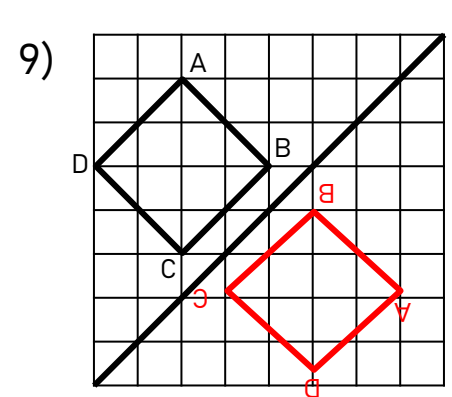
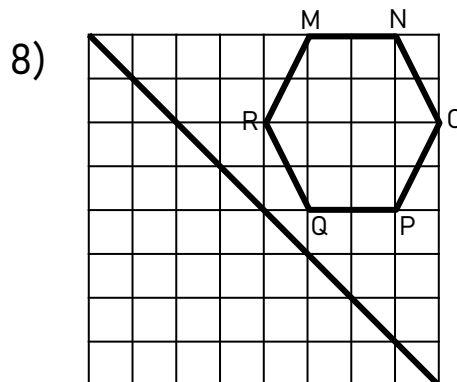
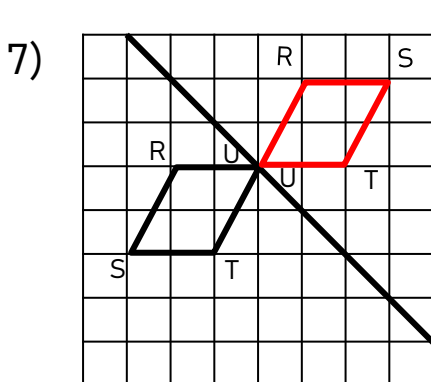
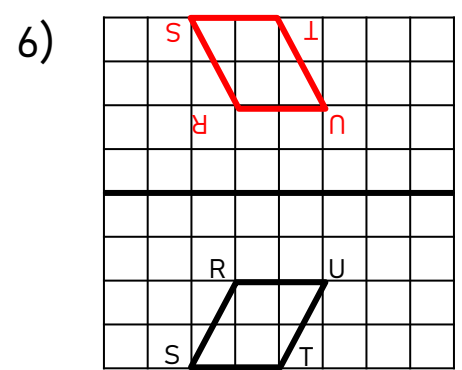
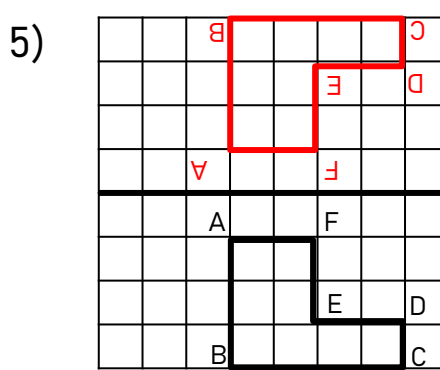
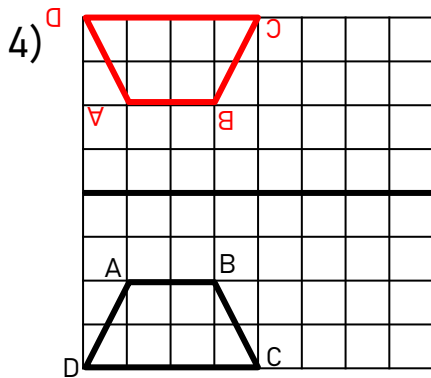
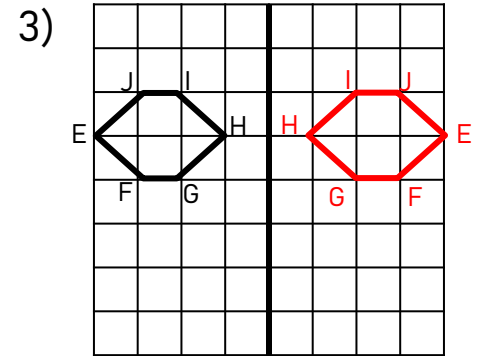
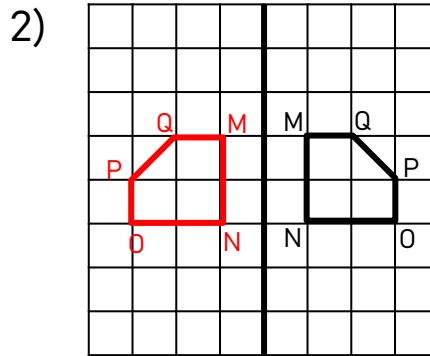
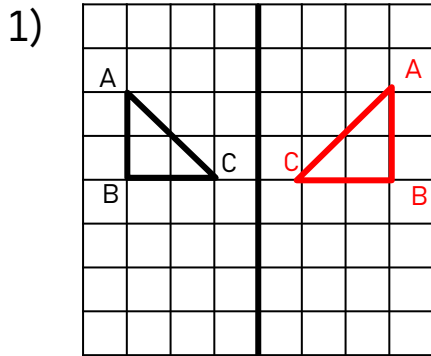
Part 2 Give the coordinates of each point after the translation

	Original Coordinate	Translation - Mapping Rule	New Coordinates
1)	P(3, -4)	$(x - 6, y + 4)$	P(-3, 0)
2)	S(-5, 8)	$(x + 3, y - 5)$	S(-2, 3)
3)	Q(-9, -5)	$(x + 2, y - 7)$	Q(-7, -12)
4)	L(10, 5) P(-3, -8)	$(x - 5, y + 8)$	L(5, 13) P(-8, 0)
5)	T(-8, 7) Y(-9, -5)	$(x + 8, y + 5)$	T(0, 12) Y(-1, 0)
6)	S(-14, -16) R(15, 12)	$(x - 11, y - 6)$	S(-25, -22) R(4, 6)
7)	N(-21, 11) K(20, -14)	$(x - 9, y + 13)$	N(-30, 24) K(11, -1)
8)	P(28, -21) E(-25, 20)	$(x + 17, y + 22)$	P(45, -4) E(-8, 42)

Drawing Reflections

Questions

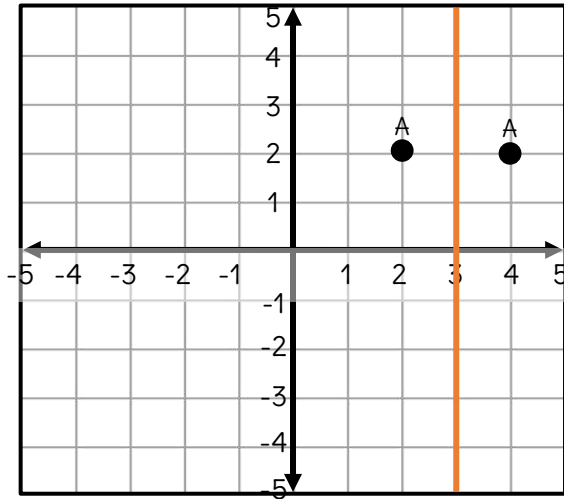
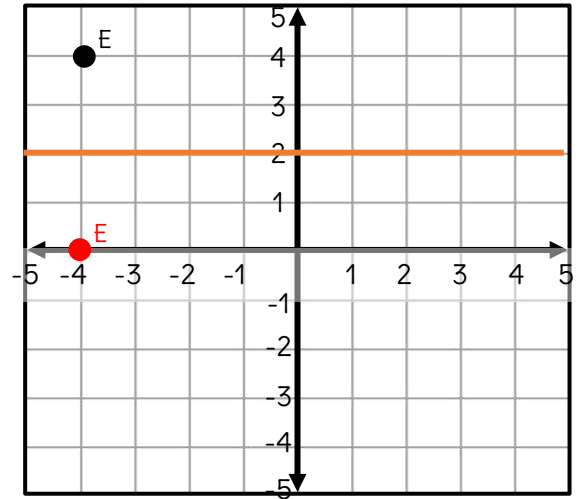
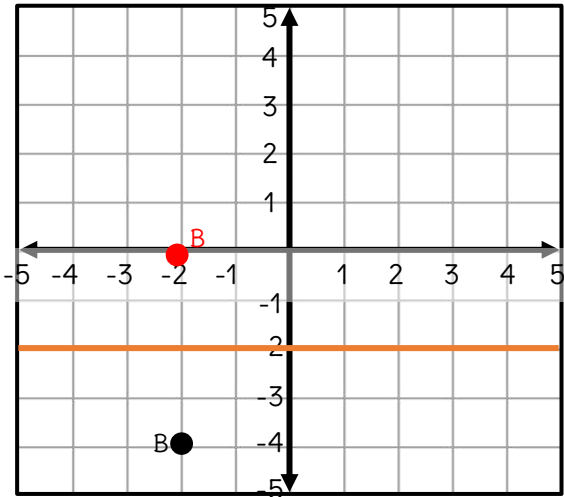
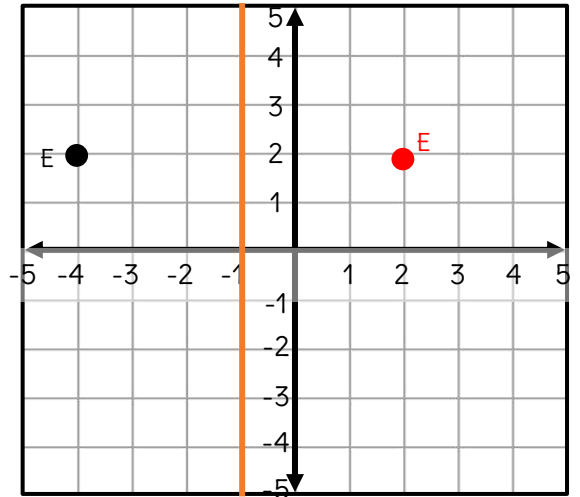
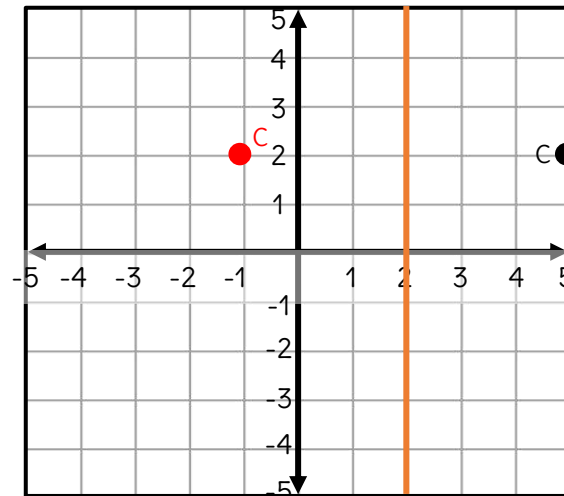
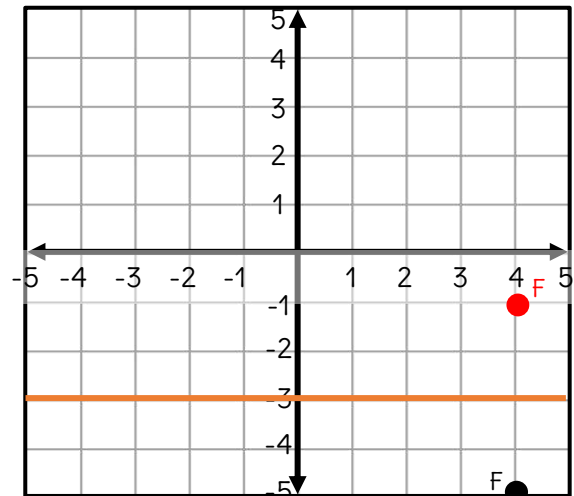
Reflect the shapes across the mirror line



Reflecting a Point Using a Mirror Line

Questions

Graph the new position of each point. The first one is done for you

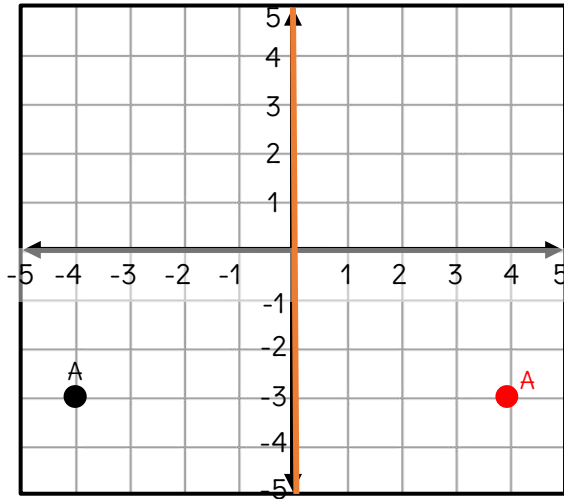
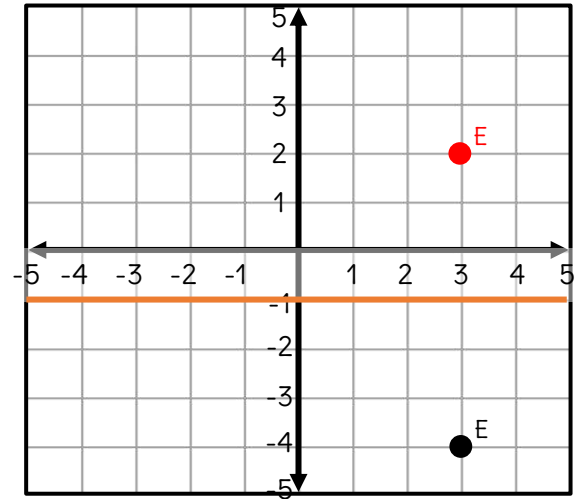
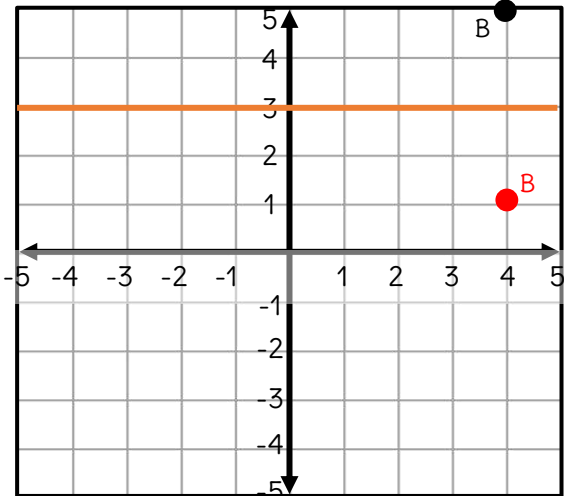
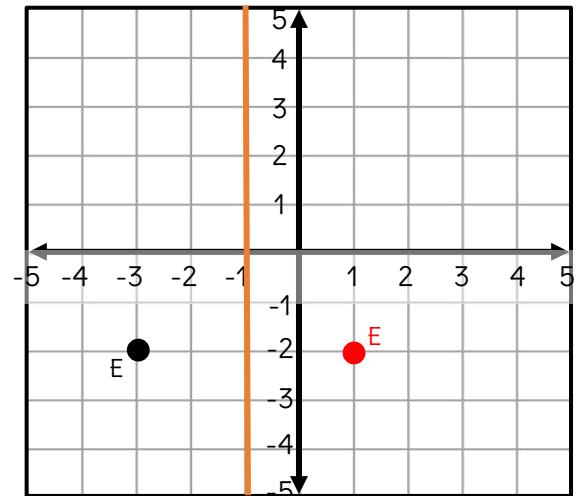
1) Reflection across the line $x = 3$ 2) Reflection across the line $y = 2$ 3) Reflection across the line $y = -2$ 4) Reflection across the line $x = -1$ 5) Reflection across the line $x = 2$ 6) Reflection across the line $y = -3$ 

Reflecting a Point Using a Mirror Line

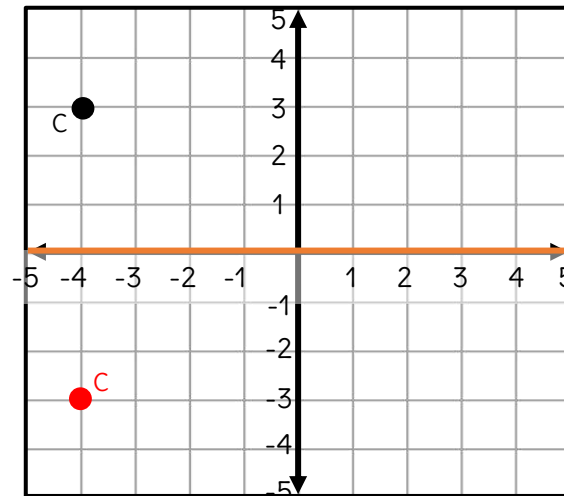
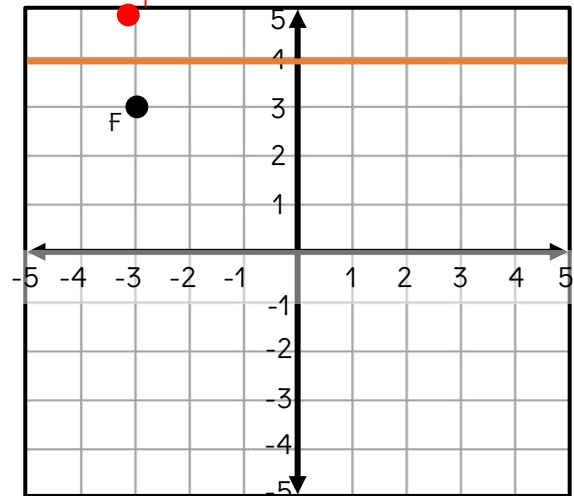
Questions

Graph the new position of each point after the given reflection

1) Reflection across the y-axis

2) Reflection across the line $y = -1$ 3) Reflection across the line $y = 3$ 4) Reflection across the line $x = -1$ 

5) Reflection across the x-axis

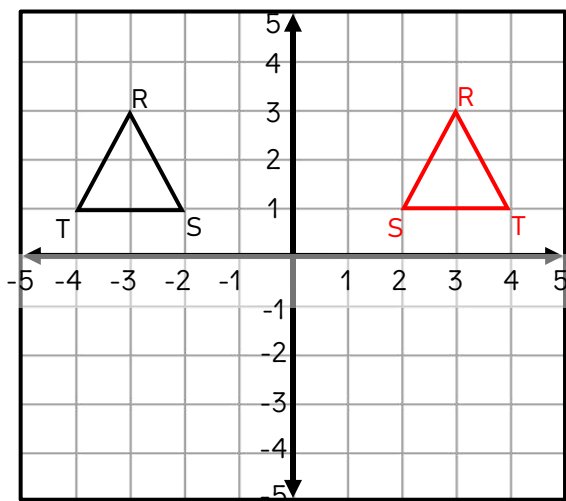
6) Reflection across the line $y = 4$ 

Reflecting Shapes using a Mirror Line

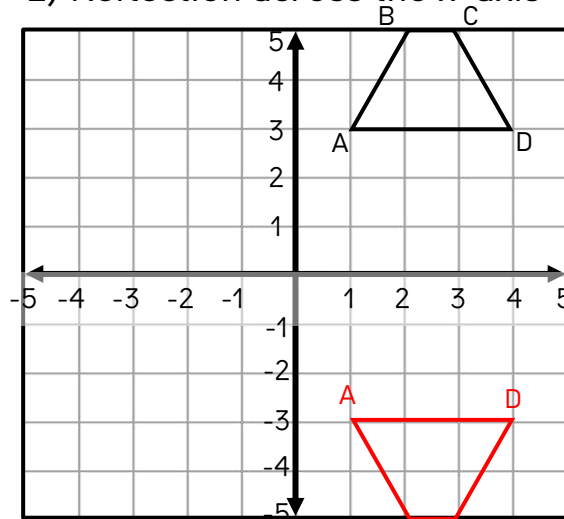
Questions

Graph the new position of each shape after the given reflection

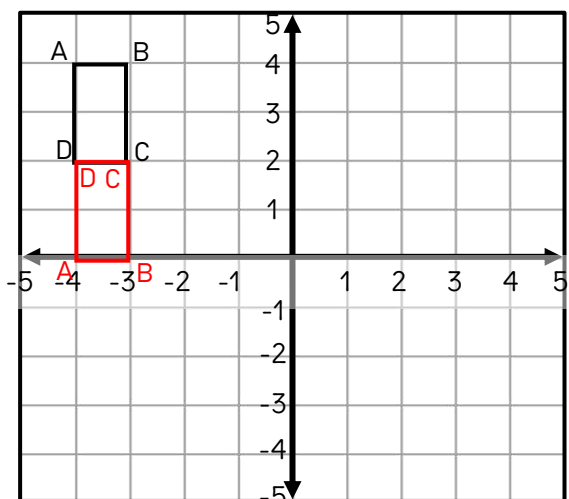
1) Reflection across the y-axis



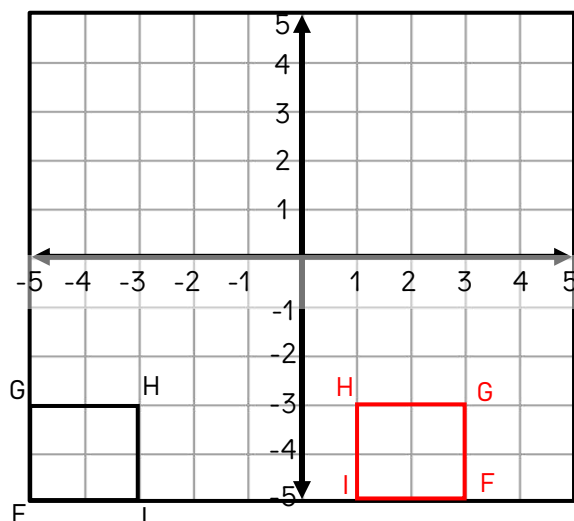
2) Reflection across the x-axis



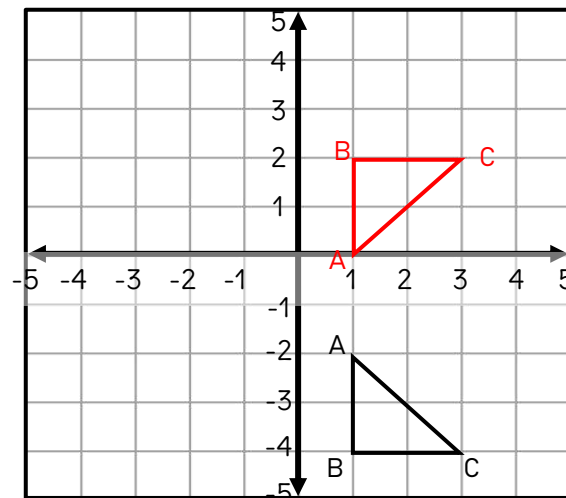
3) Reflection across the line $y = 2$



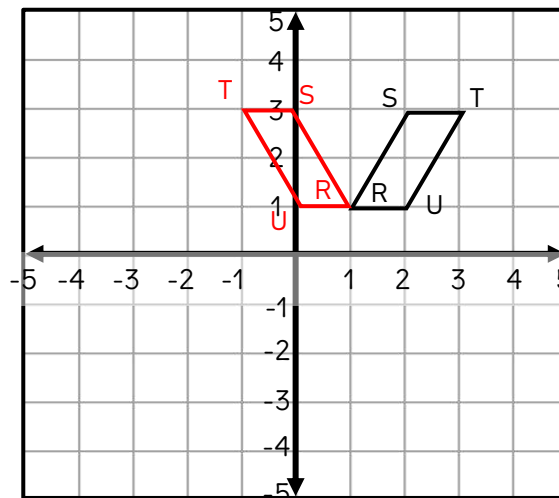
4) Reflection across the line $x = -1$



5) Reflection across the line $y = -1$

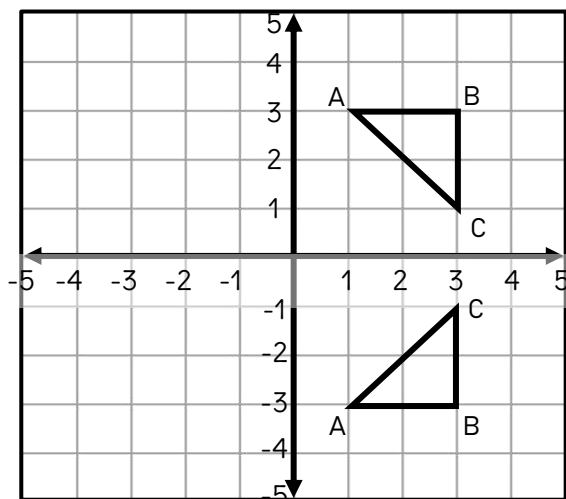
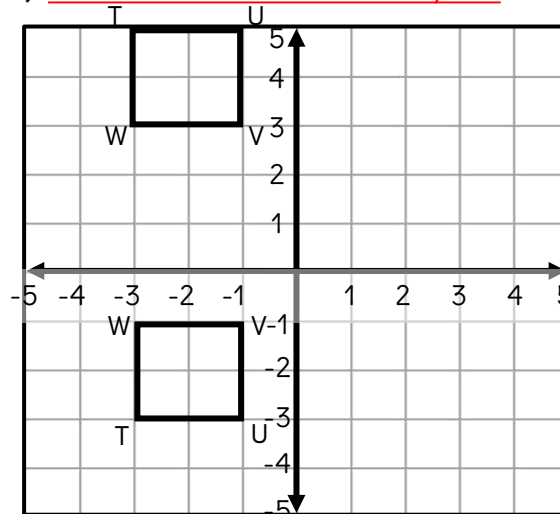
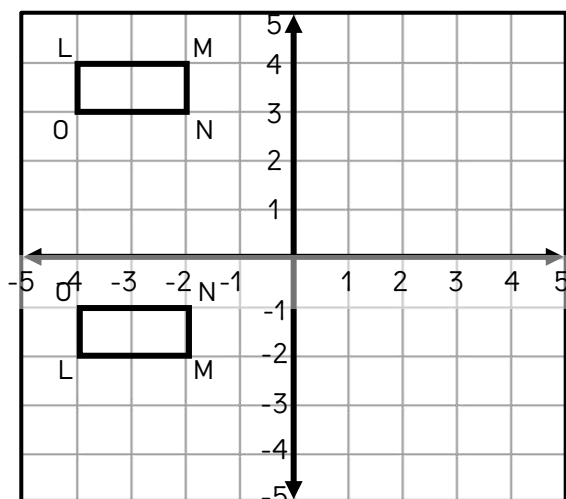
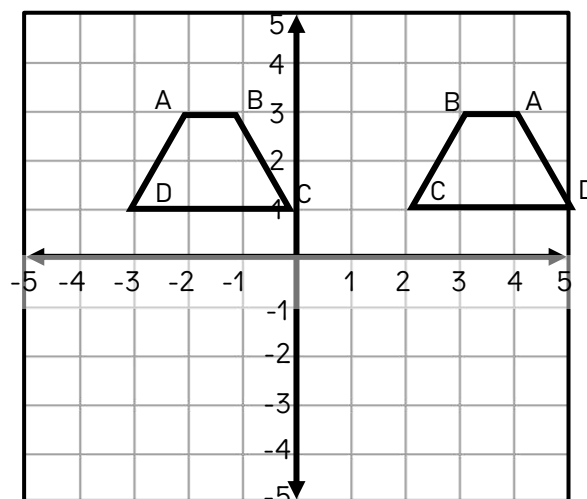
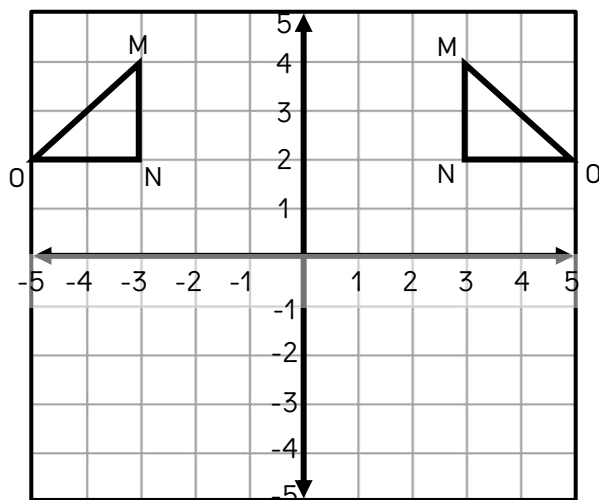
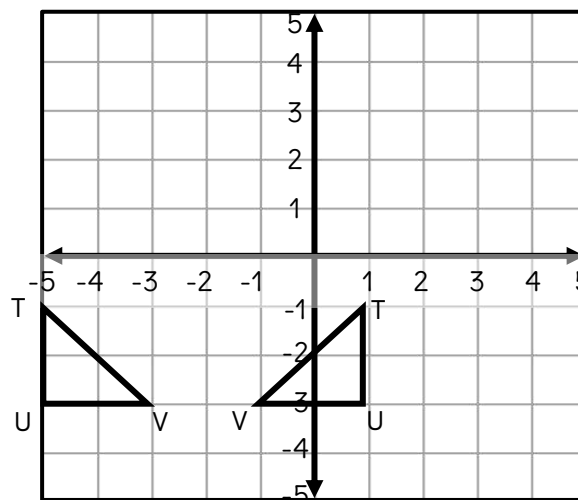


6) Reflection across the line $x = 1$



Reflections - Determine the Rule

Questions

Describe the rule for the reflection line – Ex. Reflection across the line $x = 2$ 1) Reflection across the x-axis2) Reflection across the line $y = 1$ 3) Reflection across the line $y = 1$ 4) Reflection across the line $x = 1$ 5) Reflection across the y-axis6) Reflection across the line $x = -2$ 

Reflections - Mapping Rules

Mapping Rules for Reflections

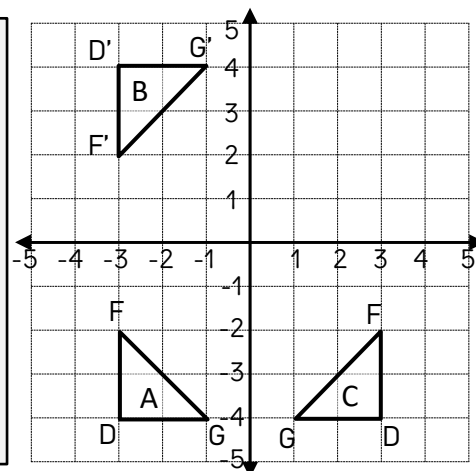
Each point on a shape moves according to the mapping rule.

The rule for a reflected shape in the x-axis is $(x, y) \rightarrow (x, -y)$

The rule for a reflected shape in the y-axis is $(x, y) \rightarrow (-x, y)$

In the example of Shape A being reflected to Shape B, point F $(-3, -2)$ has been reflected across the x-axis, which means the new coordinates for F are $(-3, 2)$.

If Shape A was reflected across the Y axis to Shape C, point F becomes $(3, -2)$.



Questions

Use the mapping rules to write the new coordinates

	Original Coordinate(s)	Reflection across the	New Coordinates
1)	P(5, 4)	y-axis	P(5, -4)
2)	S(8, -3)	x-axis	S(8, 3)
3)	Q(-6, 7)	y-axis	Q(6, 7)
4)	P(-4, -2)	y-axis	P(4, -2)
5)	T(-5, 9) Y(-11, -15)	x-axis	T(-5, -9) Y(-11, 15)
6)	S(-12, -3) R(7, 13)	x-axis	S(-12, 3) R(7, -13)
7)	N(-4, 9) K(8, -17)	y-axis	N(4, 9) K(-8, -17)
8)	P(13, -5) E(-6, 15)	x-axis	P(13, 5) E(-6, -15)
9)	S(-18, -13) R(9, 14)	y-axis	S(18, -13) R(-9, 14)
10)	N(-6, 11) K(7, -23)	x-axis	N(-6, -11) K(7, 23)

Reflections - Coordinates

Part 1

Draw the shapes using the coordinates provided. Then reflect the shapes

Shape A

P(5,4), Q(3,7), R(3,3)

Reflect over the x-axis

New Coordinates

P(5,-4), Q(3,-7), R(3,-3)

Shape B

F(-8,9), G(-4,5), H(-8,2)

Reflect over the x-axis

New Coordinates

F(-8,-9), G(-4,-5), H(-8,-2)

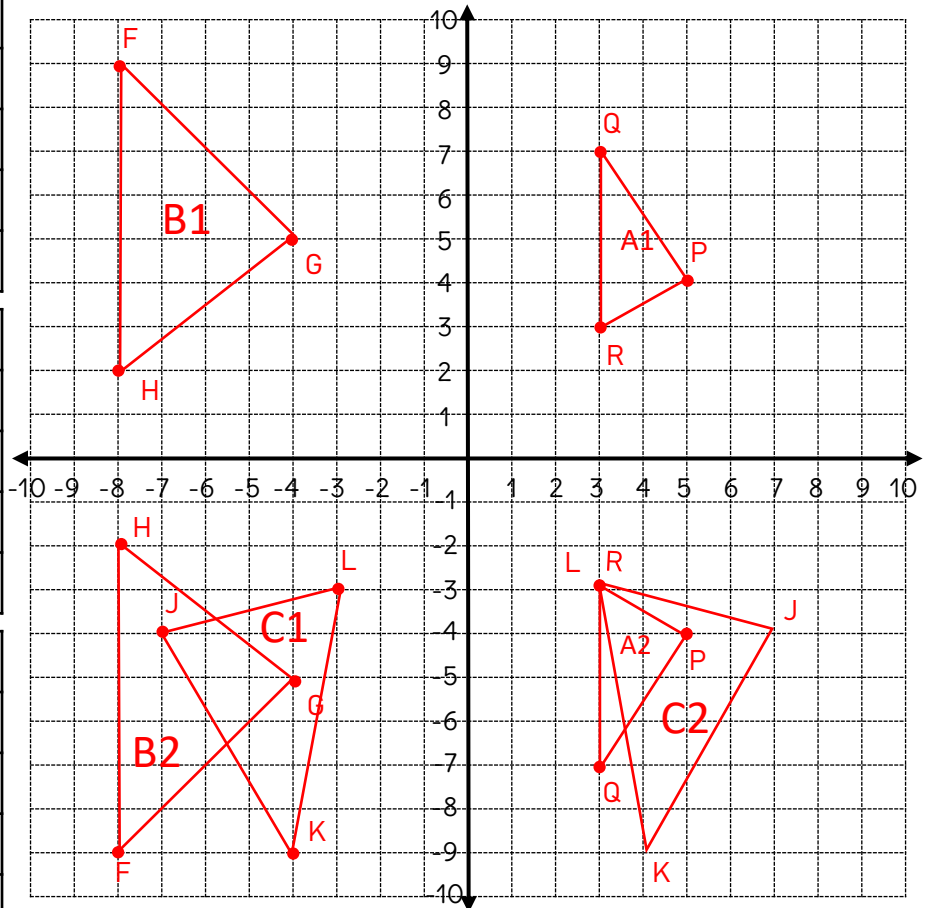
Shape C

J(-7,-4), K(-4,-9), L(-3,-3)

Reflect over the y-axis

New Coordinates

J(7,-4), K(4,-9), L(3,-3)

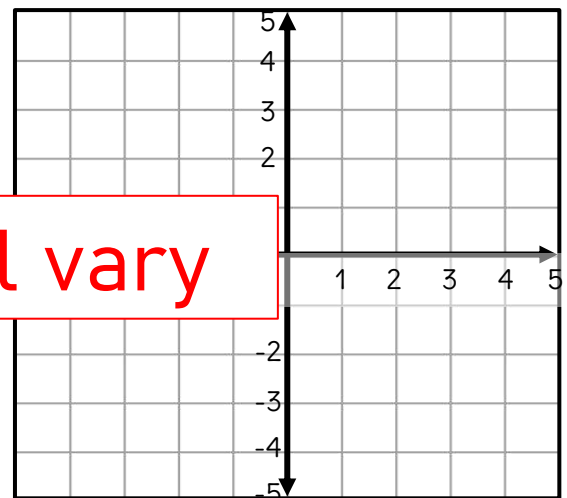
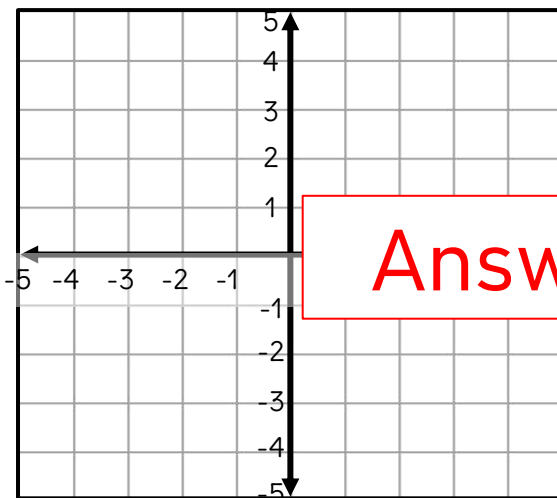


Part 2

Draw your own shape and then perform the reflection provided

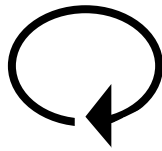
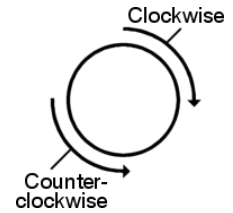
1) Reflection across the y-axis

2) Reflection across the line $x = -1$



Answers will vary

Clockwise and Counterclockwise Rotations

360°
rotation180°
rotation90°
rotation

Questions

Draw the smiley face after it has been rotated

1)



Clockwise 90° rotation



2)

Counterclockwise 90°
rotation

3)



Clockwise 180° rotation



4)

Counterclockwise 180°
rotation

5)



Clockwise 360° rotation



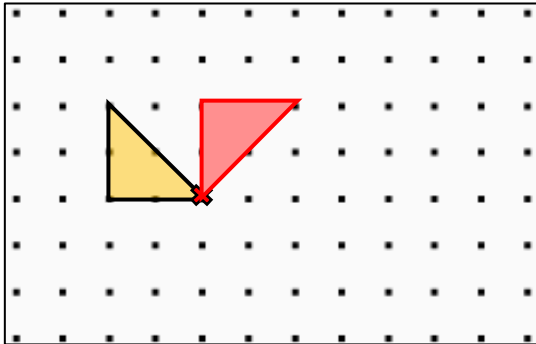
6)

Counterclockwise 360°
rotation

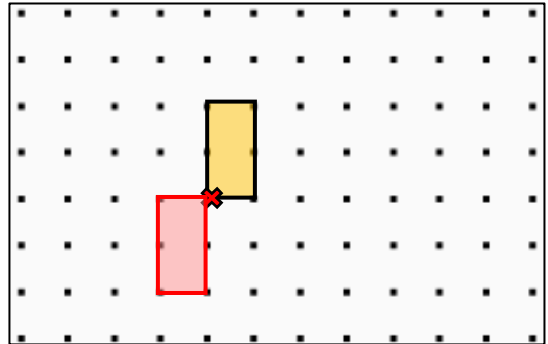
Drawing Rotations

Questions

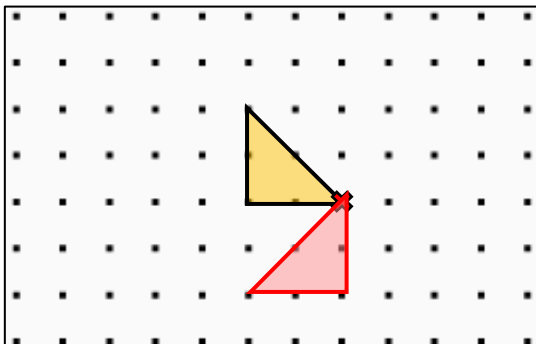
Rotate the shapes around the point marked ✕



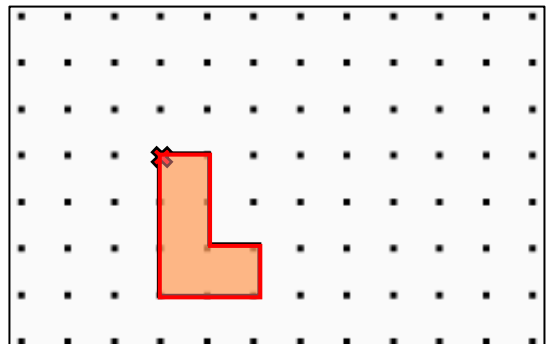
1) 90° clockwise rotation



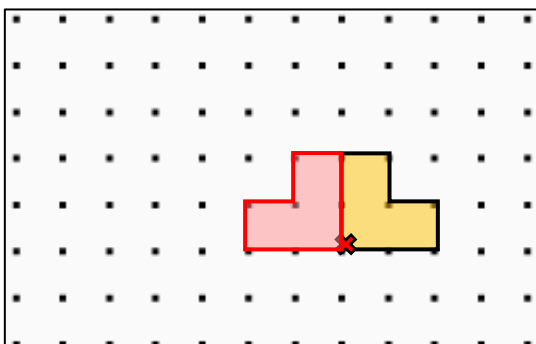
2) 180° clockwise rotation



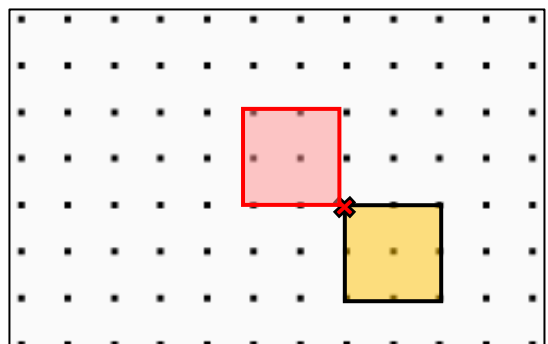
3) 90° counter-clockwise rotation



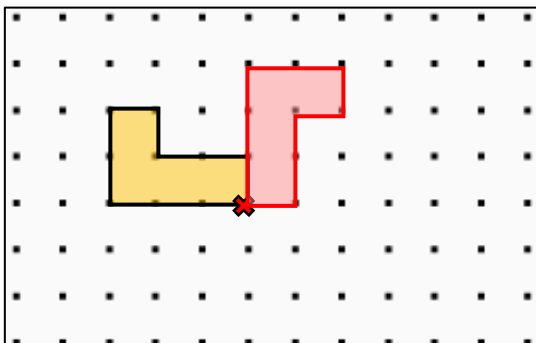
4) 360° clockwise rotation



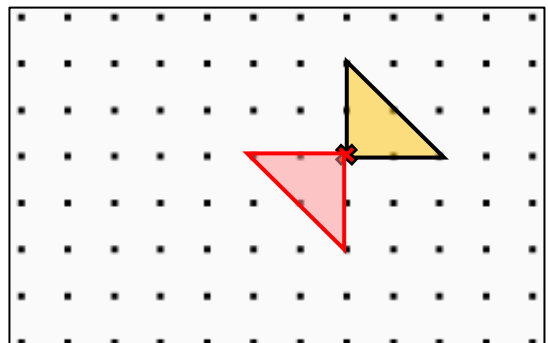
5) 90° counter-clockwise rotation



6) 180° counter-clockwise rotation



7) 90° clockwise rotation

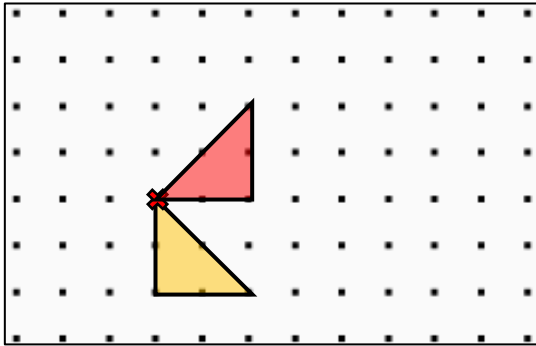
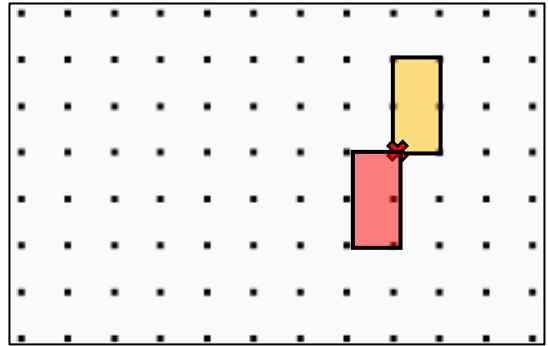
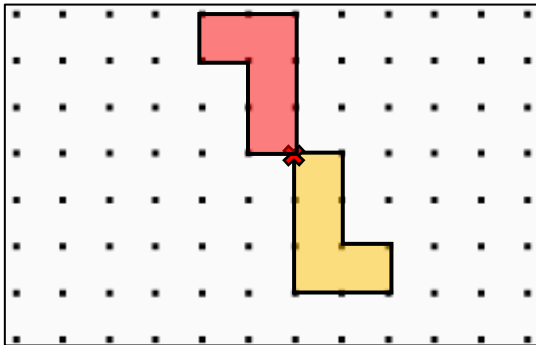
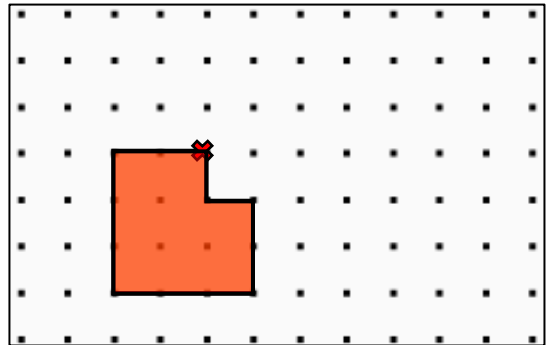
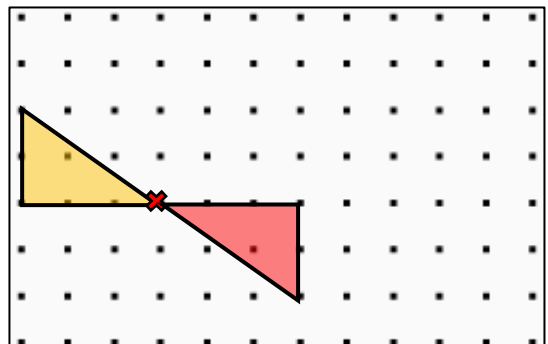
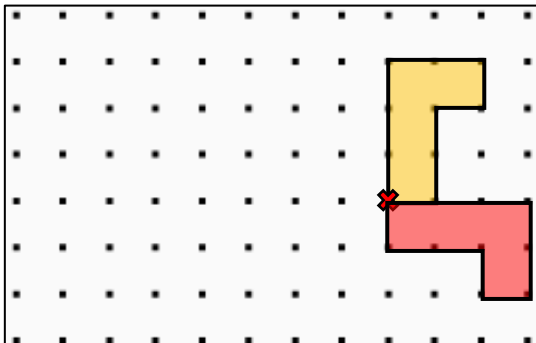
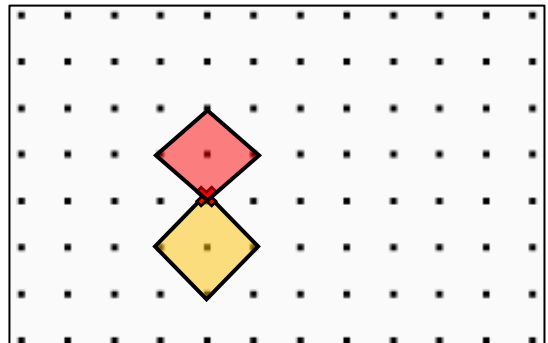


8) 180° counter-clockwise rotation

Drawing Rotations

Questions

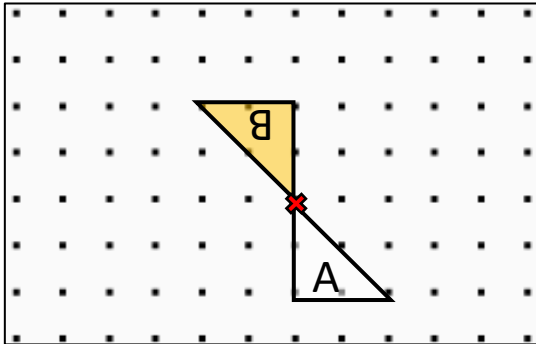
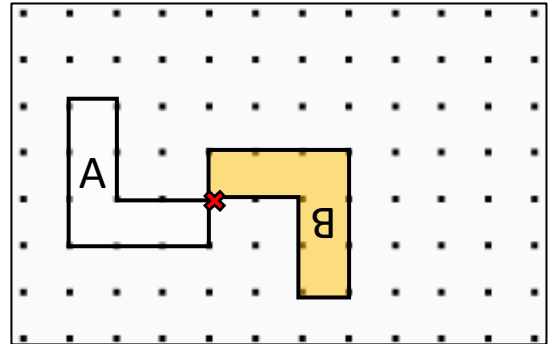
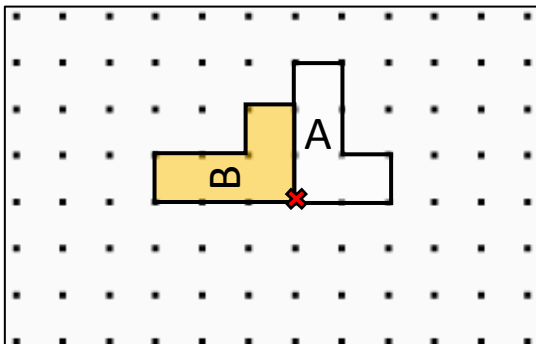
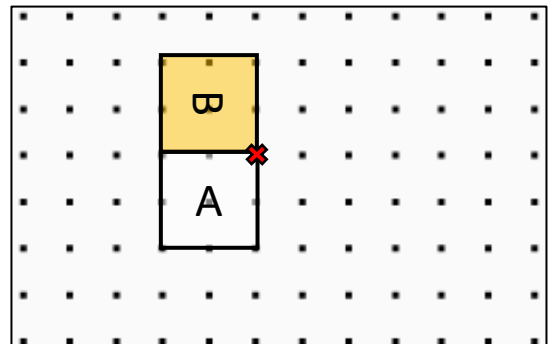
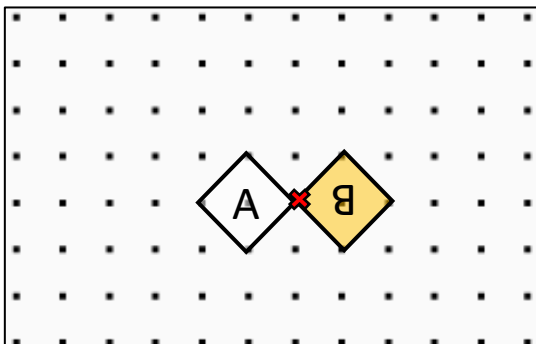
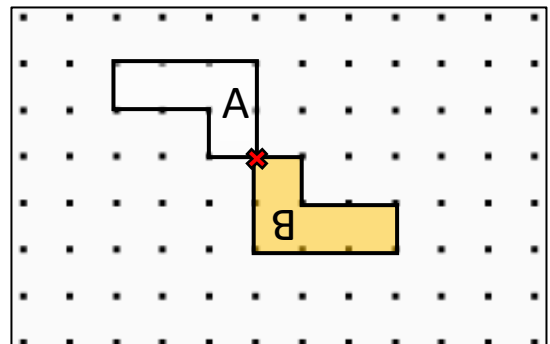
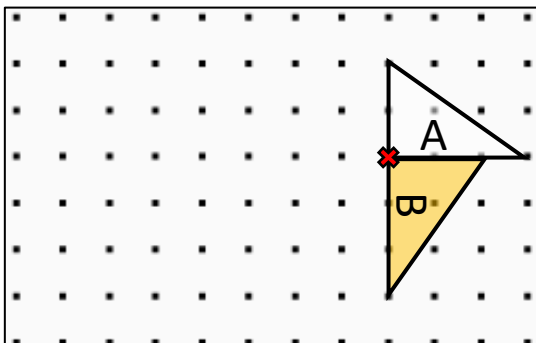
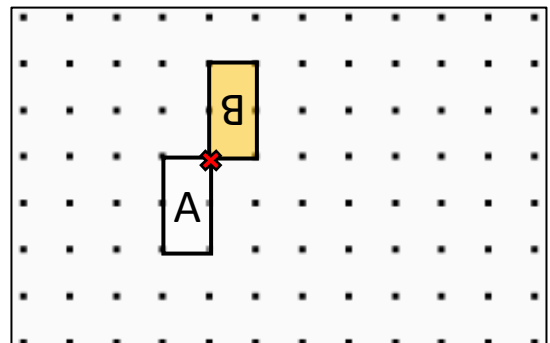
Rotate the shapes around the point marked ✕

1) 90° counter-clockwise rotation2) 180° counter-clockwise rotation3) 180° clockwise rotation4) 360° clockwise rotation5) 90° counter-clockwise rotation6) 180° counter-clockwise rotation7) 90° clockwise rotation8) 180° counter-clockwise rotation

Describing Rotations

Questions

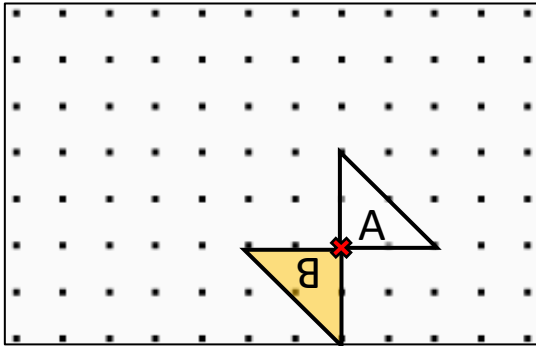
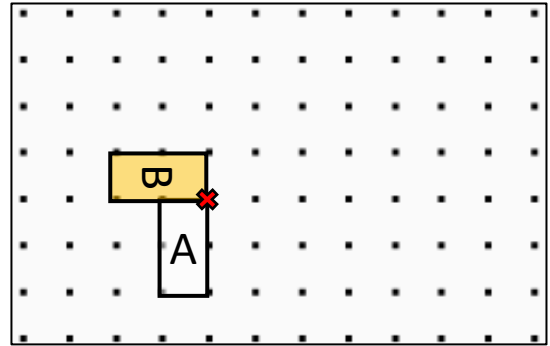
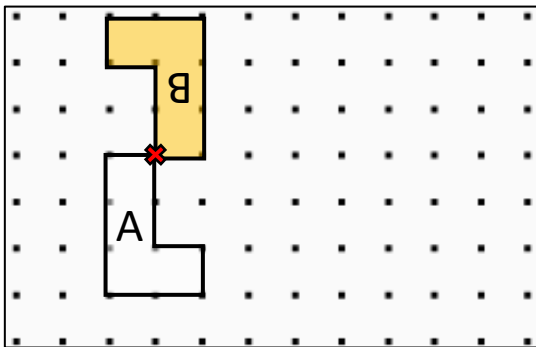
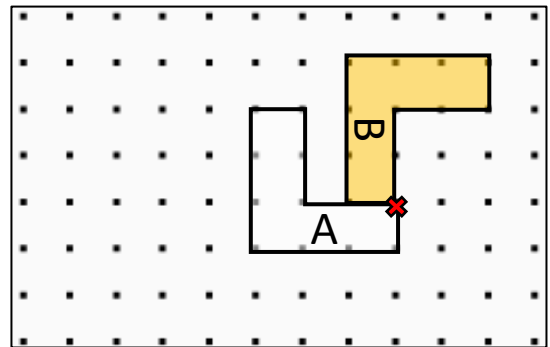
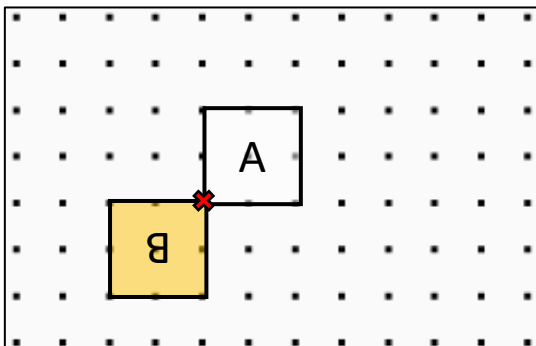
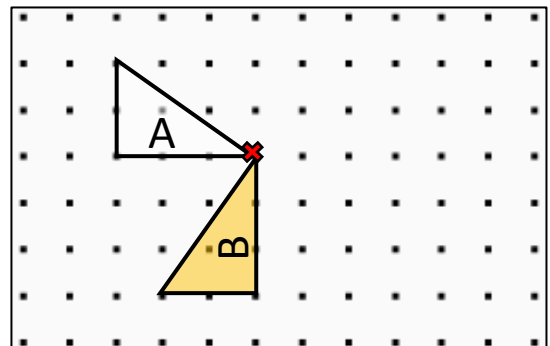
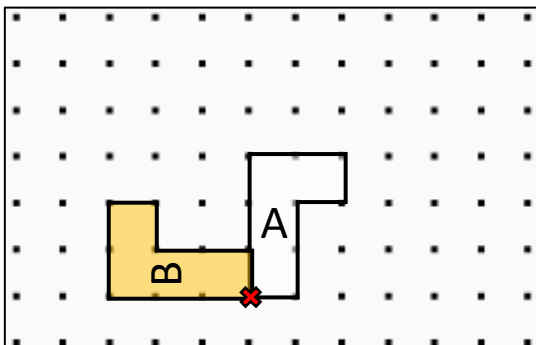
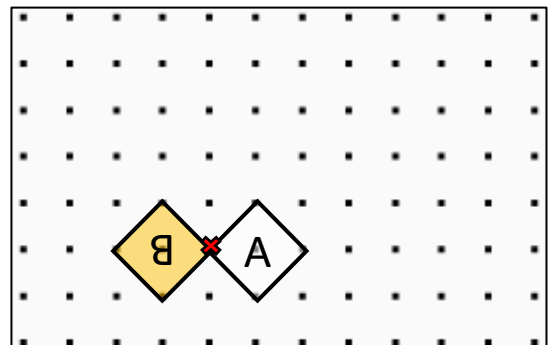
Describe the rotations. Shape A is the original shape

1) 180° rotation2) 180° rotation3) 90° counter-clockwise rotation4) 90° clockwise rotation5) 180° rotation6) 180° rotation7) 90° clockwise rotation8) 180° rotation

Describing Rotations

Questions

Describe the rotations. Shape A is the original shape

1) 180° rotation2) 90° clockwise rotation3) 180° rotation4) 90° counterclockwise rotation5) 180° rotation6) 90° counterclockwise rotation7) 90° counterclockwise rotation8) 180° rotation

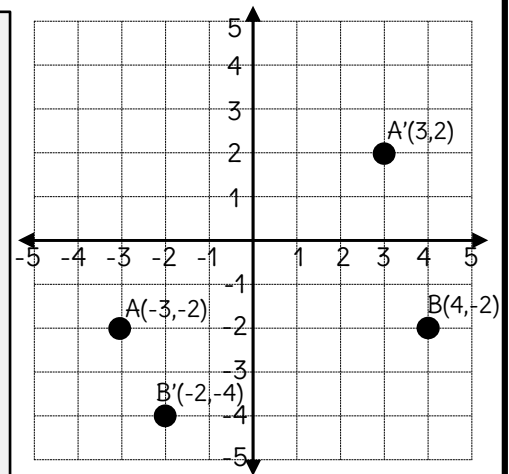
Rotating a Point

Mapping Rules for Rotations

Each point on a shape moves according to the mapping rule.

- a shape rotated 90° counterclockwise has a mapping rule of: $(x, y) \rightarrow (-y, x)$.
- a shape rotated 180° counterclockwise has a mapping rule of: $(x, y) \rightarrow (-x, -y)$.
- a shape rotated 270° counterclockwise has a mapping rule of: $(x, y) \rightarrow (y, -x)$.

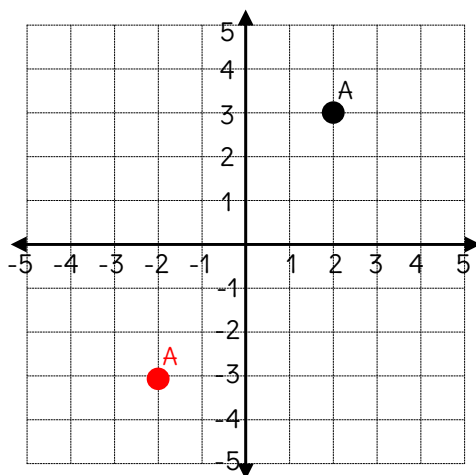
In the example, Point A was rotated 180° counter-clockwise
In the example, Point B was rotated 90° clockwise



Questions

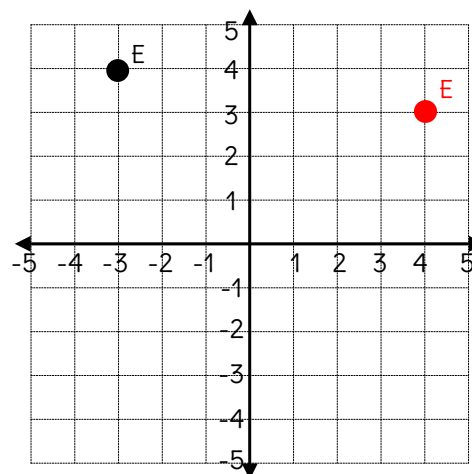
Graph the new position after rotating around the origin

1) 180° rotation



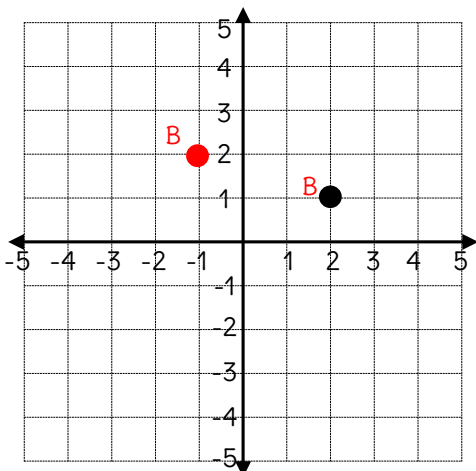
Original Coordinates
A(2, 3)
Rotated Coordinates
A(-2, -3)

2) 90° clockwise rotation



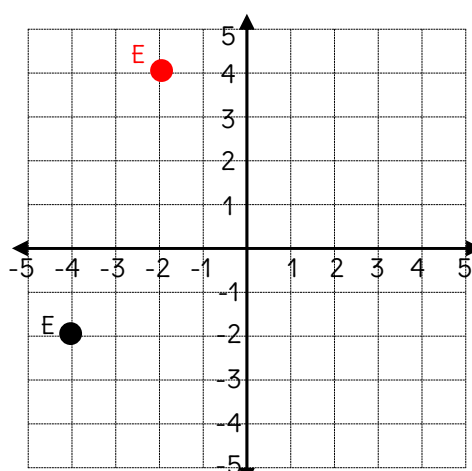
Original Coordinates
E(4, 3)
Rotated Coordinates
E(-3, 4)

3) 90° counterclockwise rotation



Original Coordinates
B(2, 1)
Rotated Coordinates
B(-1, 2)

4) 90° clockwise rotation

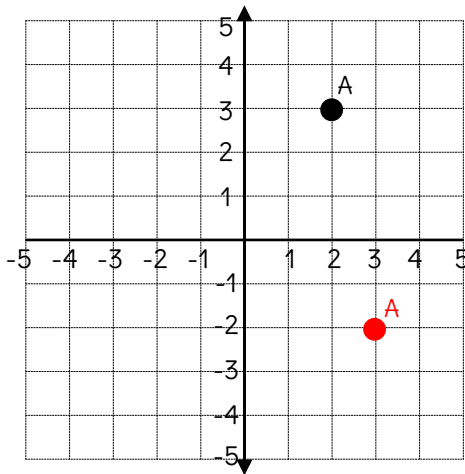
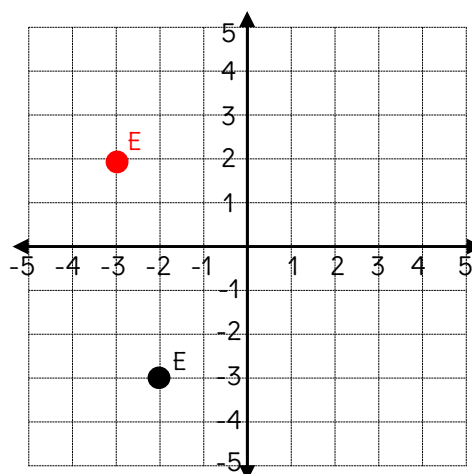
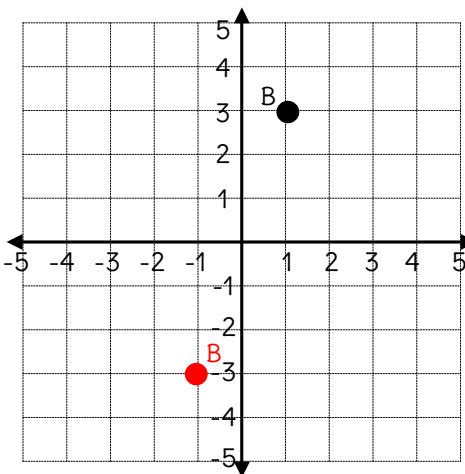
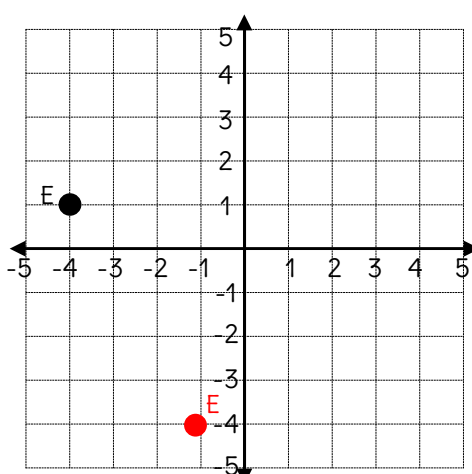
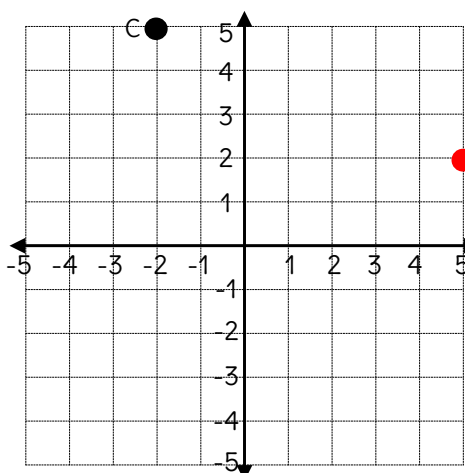
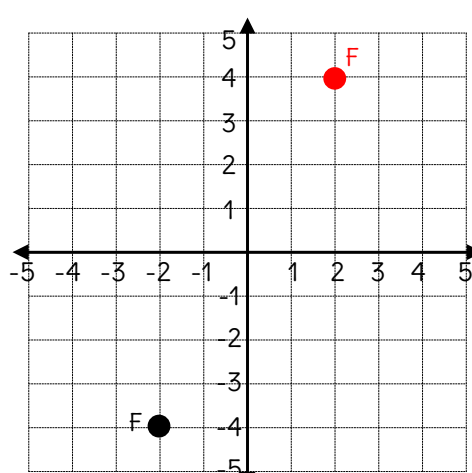


Original Coordinates
E(-4, -2)
Rotated Coordinates
E(-2, 4)

Rotating a Point

Questions

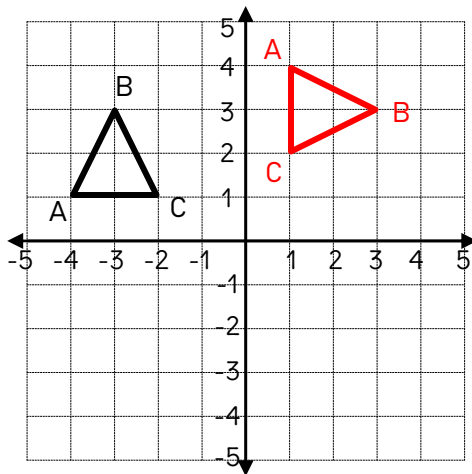
Graph the new position after rotating around the origin

1) 90° clockwise rotation**Original
Coordinates** $A(2, 3)$ **Rotated
Coordinates** $A(3, -2)$ 2) 90° counterclockwise rotation**Original
Coordinates** $E(-3, 2)$ **Rotated
Coordinates** $E(-2, -3)$ 3) 180° rotation**Original
Coordinates** $B(1, 3)$ **Rotated
Coordinates** $B(-1, -3)$ 4) 270° clockwise rotation**Original
Coordinates** $E(-4, 1)$ **Rotated
Coordinates** $E(-1, -4)$ 5) 270° counterclockwise rotation**Original
Coordinates** $C(-2, 5)$ **Rotated
Coordinates** $C(5, 2)$ 6) 180° rotation**Original
Coordinates** $F(2, 4)$ **Rotated
Coordinates** $F(-2, -4)$

Rotating Shapes

Questions

Graph the new position of each shape after the given rotation

1) 90° clockwise rotation
Original Coordinates

A(-4, 1)

B(-3, 3)

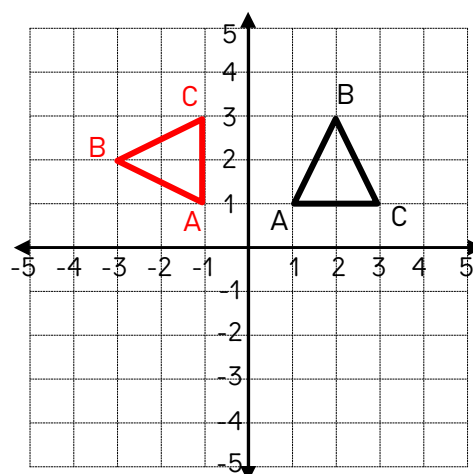
C(-2, 1)

Rotated Coordinates

A(1, 4)

B(3, 3)

C(1, 2)

2) 90° counterclockwise rotation
Original Coordinates

A(1, 1)

B(2, 3)

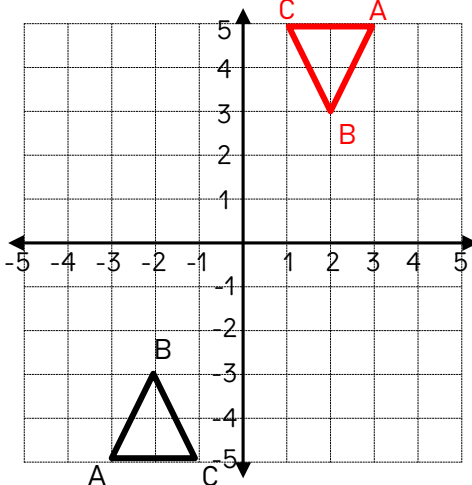
C(3, 1)

Rotated Coordinates

A(-1, 1)

B(-3, 2)

C(-1, 3)

3) 180° rotation
Original Coordinates

A(-3, -5)

B(-2, -3)

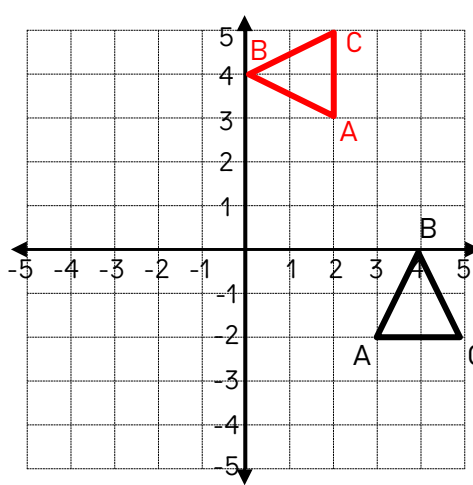
C(-1, -5)

Rotated Coordinates

A(3, 5)

B(2, 3)

C(1, 5)

4) 270° clockwise rotation
Original Coordinates

A(3, -2)

B(4, 0)

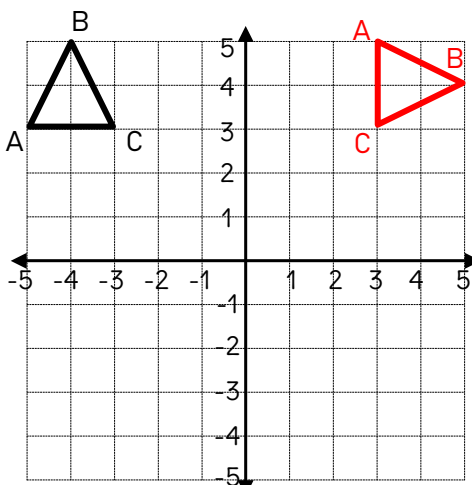
C(5, -2)

Rotated Coordinates

A(2, 3)

B(0, 4)

C(2, 5)

5) 90° clockwise rotation
Original Coordinates

A(-5, 3)

B(-4, 5)

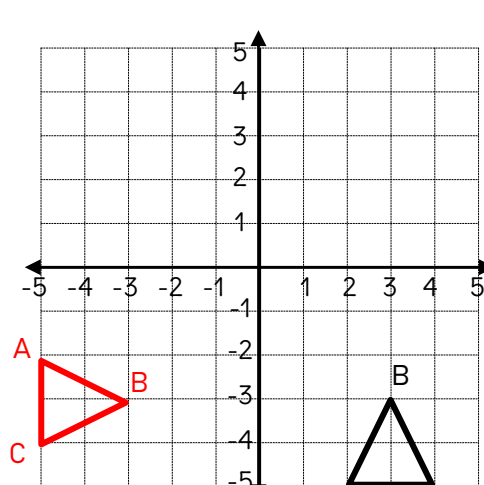
C(-3, 3)

Rotated Coordinates

A(3, 5)

B(5, 4)

C(3, 3)

6) 90° counterclockwise rotation
Original Coordinates

A(2, -5)

B(3, -3)

C(4, -5)

Rotated Coordinates

A(-5, -2)

B(-3, -3)

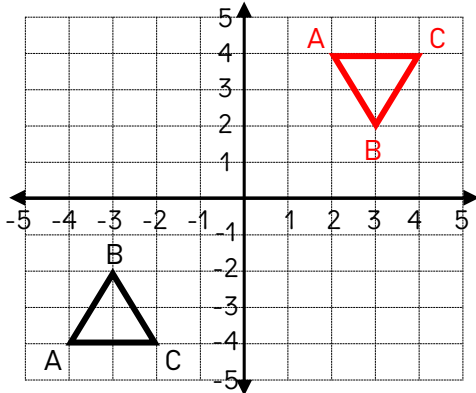
C(-5, -4)

Rotating Shapes

Questions

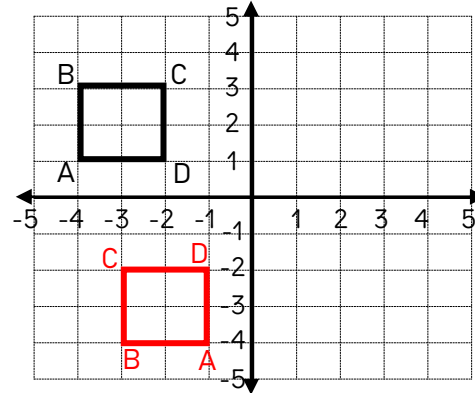
Graph the new position of each shape after the given rotation

1) 180° rotation



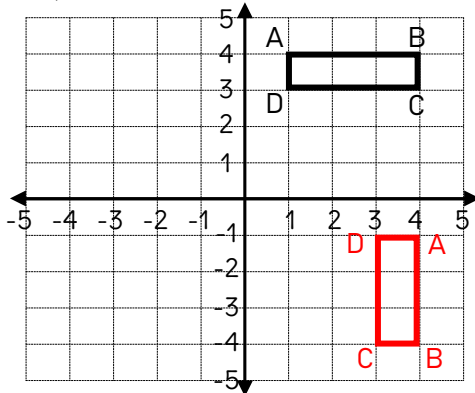
Original	A(-2,-4)	B(-3,-2)	C(-4,-4)
Rotated	A(2,4)	B(3,2)	C(4,4)

2) 90° counterclockwise rotation



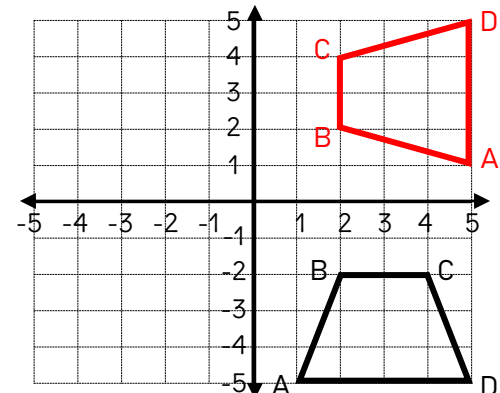
Original	A(-4,1)	B(-4,3)	C(-2,3)	D(-2,1)
Rotated	A(-1,-4)	B(-3,-4)	C(-3,-2)	D(-1,-2)

3) 90° clockwise rotation



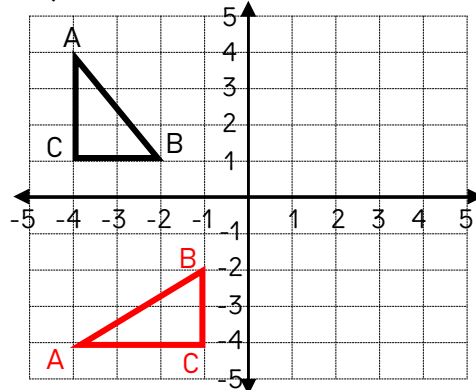
Original	A(1,4)	B(4,4)	C(4,3)	D(1,3)
Rotated	A(4,-1)	B(4,-4)	C(3,-4)	D(3,-1)

4) 90° counterclockwise rotation



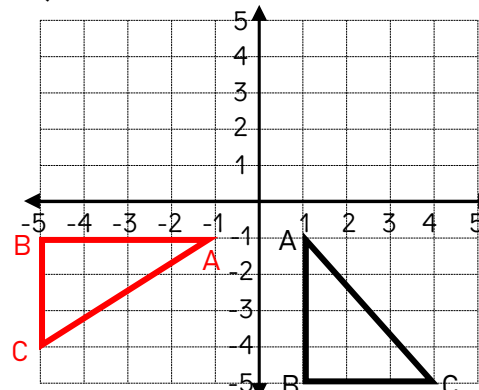
Original	A(1,-5)	B(2,-2)	C(4,-2)	D(5,-5)
Rotated	A(5,1)	B(2,2)	C(2,4)	D(5,5)

5) 270° clockwise rotation



Original	A(-4,4)	B(-2,1)	C(-4,1)
Rotated	A(-4,-4)	B(-1,-2)	C(-1,-4)

6) 90° counterclockwise rotation



Original	A(1,-1)	B(1,-5)	C(4,-5)
Rotated	A(-1,-1)	B(-5,-1)	C(-5,-4)

Rotations - Coordinates

Part 1 Draw the shapes using the coordinates provided. Then rotate the shape about the origin

Shape A

P(8,4), Q(5,7), R(4,3)

90° counterclockwise rotation

New Coordinates

P(-4,8), Q(-7,5), R(3,-4)

Shape B

F(-8,8), G(-9,5), H(-2,5)

180° rotation

New Coordinates

F(8,-8), G(9,-5), H(2,-5)

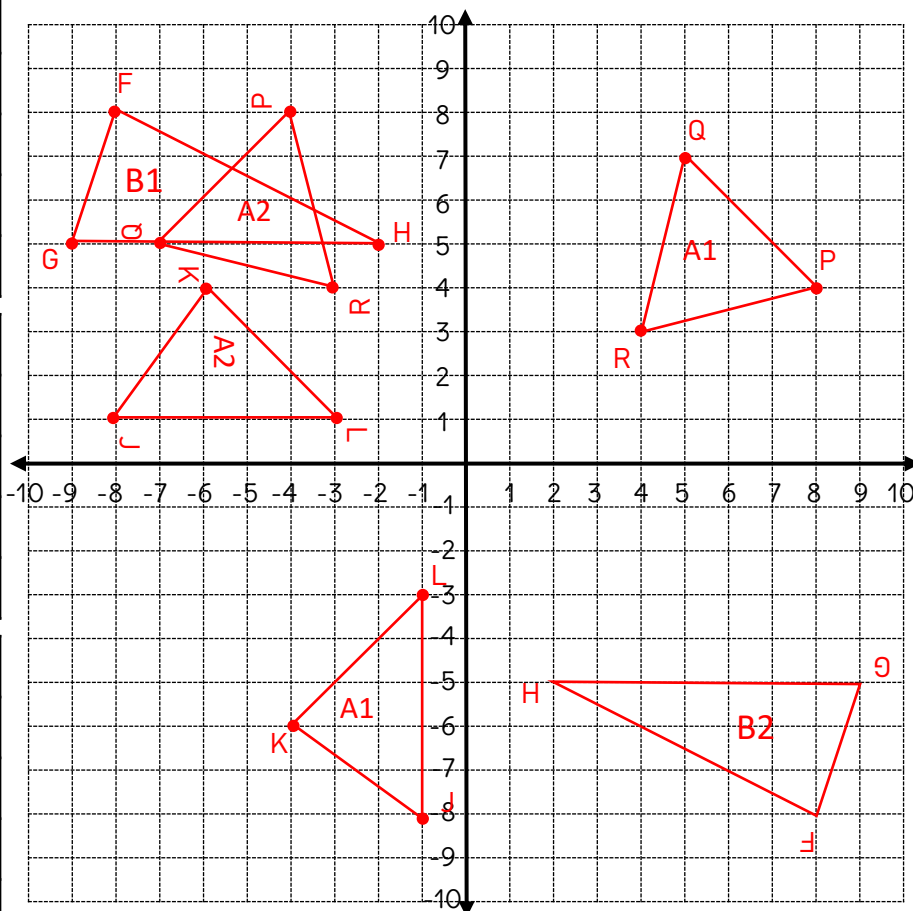
Shape C

J(-1,-8), K(-4,-6), L(-1,-3)

270° counterclockwise rotation

New Coordinates

J(-8,1), K(-6,4), L(-3,1)



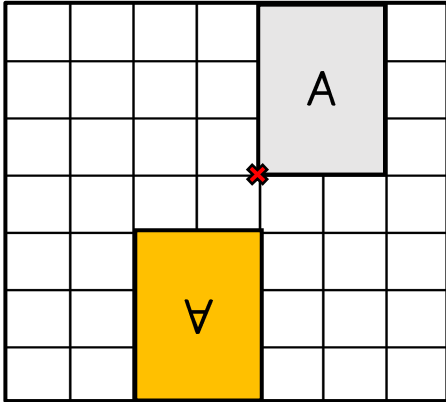
Part 2 Give the coordinates of each point after the rotations

	Original Coordinate	Rotations across the line...	New Coordinates
1)	P(5, 4)	90° counterclockwise rotation	P(-4, 5)
2)	S(3, -6)	180° rotation	S(-3, 6)
3)	Q(-4, 9)	360° rotation	Q(-4, 9)
4)	P(-7, -11)	270° counterclockwise rotation	P(-11, 7)
5)	T(-5, 1) Y(-4, -7)	90° clockwise rotation	T(1, 5) Y(-7, 4)
6)	S(-7, -5) R(8, 2)	180° rotation	S(7, 5) R(-8, -2)
7)	N(-5, 8) K(4, -9)	270° clockwise rotation	N(-8, -5) K(9, 4)
8)	P(3, -5) E(-6, 2)	180° rotation	P(-3, 5) E(6, -2)

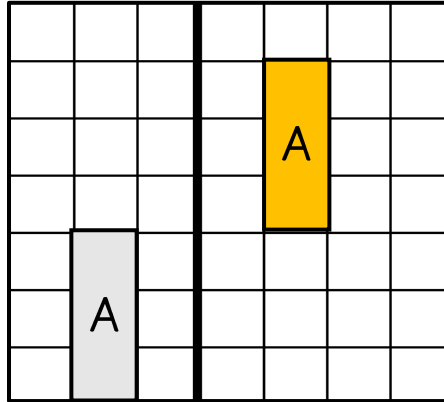
Performing Multiple Transformations

Questions

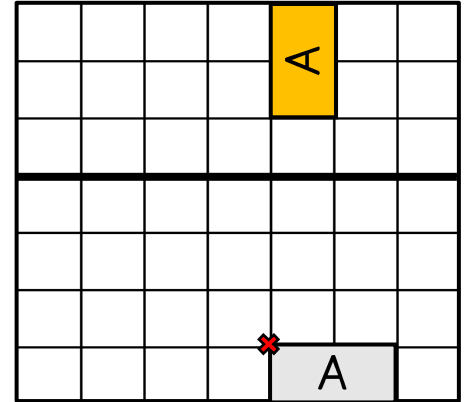
Complete the following combination of transformations



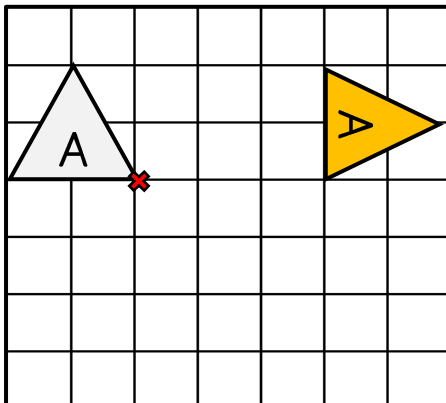
1) 180° rotation, translate down 1



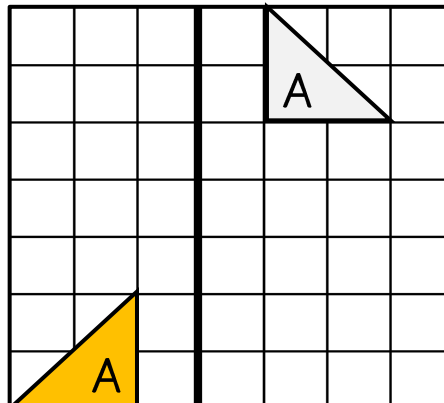
2) Reflect and translate up 3



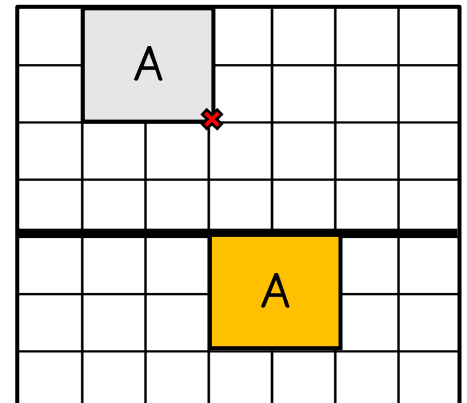
3) rotate 90° counterclockwise and reflect



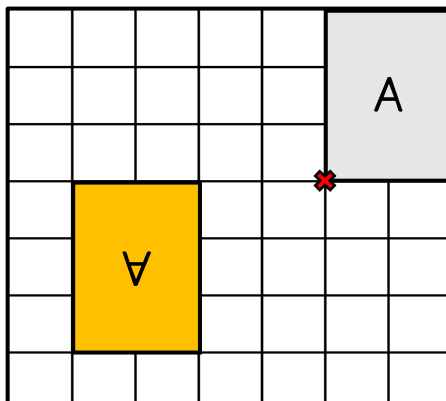
4) 90° clockwise rotation, translate right 3



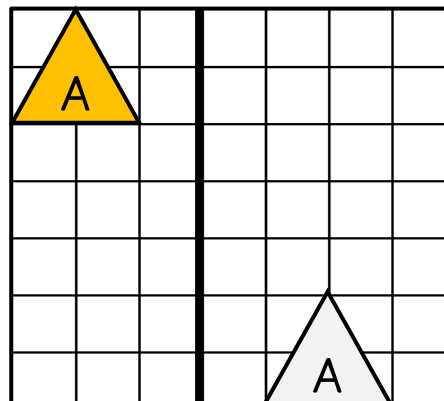
5) Translate down 5 and reflect



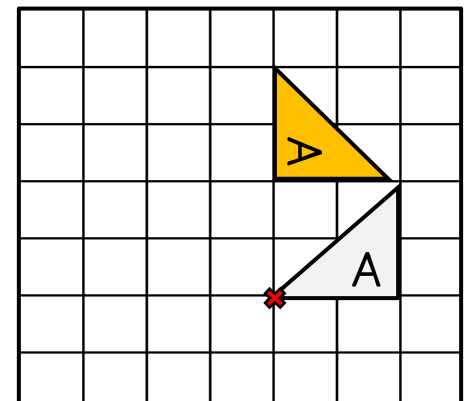
6) rotate 180° counterclockwise and reflect



7) 180° rotation, translate left 2



8) Reflect and translate up 5

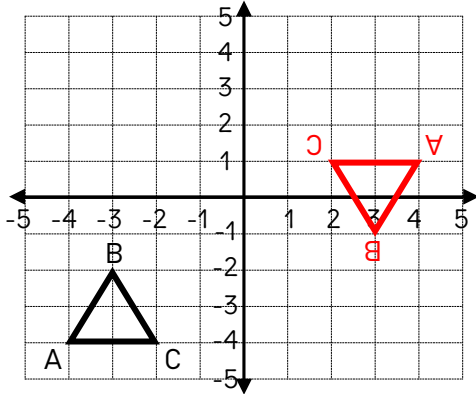


9) Rotate 90° counterclockwise and translate up 4

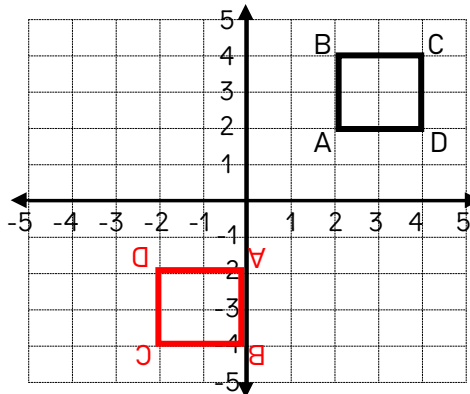
Performing Multiple Transformations

Questions

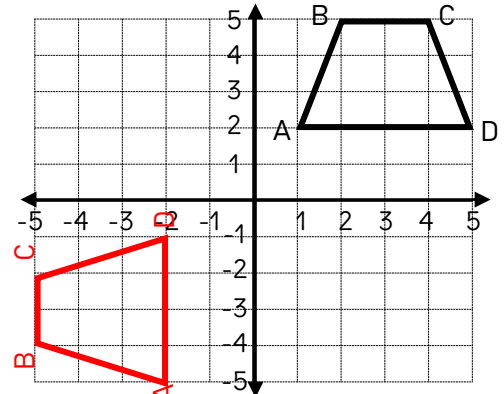
Complete the following combination of transformations



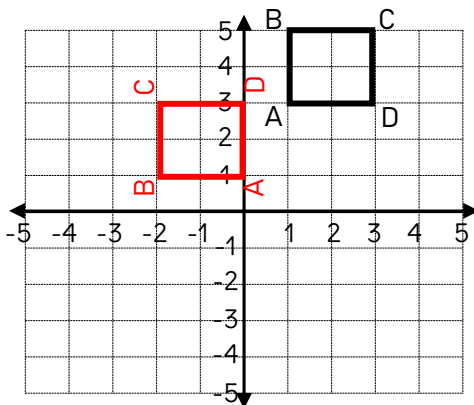
1) 180° rotation, translate down 3



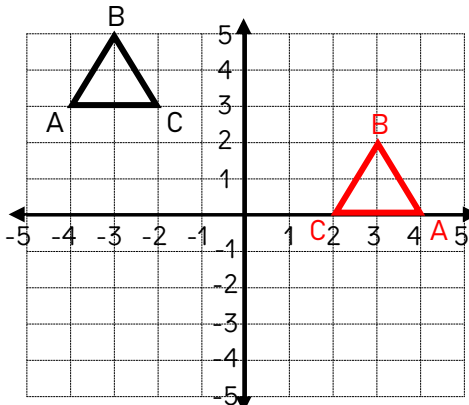
2) Reflect across the x-axis and translate left 4



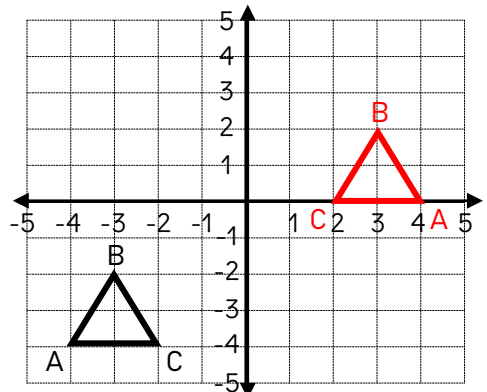
3) rotate 90° clockwise and reflect across the y-axis



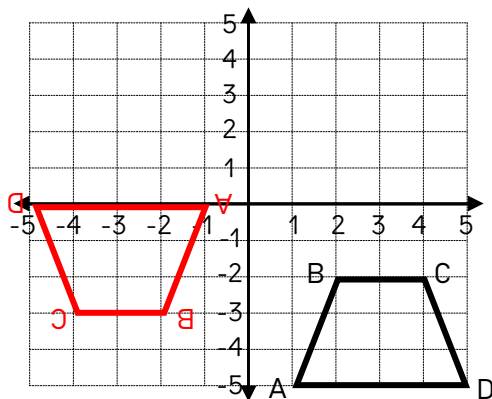
4) 90° counterclockwise rotation, translate right 3



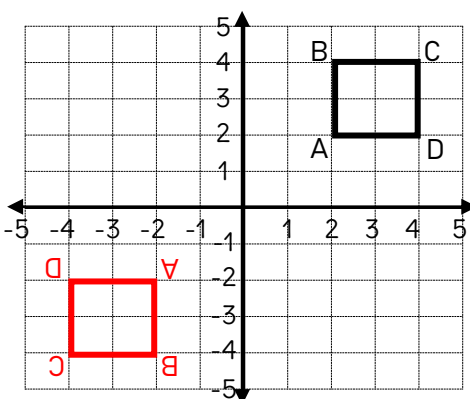
5) Translate down 3 and reflect across the y-axis



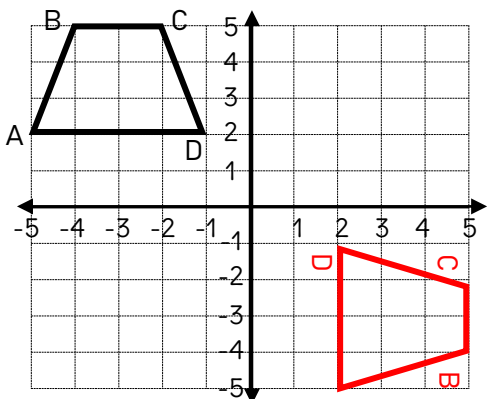
6) Reflect across the y-axis and translate up 4



7) 180° rotation, translate down 5

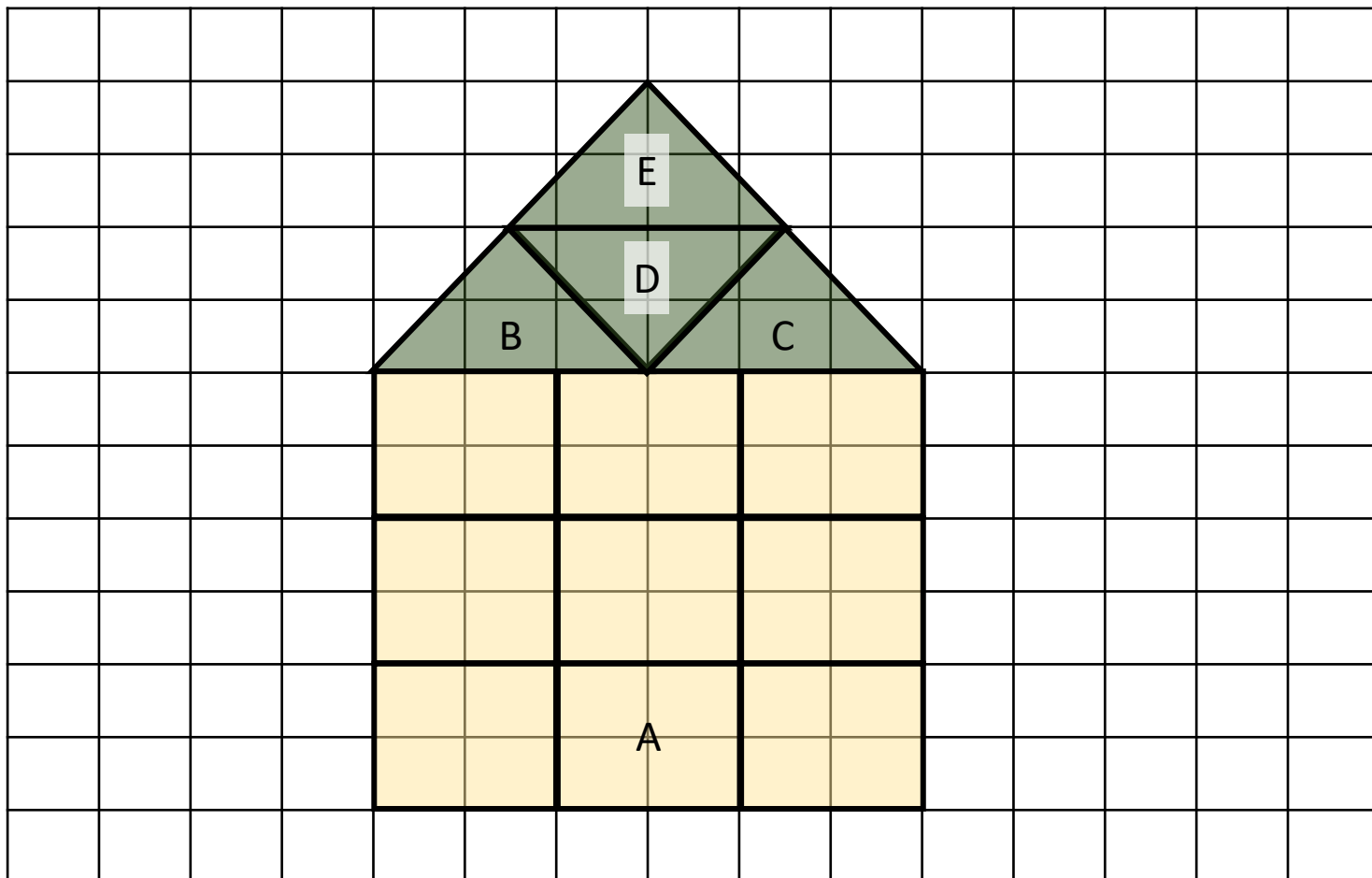


8) Reflect across the x-axis and translate left 6



9) Rotate 90° clockwise and reflect across the x-axis

Describing Transformations in a Design



Questions

Answer the questions below

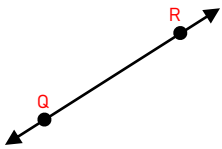
1) Which shape is A?	Square
2) Which transformation was used with shape A?	Translations
3) Which shape is B, C, D, and E?	Triangle
3) Which transformation was used to move shape B to C?	Translation
4) Which two transformations were used to move shape C to D?	1) translation 2) Rotation
5) Which transformation was used to move shape D to E?	reflection

Unit Test

Geometric Constructions & Transformations

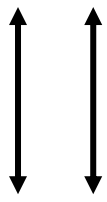
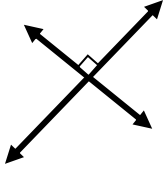
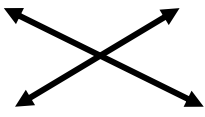
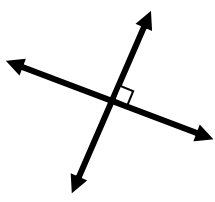
Part 1

Construct a ray, line, point, and line segment. Label each.

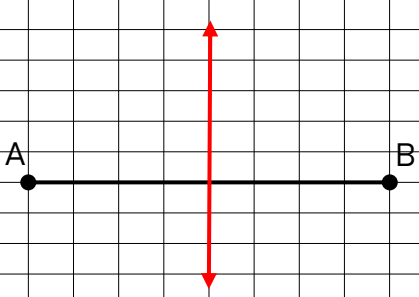
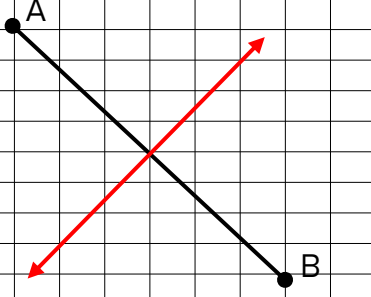
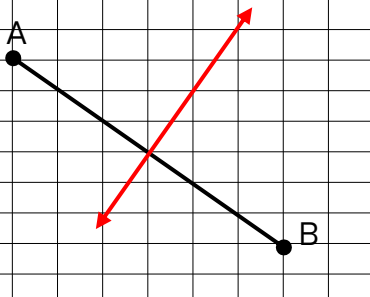
1) 	2) 	3) 	4) 
Line Segment – AB	Point C	Line – QR	Ray – MN

Part 2

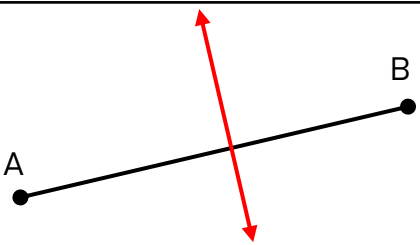
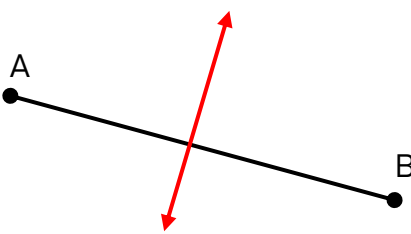
Label the lines parallel, perpendicular, or intersecting

1) 	2) 	3) 	4) 
Parallel	Perpendicular	Intersecting	Perpendicular

Part 3Construct perpendicular lines of the line segments $\overline{AB}$

1) 	2) 	3) 
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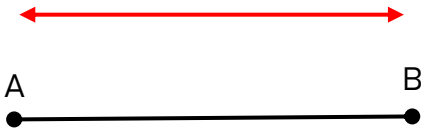
Part 4Construct perpendicular lines of the line segments $\overline{AB}$

1) 	2) 
---	--

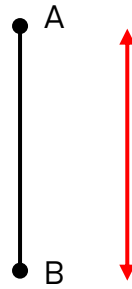
Part 5

Construct parallel lines of the line segment $\overleftrightarrow{AB}$

1)



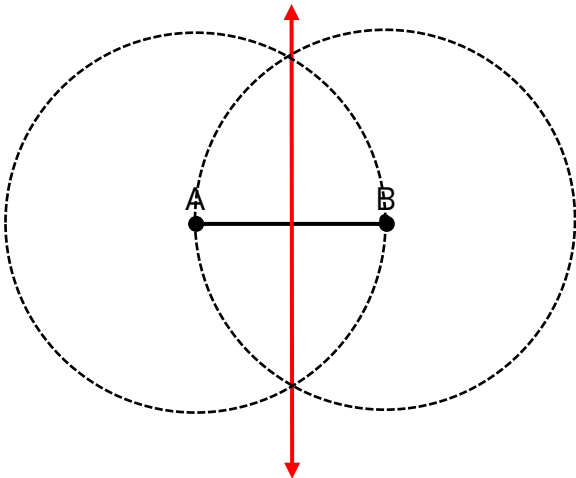
2)



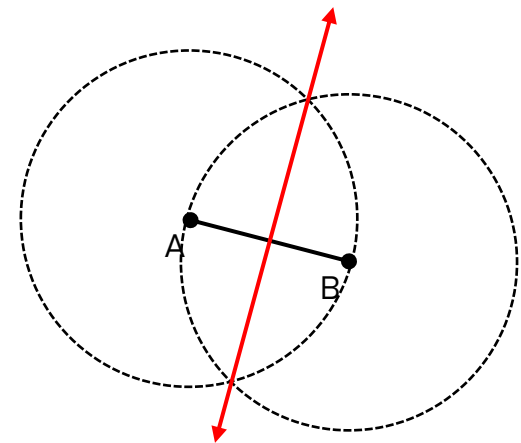
Part 6

Use a compass to construct a perpendicular bisector of the line segment $\overleftrightarrow{AB}$

1)



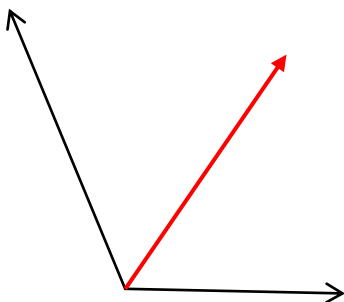
2)



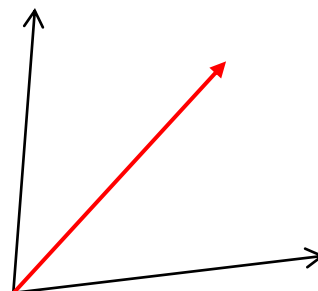
Part 7

Construct an angle bisector of the angle below using a compass

1)



2)



Part 8

Write which quadrant the points would be found in

Coordinates (x, y)	Quadrant (I, II, III, IV)
(4, -3)	IV
(-5, -4)	III
(2, 5)	I
(-2, 3)	II

Part 9

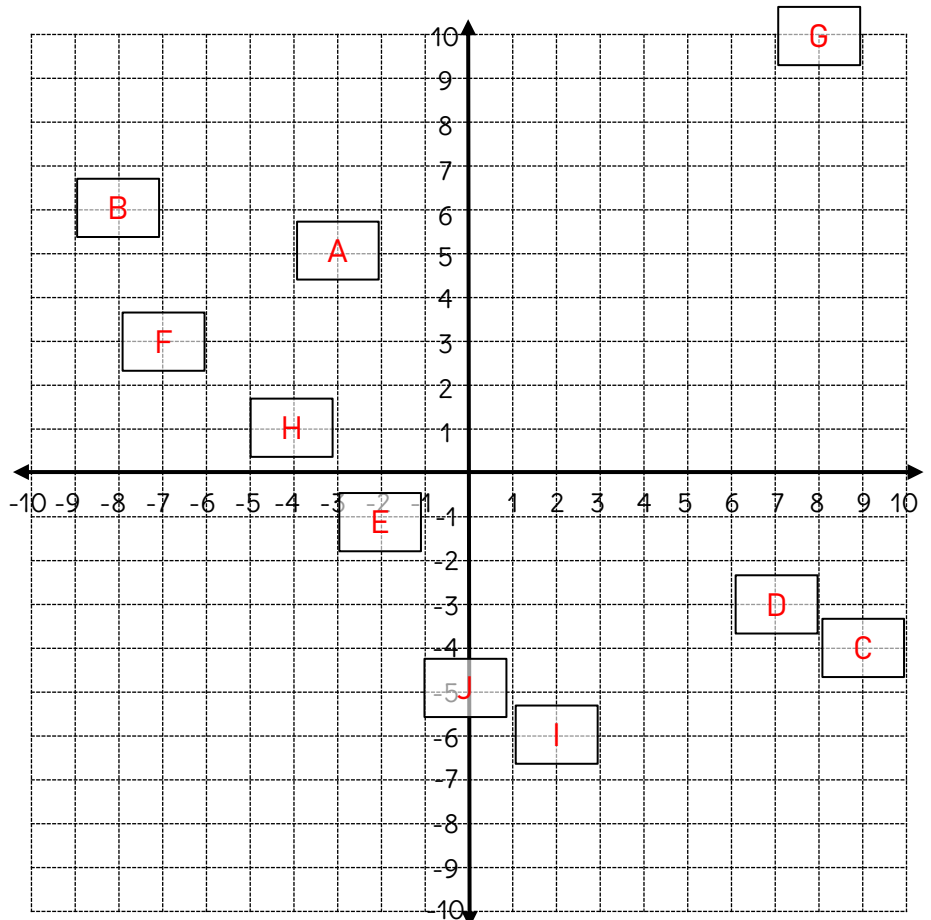
Which quadrant number is associated with the descriptions below

	Description	Quadrant
1)	Both positive values	I
2)	Both negative values	III
3)	An x positive value and y negative value	IV
4)	An x negative value and y positive value	II

Part 10

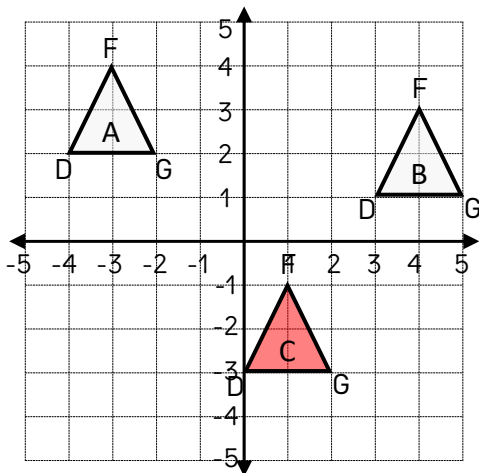
Plot the points of the coordinates on the cartesian plane

Letter	Coordinates (x, y)
A	(-3, 5)
B	(-8, 6)
C	(9, -4)
D	(7, -3)
E	(-2, -1)
F	(-7, 3)
G	(8, 10)
H	(-4, 1)
I	(2, -6)
J	(0, -5)



Part 11

1) Fill in the coordinates 2) Describe the translation 3) Translate shape C

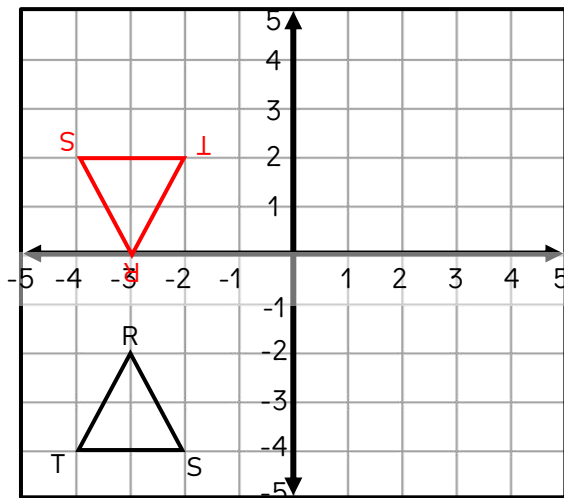


Coordinates A	Coordinates B
D(-4,2) F(-3,4) G(-2,2)	D(3,1) F(4,3) G(5,1)
Describe the translation	
<u>$(x + 7, y - 1)$ or right 7, down 1</u>	
Translate Shape C from Shape B	
Left 3 units and down 4 units	
Coordinates C	
D(0,-3) F(1,-1) G(2,-3)	

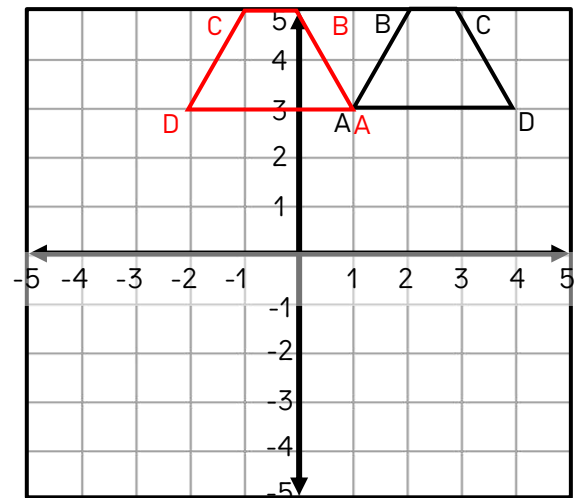
Part 12

Graph the new position of each shape after the given reflection

1) Reflection across the line $y = -1$



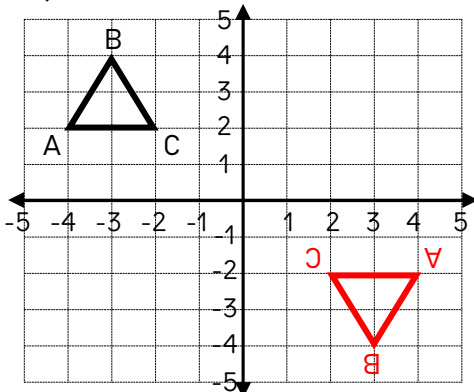
2) Reflection across the line $x = 1$



Part 13

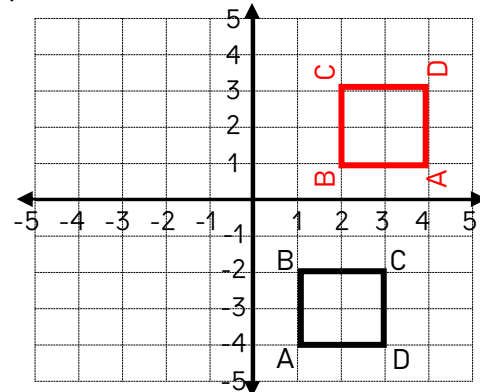
Graph the new position of each shape after the given rotation

1) 180° rotation



Original	A(-4,2)	B(-3,4)	C(-2,2)
Rotated	A(4,-2)	B(3,-4)	C(2,-2)

2) 90° counterclockwise rotation



Original	A(1,-4)	B(1,-2)	C(3,-2)	D(3,-4)
Rotated	A(4, 1)	B(2, 1)	C(2, 3)	D(4, 3)

Credits

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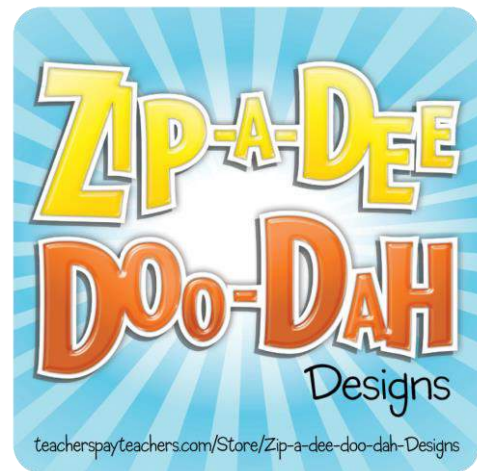
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Manitoba Math Curriculum Patterns & Relations – Grade 7

3-Part Lesson Format

Part 1 – Minds On!

- Learning Goals
- Discussion Questions
- Quotes
- And More!

LEARNING GOAL

We are learning to recognize and describe increasing number patterns using addition and multiplication to understand how numbers grow and change.

Increasing Patterns - Addition

Increasing Patterns: $+10$ $+20$ $+30$ $+40$ $+10$ $+20$ $+30$ $+40$

Determine the pattern rule and fill in the blanks in the increasing pattern.

1) 17, 24, 31, _____	2) 56, 65, 74, _____
3) 124, 129, 134, _____	4) 318, 323, 328, _____
5) 448, 458, 468, _____	6) 590, 596, 602, _____

Part 2 – Action!

- Writing
- Matching
- Drag and Drop
- Drawing
- And More!

Part 3 – Consolidation!

- Exit Cards
- Quizzes
- Reflection
- And More!

Consolidation - Multiple-Choice Questions

Drag the checkmark to answer the following multiple-choice questions about the topic.

1) Which pattern is increasing, but not by a constant amount each time? 1) 10, 12, 14, 16, 18 2) 1, 2, 4, 8, 16 3) 3, 6, 9, 12, 15 4) 30, 25, 20, 15, 10	2) The pattern 4, 9, 14, 19, 24 can be described by which rule? 1) Start at 4 and multiply by 5 each time 2) Start at 9 and add 4 each time 3) Start at 4 and add 4 each time 4) Start at 4 and add 5 each time	3) Which statement best describes how these two patterns grow? Pattern A: 6, 9, 12, 15, 18 Pattern B: 6, 12, 24, 48, 96 1) Both patterns increase by adding the same number each time. 2) Pattern A increases by multiplication; Pattern B increases by addition. 3) Pattern A increases by addition; Pattern B increases by multiplication. 4) Both patterns increase by multiplying by the same number each time.
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Manitoba Math Curriculum Patterns & Relations – Grade 7

Decreasing Pattern Rules

Fill in the boxes and blanks to complete the patterns by figuring out the pattern rules.

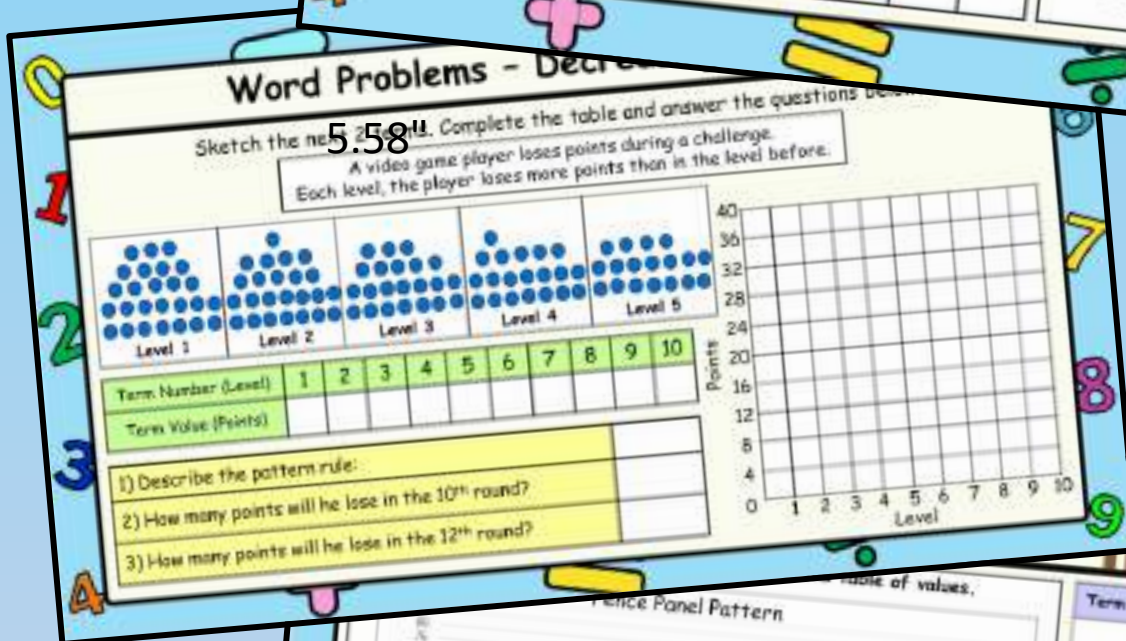
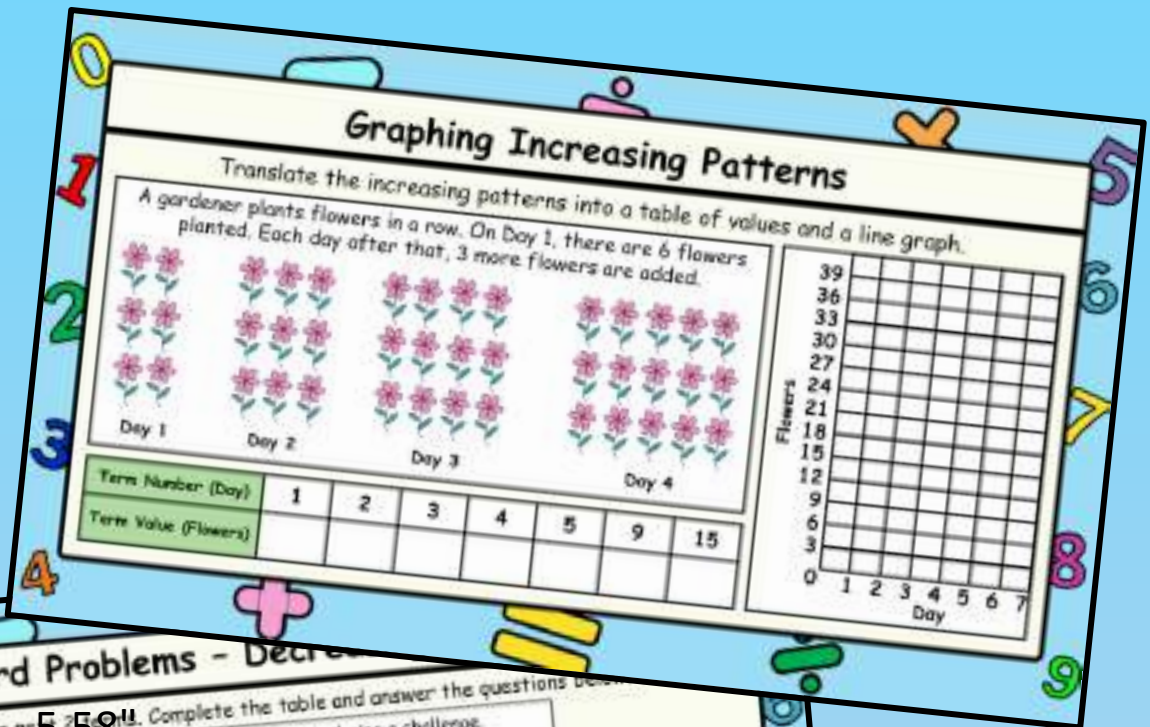
#	PATTERN	RULE
1)	420 400 380	Start at _____ then subtract _____ each time
2)	335 320 305	Start at _____ then subtract _____ each time
3)	222 215 208	Start at _____ then subtract _____ each time
4)	504 490 476	Start at _____ then subtract _____ each time
5)	626 617 608	Start at _____ then subtract _____ each time

Use the algebraic expression to fill in the tables.

$3x + 5$		$6x - 4$		$20 - x + 7$	
Term Number	Term Value	Term Number	Term Value	Term Number	Term Value
0		1		1	
1		2		2	
2		3		3	
3		4		4	
4		5		5	
12		15		10	



Manitoba Math Curriculum Patterns & Relations – Grade 7





Workbook Preview



Grade 7 Patterns

	Curriculum Expectations	Pages That Cover the Expectations
PR.1	Demonstrate an understanding of oral and written patterns and their equivalent linear relations	20 – 32, 39 – 40, 42 – 43, 45 – 46, 48 – 51, 53
Preview of 50 pages from this product that contains 230 pages total.		

Recursive vs Functional Relationships

A **recursive relationship** describes the pattern between successive numbers in one of the rows/columns of a table of values. A **functional relationship** is a general rule to describe the relationship between two columns/rows of numbers in a table of values. We look across the table instead of beside.

Part 1

Is Jeffrey describing the recursive or functional relationship?

	Pattern					Jeffrey's Description	Recursive or Functional
1)	x	1	2	3	4	The pattern goes up by 3 each time.	
	y	5	8	11	14		
2)	x	10	100	30	1000	Each term number is multiplied by 10	
	y	100	200	300	400		
3)	x	1	2	3	4	Each term number is multiplied by 4 and 1 is added	
	y	5	9	13	17		
4)	x	1	2	3	4	The pattern goes up by 4	
	y	8	12	16	20		
5)	x	1	2	3	4	$7x + 11 = y$	
	y	18	25	32	39		

Part 2

Provide a recursive and functional description of the patterns

	Pattern					Recursive	
1)	x	1	2	3	4	Functional	
	y	3	9	15	21		
	Pattern					Recursive	
2)	x	1	2	3	4	Functional	
	y	12	20	28	36		

Pattern Rule - Input/Output Tables**Questions**

Fill in the input/output tables below by using the expression provided

In n	Out $2n$
1	
2	
3	
5	

In n	Out $2n + 3$
1	
2	
3	
4	
5	

In n	Out $5n - 5$
1	
2	
3	
4	
5	

In x	Out $3x - 3$
10	
20	
30	
40	
50	

In x	Out $x + 2$
4	
6	
8	
10	

In x	Out $20 + x$
1	
3	

In p	Out $3p + 10$
20	
40	
60	
80	
100	

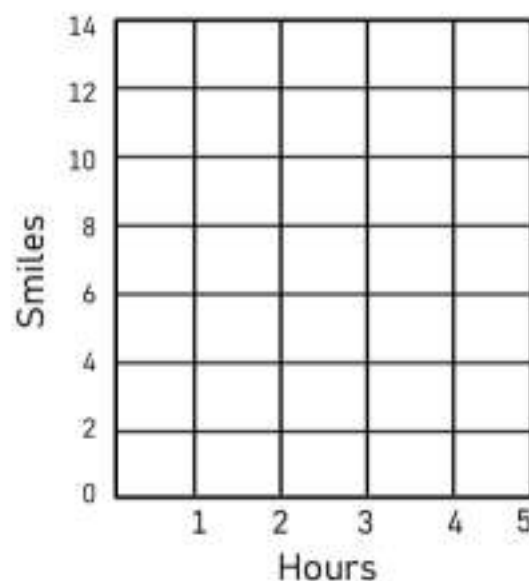
In p	Out $10p - 12$
3	
6	
9	
12	
15	

In p	Out $7p + 20$
5	
10	
15	
20	
25	

Graphing Shrinking Patterns

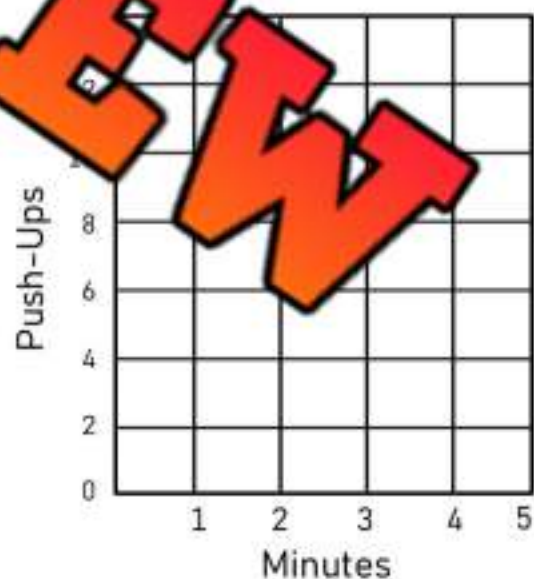
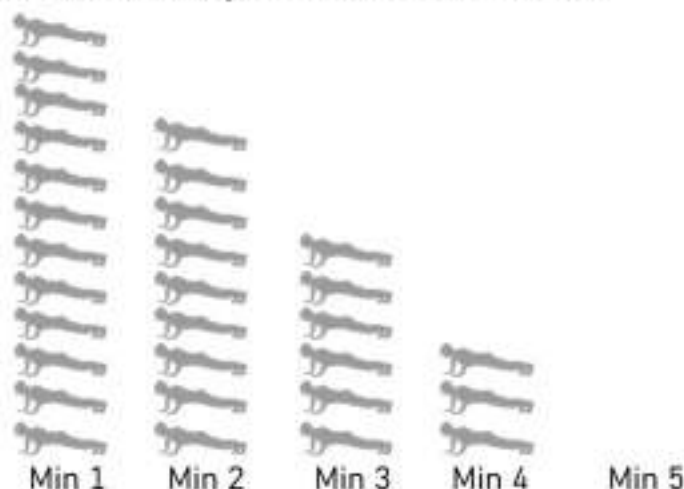
Questions Translate each shrinking pattern into a table of values and a line graph

1) Jane kept track of how many times she smiled in an hour



Term Number				
Term Value				

2) Sam counted how many push-ups he could do every minute for 5 minutes.



Term Number				
Term Value				

Shrinking Patterns

Questions

How many total blocks are in each term. Sketch the next 2 terms

1)

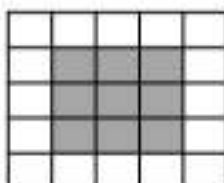
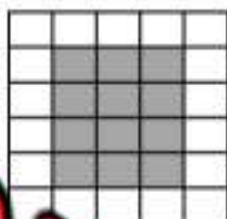
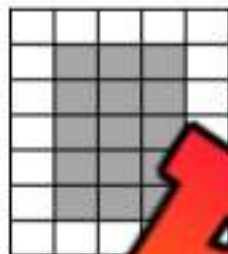


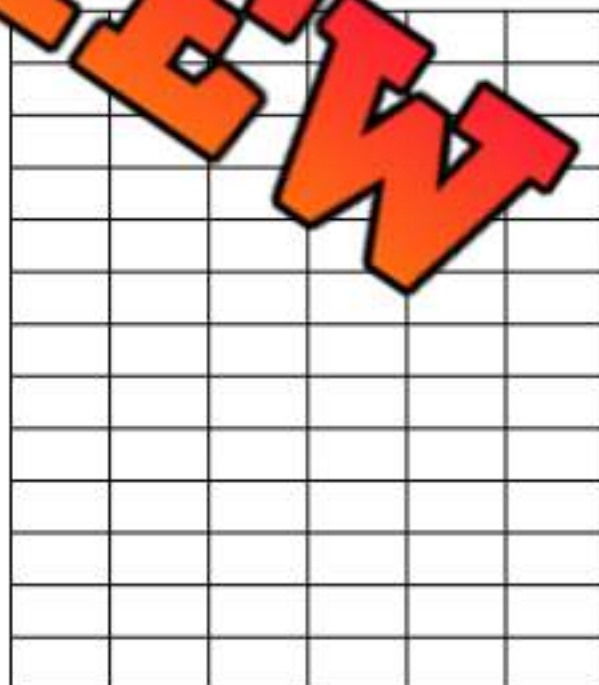
Figure Number	3	4	5	6
Number of grey blocks				
Number of white blocks				
Number of total blocks				

1) Describe the pattern rule for the total blocks?

2) Describe the pattern rule for the white blocks?

3) Describe the pattern rule for the grey blocks?

Total Blocks



1 2 3 4 5

Figure Number

Writing Algebraic Expressions



Practice

Answer the questions below

1)	Situation	Expression/Answer
a)	Blake sells lemonade at his stand. For every sale (s), he earns \$5. Write the expression.	
b)	Blake made 12 sales Monday. How much money did he make? Write the expression and the answer.	
c)	Blake made 20 sales the week, how much money did he make? Write the expression and the answer.	
d)	Blake earned \$100 yesterday selling lemonade. How many cups (c) did he sell?	

2)	Situation	Expression/Answer
a)	Sandy earns \$14 for every hour (h) she works. She spends \$2 each time she works to take the bus. Write the expression.	
b)	Sandy worked 8 hours yesterday. How much money did she take home? Write the expression and the answer.	
c)	Sandy worked 12 hours today. How much money did she take home? Write the expression and the answer.	

3)	Situation	Expression/Answer
a)	Jake is driving across Alberta to visit a friend. For every hour (h) he drives, he travels 110km. Write the expression.	
b)	Jake drove 8 hours today. How far did he go? Write the expression and the answer.	
c)	Jake needs to drive 1430km. How many hours he needs to drive?	

Uncovering the Relation Between Variables

When we discover a pattern between two things (variables), we need to identify the term number and the term value.

Example: determine the number of students and adults in a school if there are 20 times more students than adults.

Clues

- There are two terms to quantify – students and adults
- There are 20 times more students than adults, so the number of students is adults $\times$ 20
- We can use adults as the term number. The letter a will represent the number of adults
- The number of students is the term value. The letter s will represent the number of students
- The relation is $s = 20a$ or $30a = s$

Scenarios Write the relations for each of the scenarios below

		Relation
Ex.	The number of chairs in a room if there are 1 chair (c) for every 1 student (s)	$c = s$
1)	The number of wheels present in a collection of cars if each car has 4 wheels	
2)	The number of pencils there are in class if each student has 3 pencils each	
3)	The number of shoes that are in your class if each student has 2 shoes	
4)	How many total cans collected for a food drive in a school if each class brings on average 25 cans	
5)	The number of students absent today if there is always 1 person absent for every 10 students in a class	

Your Turn

Write your own scenarios and the relation that solves the problem

	Scenario	Relation
1)		
2)		

Constant Rate of Change

A **constant rate** is a rate of change that remains the same and does not go up or down. For example, when you are paid \$20 an hour, the rate of change is constant because for every hour you work, your pay goes up by the same amount - \$20.

Questions

Fill in the tables below to show a constant rate of change

- 1) Phil's pay for today has been represented in the table below

Hour	1	2	3	4	5	6	7	8
Money Earned (\$)		42	63					

What is the rate of change? _____ Is the rate of change constant? Yes No

- 2) Laura sells cars. She earns commission when she sells a car. Her earnings for last week are represented in the table below. There were some days she did not earn commission.

Days Worked	1	2	3	4	5	6	7
Money Earned (\$)	105	210	315	420	525	715	1300

- a) Is the rate of change constant? Yes No
 b) What day do you think Laura sold the most cars? _____
 c) How much did she earn that day? _____
 d) How much do you think Laura made if she didn't sell a car? _____

- 3) Kim sells necklaces she made. Her sales have been represented in the table.

Necklaces Sold	10	20	30	40	50	60	70	80
Money Earned (\$)	30	60	90					

- a) What is the rate of change? _____ Is the rate of change constant? Yes No
 b) How much would Kim sell 1000 necklaces for? _____ 5000 necklaces: _____

Comparing Rates of Change

Questions

Circle which variable (x or y) increases at a greater rate of change?

1) Term Number	1	2	3	4	5
x	15	30	45	60	75
y	5	25	45	65	85
x or y					

2) Term Number	1	2	3	4	5
x	35	70	105	140	175
y	50	80	110	140	170
x or y					

3) Term Number	1	2	3	4	5
x	225	340	400	460	
y	125		275	325	
x or y					

4) Term Number	1	2	3	4	5
x	612	635	658	681	704
y	548	575	602	629	656
x or y					

5) Term Number	1	2	3	4	5
x	315	450	585	720	855
y	438	579	720	861	1002
x or y					

6) Term Number	1	2	3	4	5
x	530	715	900	1085	1270
y	655	829	1003	1177	1351
x or y					

Writing Algebraic Expressions - Growing Pattern

Questions

Draw the 4th and 5th term. Then answer the questions

				
Term 1	Term 2	Term 3	Term 4	Term 5
1) Questions			Expression	
a) Write an expression that represents how many shapes are in the pattern?				
b) How many shapes will be in the 10 th term?				
c) How many shapes will be in the 100 th term?				
d) How many rectangles will be in the 100 th term?				
e) How many stars will be in the 1000 th term?				

				
Term 1	Term 2	Term 3	Term 4	Term 5
2) Questions			Expression	
a) Write an expression that represents how many shapes are in the pattern?				
b) How many shapes will be in the 10 th term?				
c) How many shapes will be in the 20 th term?				
d) How many rectangles will be in the 50 th term?				

Picnic Word Problem - T-Tables

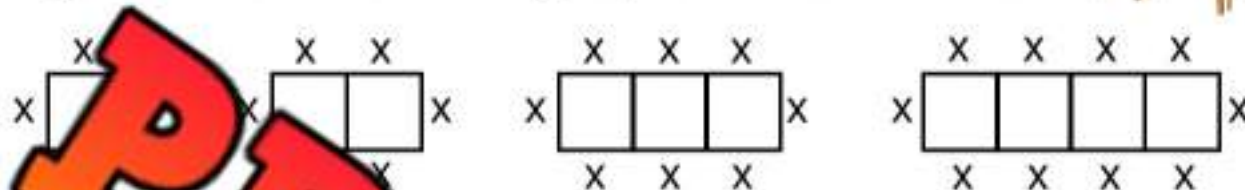
Challenge

Answer the word problem below. Use the T-Table to help.

You have been put in charge of organizing the end of the year banquet for your baseball team. You want to have as many seats as you can.



The diagram below shows how many people can sit at the tables.



a) Fill in the table below to learn more about the pattern of how many people can attend the banquet.

Tables	1	3	5	10	20	50
# of Seats						

b) Write the algebraic expression you used to find the total number of seats.

c) What if you didn't put the tables together? Would 8 tables together have more or less than 8 tables apart? Draw a diagram to help and fill in the table below.

Tables	1	2	3	4	5	6	20	50
# of Seats	4							

d) Write the algebraic expression you could use to solve for any number of tables.

Hockey Tickets - Challenge Problem

Challenge

Answer the word problem below

Nathan is organizing a trip to see a hockey game with his friends. The cost for the bus rental is \$200. The cost per person is \$20.

a) Write an algebraic expression that represents the cost if p people go.

b) How much will the trip cost Nathan if 5 people go?

c) How much will the trip cost Nathan if 20 people go?

d) Nathan wants to offer food as well. Suppose food costs \$10 per person. Write an algebraic expression that represents the cost of the bus, food, and ticket if p people go.

e) Suppose 20 people attend the hockey game and get food. How much will it cost Nathan?

f) How much will Nathan charge each person if 20 people go?



Name: _____

45

Curriculum Connection
PR.1

Integer Patterns - Adding

-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Questions

Fill in the blanks below using the pattern rule

1) Start at 0, add 2 each time

--	--	--	--	--	--

2) Start at _____, add _____ each time

--	--	--	--	--	--

3) Start at -19, add 4 each time

--	--	--	--	--	--

4) Start at 18, add -5 each time

--	--	--	--	--	--

5) Start at 14, add -4 each time

--	--	--	--	--	--

6) Start at -1, add -2 each time

--	--	--	--	--	--

7) Start at 19, add -5 each time

--	--	--	--	--	--

8) Start at -20, add 3 each time

--	--	--	--	--	--

Pattern Rule - Input/Output Tables - Integers**Questions**

Fill in the input/output tables below

In n	Out $n + (-3)$
1	
2	
3	
5	

In n	Out $2n + (-5)$
1	
2	
3	
4	
5	

In n	Out $n + 6$
-1	
-2	
-3	
-4	
-5	

In x	Out $x + (-2)$
-2	
-4	
-6	
-8	
-10	

In x	Out $x + (-5)$
4	
6	
8	
10	

In x	Out $x + 11$
-1	
-3	

In p	Out $3p + (-10)$
20	
40	
60	
80	
100	

In p	Out $p + (-12)$
-3	
-6	
-9	
-12	
-15	

In p	Out $p + (-8)$
-3	
-1	
2	
4	
6	

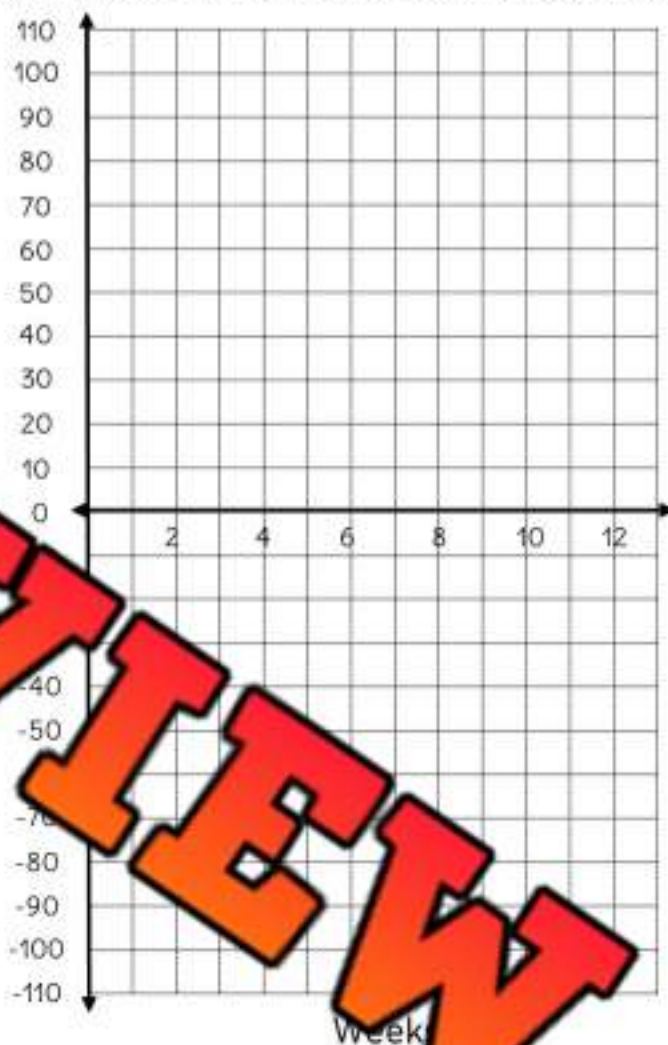
Pattern Using Negative Integers - Olivia's Money**Questions**

Answer the problems below

Olivia owes her sister \$100, and she has no other money. Therefore, she has $-\$100$. Luckily, she gets an allowance of \$15 a week.

Fill in the table of values below to learn more about how long it will take Olivia to pay back her sister.

Term Number (Weeks)	Term Value (Olivia's Money)



- Graph the table of values.
- How many weeks will it take for Olivia to pay back her sister?
- Is this a linear pattern? Explain how you know.
- Use the graph to determine how much money Olivia will have in 12 weeks.
- Use an algebraic expression to determine how much money Olivia will have in 26 weeks.

Integer Patterns - Average Temperatures

Questions

Fill in the blanks below using the pattern rule

In one of the coldest cities in Canada, the average temperature in January is -32°C . Every month after January until August, the temperature warms $+8^{\circ}\text{C}$. In September, the pattern reverses, with the temperature decreasing each month by -11°C . From December to January, the temperature drops -12°C .

Month	Temperature
January	-32
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	

a) Fill in the table to display the average temperatures each month.

b) What is the difference in temperatures between January and August?



c) What is the pattern rule from January to August?

d) What is the pattern rule from September to December?

e) What is the difference in temperatures between February and July?

f) Which month has the biggest change in temperature?

g) If you wanted to escape the coldest winter months, which months would you travel south for?



Algebra Quiz - Patterning

Part 1

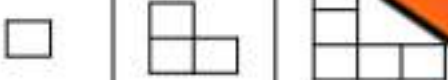
Is Anna describing the recursive or functional relationship?

	Pattern					Anna's Description	Recursive or Functional
1)	x	1	2	3	4	The term number is multiplied by 3 and then 4 is added.	
	y	7	10	13	16		
2)	x	1	2	3		The y variable has 15 added each time	
	y	5	20	35			

Part 2

How many blocks are in each term. Sketch the next 3 terms

1)



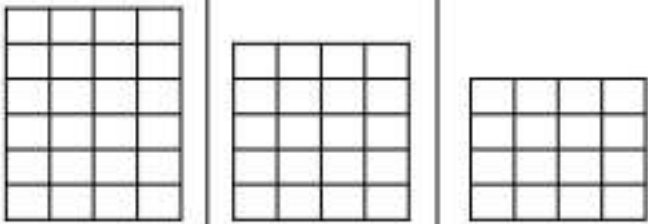
1) Describe the recursive relationship between the number of blocks.

2) Represent the pattern using an algebraic expression.

3) How many blocks will the 15th term have?

4) How many blocks will the 30th term have?

2)



Describe the recursive relationship between the number of blocks.

Grade 7

Variables and Equations

	Curriculum Expectations	Pages That Cover the Expectations
PR.3	Demonstrate an understanding of preservation of equality by: • concretely, pictorially and symbolically applying the properties of equality to solve equations.	69 – 102
PR.4	Explain the difference between an expression and an equation	59 – 60
PR.5	Evaluate an expression, given the value of the variable(s)	61 – 68
PR.6	Model and solve, concretely, pictorially and symbolically, problems that can be represented by one-step linear equations of the form $x + a = b$, where a and b are integers.	
PR.7	Model and solve, concretely, pictorially and symbolically, problems that can be represented by linear equations of the form: • $ax + b = c$ • $ax = b$ • $=x b$ where a, b and c are whole numbers.	104 – 106, 108 – 111

Equation or Expression?

Questions

Is the number sentence an expression or equation?

1) Paul has 5 cookies but needs enough for 10 people. $5 + c = 10$	Equation	Expression
2) The path has the following rule: $n \times 3 - 1$	Equation	Expression
3) Maria wants to run 22km this week. She has already run 22km. $22 + n$	Equation	Expression
4) The cost to enter an event is \$20 per ticket. $20 \times n$	Equation	Expression
5) Jeff works at a garden centre and earns \$15 an hour. He can figure out his pay by using the following: $h \times 15$	Equation	Expression
6) Bailey made \$200 last week working with her mom. She worked 10 hours. $10 \times w = 200$	Equation	Expression
7) Jane had 150 candies to give away on Halloween. She has 30 left. $150 - c = 30$	Equation	Expression
8) Ashley had 200 candies to give away on Halloween. She will give 2 candies to each kid. How many kids can she give candy to? $200 \div 2 = k$	Equation	Expression
9) Candy bags come in 30 packs. The total number of candies is represented below: $b \times 30$	Equation	Expression

Writing Algebraic Expressions

Using algebraic expressions helps us understand mathematical situations. We can use a variable to replace a changing number, like how many tickets are sold to a game – $t \times 10$

Part 1

Write each algebraic expression in words.
Use the words, "a number" in place of the variable

1) $7 - t$

Seven subtract a number

2) $n +$

3) $8 + b$

4) $9r$

5) $\frac{y}{5}$

Part 2

Write an algebraic expression for each situation

1) Nineteen add a number

2) Divide a number by three

3) A number is subtracted by nineteen

4) Triple a number and add seven

5) Subtract 19 from a number, then multiply by four

Writing Algebraic Expressions - Treats

A mathematical expression is similar to an equation, but it does not have an equal sign. We use expressions to describe a mathematical situation.

Questions

Write the expressions for the situations below

1) Lindsay has y amount of cookies. She gives 27 cookies away to the students in her class.

Expression: _____



2) Courtney bakes brownies and cuts them into b pieces. She eats 3 brownies.

Expression: _____



3) Alyse makes cupcakes to share equally with her 5 friends.

Expression: _____



4) Hani gives 3 candies to each of his f number of friends.

Expression: _____



5) Scott has 14 sodas in his fridge and buys s more sodas.

Expression: _____



6) Dan buys 3 dozen donuts and eats d number of donuts for breakfast.

Expression: _____



7) Steve buys x number of cookies and gives 31 to his staff.

Expression: _____



8) Alexa has 100 suckers that she shares equally with her f number of friends.

Expression: _____



9) Brian has 250 gummy worms and takes n number of gummies from his brother.

Expression: _____



10) Howard gives 4 books each to s number of students.

Expression: _____



Evaluating Algebraic Expressions - Addition**Part 1**Evaluate the following expressions for $x = 8$

1) $x + 12$	2) $8 + x$	3) $23 + x$	4) $x + 24$
5) $41 + x$	6) $63 + x$	7) $82 + 13 + x$	8) $92 + x + 11$

Part 2Evaluate the following expressions for $y = 8$ and $n = -2$

1) $y + (n)$	2) $5 + y + (n)$	3) $8 + y + (n)$	4) $y + 12 + (n)$
5) $43 + y + (n)$	6) $(n) + y + 20$	7) $(n) + 53 + (n) + y$	

Part 3Evaluate the following expressions for $x = -5$ and p

1) $(x) + (p) - 10$	2) $10 + (x) + (p)$	3) $15 + (x) + (p)$	4) $(x) + 11 + (p)$
5) $(p) + 20 + (x)$	6) $(x) + 18 + (p)$	7) $(x) + 5 + (p)$	8) $22 + (p) + (x)$

Evaluating Algebraic Expressions - Subtraction

Subtraction Integers Rules

To subtract integers, it is easiest to change the operation to addition and then follow the addition rules. We can do this by using the rule – Keep, Flip, Change. We keep the first number the same, flip the operation from subtraction to addition, and then change the third number's sign.

Example: $5 - (-6) = ?$ becomes $5 + 6 = 11$

Keep the
first
integer

Flip the
operation

Change the
sign of the next
integer

Part 1 Evaluate the following expressions for $x = 5$

1) $x - 12$

8

3) $23 - x$

4) $x - 24$

5) $41 - x$

6) $63 - x$

7) $x - 13$

8) $92 - x - 11$

Part 2 Evaluate the following expressions for $y = 10$ and $n = 3$

1) $y - (n)$

2) $11 - (n) - y$

3) $15 - y - (n)$

4) $y - 6 - (n)$

5) $21 - y - (n)$

6) $(n) - y - 13$

7) $y - (n) - 3$

8) $32 - (n) - y$

Evaluating Algebraic Expressions - Café

Whitney works at a café selling muffins, coffee, tea, and scones. She uses algebraic expressions to determine the cost of her customer's orders.



Menu	
Scone (s)	\$3.50
Muffin (m)	\$2.25
Tea (t)	\$2.00
Coffee (c)	\$2.50

Solve the algebraic expression and then evaluate using the menu prices

Customer Order	Expression	Answer
1) 2 coffees, 1 muffin	$2 \times c + m$ $2.50 + 2.25$	
2) 3 teas, 1 scone		
3) 4 coffees, 2 teas		
4) 2 coffees, 2 teas, 2 muffins		
5) 3 teas, 4 muffins, 2 scones		
6) 10 coffees, 10 muffins		
7) 5 teas, 3 muffins, 2 scones		
8) 3 coffees, 3 scones		

Name: _____

66

Curriculum Connection
PR.5

Evaluating Algebraic Expressions - Canteen

Brad works at a canteen selling chips, drinks, and gummies. He calculates the cost of orders (o) and subtracts it from the payment (p) he is given to determine how much change to give his customers.



Menu	
Chips	\$1.50
Drinks	\$2.50
Gummies	\$1.00

Evaluate

Solve the subtraction expressions below

Variable Values		Expression - Customer's Change $p - o$
o	p	
\$17.00	\$20.00	
\$10.00	\$20.00	
\$9.25	\$20.00	
\$35.65	\$	

Evaluate

Calculate the cost of the order and subtract it from the customer's change



Order			Expression	Payment (p)	Change (c)
c	d	g			
1	0	2	$c + (2 \times g)$ $1.50 + (2 \times 1.00)$ $1.50 + 1.00$ $\$2.50$	\$10.00	$p - o$ $10.00 - 2.50$ $\$7.50$
3	1	0		\$10.00	
1	2	1		\$10.00	
2	2	2		\$20.00	
3	3	5		\$20.00	

Evaluating Algebraic Expressions - (x ÷)**Part 1**Evaluate for $x = 3$. Use brackets to separate the numbers

1) $5x$	2) $9x$	3) $3x$	4) $8x + 6$
5) $21x +$	6) $12x - 12$	7) $5x - x$	8) $9x + 8 - x$

Part 2Evaluate the following expressions for $y = 10$

1) $\frac{y}{2}$	2) $\frac{y}{y}$	4) $\frac{y}{5} + 5$
5) $\frac{30}{y} + 8$	6) $\frac{100}{y} + y$	7) $\frac{100}{y} \times y$

Part 3

Write the expressions using the values/operations below

9 8 4 n + x - +

1) Nine times a number, add four	
2) Eight divided by four, subtract a number	
3) A number multiplied by eight, add nine	
4) Eight more than four divided by a number	
5) A number divided by nine, add eight	

Writing Equations

An equation is a statement that two expressions are equal. An expression has no equal sign, whereas an equation has an equal sign. When we can solve the answer to an expression, it becomes an equation because we add an equal sign.

Expression

Eight more than a number

$$8 + n$$

$$n = ?$$

Equation

Eight more than a number is 14

$$8 + n = 14$$

$$n = 6$$

Part 1 Write equations for each sentence

	Equation	Answer
1) Nine less than a number is 17		
2) Fifteen more than a number is 2		
3) Eight times a number is 24		
4) Twelve divided by a number is three		
5) A number plus eight divided by two is 10		
6) Seven times a number plus four is 39		

Part 2 Write a sentence in words for each equation

Equation	Sentence	Value of n
1) $4n = 24$		
2) $8 + n - 3 = 10$		
3) $5 + \frac{12}{n} = 7$		
4) $3n - 3 = 12$		

Addition - Are They Equal?

Are the equations equal? Put a slash through the equal sign for any equations that are not equal.

$8 + 4 = 12$

$23 + 15 \neq 36$

$47 + 13 = 50$

Part 1Put a slash through the equal sign ($\neq$) if it is not balanced

1) $6 + 7 = 13$

2) $51 + 15 = 67$

3) $47 + 13 = 50$

4) $65 + 7 = 72$

5) $74 + 13 = 87$

6) $92 + 11 = 103$

7) $95 + 25 = 110$

8) $12 + 126 = 138$

9) $144 + 17 = 171$

10) $155 + 26 = 181$

11) $1 + 144 = 145$

12) $212 + 12 = 224$

Part 2

Fill in the missing number to balance the equation

1) $\square + 12 = 95$

2) $\square + 25 = 50$

3) $\square = 66$

4) $72 + 14 = \square$

5) $64 + \square = 80$

6) $\square + 50 = 65$

7) $68 + \square = 82$

8) $83 + 15 = \square$

9) $89 + \square = 102$

10) $105 + \square = 116$

11) $121 + 14 = \square$

12) $145 + \square = 160$

Addition Equations - Golf Tournament

Zack hosted a 2-round golf tournament. He has the results and needs to find out who won the tournament. The leaderboard is below but is missing numbers.



Directions

Fill in the leaderboard

Player	Round 1	Round 2	Final Score
Rich	-2	-5	
	-5		-5
Dominic		-2	-6
Kayden		-1	
Silas			-1
Lillian	3		
Brooklyn	-2		-5
Natalie			-1
Andrew	-4	6	
Santiago		5	2

Results

Who won the golf tournament?

1) Who won the golf tournament?	
2) The entry fee for the tournament was \$100. All the money went to the prize (p). Write an equation that determines the value for (p).	
3) More golfers joined the tournament. The prize ended up being \$1400. Write an equation that determine how many golfers (g) participated in the tournament.	

Equation Pairs - Addition

When we add numbers or variables (letters) together, we can change the order of the numbers/letters without affecting the answer. This is called the **commutative property**.

Directions: Isaac works at a fast-food truck. He sells burgers (b) and fries (f). His job is to calculate how much the customer owes in total (t) for their order.



Part 1 Write 2 equations for the orders below

#	Fries	Burger	Equation 1 (f + b = t)	Equation 2 (b + f = t)
1	3	8	$3 + 8 = 11$	$8 + 3 = 11$
2	7			
3	6	15		
4	8	8		
5	15	18		
6	10	13		
7	13	15		
8	11	16		

Part 2 Solve the addition equations below

	Equation 1	Equation 2
1	$5 + 7 + 15 + 13 =$	$13 + 7 + 15 + 5 =$
2	$12 + 17 + 18 + 13 =$	$17 + 13 + 18 + 12 =$
3	$34 + 21 + 26 + 29 =$	$34 + 26 + 29 + 21 =$
4	$55 + 66 + 34 + 45 =$	$55 + 45 + 66 + 34 =$

Subtracting Decimals - Solve the Variable**Practice**

Find the value of the variables below

1) $6.5 - n = 2$ $n =$	2) $n - 4.5 = 3$ $n =$	3) $s - 5.2 = 3$ $s =$
4) $8.2 = p$ $p =$	5) $10.1 - p = 7$ $p =$	6) $14.3 - r = 10.5$ $r =$
7) $10.4 - n = 2$ $n =$	8) $n - 4.5 = 12.5$ $n =$	9) $t - 5.4 = 15$ $t =$
10) $24.7 - n = 20.2$ $n =$	11) $10.1 - t = 5$ $t =$	12) $34.6 - 5 = p$ $p =$

Word Problems

Write an equation and solve for a variable with an unknown amount

- 1) Laura has \$4.35 to spend on candy. She leaves the shop with \$1.20. How much did she spend on candy (c)?
- 2) Randy works for 8.5 hours today. He only has 2 hours left to work. How much time (t) has elapsed?
- 3) Ryan jumped 3.58m in long jump. Jody jumped 2.98m. What is the difference (d) between their jumps?
- 4) Rebecca has 200g of sugar. She used 42.5g of sugar to make cookies. How many grams of sugar (s) does she have left?



Integer Patterns - Average Temperatures

Questions

Answer the questions below



The table below shows the average temperatures in four Canadian cities. We can use the table to compare the average temperatures in February and October.

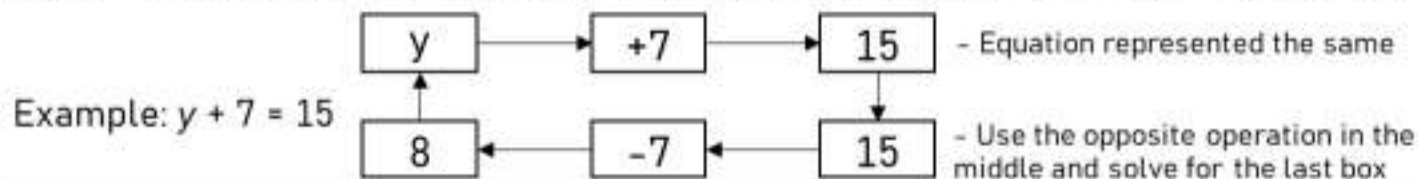
City	October (o) Temperature	February (f) Temperature	Temperature Difference (d)
Calgary (AB)	6	-7	
Thunder Bay (ON)	10	-3	
Victoria (BC)	12	6	
Yellowknife (NT)	1	-21	
Winnipeg (MB)	9	-14	
Ottawa (ON)	8	-8	
Eureka (NU)	-1	-38	
Quebec City (QC)	7		

- Fill in the table with the temperature difference from October to February.
- Write an equation using the variables: f , o , and d to show the difference between the temperatures in each city from October to February.
- Which city had the largest difference between their October and February months?
- What is the difference between Victoria's February temperature and Eureka's February temperature?
- What is the difference between Yellowknife's October temperature compared with Eureka's October temperature?



Adding and Subtracting Equations - Flow Chart

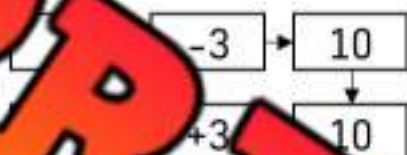
We can use a reverse flow chart to calculate the value of a variable in an equation.



Direction

Use the flow chart to find the value of the variable

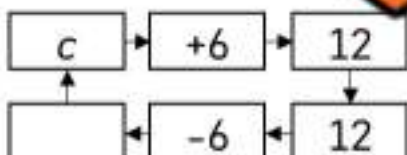
1) $t - 3 = 10$



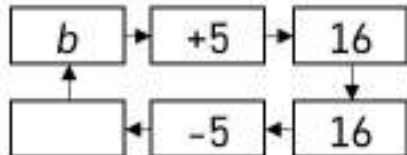
2) $r - 5 = 8$



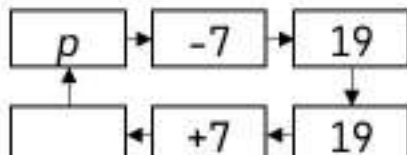
3) $c + 6 = 12$



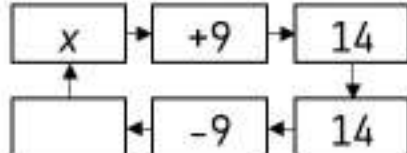
4) $b + 5 = 16$



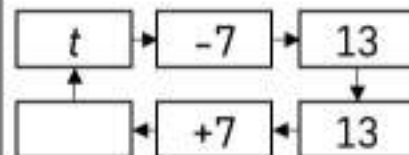
5) $p - 7 = 19$



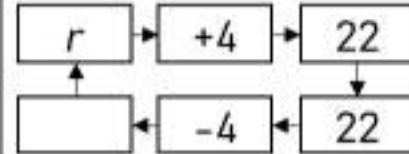
6) $x + 9 = 14$



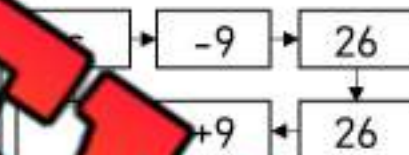
7) $t - 7 = 13$



8) $r + 4 = 22$



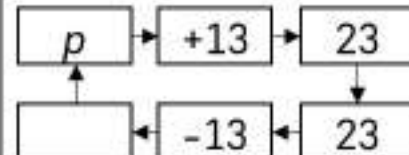
9) $s - 9 = 26$



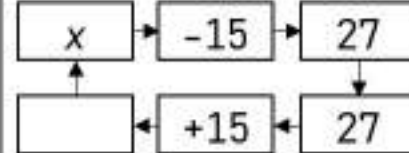
10) $b + 11 = 31$



11) $p + 13 = 23$



12) $x - 15 = 27$



Multiplication - Find the Variable

When we multiply a number by a variable, we do not need to use the multiplication sign. It is known that any variable next to a number means the operation we are using is multiplication.

Example: $7n = 14$ means $7 \times n = 14$

We can figure out the unknown number by balancing the equation - $n = 2$.

Part 1

Find out the value of the variable

1) $5n = 15$ $n =$	2) $4n = 16$ $n =$	3) $8(s) = 48$ $s =$
4) $9 \times 4 = p$ $p =$	5) $6n = 35$ $n =$	6) $7k = 21$ $k =$
7) $3n = 21$ $n =$	8) $4n = 24$ $n =$	9) $n \times 7 = 77$ $n =$
10) $5n = 45$ $n =$	11) $8 \times 7 = t$ $t =$	12) $9 \times 4 = p$ $p =$
13) $8n = 96$ $n =$	14) $10n = 100$ $n =$	15) $7(s) = 35$ $s =$
16) $9(s) = 27$ $s =$	17) $8 \times 8 = s$ $s =$	18) $6 \times 8 = t$ $t =$

Part 2

Calculate the area using the variables for Length and Width

The formula for calculating area is: $A = L \times W$

Calculate the area in the questions below using the values for the variables L and W

L = 3 W = 9	A =	L = 5 W = 9	A =
L = 8 W = 7	A =	L = 11 W = 7	A =
L = 10 W = 11	A =	L = 4 W = 13	A =

Writing Multiplication Equations - Bakery

Jasmine works at a bakery. She sells bread, muffins, cakes, and donuts. When a customer orders from Jasmine, she uses an equation to figure out their total (t) – how much they owe for their order.

Bread (b)	Muffin (m)	Cake (c)	Donut (d)
\$5.00	\$3.00	\$14.00	\$2.00
			

Questions

Complete the table below. The first one is done for you

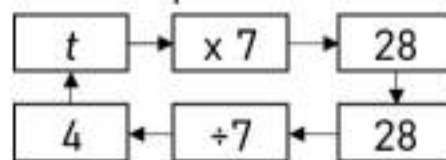
#	Order				Equation	Answer
	B	M	C	D		
1	1	0	0	0	$t = 1b + 2m$	$T = 5 + 6$ $T = 11$
2	1	0	0	0		
3	0	2	1	0		
4	1	1	0	2		
5	2	2	0	0		
6	3	1	1	0		
7	0	2	1	2		
8	2	0	1	3		
9	1	2	1	4		

Multiplying Equations - Flow Chart

Steps to fill in a flow chart:

- 1) Write the variable in the first box
- 2) Write the second value in the second box
- 3) Write the answer in the third box
- 4) We are working in reverse now. Write the answer in the first box
- 5) We do the opposite to the next box as we did with the second box
- 6) Fill in the last box to find the value of the variable, which it points to

Example: $7t = 28$



Directions: Fill in the blank in the flow chart

1) $4t = 12$		6) $11t = 77$	
2) $8r = 48$		7) $12r = 48$	
3) $5c = 35$		8) $7c = 56$	
4) $6b = 42$		9) $12b = 144$	
5) $9p = 72$		10) $9n = 63$	

Division - Find the Variable

A **variable** is a letter that represents an unknown number. When we don't know a number, we can use a letter to take the place of the unknown number.

Example: $27 \div n = 3$

We can figure out the unknown number by balancing the equation: $n = 9$.

Part 1

Find out the value of the variable

1) $50 \div n = 5$ $n =$	2) $n \div 8 = 3$ $n =$	3) $s \div 4 = 3$ $s =$
4) $32 \div 4 = p$ $p =$	5) $28 \div p = 4$ $p =$	6) $56 \div r = 8$ $r =$
7) $42 \div n = 6$ $n =$	8) $n \div 8 = 3$ $n =$	9) $t \div 11 = 7$ $t =$
10) $81 \div n = 9$ $n =$	11) $s = t$ $t =$	12) $63 \div 9 = p$ $p =$
13) $64 \div n = 8$ $n =$	14) $63 \div n = 7$ $n =$	15) $s = 7$ $s =$
16) $28 \div s = 4$ $s =$	17) $12 \div 4 = s$ $s =$	18) $s =$

Part 2

Calculate the area using the variables Length and Width

Servers at a restaurant share tips (t) equally at the end of the day. The number of people that share the tips depends on how many servers (s) were working. We can use a formula to find out how much money (m) each server takes home: $m = t \div s$

$t = 150$ $s = 5$	$m = 150 \div 5$	$m = 30$
$t = 80$ $s = 4$	$m = \div$	$m =$
$t = 200$ $s = 5$	$m = \div$	$m =$

$t = 180$ $s = 3$	$m = \div$	$m =$
$t = 280$ $s = 7$	$m = \div$	$m =$
$t = 440$ $s = 4$	$m = \div$	$m =$

Writing Division Equations - Sharing

Riley is the best boss! Every week, she brings in treats for her staff to share. Each week, there are different treats and a different number of staff members working at the office.



Questions

Use a formula to find out how many treats (t) each person gets

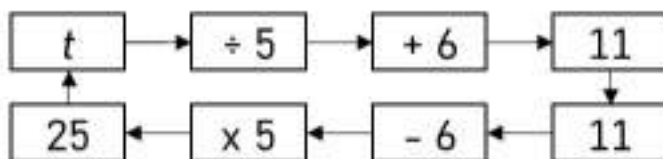
#	Treat	# of Staff (s)	Formula	Answer
1	16 donuts (d)	8	$\frac{d}{s} = t$	$\frac{16}{8} = 2$
2	12 cookies (c)	6	$\frac{c}{s} = t$	$\frac{12}{6} = 2$
3	24 muffins (m)			
4	60 slices of pizza (p)	30		
5	42 bagels (b)	7		
6	36 donuts (d)	12		
7	40 cookies (c)	10		
8	56 muffins (m)	8		
9	27 pastries (p)	9		
10	54 cookies (c)	6		
11	55 slices of pizza (p)	11		
12	60 bagels (b)	15		
13	48 muffins (m)	12		

Division Equations - Flow Chart

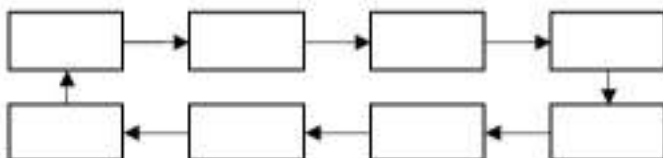
Directions

Fill in the blank in the flow chart

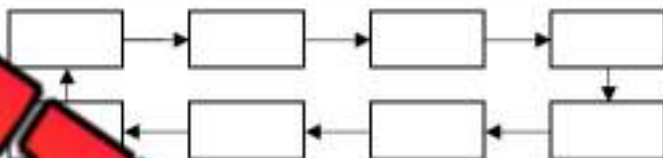
1) $\frac{t}{5} + 6 = 11$



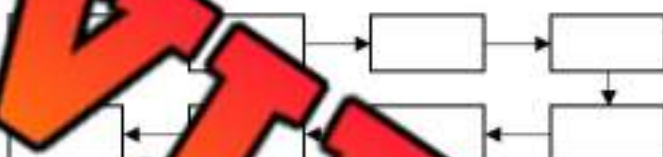
2) $\frac{r}{8} - 7 = 15$



3) $\frac{c}{4} + 8 = 15$



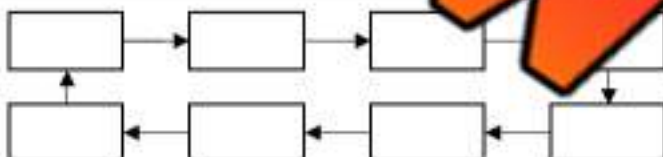
4) $\frac{b}{6} - 9 = 0$



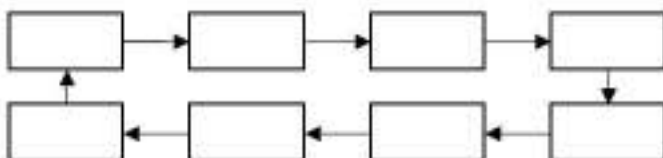
5) $\frac{p}{7} - 7 = 2$



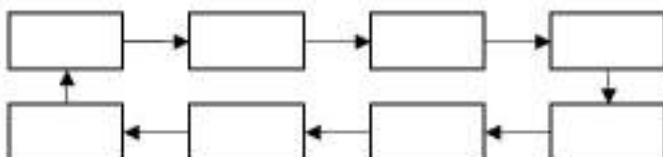
6) $\frac{n}{3} + 12 = 22$



7) $\frac{t}{2} - 6 = 5$



8) $\frac{r}{11} + 8 = 15$

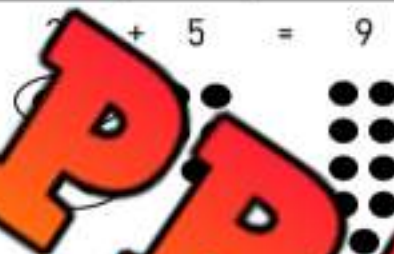
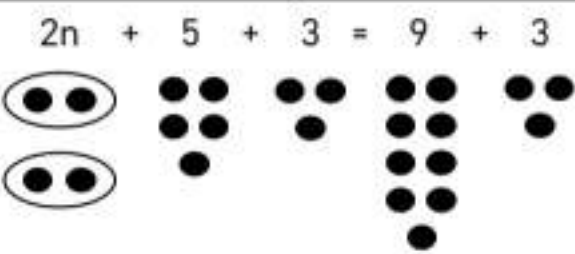


Equivalent Forms of an Equation

When we add or subtract the same amount from both sides of an equal sign, the equation does not change. Investigate this theory below.

Questions

Draw circles to represent the equations

#	Original Equation	Change	New Equation
1	$2n + 5 = 9$ 	Add 3	$2n + 5 + 3 = 9 + 3$ 
2	$7 + =$		
3	$13 - n = 6$	Add 3	
4	$2n + 6 = 14$	Subtract 5	
5	$5 + 3n = 17$	Add 7	

Equivalent Forms of an Equation

When we change an equation by adding, subtracting, multiplying, and dividing the same amount from both sides, does the equation change? Investigate below!

Questions

Fill in the table below

#	Original Equation	Change	New Equation
1	$5n = 20$ $n = 4$	Add 8 to each side	$5n + 8 = 20 + 8$ $n = 4$
2	$n = 7$	Add 6 to each side	
3	$15 + n = 26$ $n =$	Subtract 11 from each side	
4	$6n = 18$ $n =$	Multiply each side by 3	
5	$4n = 24$ $n =$	Divide each side by 4	
6	$52 - n = 38$ $n =$	Subtract 15 from each side	
7	$68 + n = 93$ $n =$	Add 14 to each side	
8	$5n = 50$ $n =$	Multiply each side by 5	
9	$2n = 24$ $n =$	Divide each side by 2	

Representing Equivalent Equations - Balance Scale

Blocks are placed on a balance scale. Some of the blocks on the left side of the scale are put in a bag before being placed on the scale. Use b to represent bag in your equation.

Questions

Write 2 different equations for each pictorial representation

#	Pictorial Representation	Equation # 1	Equation # 2
Ex)		$b + 8 = 14$	$2b + 2 = 14$
1)			
2)			
3)			
4)			
5)			

Using Linear Equations and Pictorial Representations

Questions

Write a pictorial representation and linear equation of the example

#	Real-World Example	Linear Equation	Pictorial Representation
Ex)	Kennedy has 25 socks. She has an equal number of black and white socks that she keeps in 2 piles. She has 7 randomly coloured socks. How many black socks are in each pile?	$2p + 7 = 25$ $p = 9$	
1)	_____ went to school and brought _____ cookies to school. _____ gave the _____ cookies to her teacher. _____ gave 8 cookies to her friend. _____ gave _____ cookies to her friend. How many cookies did she give to her friend?		
2)	Harley earned \$42 from her job today after she worked for _____ hours. She received a \$10 tip as part of the \$42. What does Harley earn per hour at her job?		
3)	You paid \$15 for admission to the movies. Snacks were \$4 each. If you spent \$27 in total, how many snacks did you buy?		
4)	In a basketball game, Henry scored 23 points. This was 5 more than double the points he scored last game. How many points did he score last game?		
5)	Katie and Sam went on an Easter egg hunt. Katie found 24 eggs. Katie found 3 times more eggs than Sam. How many eggs did Sam find?		

Representing Linear Equations ($ax = b$)

Questions

Write a pictorial representation of the linear equations provided

#	Linear Equation ($ax = b$)	Pictorial Representation
Ex)	$4x = 20$ $x = 5$	 4 groups of 5 = 20
1)	$3x = 15$ $x =$	
2)	$7x = 49$ $x =$	
3)	$9x = 45$ $x =$	
4)	$8x = 48$ $x =$	
5)	$2x = 96$ $x =$	
6)	$6x = 72$ $x =$	
7)	$4x = 52$ $x =$	

Representing Linear Equations ($ax + b = c$)

Questions

Write a pictorial representation of the linear equations provided

#	Linear Equation	Pictorial Representation
Ex)	$3x + 6 = 30$ $x = 8$	 3 groups of 8 + 6 = 30
1)		
2)	$8x + 4 = 28$ $x =$	
3)	$5x + 4 = 29$ $x =$	
4)	$7x + 6 = 34$ $x =$	
5)	$2x + 9 = 23$ $x =$	
6)	$4x + 9 = 25$ $x =$	
7)	$8x + 5 = 29$ $x =$	

Representing Problems with Linear Equations ($x + a = b$)**Questions** Represent the problems with linear equations ($x + a = b$) and solve for x

1)

Camila had some markers and then bought 24 more. Now she has 56 markers. How many markers did she have before she bought more?



Linear equation: _____

 $x =$ _____

2)

Carlos opened a bank account last year and has been adding to it. Today he has \$312. How much did he have before?



Linear equation: _____

 $x =$ _____

3)

Mia tracks how many steps she takes each day. Before noon, she had taken a lot of steps. From noon until the end of the day, she took 7,450 steps. In total, she took 16,340 steps. How many steps did she take before noon?



Linear equation: _____

 $x =$ _____

4)

Caleb scored a bunch of points in the first half of a basketball game. In the second half, he only had 7 points. At the end of the game, he had scored with 31 points. How many points did he score in the first half?



Linear equation: _____

 $x =$ _____

5)

Nick's new business sold quite a few products in May. In June, they sold 572 products. In May and June combined, they sold 931 products. How many products did Nick's business sell in May?

Linear equation: _____

 $x =$ _____

6)

Daniel is going to a friend's house who lives far away. He drove for awhile this morning before stopping for gas. He then drove another 362km before arriving at his friend's house, which was 710km away. How far did he drive before stopping?

Linear equation: _____

 $x =$ _____

Representing Problems with Linear Equations ($ax + b = c$)**Questions** Represent the problems with linear equations ($ax + b = c$) and solve for x

1)

Hunter's cousin is 24 years old. He is 2 years older than twice Hunter's age. How old is Hunter?

Linear equation: _____

 $x =$ _____

2)

Jessica bought 32 treats to work and gave them all away. She gave 8 to her brother and the rest to each of her friends. How many friends did she give treats to?

Linear equation: _____

 $x =$ _____

3)

Cindy has \$8. Her sister has twice as much as her brother. The three of them have \$44. How much money does her brother have?

Linear equation: _____

 $x =$ _____

4)

Dylan went to an amusement park. He paid \$5 to get in and then he went on. He decided to go on 8 rides. He also had to pay \$4 for a hot dog. In total, it cost him \$52 at the amusement park. How much did each ride cost?

Linear equation: _____

 $x =$ _____

5)

Carson earned \$63 from work today. He worked for 4 hours and received a bonus of \$15. How much does he earn per hour?

Linear equation: _____

 $x =$ _____

6)

Shelly collected 66 treats on Halloween. She went to 15 houses and started with 6 candies at the beginning. How many candies on average did she collect at each house?

Linear equation: _____

 $x =$ _____

Representing Problems with Linear Equations ($x/a = b$)**Questions**Represent the problems with linear equations ($\frac{x}{a} = b$) and solve for x

1)

Claire bought a lot of donuts for her party. She is expecting 32 guests and bought enough for each guest to have 3 donuts. How many donuts did she buy?

Linear equation:

 $x =$

2)

Every day, his friends earned some money by selling lemonade. They split the money between the 6 friends and each got \$24. How much total money did they earn?

Linear equation:

 $x =$ 

3)

Amara collected some eggs during a hunt. She split her eggs up equally between her 4 sisters and her brother. Each sibling got 36 eggs. How many eggs did she collect?

Linear equation:

 $x =$

4)

David is given some money to spend on vacation. He is spending it all during the 5-day vacation, spending \$13 each day. How much money was he given?

Linear equation:

 $x =$ 

5)

Weston practiced piano for a long time this week. He practiced each day for 44 minutes. How many minutes total did he practice for the week?

Linear equation:

 $x =$

6)

Declan doesn't have many chocolates left from Valentine's Day. He rationed them out for the next 8 days, allowing himself to eat 13 chocolates each day. How many chocolates did he have left before the 8 days?

Linear equation:

 $x =$ 

Representing Problems with Linear Equations

Questions

Represent the problems with linear equations

1)

Dominic went to the movie theatre and paid \$13 for admission. Each treat he bought inside was \$6. He ended up spending \$37 in total. How many treats did he buy?

Linear equation: _____

 $x =$ _____

2)

Piper got a new job where she worked 20 hours in her first week. She made \$140 for the week. How much does Piper earn per hour?

Linear equation: _____

 $x =$ _____

3)

Quinn bought treats for her party. She is expecting 13 guests and bought enough to give 11 treats. How many treats did she buy in total?

Linear equation: _____

 $x =$ _____

4)

Silas has been saving money for a long time. He saved an extra \$132 today and now has a total of \$375. How much did he have before?

Linear equation: _____

 $x =$ _____

5)

Alex earned \$89 in total from work today. He worked for 5 hours and received a tip of \$9. How much does he earn per hour?

Linear equation: _____

 $x =$ _____

6)

Micah had 26 points in the 2nd, 3rd, and 4th quarter of today's game. He finished with 39 points. How many points did he have in the first quarter?

Linear equation: _____

 $x =$ _____

Algebra Quiz - Equations

Part 1

Is the example an expression or equation? Circle your answer

	Sentence	Answer
1)	$8n$	Expression Equation
2)	$4n + 3$	Expression Equation
3)	$4n + n - 3$	Expression Equation

	Sentence	Answer
4)	$11x + 12 = 26$	Expression Equation
5)	$\frac{28}{x} + 12 = 16$	Expression Equation
6)	$\frac{35}{x} + x$	Expression Equation

Part 2

Evaluate the following expressions for $x = 5$

1) $x - 10$	2) $9 - x$	3) $5x - 1$	4) $x - 14$
5) $44 + x$	6) $67 + x$	7) $100 - x$	8) $19 + x + 11$

Part 3

Evaluate the following expressions for $y = 8$

1) $5y$	2) $9y - 5$	3) $3y + 5$	4) $8y + 6$
5) $\frac{32}{y} + 8$	6) $\frac{64}{y} + y$	7) $\frac{24}{y} - 9$	8) $\frac{y}{y} \times y$



Google Slides Lessons Preview





Manitoba Math Curriculum Number Unit – Grade 7

3-Part Lesson Format

Part 1 – Minds On!

- Learning Goals
- Discussion Questions
- Quotes
- And More!

Learning Goal

We are learning to recall and use division facts for numbers like 2, 5, 10, 3, 4, 6, 7, 8, and 9, and divide by 10, so we can solve problems with numbers quickly and easily.

Discussion Questions

- 1) How can you tell if a number is divisible? – If you look at a number like 24, how can you quickly decide if it is divisible by 2, 3, or 4 without dividing each time? What clues do you notice?
- 2) What's the fastest way to divide? – If you need to solve $72 \div 8$, would you rather skip count, use multiplication, or another strategy? Why?
- 3) Why does dividing by a bigger number make the answer smaller? – If you divide $48 \div 4$, you get 12, but if you divide $48 \div 8$, you get 6. Why does dividing by a bigger number give you a smaller answer?

Divisibility Check

Paste the sticky notes on the specified boards.

45, 95, 105, 135, 351, 501, 81, 570, 456, 3456

Divisible by 5

Divisible by 9

Part 2 – Action!

- Writing
- Matching
- Drag and Drop
- Drawing
- And More!

Part 3 – Consolidation!

- Exit Cards
- Quizzes
- Reflection
- And More!

Divisibility Rules - Word Problems

- 1) Eli says that all numbers divisible by 6 are also divisible by 3. Is Eli correct? Explain why or why not.
- 2) Somel says that all odd numbers are not divisible by 2. Is this always true? Explain why.
- 3) Kairo has 96 pencils. He wants to arrange them into equal rows of 7. Will there be any pencils left over? How do you know?



Manitoba Math Curriculum Number Unit – Grade 7

Adding Decimals - Thousandths – Regrouping

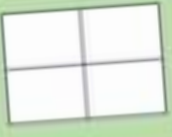
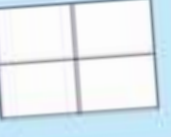
Use the standard algorithm to solve the addition problems below.

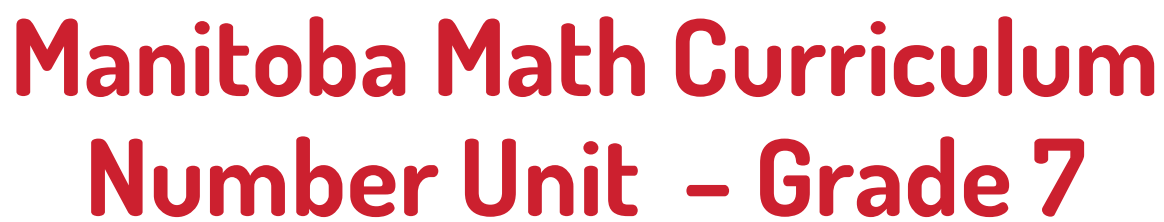
1) $\begin{array}{r} 43.284 \\ + 25.785 \\ \hline \end{array}$	2) $\begin{array}{r} 53.943 \\ + 67.598 \\ \hline \end{array}$	3) $\begin{array}{r} 73.257 \\ + 56.894 \\ \hline \end{array}$
4) $\begin{array}{r} 456.683 \\ + 573.977 \\ \hline \end{array}$	5) $\begin{array}{r} 758.652 \\ + 667.359 \\ \hline \end{array}$	6) $\begin{array}{r} 895.775 \\ + 968.266 \\ \hline \end{array}$

Below.

$\begin{array}{r} 78.154 \\ - 49.637 \\ \hline \end{array}$	$\begin{array}{r} 96.531 \\ - 54.786 \\ \hline \end{array}$
$\begin{array}{r} 334.564 \\ - 278.875 \\ \hline \end{array}$	$\begin{array}{r} 863.783 \\ - 629.846 \\ \hline \end{array}$

Use the area model to solve the multiplication problems below.

1) $13 \times 18 =$ 	2) $22 \times 19 =$ 	3) $36 \times 45 =$ 
4) $53 \times 67 =$ 	5) $78 \times 61 =$ 	6) $84 \times 92 =$ 



Practice - 2-Digit Multiplier
Use the standard algorithm to solve the multiplication problems below.

3)						
		9	4		5	2
x					9	6



Mental Math

When you multiply by 0.1, it's the same as dividing by 10. Move the digits one place to the left.
Example: $500 \times 0.1 = 50$ and $50 \times 0.1 = 5$

When you multiply by 0.01, it's the same as dividing by 100. Move the digits two places to the right.
Example: $500 \times 0.01 = 5$ and $50 \times 0.01 = 0.5$

Match each equation with its answer.

Match each equation with its answer.		
$60 \times 0.1 = \underline{\quad}$		2
$200 \times 0.01 = \underline{\quad}$		90
$40 \times 0.1 = \underline{\quad}$		6
$9\ 000 \times 0.01 = \underline{\quad}$		300
$3\ 000 \times 0.1 = \underline{\quad}$		4

The image shows ten 10x10 grids, each with a different pattern of pink squares. Below each grid is a table with three columns: Fraction, Decimal, and Percent. The grids represent various fractions, such as 1/10, 1/5, 2/5, 3/5, 4/5, 1/2, 2/3, 3/4, 4/6, and 5/10.



Workbook Preview



Grade 7 NUMBER

	Curriculum Expectations	Pages That Cover the Expectations
N.1	Determine and explain why a number is divisible by 2, 3, 4, 5, 6, 8, 9 or 10, and why a number cannot be divided by 0.	3 – 7
N.2	Demonstrate an understanding of the addition, subtraction, multiplication and division of decimals to solve problems (for more than 1-digit divisors or 2-digit multipliers, the use of technology is expected).	8 – 60
N.	Preview of 50 pages from this product that contains 343 pages total.	
N.		
N.		
N.5	Demonstrate an understanding of adding and subtracting positive fractions and mixed numbers, with like and unlike denominators, concretely, pictorially and symbolically (limited to positive sums and differences).	84 – 112
N.6	Demonstrate an understanding of addition and subtraction of integers, concretely, pictorially and symbolically.	113 – 125
N.7	Compare and order positive fractions, positive decimals (to thousandths) and whole numbers by using: • benchmarks • place value • equivalent fractions and/or decimals.	126 – 167

Divisibility Rules

We can determine whether one whole number is divisible by another without doing division. We can use the following divisibility rules:

- A number is divisible by **2** if the last digit is even (0, 2, 4, 6, or 8)
- A number is divisible by **3** if the sum of the digits is divisible by 3
- A number is divisible by **4** if the last two digits form a number divisible by 4
- A number is divisible by **5** if the last digit is 0 or 5
- A number is divisible by **6** if the number is divisible by both 2 and 3
- A number is divisible by **9** if the sum of the digits is divisible by 9
- A number is divisible by **10** if the last digit is a 0

Question: For each number on the left, place a check mark under the numbers it is divisible by

Number	2	3	5	6	8	9	10
1) 65							
2) 20							
3) 105							
4) 81							
5) 120							
6) 548							
7) 423							
8) 657							

Name: _____

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Curriculum Connection
N.1

Divisibility Rules - 2 and 3

We can determine whether one whole number is divisible by another without doing division. We can use the following divisibility rules:

- A number is divisible by **2** if the last digit is even (0, 2, 4, 6, or 8)
- A number is divisible by **3** if the sum of the digits is divisible by 3

Part 1 Is the number divisible by 2?

- 1) _____ 2) 953 _____
3) 582 _____ 4) 8 694 _____

Part 2 Is the number divisible by 3?

- 1) 268 _____ 417 _____
3) 1 458 _____

Part 3 Which numbers are divisible by 2? Circle them

41 58 162 247 358 583
685 714 805 901 1,025 1,714 2,058

Part 4 Which numbers are divisible by 3? Circle them

73 58 84 105 215 324 515
645 683 729 806 1,358 2,355 5,484

Adding Decimals - Regrouping**Questions**

Use the standard algorithm to solve the addition problems below

1) $\begin{array}{r} 63.722 \\ + 25.543 \\ \hline \end{array}$	2) $\begin{array}{r} 65.458 \\ + 23.323 \\ \hline \end{array}$	3) $\begin{array}{r} 38.345 \\ + 26.537 \\ \hline \end{array}$	4) $\begin{array}{r} 35.256 \\ + 41.632 \\ \hline \end{array}$
5) $\begin{array}{r} 26.454 \\ + 17.335 \\ \hline \end{array}$	6) $\begin{array}{r} 50.528 \\ + 7.111 \\ \hline \end{array}$	7) $\begin{array}{r} 28.265 \\ + 17.632 \\ \hline \end{array}$	8) $\begin{array}{r} 66.574 \\ + 29.213 \\ \hline \end{array}$
9) $\begin{array}{r} 192.673 \\ + 325.235 \\ \hline \end{array}$	10) $\begin{array}{r} 374.214 \\ + 53.523 \\ \hline \end{array}$	11) $\begin{array}{r} 18.345 \\ + 22.111 \\ \hline \end{array}$	12) $\begin{array}{r} 652.514 \\ + 95.337 \\ \hline \end{array}$

Part 2

Answer the word problems below

1) Neill just ran a 200m race. He ran the first 100m in 12.326 seconds and the second 100m in 13.63 seconds. How long did it take him to finish the race?



2) Erica's pet snake was 17.425cm long when she got it. The snake grew 4.39cm in the last year. How long is the snake now?



Multiplication - 2 x 2 Digits**Questions**

Use the standard algorithm to solve the multiplication problems below

1)			
		6	3
	x		9

2)			
		8	8
	x	5	4

3)			
		4	6
	x	8	3

4)			
		4	8
	x	3	7

5)			
		8	5
	x	7	8

6)			
		8	3
	x	6	9

7)			
		8	3
	x	6	9

8)			
		3	9
	x	6	3

Part 2

Solve the word problems below

1) Joseph is planning a group trip to a sporting event. He has 31 people going to the event and each person is paying \$64. How much money is Joseph collecting from everyone?



2) Aria hands out a lot of candy on Halloween. She decided to buy 23 boxes of candy. Each box has 95 candies in it. How many candies did she buy in total?



Multiplication - 2 x 2 Digits**Part 1** Use the standard algorithm to solve the multiplication problems below

1) $\begin{array}{r} 67 \\ \times 53 \\ \hline \end{array}$	2) $\begin{array}{r} 55 \\ \times 33 \\ \hline \end{array}$	3) $\begin{array}{r} 85 \\ \times 62 \\ \hline \end{array}$	4) $\begin{array}{r} 24 \\ \times 15 \\ \hline \end{array}$	5) $\begin{array}{r} 78 \\ \times 44 \\ \hline \end{array}$
6) $\begin{array}{r} 8 \\ \times 54 \\ \hline \end{array}$	7) $\begin{array}{r} 65 \\ \times 95 \\ \hline \end{array}$	8) $\begin{array}{r} 76 \\ \times 95 \\ \hline \end{array}$	9) $\begin{array}{r} 38 \\ \times 22 \\ \hline \end{array}$	10) $\begin{array}{r} 78 \\ \times 25 \\ \hline \end{array}$
11) $\begin{array}{r} 48 \\ \times 67 \\ \hline \end{array}$	12) $\begin{array}{r} 52 \\ \times 41 \\ \hline \end{array}$	13) $\begin{array}{r} 64 \\ \times 37 \\ \hline \end{array}$	14) $\begin{array}{r} 2 \\ \times 6 \\ \hline \end{array}$	15) $\begin{array}{r} 68 \\ \times 53 \\ \hline \end{array}$

Part 2 Solve the word problems below

- 1) Harper played 42 games of basketball last season. She scored 17 points per game. How many points did she score in total for the season?



- 2) Brianna blinks 18 times a minute. How many times does she blink in one hour?



Front-End Estimation - Multiplication Using Decimals**Questions**

Use front-end estimation to round to the nearest whole number

1) Question	$5.31 \times 5 = ?$
Front-End Estimation Version	$5 \times 5 = 25$
2) Question	$8.82 \times 7 = ?$
Front-End Estimation Version	_____ $\times$ _____ = _____
3) Question	$6.31 \times 4 = ?$
Front-End Estimation Version	_____ $\times$ _____ = _____
4) Question	$9.87 \times 8 = ?$
Front-End Estimation Version	_____ $\times$ _____ = _____
5) Question	_____ $\times$ _____ = _____
Front-End Estimation Version	_____ $\times$ _____ = _____
6) Question	$19.48 \times 4 = ?$
Front-End Estimation Version	_____ $\times$ _____ = _____
7) Question	$22.13 \times 9 = ?$
Front-End Estimation Version	_____ $\times$ _____ = _____
8) Question	$29.94 \times 6 = ?$
Front-End Estimation Version	_____ $\times$ _____ = _____

Front End Estimation - Becky's Shop

Becky runs a bakery where she sells bread, muffins, and cookies. She always uses front-end estimation when charging her customers. They appreciate it because the final price is always underestimated.

Menu	Cost
Bread	\$3.19
Muffins	\$2.25
Cookies	\$1.49

Questions

Use front-end estimation to calculate how much customers owe Becky

1) One customer purchased 3 loaves of bread and 2 muffins. How much did Becky charge?

2) A customer ordered 2 loaves of bread. How much do they owe Becky?

3) A customer ordered 5 of each item on the menu. How much do they owe Becky?

4) A customer used a \$20 bill to buy 4 loaves of bread and 3 cookies. How much change does Becky owe them?

5) A customer ordered 4 muffins and 4 cookies. The customer right after said they wanted the same thing. How much did Becky earn on the 2 sales?

Multiplication - 1-Digit Multiplier

Part 1

Use the standard algorithm to solve the multiplication problems below

1)					
	1	3	.	2	7
x					2

2)					
		5	.	4	7
x					3

3)					
	4	2	.	4	6
x					5

4)					
	3	6	.	6	
x					8

				5	6
					6

6)					
	3	2	.	8	9
x					7

Part 2

Use the standard algorithm to solve the multiplication problems below

1) 5.14 $\times 5$	2) 7.37 $\times 3$	3) 2.47 $\times 7$	4) 3.1 $\times 9$	5) 1.2 $\times 8$
6) 9.78 $\times 2$	7) 5.52 $\times 4$	8) 7.26 $\times 6$	9) 6.48 $\times 5$	10) 7.43 $\times 8$

Multiplication - 2-Digit Multipliers - Earnings**Questions**

Solve the word problems below

Kevin is a high-school student who just started a new job. He is excited to start earning money, so he is calculating how much he will make. A schedule of his 6 weeks of work is listed below.



	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Hours	13	15	21	22	12	

- 1) For his first week of work, Kevin will earn only \$9.25 per hour because he is just being trained. How much will he earn in week 1?
- 2) For his second week of work, Kevin begins earning \$14.75 per hour. How much will he earn in week 2?
- 3) How much will Kevin earn in week 3 if he continues earning \$14.75 per hour?
- 4) If Kevin continues earning \$14.75 for weeks 2-6, how much money will he make in his first 6 weeks?



Division - Decimal Numbers**Questions**

How many times you can divide the bigger number by the smaller number

1)
$$\begin{array}{r} \\ 2 \overline{) 4.22} \end{array}$$

2)
$$\begin{array}{r} \\ 3 \overline{) 9.63} \end{array}$$

3)
$$\begin{array}{r} \\ 2 \overline{) 8.48} \end{array}$$

4)
$$\begin{array}{r} \\ 4 \overline{) 8.60} \end{array}$$

5)
$$\begin{array}{r} \\ 4 \overline{) 4.88} \end{array}$$

7)
$$\begin{array}{r} \\ 2 \overline{) 6.39} \end{array}$$

8)
$$\begin{array}{r} \\ 6 \overline{) 6.48} \end{array}$$

Part 2

Use an area model to solve the word problem

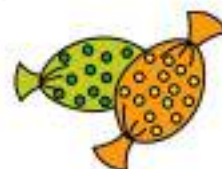
1) An ice cream tub has 2.07kg of ice cream in it. There are 9 servings of ice cream.

a) How many kg of ice cream are there per serving?

b) How many grams are in each serving?



2) A bag of 8 candies weighs 184g. How much does each candy weigh?



Division - Decimal Word Problems**Questions**

Solve the word problems below

1) Tim bought 6 of the same candies for \$6.48. How much did each candy cost?



2) Shannon bought 8 raffle tickets for \$4.24. How much was each ticket?



3) Leah bought 5 coffees for her friends. How much did each coffee cost her \$10.45. How much money did each coffee cost?



4) Sam paid \$9.36 for 3 ice cream treats. How much did each treat cost?



Dividing Decimals - Scaling by 10

We can make a division statement easier by scaling it to make both numbers whole numbers.

Example:

$70.5 \div 0.5$ can be scaled by 10 (multiply by 10), so that the question is $705 \div 5 = 141$, therefore, $70.5 \div 0.5 = 141$

***When we scale numbers in a number sentence, we have to scale them by the same number for the sentences to be equivalent.

Question: Scale the division sentence by 10 and then solve

1) Original Question $10.5 \div 0.5 =$

Scaled by 10

2) Original Question $1.2 \div 0.3 =$

Scaled by 10

3) Original Question $8.8 \div 0.4 =$

Scaled by 10

4) Original Question $12.6 \div 0.6 =$

Scaled by 10

5) Original Question $21.7 \div 0.7 =$

Scaled by 10

Dividing Decimals - Scaling by 100**Questions**

Scale the division sentence by 100 and then solve

1) Original Question	$2.34 \div 0.18 =$
Scaled by 10	
2) Original Question	$5.5 \div 0.25 =$
Scaled by 10	
3) Original Question	$6.12 \div 0.36 =$
Scaled by 10	
4) Original Question	$\quad \div \quad =$
Scaled by 10	

Word Problems

Answer the word problems below

1) Roman bought 9.12kg of canned tomatoes. Each can holds 0.48kg. How many cans did he buy?



2) Lillian returned a bag of cans and received \$4.85. She received \$0.05 for each can she returned. How many cans did she return?



Mental Math - Calculating Percentages - 25% and 50%

Percents represent a rate out of 100 in relation to a whole. 50% represents half of a number and 25% is a quarter of a number.

Steps - Calculating 50%...

1. Find half of the number

Example - 50% of 148

1. Divide the number 148 in half
($148 \div 2 = 74$)
2. 50% of 148 is 74

Steps - Calculating 25%

1. Find out what 50% of the number is by halving the number
2. Halve the number one more time

Example - 25% of 188

1. $188 \div 2 = 94$
2. $94 \div 2 = 47$

Part 1 Find half of the numbers below?

- | | |
|---------------|---------------|
| 1) 24 _____ | 3) 76 _____ |
| 4) 128 _____ | 6) 212 _____ |
| 7) 264 _____ | 9) 410 _____ |
| 10) 550 _____ | 12) 844 _____ |

Part 2 Fill in the table below

	Number	50%	25%
1)	100		
2)	200		
3)	240		
4)	164		
5)	188		
6)	264		

	Number	50%	25%
7)	348		
8)	414		
9)	560		
10)	644		
11)	828		
12)	940		

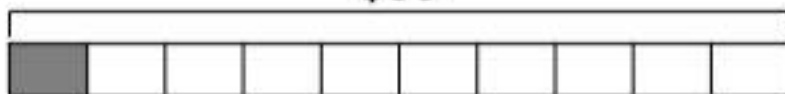
Mental Math - Calculating Percentages - Visuals

When we want to find the percent of a number, scaling up and down is the best way.

For example, a shirt costs \$80 at regular price. To calculate a sale price, we can scale 10% up and down. First, 10% of 80 is 8 which means 20% is 16 and 30% is 24.



\$80



10%
\$8



Practice the problems below

- 1) Tom is shopping for new shoes. He finds a pair he likes for \$70.00 that are on sale for 15% off. How much will the shoes cost before tax?



- 2) Lindsay is out shopping for a new winter coat. She finds one for \$90.00 plus an additional 20% off. How much will the coat cost before tax?



- 3) Joe brings \$100 to the mall to buy some new speakers. He finds some for \$78.00 with an additional 35% off.

- How much will the speakers cost before tax?
- With a sales tax of 5%, how much will the speakers cost?
- How much of the \$100 will Joe have when he leaves the mall?



Determining Sales Tax

When we pay for something, we need to pay tax. **Tax** is an extra cost placed on a good or service that goes to the government. In Alberta, we pay 5% GST.

When we purchase something, we should add 5% to the total price so we know if we can afford it. We can do this by using a calculator or by estimating. Follow these steps:

Estimating Sales Tax

- 1) Divide the price by 10 (example - $\$32.00 \div 10 = \3.20) to determine 10% of the cost
- 2) We can take that number in half to find another 5% (example = $\$3.20 \div 2 = \1.60)
- 3) Add the 10% and 5% to the product price to find the total price ($\$32.00 + \$1.00 = \$33.00$)

Province	British Columbia	New Brunswick	Saskatchewan
	12%	15%	11%

Questions

1. Find the 10% of the price by dividing the price by 10 and then divide that answer by 2

#	Product Price	10%	5% (half of 10%)	Total Price
1	\$20.00	\$2.00	\$1.00	\$21.00
2	\$10.00			
3	\$30.00			
4	\$40.00			
5	\$50.00			
6	\$60.00			
7	\$25.00			
8	\$100.00			
9	\$42.00			
10	\$88.00			

Determining Sales Tax - Word Problems**Questions**

Answer the word problems below

1) Kayden has a \$10 bill and wants to know if he can afford a burger and fry meal that costs \$9.00 before taxes. Calculate the total cost of the meal after adding 5% tax. Can he afford the meal?

Bonus: How much money does he have left?



2) Dexter wants to buy a video game that costs \$95.00 before tax. How much will he have left if he has \$100 and the game costs \$95.00 before tax. How much will he have left if he has \$100 and the game costs \$95.00 before tax. How much will he have left if he has \$100 and the game costs \$95.00 before tax?

Bonus: How much money will he have left if he has \$100 and the game costs \$95.00 before tax. How much will he have left if he has \$100 and the game costs \$95.00 before tax. How much will he have left if he has \$100 and the game costs \$95.00 before tax?



3) Mya is thinking of purchasing a new pair of headphones that cost \$62.00. She only has \$65.00. Does she have enough money to buy them after a 5% tax is added? Explain.



Word Problems - Percentages

Questions

Answer the word problems below

- 1) The grade 7's voted on where their class trip would be. There were 5 options and students could only vote for one option. The results are below:

- a) What percentage of students chose Mini-golf?

Movie Theatre	15%
Amusement Park	23%
Hockey Arena - Skating	18%
Shopping Mall	31%
Mini-Golf	

- b) If there were 20 grade 7 students, how many chose going to the amusement park?



- 2) In a math test, the percentage of grade 7 students who scored an A, B, C, D, and F is listed below.

- a) What percentage of students received an F?

A	22%
B	35%
C	27%
D	12%
F	

- b) If there were 50 students who wrote the test, how many students received an F?



- 3) Ryan surveyed his grade 7 classmates asking what their favourite food is. He tallied his results as percentages.

- a) What percentage of students liked pizza the best?

Pizza	
Subs	21%
Steak	12%
Chicken	18%
Tacos	17%

- b) If Ryan surveyed 25 students, how many chose pizza?



Name: _____

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Curriculum Connection
N.3**Class List - Decimal, Fraction, Percent**

Mrs. Hansen just finished marking a math test. Her class list with the results of the test are below. She has simplified some of the fractions, and some students wrote a different test, meaning they are out of a different total.

Grades

A = 80% and up

B = 70% - 79%

C = 60% - 69%

D = 50% - 59%

F = 49% or less

Questions

Fill in the class list



Student Name	Mark	Decimal	Percent	Grade
Madison	3/4			
Stella	10/10			
Matthew	7/10			
Eli	7/10			
John	1/2			
Kai	1/4			
Ivy	4/4			
Everly	1/5			
Bella	75/100			
Skylar	95/100			
Leah	8/10			
Roman	1/8			
Adrian	1/10			
Easton	4/5			
Savannah	75			

Sport Statistics - Fractions, Decimals, and Percents**Questions****Baseball Statistics – 2020 Regular Season Offensive Statistics**

1) Mike Trout had 200 at bats in 2020. He had $56/200$ hits, $42/200$ runs, and $18/200$ home runs. This means for every 200 at bats, he would have 56 hits, 42 runs, and 18 home runs.

	Hits	Runs	Home Runs
Totals - Fraction	$56/200$	$42/200$	$18/200$
Decimal to thousandths			
Percent			

a) If Trout had 100 at bats, how many hits would he have? _____



2) Mookie Betts had 300 at bats in 2020. He had $97/300$ hits, $57/300$ runs, and $27/300$ home runs. This means for every 300 at bats, he would have 97 hits, 57 runs, and 27 home runs.

	Hits	Runs	Home Runs
Totals - Fraction	$97/300$	$57/300$	$27/300$
Decimal to thousandths			
Percent			

a) If Betts had 100 at bats, how many hits would he have? _____

Terminating and Repeating decimal

Terminating Decimal

- Decimals that come to an end

Example - $2/4 = 0.5$

Repeating Decimal

- Decimals that never end

Example - $2/3 = 0.66666... \text{ or } 0.\overline{6}$

We can use a line over the repeating number or number pattern to show it repeats forever

Part 1

Write the decimal a repeating or terminating decimal?

1) 0	6) 0.9
2) 0.3	7) $0.\overline{72}$
3) $0.\overline{7}$	8) $0.41\overline{6}$
4) 0.25	9) 0.15
5) $0.\overline{6}$	10) 10

Part 2

Write the decimals below - use a line to show repeating decimals

1) $\frac{1}{3} = 0.\overline{3}$	2) $\frac{6}{10} =$	3) $\frac{1}{2} =$
4) $\frac{2}{3} =$	5) $\frac{8}{11} =$	6) $\frac{3}{9} =$
7) $\frac{1}{4} =$	8) $\frac{11}{12} =$	9) $\frac{4}{12} =$
10) $\frac{3}{5} =$	11) $\frac{4}{6} =$	12) $\frac{1}{12} =$
13) $\frac{5}{8} =$	14) $\frac{1}{8} =$	15) $\frac{7}{8} =$

Name: _____

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Curriculum Connection
N.4

Terminating and Repeating decimal

Part 1

Write the decimal number as it would show on a calculator.
Stop after 8 decimal points.

1) $0.\overline{4}$	
2) $0.\overline{001}$	
3) $0.\overline{7}$	
4) $0.\overline{9}$	
5) $0.\overline{6}$	

6) 0.9	
7) $0.\overline{285714}$	
8) 0.265615	
9) $0.\overline{85}$	
10) $0.\overline{27}$	

Part 2

Write the following as terminating and repeating decimals

Terminating Decimals	Repeating Decimals

Part 3

Define the terms below in your own words

Terminating Decimal	
Repeating Decimal	

Patterns Found With Repeating Decimals

We can find patterns between fractions and their repeating decimals.

For example:

Using a denominator of 7 will always:

- produce 6 repeating digits
- digits will be 142857 in a cyclic pattern

Example	
$2/7 = 0.\overline{285714}$	$4/7 = 0.\overline{571428}$
$3/7 = 0.\overline{428571}$	$5/7 = 0.\overline{714285}$

Question Discover the patterns with each of the fraction/decimal relationships

1)	$1/11 =$	$2/11 =$	$3/11 =$	$4/11 =$	$5/11 =$
What patterns did you notice about the answers?					
2)	$1/9 =$	$3/9 =$	$7/9 =$	$8/9 =$	
What patterns did you notice about the answers?					
3)	$1/99 =$	$2/99 =$	$3/99 =$	$4/99 =$	
What patterns did you notice about the answers?					
4)	$1/999 =$	$3/999 =$	$5/999 =$	$7/999 =$	$9/999 =$
What patterns did you notice about the answers?					

Patterns Found With Repeating Decimals

Part 1

Fill in the table to learn more about patterns with repeating decimals

1)	$3/9 =$	$3/90 =$	$3/900 =$	$3/9000 =$
2)	$1/6 =$	$1/60 =$	$1/600 =$	$1/6000 =$
3)	$4/9 =$	$4/90 =$	$4/900 =$	$4/9000 =$
4)	$6/7 =$	$6/110 =$	$6/1100 =$	$6/11000 =$
5)	$5/7 =$	$5/70 =$	$5/700 =$	$5/7000 =$

Part 2

Use the information to answer the questions below. No Calculators!

Denominator of the fraction	Pattern in the Repeating Decimal	Example
9	- Single repeating digit - The numerator is the repeating digit	$\frac{5}{9} = 0.\overline{5}$
90	- Single repeating digit - Numerator is the repeating digit - Add a zero before the repeating digit	$\frac{5}{90} = 0.0\overline{5}$

	Fraction	Repeating Decimal
1)	$\frac{1}{9}$	
2)	$\frac{2}{9}$	
3)	$\frac{4}{9}$	
4)	$\frac{7}{9}$	
5)	$\frac{8}{9}$	
6)	$\frac{8}{90}$	

	Repeating Decimal	Pattern
1)	$0.\overline{3}$	
2)	$0.\overline{6}$	
3)	$0.0\overline{5}$	
4)	$0.00\overline{8}$	
5)	$0.0000\overline{2}$	
6)	$0.000\overline{4}$	

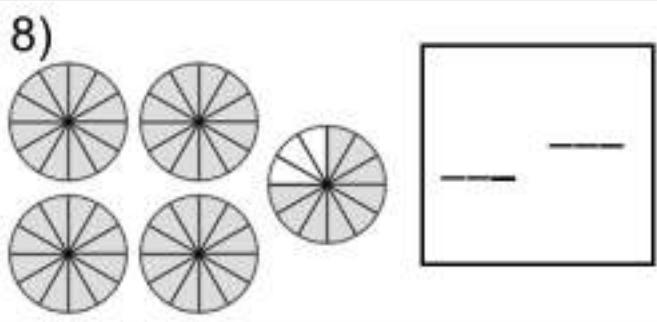
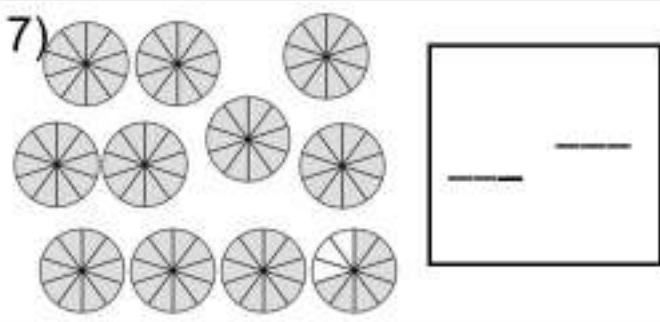
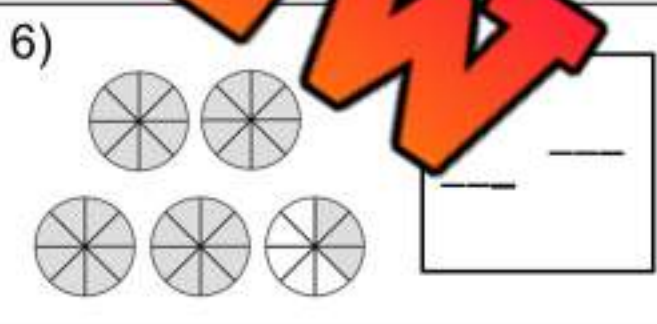
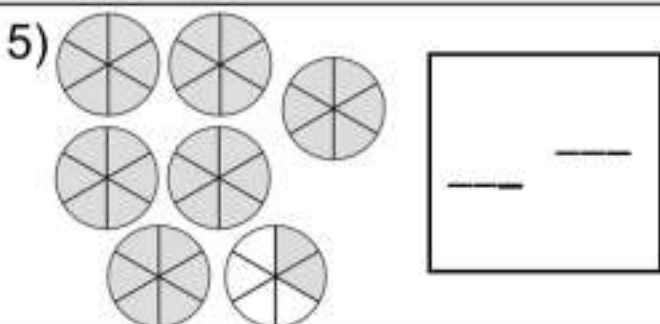
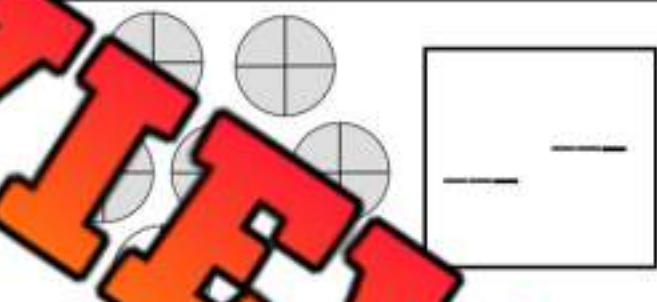
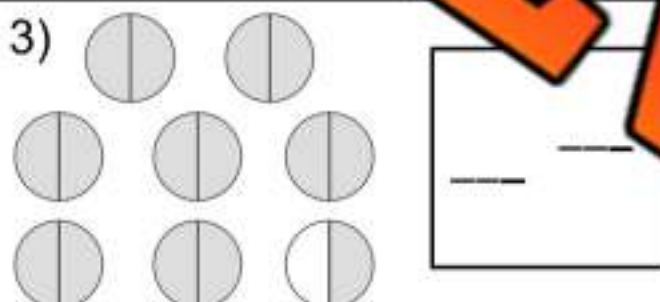
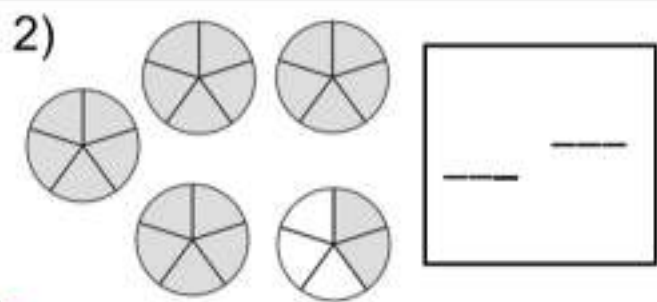
Mixed Numbers

A **mixed fraction** displays a whole number and a fraction to represent a value.

For example, if you have 2 full pizzas and $\frac{2}{4}$ of a pizza, the mixed fraction would be: $2 \frac{2}{4}$

**Question**

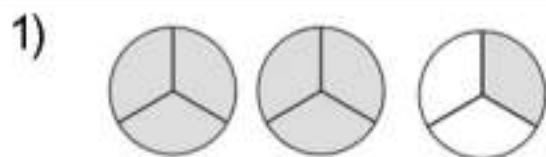
Write the fraction beside the visual fractions



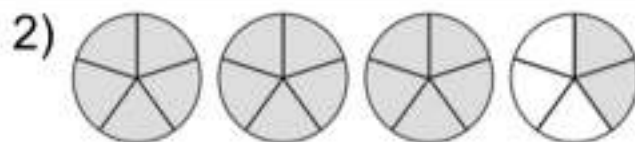
Improper Fractions

Questions

Convert the mixed numbers into improper fractions



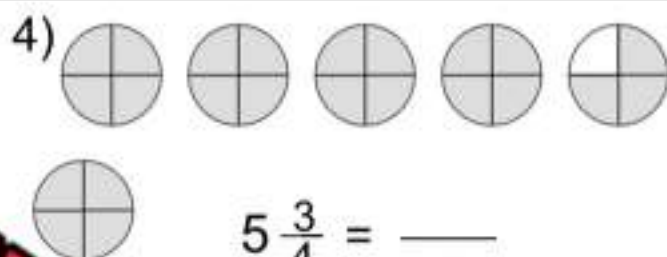
$$4 = \underline{\hspace{2cm}}$$



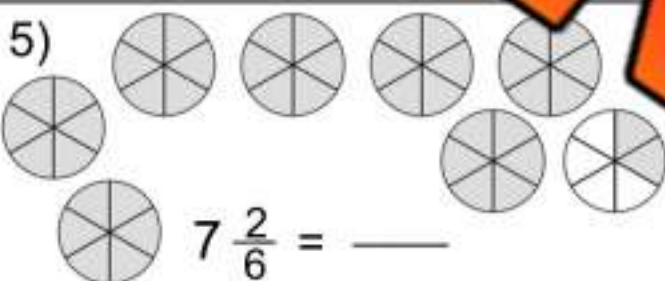
$$3 \frac{2}{5} = \underline{\hspace{2cm}}$$



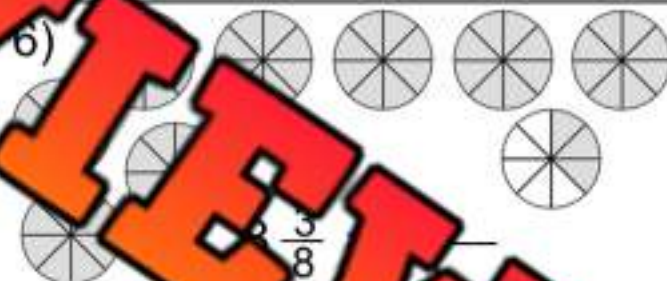
$$6 \frac{1}{2} = \underline{\hspace{2cm}}$$



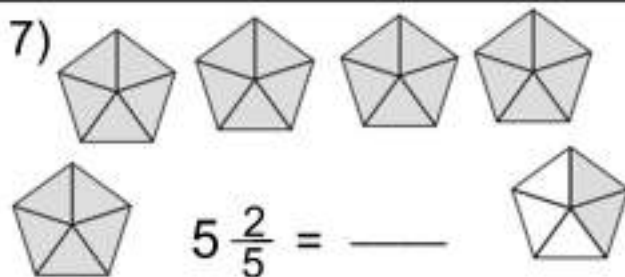
$$5 \frac{3}{4} = \underline{\hspace{2cm}}$$



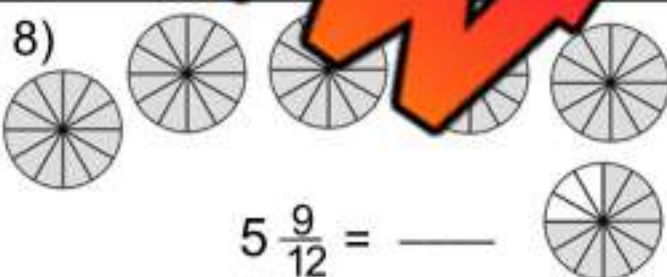
$$7 \frac{2}{6} = \underline{\hspace{2cm}}$$



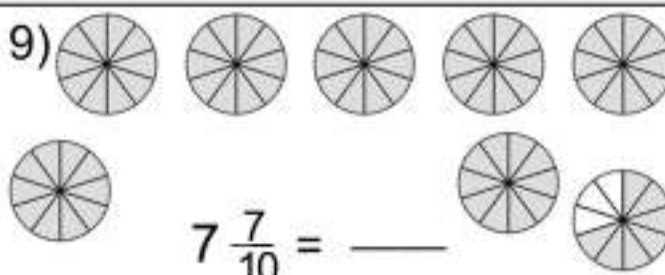
$$8 \frac{3}{8} = \underline{\hspace{2cm}}$$



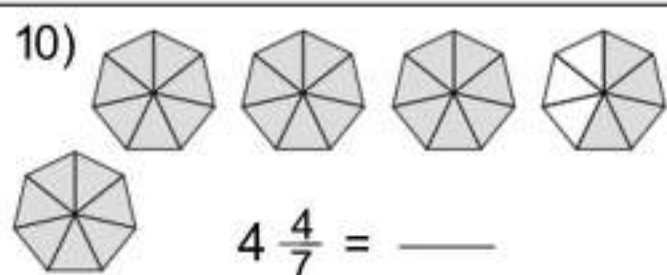
$$5 \frac{2}{5} = \underline{\hspace{2cm}}$$



$$5 \frac{9}{12} = \underline{\hspace{2cm}}$$



$$7 \frac{7}{10} = \underline{\hspace{2cm}}$$



$$4 \frac{4}{7} = \underline{\hspace{2cm}}$$

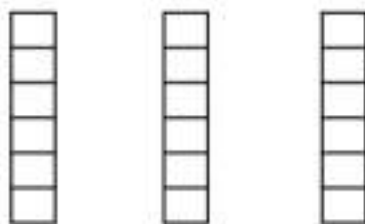
Adding Fractions with Common Denominators**Questions**

Add the fractions below using the models

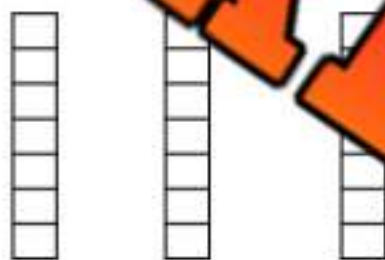
1) $\frac{2}{4} + \frac{1}{4} = \frac{3}{4}$



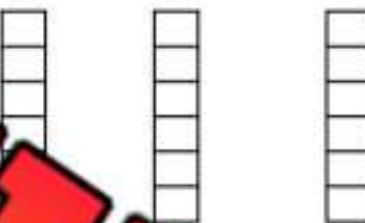
2) $\frac{4}{6} + \frac{1}{6} = \underline{\hspace{1cm}}$



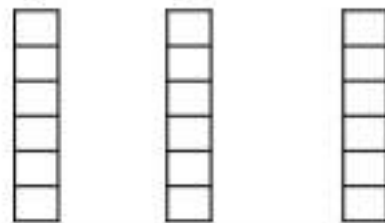
3) $\frac{2}{7} + \frac{1}{7} = \underline{\hspace{1cm}}$



4) $\frac{2}{6} + \frac{2}{6} = \underline{\hspace{1cm}}$



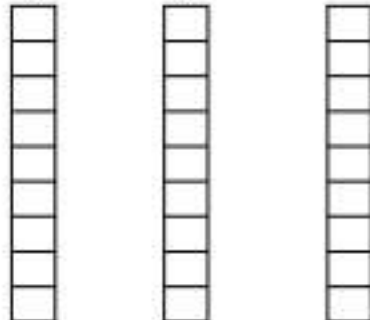
5) $\frac{4}{6} + \frac{1}{6} = \underline{\hspace{1cm}}$



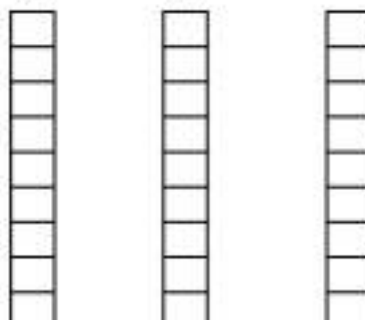
6) $\frac{3}{5} + \frac{2}{5} = \underline{\hspace{1cm}}$



7) $\frac{3}{9} + \frac{2}{9} = \underline{\hspace{1cm}}$



8) $\frac{5}{9} + \frac{3}{9} = \underline{\hspace{1cm}}$



Adding Fractions with Common Denominators**Questions**Add the fractions below and write the answer as an improper fraction and mixed number

1) $\frac{3}{4} + \frac{5}{4} = \frac{8}{4}$ or $2\frac{0}{4}$

2) $\frac{5}{6} + \frac{2}{6} = \text{---} \text{---}$

3) $\frac{2}{5} + \frac{3}{5} = \text{---} \text{---}$

4) $\frac{6}{9} + \frac{5}{9} = \text{---} \text{---}$

5) $\frac{3}{2} + \frac{2}{2} = \text{---} \text{---}$

6) $\frac{3}{3} + \frac{1}{3} = \text{---} \text{---}$

7) $\frac{6}{3} + \frac{2}{3} = \text{---} \text{---}$

8) $\frac{6}{8} + \frac{2}{8} = \text{---} \text{---}$

9) $\frac{6}{6} + \frac{4}{6} = \text{---} \text{---}$

10) $\frac{4}{6} + \frac{3}{6} = \text{---} \text{---}$

11) $\frac{4}{4} + \frac{2}{4} = \text{---} \text{---}$

12) $\frac{9}{4} + \frac{5}{4} = \text{---} \text{---}$

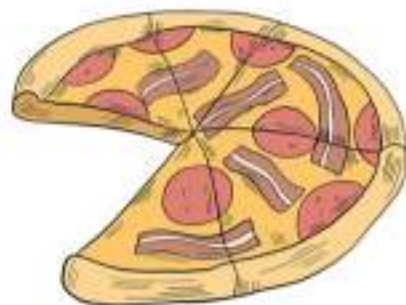
13) $\frac{5}{8} + \frac{5}{8} = \text{---} \text{---}$

14) $\frac{9}{7} + \frac{6}{7} = \text{---} \text{---}$

Cooking with Fractions - Adding**Questions**

Solve the word problems

1) Kelly is making 5 pizzas. She needs $\frac{2}{3}$ of a cup of flour for each pizza. How many cups of flour does she need in total?



2) A cookie recipe calls for $\frac{3}{8}$ of a cup of sugar and $\frac{1}{2}$ of a cup of brown sugar. How much sugar in all does the cookie recipe use?



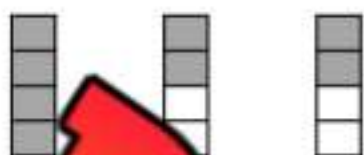
3) A smoothie calls for $\frac{3}{5}$ of a banana, $\frac{8}{10}$ of a peach, and $\frac{1}{2}$ of a kiwi. How many pieces of fruit are in the smoothie?



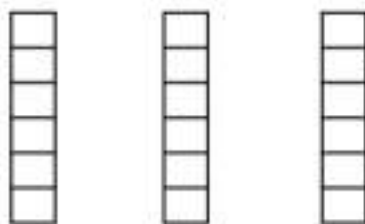
Subtracting Fractions - Common Denominators**Questions**

Subtract the fractions below using the models

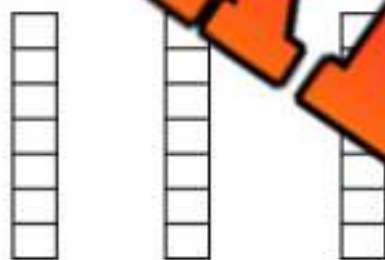
1) $\frac{4}{4} - \frac{2}{4} = \frac{2}{4}$



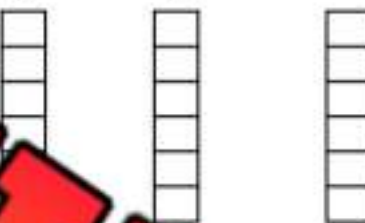
2) $\frac{5}{6} - \frac{3}{6} = \underline{\hspace{1cm}}$



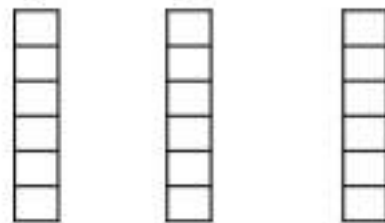
3) $\frac{5}{7} - \frac{2}{7} = \underline{\hspace{1cm}}$



4) $\frac{6}{6} - \frac{3}{6} = \underline{\hspace{1cm}}$



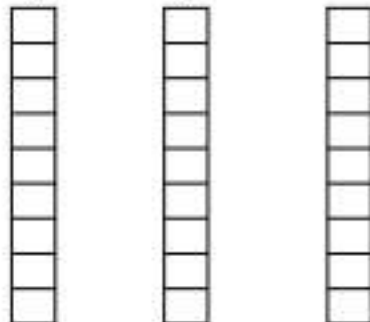
5) $\frac{5}{6} - \frac{1}{6} = \underline{\hspace{1cm}}$



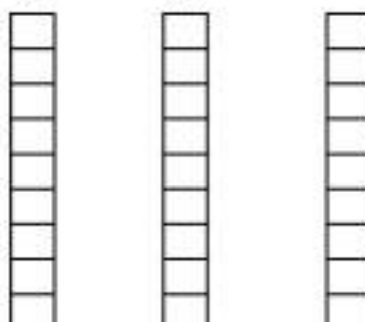
6) $\frac{4}{5} - \frac{2}{5} = \underline{\hspace{1cm}}$



7) $\frac{8}{9} - \frac{3}{9} = \underline{\hspace{1cm}}$



8) $\frac{7}{9} - \frac{2}{9} = \underline{\hspace{1cm}}$



Subtracting Fractions - Word Problems**Questions**

Solve the word problems

1) Brittney's father is $6\frac{1}{4}$ feet tall. Brittney is $5\frac{2}{4}$ feet tall. How much taller is Brittney's father?



2) Nathan is $12\frac{1}{4}$ years old. His older sister is $\frac{64}{4}$ years old. How much older is Nathan's sister than he is?



3) A car's gas tank can hold $30\frac{2}{5}$ litres of gas. The car has $\frac{75}{5}$ litres of gas in it. How many more litres can the gas tank hold until it is full?



Subtracting Fractions with Unlike Denominators**Questions**

Create common denominators and then subtract the fractions below

1) $\frac{2}{4} - \frac{1}{2} = \frac{2}{4} - \frac{2}{4} = \frac{0}{4}$

2) $\frac{3}{4} - \frac{2}{8} = \underline{\quad} - \underline{\quad} = \underline{\quad}$

3) $\frac{1}{2} - \underline{\quad} = \underline{\quad}$

4) $\frac{5}{6} - \frac{1}{2} = \underline{\quad} - \underline{\quad} = \underline{\quad}$

5) $\frac{3}{4} - \frac{3}{8} = \underline{\quad} - \underline{\quad} = \underline{\quad}$

6) $\frac{10}{14} - \frac{3}{7} = \underline{\quad} - \underline{\quad} = \underline{\quad}$

7) $\frac{5}{6} - \frac{6}{12} = \underline{\quad} - \underline{\quad} = \underline{\quad}$

8) $\frac{5}{6} - \underline{\quad} = \underline{\quad}$

9) $\frac{10}{15} - \frac{2}{5} = \underline{\quad} - \underline{\quad} = \underline{\quad}$

10) $\frac{12}{20} - \frac{8}{40} = \underline{\quad} - \underline{\quad} = \underline{\quad}$

11) $\frac{9}{12} - \frac{2}{4} = \underline{\quad} - \underline{\quad} = \underline{\quad}$

12) $\frac{10}{18} - \frac{5}{9} = \underline{\quad} - \underline{\quad} = \underline{\quad}$

13) $\frac{3}{4} - \frac{5}{16} = \underline{\quad} - \underline{\quad} = \underline{\quad}$

14) $\frac{4}{7} - \frac{6}{14} = \underline{\quad} - \underline{\quad} = \underline{\quad}$

Adding Integers - Zero Pairs



+	+	+	-	-	-
+	+	+	-	-	-
+	+				

8 + (-6) = 2



Question

Cross out the zero pairs. What is left?

1) $\begin{matrix} (+) \\ (+) (+) (+) \\ (+) (+) (+) \end{matrix}$ ____ + ____ = ____	2) $\begin{matrix} (+) (+) (+) \\ (+) (+) \end{matrix}$ $\begin{matrix} (-) (-) (-) \\ (-) (-) (-) \end{matrix}$ ____ + ____ = ____	3) $\begin{matrix} (+) (+) (+) \\ (+) (+) \end{matrix}$ $\begin{matrix} (-) (-) (-) \\ (-) (-) (-) \\ (-) (-) (-) \end{matrix}$ ____ + ____ = ____
4) $\begin{matrix} (+) (+) (+) \end{matrix}$ $\begin{matrix} (-) (-) (-) \\ (-) (-) (-) \\ (-) (-) \end{matrix}$ ____ + ____ = ____	5) $\begin{matrix} (+) (+) \\ (+) \end{matrix}$ $\begin{matrix} (-) (-) (-) \\ (-) (-) (-) \\ (-) (-) \end{matrix}$ ____ + ____ = ____	6) $\begin{matrix} (+) (+) \end{matrix}$ $\begin{matrix} (-) (-) (-) \\ (-) (-) (-) \end{matrix}$ ____ + ____ = ____
7) $\begin{matrix} (+) (+) (+) \\ (+) (+) (+) \\ (+) (+) \end{matrix}$ $\begin{matrix} (-) (-) (-) \\ (-) \end{matrix}$ ____ + ____ = ____	8) $\begin{matrix} (+) (+) (+) \\ (+) (+) (+) \\ (+) \end{matrix}$ $\begin{matrix} (-) (-) (-) \\ (-) (-) (-) \\ (-) (-) \end{matrix}$ ____ + ____ = ____	9) $\begin{matrix} (+) \\ (+) \end{matrix}$ $\begin{matrix} (-) (-) (-) \\ (-) (-) (-) \\ (-) (-) (-) \end{matrix}$ ____ + ____ = ____
10) $\begin{matrix} (+) (+) (+) \\ (+) (+) \end{matrix}$ $\begin{matrix} (-) (-) (-) \\ (-) (-) (-) \\ (-) (-) \end{matrix}$ ____ + ____ = ____	11) $\begin{matrix} (+) (+) (+) \\ (+) (+) (+) \\ (+) (+) \end{matrix}$ $\begin{matrix} (-) (-) (-) \\ (-) (-) \end{matrix}$ ____ + ____ = ____	12) $\begin{matrix} (+) (+) (+) \\ (+) (+) \end{matrix}$ $\begin{matrix} (-) (-) (-) \\ (-) (-) (-) \\ (-) (-) (-) \end{matrix}$ ____ + ____ = ____

Golf - Adding Integers - Zero Pairs

Word Problems

Solve the word problems below using counter chips



- 1) Alice played 2 rounds of golf. Her final scores for both rounds are on the scorecard. What is the total score for the two rounds?



Round	Score
1	-6
2	+9
Total Score	

Equation: _____ + _____ = _____

- 2) Theo played 3 rounds of golf. His final scores for all three rounds are on the scorecard. What is his total score?



Round	Score
1	-5
2	-3
3	+5
Total Score	

Equation: _____ + _____ + _____ = _____

- 3) Leah played 4 rounds of golf. Her final scores are on the scorecard. What is her total score?

R1	R2	R3	R4
-4	4	-2	-4



Equation: _____ + _____ + _____ + _____ = _____

- 4) Miles played 4 rounds of golf. His final scores are written on the scorecard. What is his total score?

R1	R2	R3	R4	Total Score
8	3	-6	-5	



Equation: _____ + _____ + _____ + _____ = _____

Adding Integers - Using Number Lines

-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Part 1

Solve the questions below

1) $5 + (-3) + 2$

6) $-15 + 11 + (-5)$

2) $1 + (-3) + 3$

7) $17 + (-6) + (-8)$

3) $-12 + 5 + (-3)$

8) $-15 + (-5) + 11 + (-7)$

4) $13 + (-6) + (-4)$

9) $11 + (-7) + (-5)$

5) $-11 + 4 + (-2)$

10) $1 + (-5) + 7$

Part 2

Answer the word problems below. Write the equation.

- You take 9 steps forwards, 7 steps backwards, another 5 steps backwards, and another 4 steps forwards. How many steps have you taken?
- The Big Dipper rollercoaster climbs straight up 30m above ground level before it drops 18m. Next, it climbs another 22m before it drops 17m. When the ride is over, the participants are how much higher than ground level?



Adding Integers - Rules

Adding Integers Rules

$\oplus + \oplus = \oplus$ Adding 2 positive integers will always give a positive answer

$\ominus + \ominus = \ominus$ Adding 2 negative integers will always give a negative answer

$\oplus + \ominus = \ominus$ Adding integers with different signs $\rightarrow$ use the larger number

$\ominus + \oplus = \oplus$ Adding integers with different signs $\rightarrow$ use the larger number

*** If integers have the same sign, add them and keep the sign

*** If integers have different signs, subtract them and use the sign of the larger number

Part 1 Use the rules to answer the 1-step questions below

1) $42 + (-13)$

6) $175 + (-121)$

2) $57 + (-66)$

5) $(-5) + (-136)$

3) $-132 + (-112)$

7) $1 + (-1)$

4) $(+33) + (+86)$

8) $-128 + (-3)$

Part 2 Simplify the multi-step questions and use the rules

1) $16 + (-11) + (-17)$

4) $42 + 35 + (-28) + (-1)$

2) $37 + (-26) + 28$

5) $68 + (-75) + (-33) + 91$

3) $-82 + (-42) + (-35)$

6) $-108 + 85 + (-72) + (132)$

Subtracting Integers - Keep, Flip, Change

Subtraction Integers Rules

To subtract integers, it is easiest to change the operation to addition and then follow the addition rules. We can do this by using the rule – Keep, Flip, Change. We keep the first number the same, flip the operation from subtraction to addition, and then change the third number's sign.

Example: $5 - (-6) = ?$ becomes $5 + 6 = 11$

Keep the
first
integer

Flip the
operation

Change the
sign of the next
integer

Part 1 Use the rules above to solve the problems

1) $8 - (-9) =$

6) $(+37) - (+41) =$

2) $24 - (-11) =$

7) $(-12) - (+23) =$

3) $(-11) - 8 =$

8) $(-5) - (-8) =$

4) $(-23) - 13 =$

9) $(-53) - (-20) =$

5) $(-31) - (-12) =$

10) $88 - (-57) =$

Part 2 Answer the word problem below. Write the equation for each question

The highest recorded temperature on Earth is 56°C . The lowest recorded temperature is -89°C . What is the difference between these two temperatures?



Name: _____

123

Curriculum Connection
N.6

Subtracting Integers - Riddle

Questions

Write the letters above the answers at the bottom to solve the riddle

E) $10 - (-4) =$

N) $(+17) - (+30) =$

P) $(-15) - (-10) =$

E) $(+61) - (+38) =$

L) $(-18) - 7 =$

O) $(-36) - (-20) =$

N) $(-12) - 17 =$

E) $(-10) - (-10) =$

V) $43 - (-18) =$

A) $(+63) - (+53) =$

What begins with an E but only has one letter

10 -13_____
14 -29_____
61_____
23_____
-25_____
-16_____
0_____
15

Subtracting Integers - Number Line

-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Part 1

Solve the questions below

1) $11 - (\quad) =$

6) $(-15) - 13 =$

2) $(\quad) - (-6) =$

7) $18 - (-6) =$

3) $(-18) - 11 =$

8) $(-18) - (-5) =$

4) $16 - (-7) =$

9) $(\quad) - (+3) =$

5) $(-19) - 8 =$

10) $(\quad) - 6 =$

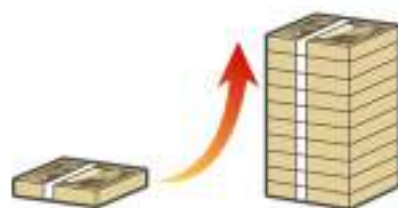
Part 2

Answer the word problems below. Write the equation.

- 1) The winner of a golf tournament scored a -18 after four rounds. The last place golfer scored a $+26$. What is the difference between these two scores?



- 2) Colton and Logan both invested some of their money in the stock market. Colton lost $-\$138$ and Logan earned $+\$263$. What is the difference between their earnings and losses?

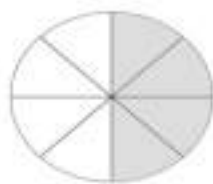


Equivalent Fractions

Equivalent fractions are fractions that have the same value. Visualize this...



Pizza 1



Pizza 2

Your family orders large 2 pizzas. The first one is cut into only 4 slices. The second is cut into 8 slices. You could have 2 slices from pizza 1 and 4 slices from 2 and still have the same amount of pizza.

Question Shade in the fraction and decide if they are equivalent



$$\frac{1}{4}$$

Yes



$$\frac{3}{6}$$

☒ No

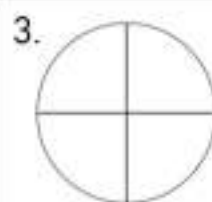
$$\frac{2}{6}$$

Yes



$$\frac{1}{3}$$

No



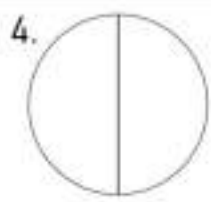
$$\frac{3}{4}$$

Yes



$$\frac{5}{8}$$

No



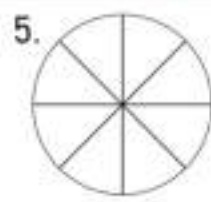
$$\frac{1}{2}$$

Yes



$$\frac{4}{8}$$

No



$$\frac{2}{8}$$

Yes



$$\frac{2}{4}$$

No



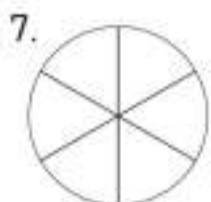
$$\frac{3}{3}$$

Yes



$$\frac{4}{4}$$

No



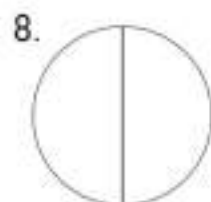
$$\frac{3}{6}$$

Yes



$$\frac{1}{3}$$

No



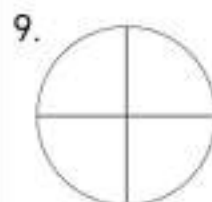
$$\frac{1}{2}$$

Yes



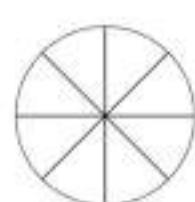
$$\frac{2}{4}$$

No



$$\frac{3}{4}$$

Yes



$$\frac{6}{8}$$

No

Equivalent Fractions

QuestionsCompare the fractions using $< > =$

1.

$$\frac{2}{6} \quad \square \quad \frac{4}{6}$$

2.

$$\frac{4}{8} \quad \square \quad \frac{6}{10}$$

3.

$$\frac{1}{5} \quad \square \quad \frac{2}{10}$$

4.

$$\frac{2}{3} \quad \square \quad \frac{3}{4}$$

5.

$$\frac{3}{12} \quad \square \quad \frac{1}{4}$$

6.

$$\frac{4}{6} \quad \square \quad \frac{2}{4}$$

7.

$$\frac{5}{7} \quad \square \quad \frac{8}{14}$$

8.

$$\frac{7}{8} \quad \square \quad \frac{3}{4}$$

9.

$$\frac{6}{8} \quad \square \quad \frac{4}{6}$$

10.

$$\frac{3}{5} \quad \square \quad \frac{6}{10}$$

11.

$$\frac{6}{12} \quad \square \quad \frac{7}{14}$$

12.

$$\frac{3}{4} \quad \square \quad \frac{8}{12}$$

Simplifying Fractions

Fractions can be equal, which means we can write the same fraction in many different ways. The best way to write a fraction is to simplify it to its lowest form.

How To Do It:

1. Write down the factors for both numbers.

Example: the number 6 has 4 factors: 6, 1, 2, 3

2. Find the greatest common factor (GCF) by circling the largest number that fits into both numbers.

3. Divide both by the GCF.

Example

$\frac{25}{100}$ - Factors: 1, 5, 25
 $\frac{100}{100}$ - Factors: 1, 2, 4, 5, 10, 20, 25, 50, 100

$$\frac{25}{100} \div 25 = \frac{1}{4}$$



Questions

1) $\frac{8}{16} = \frac{\quad}{\quad}$

3) $\frac{12}{18} = \frac{\quad}{\quad}$

5) $\frac{36}{60} = \frac{\quad}{\quad}$

7) $\frac{14}{42} = \frac{\quad}{\quad}$

4) $\frac{25}{35} = \frac{\quad}{\quad}$

6) $\frac{21}{35} = \frac{\quad}{\quad}$

8) $\frac{16}{32} = \frac{\quad}{\quad}$

Simplifying Fractions - Matching**Questions**

Draw a line from the fraction to its simplest form

Fraction**Simplest Form**


$$\frac{8}{16}$$

$$\frac{5}{6}$$


$$\frac{13}{18}$$

$$\frac{4}{5}$$

$$\frac{35}{50}$$

$$\frac{6}{7}$$

$$\frac{36}{42}$$

$$\frac{8}{4}$$

$$\frac{24}{27}$$

$$\frac{4}{9}$$

$$\frac{8}{10}$$

$$\frac{1}{2}$$

$$\frac{7}{10}$$

PREVIEW

Simplifying Fractions - Alex's Homework**Questions**

Alex answered the questions but didn't simplify enough. Help him out!

Question	Alex's Answer	Your Answer
1) Isabella baked 30 cookies. She gave away 20 of them. What fraction of cookies did she give away? 	$20/30$ or $10/15$	
2) Zoe earned \$15 a week selling baked goods. She made \$15 of the \$60 on Friday. What fraction of the money did she earn on Friday? 	$15/60$ or $3/12$	
3) Ethan has 18 candies. 6 are blue and 12 are green. What fraction of the candies are blue? 	$6/18$	
4) A canteen sold 64 drinks today. They sold 24 sport drinks. What fraction of drinks were sport drinks? 	$24/64$ or $12/32$	
5) Ella scored 16 points in her basketball game. Her team scored a total of 36 points. What fraction of total points did Ella score? 	$16/36$ or $8/18$	

Generating Fractions Between Whole Numbers**Practice**

List at least three fractions between the numbers

1)

1

2

Fractions

2)

2

3

Fractions

3)

4

5

Fractions

Word Problems

Solve the problems below

- 1) Daniel thinks $3\frac{3}{4}$ is between 2 and 3. Is he right? Explain why or why not.
- 2) Thomas said he has listed all the fractions between 1 and 2. Is he right? Explain why or why not. His list is written below.

$$1\frac{1}{8}, 1\frac{2}{8}, 1\frac{3}{8}, 1\frac{4}{8}, 1\frac{5}{8}, 1\frac{6}{8}, 1\frac{7}{8}, 1\frac{8}{8}$$

Comparing Decimals - Different Place Values**Part 1**

Compare the following numbers

1) 0.15 < 0.112	6) 2.56 2.1
2) 0.52 0.321	7) 5.84 5.822
3) 0.192 0.18	8) 8.96 8.992
4) 0.457 0.45	9) 11.52 11.247
5) 0.571 0.59	10) 15.27 15.32

Part 2

Answer the word problems

- 1) Joe makes 0.412 three-pointers he takes. Adam makes 0.42 three-pointers he shoots. If they both took 100 three pointers, who would make more?
- 2) Willow and Stella measure the length of their pencils. Willow's pencil is 12.531cm long and Stella's pencil is 12.54cm long. Who's pencil is longer?
- 3) It took Jayden 14.386 seconds to run 100m. Luke ran the 100m race in 14.39 seconds. Who ran it faster?



Ordering Decimals**Part 1**

Order the numbers below from least to greatest

1) 0.123, 0.39, 0.41, 0.113

_____, _____, _____, _____

2) 0.327, 0.32, 0.35, 0.326

_____, _____, _____, _____

3) 0.42, 0.4, 0.44

_____, _____, _____, _____

4) 1.554, 1.51, 1.5, 1.516

_____, _____, _____, _____

5) 13.46, 13.3, 13.26, 13.32

_____, _____, _____, _____

6) 23.2, 23.15, 23.238, 23.241

Part 2

Order the numbers below from least to greatest

1) 0.25, 0.261, 0.253, 0.24

_____, _____, _____, _____

2) 0.35, 0.3, 0.34, 0.34

_____, _____, _____, _____

3) 2.41, 2.419, 2.323, 2.42

_____, _____, _____, _____

4) 4.122, 4.13, 4.14, 4.232

_____, _____, _____, _____

5) 12.51, 12.29, 12.3, 12.23

_____, _____, _____, _____

6) 19.8, 19.7, 19.645, 19.71

_____, _____, _____, _____

Ordering Fractions, Decimals, and Whole Numbers

Questions

Put the integers and decimals in order from least to greatest



1)	2.485, 2.406, $\frac{1}{5}$, 0.485, 1, 4, $\frac{1}{4}$
2)	0.217, 1, $\frac{2}{5}$, 0.325, 0, 0.475, $\frac{3}{6}$
3)	1.5, 1.5, $1\frac{1}{3}$, 2.25, 1, 2, $2\frac{3}{5}$
4)	3.5, 4.25, 2.5, 4.5, $\frac{13}{2}$
5)	1.666, 2.33, $\frac{1}{4}$, 1, $\frac{1}{5}$, 1.25

Part 2

Answer the word problems



1) Jason is trying to decide which bag of coffee beans to buy. The bags are the same price but are listed in different measurements. Put the options in order from least to greatest.

Option	A	B	C	D	E	F
Size	1.5kg	$1\frac{1}{4}$ kg	2kg	1.99kg	$2\frac{3}{6}$ kg	2.4kg

2) A team of basketball player have their 3-point shooting stats listed in the table. Put the players in order from worst percentage to best.

Player	Chloe	Sofia	Lily	Mila	Ellie	Luna
Size	0.25	0.168	$\frac{2}{10}$	$\frac{4}{9}$	0.525	$\frac{15}{20}$

Fractions, Decimals, and Whole Numbers - Word Problems**Questions**

Answer the questions below

- 1) 4 friends worked a week at a farm collecting strawberries. They made \$1000 total. Some of the friends worked harder than others. A breakdown of how much each friend earned is below.

Sam	Colton	Hudson	Joel
\$	\$115.75	\$319.75	\$239/1000

Order the friends from who made the most money to who made the least.



- 2) The girl's basketball team kept stats for their games. Their shooting stats are listed below.

Alex	Hanna	Rebecca	Courtney	Brianna
0.325	30/90	0.367	2/3	15/25



Rank the girls in order from the best shooter to the worst shooter.

- 3) Brian is shopping for tomato soup. Which can of soup should he buy?

Option	A	B	C	D
Size	0.5L	$1\frac{2}{4}$ L	3L	$\frac{18}{4}$ L
Price	\$4	\$8	\$20	\$22



- a) Rank the options in order from smallest to largest?
- b) Explain which can of soup Brian should buy? Make sure to look at the prices.