



Preview – Information



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Google Slides Lessons Preview





Manitoba Math Curriculum Statistics– Grade 8

3-Part Lesson Format

Part 1 – Minds On!

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

DATA TYPES

Learning Goal

We are learning to **understand and identify** different types of data (qualitative, quantitative, discrete, and continuous) by examining their characteristics and examples, so we can correctly classify data in different situations.

QUALITATIVE, DISCRETE OR CONTINUOUS DATA

You are helping organize a school music festival and are collecting information about performers and attendees. Decide whether the data collected is qualitative, discrete, or continuous.

Data Collected	Data Type
1) How many performers are in each band?	
2) How long is each performance (in minutes)?	
3) What type of music does each band play?	
4) How many songs does each band perform?	
5) What colour are the stage lights?	
6) How many tickets were sold for the event?	
7) What is the age of each performer?	
8) How loud is the music (in decibels)?	
9) What is the name of each band?	
10) How many instruments are used in each performance?	

Qualitative Data

Discrete Data

Continuous Data



Part 2 – Action!

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

Part 3 – Consolidation!

- Exit Cards
- Quizzes
- Reflection
- And More!

PRIMARY VS SECONDARY DATA

Read each situation and determine if it is primary or secondary data. ✓

Scenario	Primary	Secondary
1) You design a survey to find out how many hours students spend on homework each week		
2) You use a government website to find the average temperature in your city last year		
3) You count how many cars pass your school in 10 minutes		
4) You read a news article about the most popular social media apps among teens		
5) You measure how long it takes your classmates to run 100 metres		
6) You collect data from a sports website about a basketball player's scoring average		
7) You record how many students bring lunch from home each day for a week		
8) You use a textbook to find the population of different provinces in Canada		
9) You interview students about their favourite type of music		
10) You look up the nutritional information of snacks from a company's website		



Manitoba Math Curriculum

Statistics– Grade 8

MODE



1 2 3 4 5 6 7 8 9 0 -

Find the mode for the data sets below.

24, 8, 20, 12, 24, 16

Mode

36, 42, 39, 36, 45, 36

Mode

21, 28, 16, 40, 55

Mode

690, 725, 670, 718, 705, 600

Mode

72, 85, 91, 75, 78, 85

Mode

305, 318, 311, 327, 318, 302

Mode

144, 152, 144, 167, 152, 149

Mode 4.38

210, 225, 218, 238, 225, 210

Mode

480, 495, 502, 480, 517, 480

Mode

Median =

Mode =

Mean =

Median =

Mode =

15.3, 18.7, 17.2, 16.5, 18.7, 19.1, 15.3

Mean =

Median =

30.5, 28.7, 32.1, 29.9, 31.4, 28.7, 30.5

Mean =

6.4, 7.8, 5.9, 6.4, 8.2, 7.1, 5.9

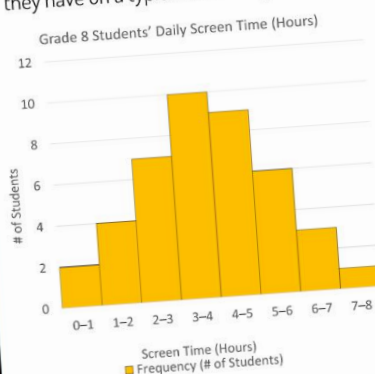
Mean =

Median =

Mode =

INTERPRETING HISTOGRAM

A school counsellor surveyed Grade 8 students to find out how many **hours of screen time** they have on a typical school day.



Fill in the frequency table and answer the questions.

Screen Time (Hours)	Frequency
0-1	
1-2	
2-3	
3-4	
4-5	
5-6	
6-7	
7-8	

- 1) Which screen time interval is the most common among students?
- 2) How many students spend less than 2 hours on screens each day?
- 3) How many students spend 5 hours or more on screens each day?
- 4) How many students were surveyed in total?
- 5) Describe one pattern or trend you notice in the distribution of screen time.

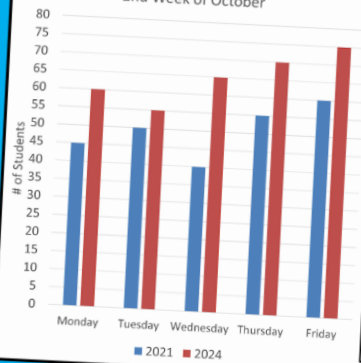


Manitoba Math Curriculum Statistics– Grade 8

INTERPRETING DOUBLE BAR GRAPHS

The graph below shows the number of students visiting the school library during the second week of October in 2021 and 2024.

of Students Visiting The School Library -
2nd Week of October



- 1) Which day had the highest number of library visitors in 2021?
- 2) Which day had the lowest number of library visitors in 2024?
- 3) What was the mean number of visitors in 2024 during this week?
- 4) What was the median number of visitors in 2021 during this week?
- 5) Describe two conclusions you can draw from the data.

Monday

Tuesday

Wednesday

Thursday

Friday

A group of 120 Grade 8 students were surveyed to find out how they usually spend their time after school. The results were organized into a circle graph below

Grade 8 Students' Favourite After-School Activities



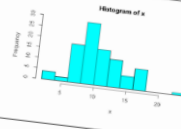
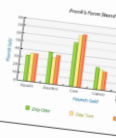
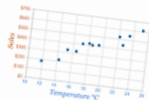
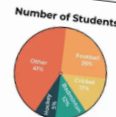
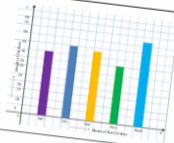
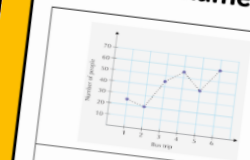
Fill in the frequency table and answer the questions.

Activity	Sports	Homework/ Studying	Video Games	Socializing	Reading
%					
# of Students					

- 1) Which activity is the most popular among the students?

TYPES OF GRAPHS

Label the names of the graphs below.



Histogram

Multiple Bar Graph

Bar Graph

Scatter Plot

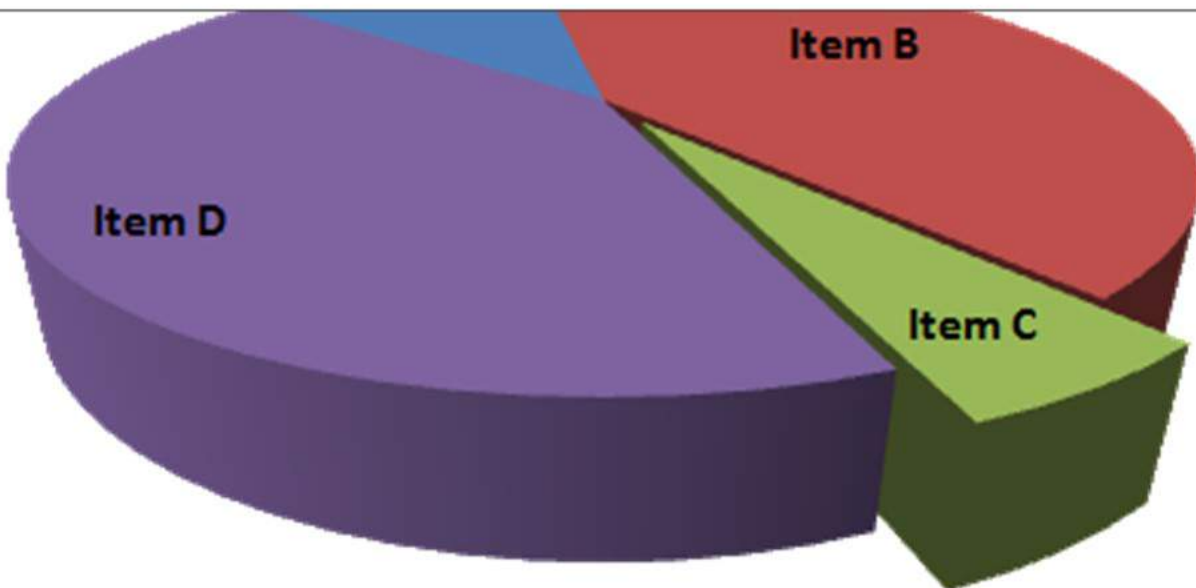
Circle Graph

Broken Line Graph

Grade 8 Data Analysis

	Curriculum Expectations	Pages That Cover the Expectations
SP.1	Critique ways in which data is presented in circle graphs, line graphs, bar graphs and pictographs.	1-58

Preview of 50 pages from this product that contains 162 pages total.



Data - Qualitative, Discrete, or Continuous?

Part 1

Researching a basketball team

You are the manager of a basketball team and are researching your next opponent. You decide to collect data based on the questions below. Is the data qualitative, discrete, or continuous?



Data Collected	Qualitative/Discrete/Continuous
1) How many players are on the team?	
2) How many games are there?	
3) How many points do they score?	
4) What colour are their jerseys?	
5) Which teams have they played before?	
6) How many games have they played?	
7) How old are their players?	
8) How many wins do they have this year?	
9) How many seconds do they take before they shoot?	
10) Which type of defense do they play - zone or man?	
11) How many three pointers do they take a game?	
12) What is the name of their mascot?	

Part 2

Write one example of each type of data

Type of Data	Example
<u>Qualitative</u>	
<u>Discrete</u>	
<u>Continuous</u>	

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)	16, 19, 1		
2)	41, 48, 58, 5		
3)	121, 105, 129, 117		
4)	5.2, 6.8, 4.3, 7.7		
5)	12.5, 14.8, 15.7, 9		
6)	-5, -7, -9, -3		
7)	-22, -31, -28, -26		
8)	-78, -95, -141, -62		
9)	7, -8, 4, -11		
10)	3.8, -4.2, 2, -1.6		

Part 2 Answer the word problems below

1) Emma is trying to figure out her handicap in golf. A handicap is your average score. She golfed 10 times this year and had the following scores. What is her handicap?

-4, -8, 5, 4, -2, -5, 0, 7, -3, -4

2) Hudson recorded his screen time in minutes for the last 5 days. What was his average screen time for the last 5 days in minutes and hours?

147, 168, 262, 241, 197

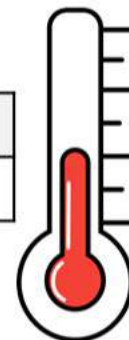
Finding Missing Data Point Using Mean

Questions

Answer the word problems below

1) The average temperature last week was -5°C . The temperatures for each day of the week have been represented in the table below. The table is missing the temperature for Friday. Calculate the missing temperature.

Day	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Temp		-7	-4	-8		3	-4



2) Gas prices for the last 10 days were an average of \$1.34 per litre. The prices for each day are listed below, but day 3 is missing. Calculate the missing value for day 3.

Day	1	2	3	4	5	6	7	8	9	10
Price	1.31	1.45		1.36	1.27	1.37		1.37	1.24	1.22



3) A diver plunged an average of -6.8m in her 8 dives last week. The depth of her dives are recorded in the table below, but her last dive is missing. Calculate the depth of her last dive.

Dive	1	2	3	4	5	6	7	8
Depth	-5.7	-4.2	-8.6	-7.4	-2.2	-6.7	-7.2	



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)	25, 33, 28, 30, 3, 29, 36, 34, 71	4)	-4, -8, -6, -21, -9, -7, 12, -5
2)	148, 1, 157, 79, 294, 147	5)	-9.4, -29.6, -8.7, -7.9, -10.1, -9.6
3)	15.2, 19.1, 16.5, 11.4, 21.7	6)	1.1, 0.5, -0.4, -1.5, 13, -0.8, -24.2, 1.3

Part 2

Answer the questions below

1) Owen practiced his sprint races according to the stopwatch that automatically record his times on a computer. His times in seconds were: 49.5, 52.3, 138.1, 51.7, 49.8, 52.2.

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



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

11243, 13178, 9135, 20891, 12483, 12875, 3878

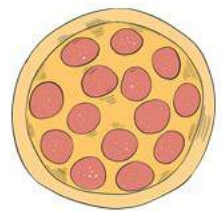
- Which of the values are outliers?
- Explain why he may have an outlier of 3878 steps?
- Why might Tony have an outlier of 20891 steps?



3) Chris owns a pizza shop. His profits for the last 7 days are listed below.

\$142, \$165, \$152, \$177, \$843, \$0, \$162

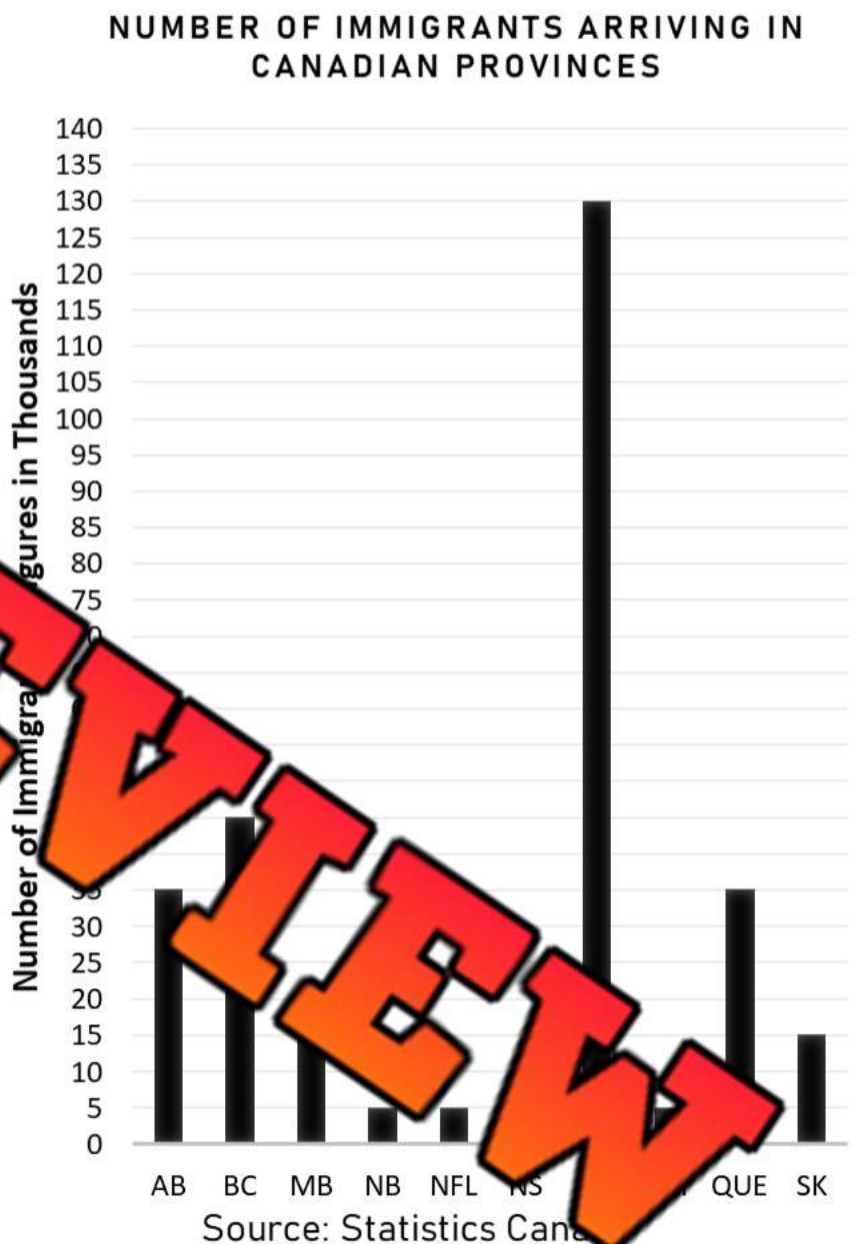
- Which of the values are outliers?
- Explain what could have led to Chris earning \$0 profits on day 6?
- Explain what could have led to Chris earning \$843 on day 5?



Vertical Bar Graph - Immigration

Canada is a popular place for people from other countries to move to. The number of immigrants who moved to Canadian provinces is represented in the bar graph. Fill in the frequency table below.

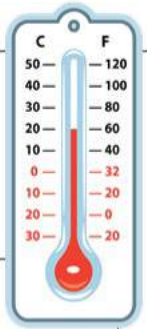
Frequency Table	
AB	
BC	
MB	
NB	
NFL	
NS	
ON	
PEI	
QUE	
SK	
Mean of Canada	
Mode of Canada	
Median of Canada	



- How many more immigrants moved to Ontario than New Brunswick?
- Did more immigrants move to Ontario than all the other provinces combined?
- Is the data quantitative or qualitative?
- Was the data collected from a primary or secondary source?
- In your opinion, what is one reason why more people immigrate to Ontario?

Interpreting a Double Bar Graph

The temperature in degrees Celsius for the 3rd week of May has been represented in the double bar graph below.



Temperatures in Degrees Celsius – 3rd Week of May



a) Which day was warmest in 2000 during this week?

b) Which day was the coldest in 2015 during this week?

c) What was the mean temperature in 2015 during this week?

d) What was the median temperature in 2000 during this week?

e) What conclusions can you draw from the data?

f) What could be the cause of the trend you noticed in the graph?

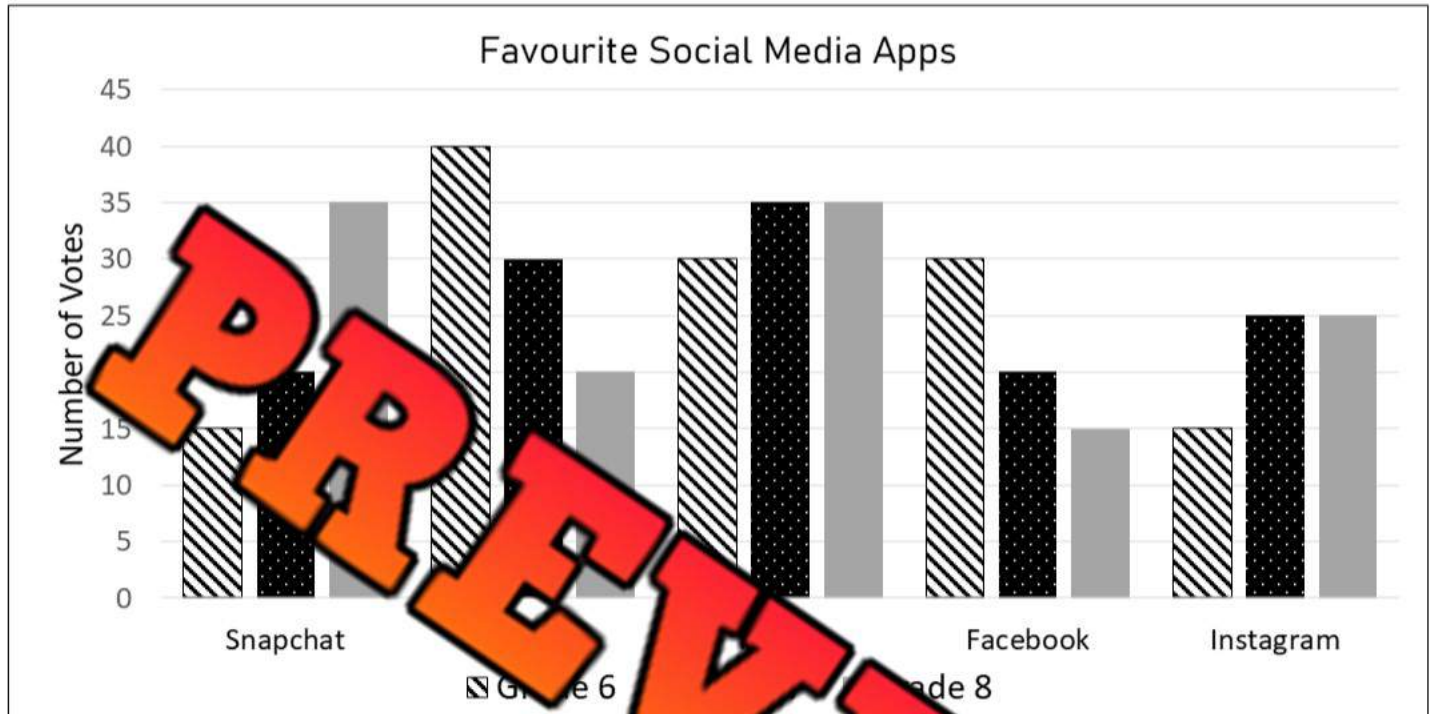
Name: _____

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Curriculum Connection
SP.1

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			

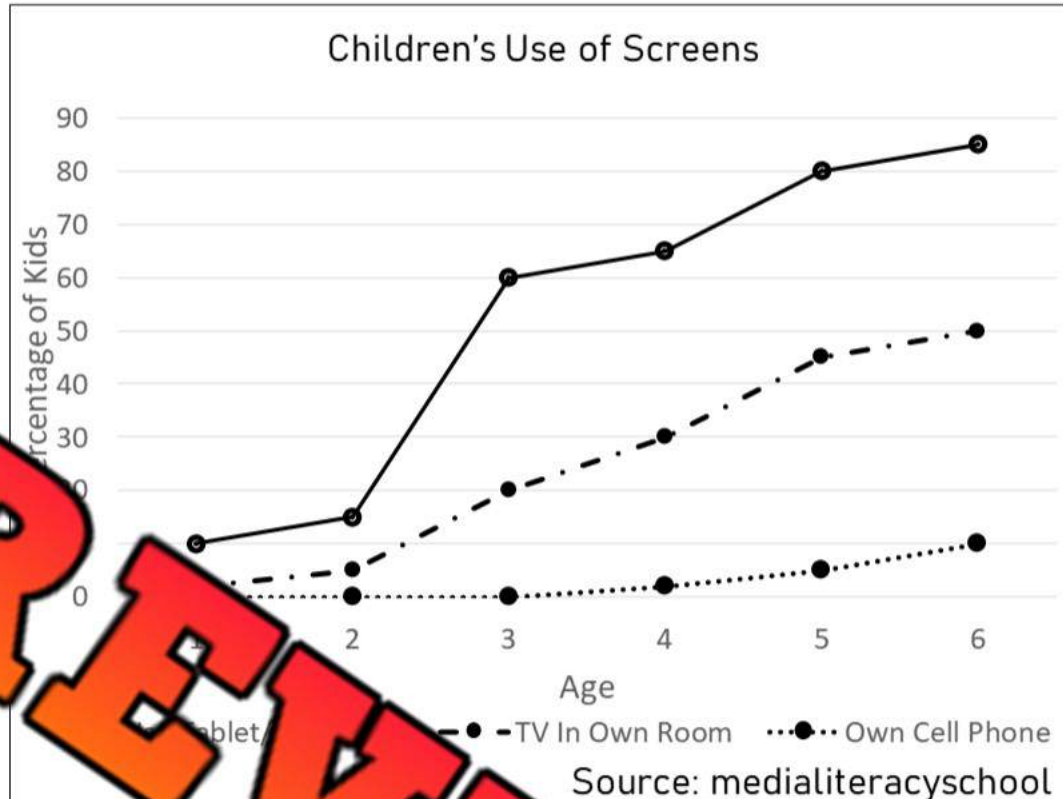
Part 2 Answer the questions below

a) How many students in each grade were surveyed?

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

Interpreting a Broken-Line Graph

Children are using screens younger and younger. The multiple-line graph represents the percentage of children who either use a tablet/computer, have a TV in their own room, or own a cell phone.



Questions

Answer the questions below.

- 1) What percentage of 5-year-olds use a tablet/computer?
- 2) What percentage of 6-year-olds own a cell phone?
- 3) Is there a relationship between the two variables – age and percentage of kids using screens?

- 4) At what age do most children start using a tablet/computer? Why do you think that is?

- 5) What do you think about this data? Is it good that children are using screens? Explain.

Collecting Quantitative Continuous Data

Quantitative continuous data is data that is collected through measuring. We don't use categories, instead we use numbers.

Examples – height of someone over time, or time it took to run a lap.



Data Collection

Collect data by measuring or researching your question of interest

Question of interest

Use the following to organize your data.

Interpreting The Data

- 1) Was your data collected from a primary or secondary source?
- 2) Fill in the table below by calculating the measures of central tendency.

Mean	Median

- 3) What conclusions can you draw from your data? What did you learn?

- 4) What surprised you about the data you collected? Include at least 1 surprise.

Name: _____

26

Curriculum Connection
SP.1

Creating a Broken-Line Graph

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

☐

X axis label

☐

Y axis label

☐

Title

☐

Scale

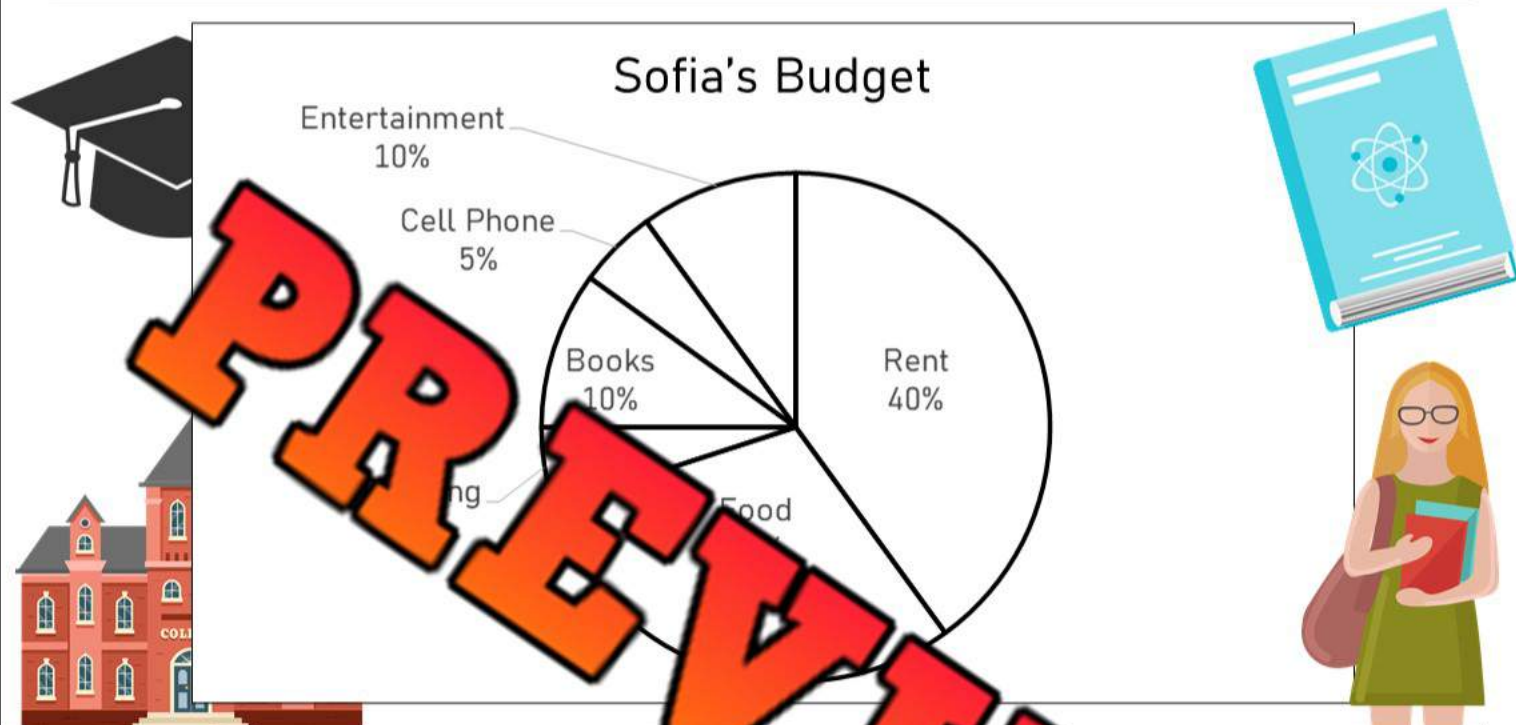
☐

Categories



Circle Graph - Budget

Sofia is heading to college soon. She has \$1000 to spend in total on the things she needs. She created a circle graph to better understand where her money is going.



Part 1

Fill in the frequency table leading to circle graph

	Rent	Food	Clothing	Books	Cell Phone	Entertainment
%						
\$ Spent						

Part 2

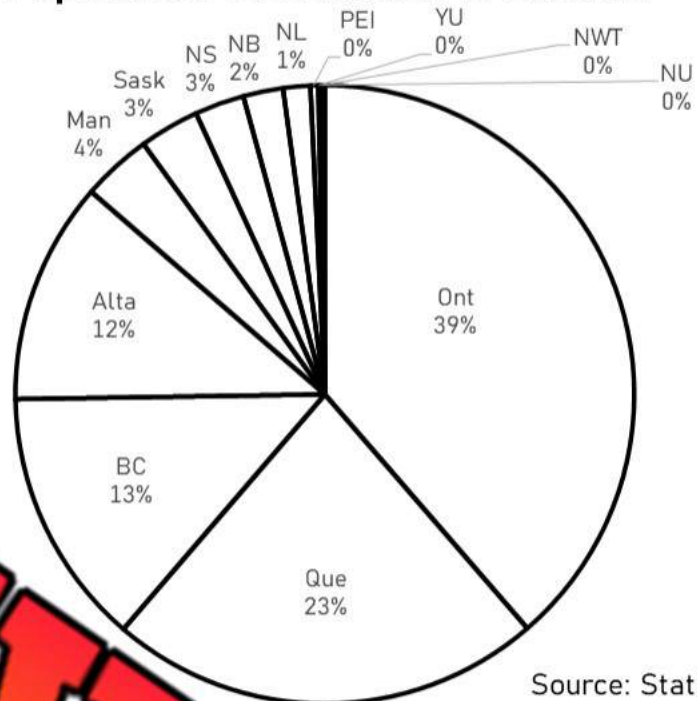
Answer the questions below

- 1) What will Sofia spend most of her money on?
- 2) Which two expenses will account for 70% of her money?
- 3) How much money will she spend on everything except rent?
- 4) What percentage do all 6 expenses add up to?
- 5) What are your thoughts on her budget? How might your budget be the same or different?

Circle Graph - Population Distribution

The population of each province and territory in Canada has been displayed in the circle graph.

Population Distribution in Canada



Source: StatCan

Part 1

Fill in the frequency table by reading the circle graph

Province	AB	BC	MB	NB	NFL	NS	PEI	SK	NWT	YU	NU
Population Distribution %											

Part 2

Answer the questions below

- 1) What percentage of Canadians live in Ontario and Quebec?
- 2) Do half of Canadians live in Ontario and Alberta?
- 3) Do half of Canadians live in Alberta, BC, and Quebec?
- 4) Martin thinks that more than 4 of 5 Canadians live in 4 provinces in Canada. Is he correct? Explain.

- 5) Why do you think not many Canadians live in the territories? Explain.

Drawing a Circle Graph - Global Emissions

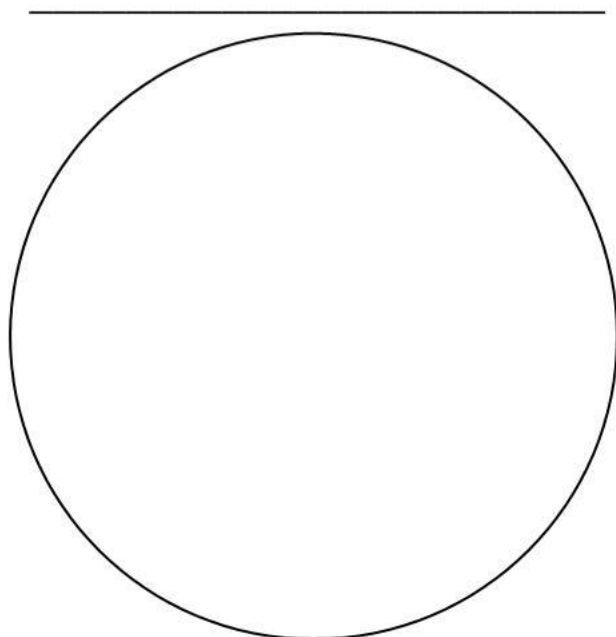
According to the World Resources Institute, Canada accounts for approximately 2% of global greenhouse emissions. The emissions each country produces are listed in the table below.



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
China	30	30/100	0.30	$0.30 \times 360 = 108^\circ$
US	15	15/100	0.15	$0.15 \times 360 = 54^\circ$
EU				
Russia	5			
India	5			
Japan				
Brazil	2			
Canada	2			
Others	29			

Part 2 Use a protractor to draw the circle graph



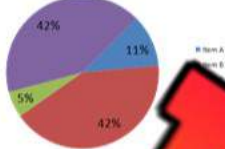
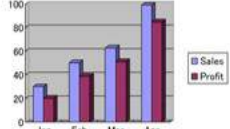
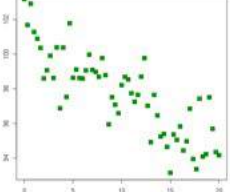
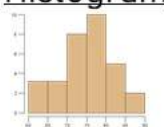
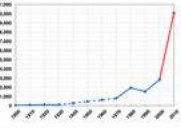
1) How many times more emissions does China produce than Canada?

2) Why do graphs sometimes use an "other" category?

3) Why do you think China produces so many emissions?

Types of Graphs - Information

There are many different types of graphs. Each graph has features that make it better for certain data sets. Read about the different graphs below and when we use each one.

Types of Graph	Explanation	When We Use Them
Circle Graph 	- A graph that is made by dividing a circle into sections that represent parts of a whole. - Each part adds up to 100%.	- When we are displaying the relative frequency of variables - Used with one set of data - Show how categories represent part of a whole data set for one variable
Bar Graph 	- A graph that plots data using bars or columns	- When we want to compare categories between different groups - Used to display 1 data set/1 variable - Used with discrete data
Line Plot 	- A graph that displays data as points or dots (checked x's) above a horizontal line - The dots are connected	- Used to show the frequency of data - Quick and simple way to organize data with smaller values - Used to display data with 1 variable
Multiple-Bar Graph 	- A graph that shows the relationship between different sets of data - The bars are presented beside each other for clear comparisons	- Used to display the relationship between two sets of data. For example - gender differences in preferences. Youth - Used to display data with 1 variable - Used with qualitative and discrete data
Scatter Plot 	- A graph that displays data points for two continuous variables - Both the y and x axis represent a different variable	- When we have two sets of data - Often used to display data represented in a table of values - Used to show the relationship between two variables
Histogram 	- A graph similar to a bar-graph that shows frequencies for different intervals	- Used when the x-axis uses numbers (intervals). For example - age ranges - Display data with 1 variable
Broken-Line Graph 	- A graph that displays data as points that are connected with a line	- Used to track changes over periods of time - Used with continuous data

Types of Graphs - Questions

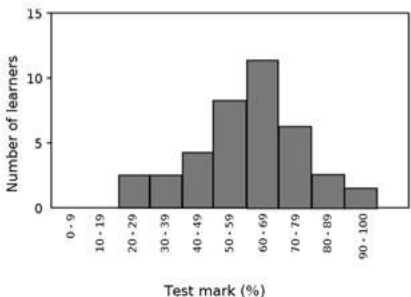
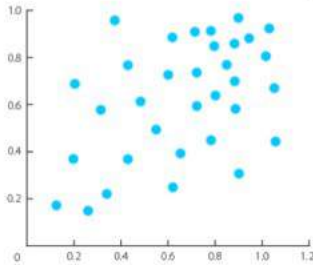
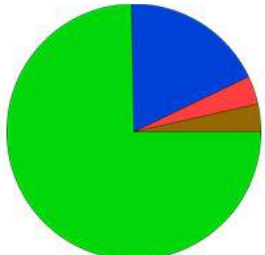
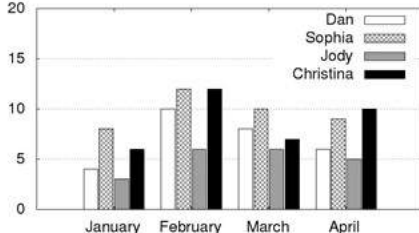
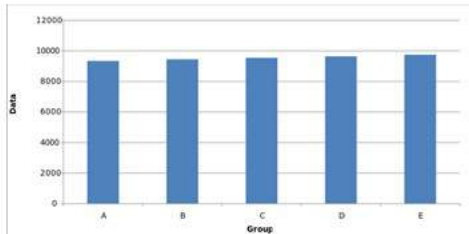
Part 1

Circle the graph you would use to represent the data

Description	Graph A	Graph B
1) You want a simple graph that displays one data set visually	Multiple Bar Graph	Bar Graph
2) You want to show the relationship between two variables	Histogram	Scatter Plot
3) You want a simple graph that has smaller values	Line Plot	Bar Graph
4) You want to display two sets of data from grade 7s and grade 8s	Bar Graph	Multiple Bar Graph
5) You want to show a continuous data set	Broken-Line Graph	Circle Graph
6) You have categories of data and want to represent each category as parts of a whole	Broken Line Graph	Circle Graph
7) You are displaying how many goals were scored in intervals of 1-5, 6-10, 11-15, 16-20	Broken-Line Graph	Histogram

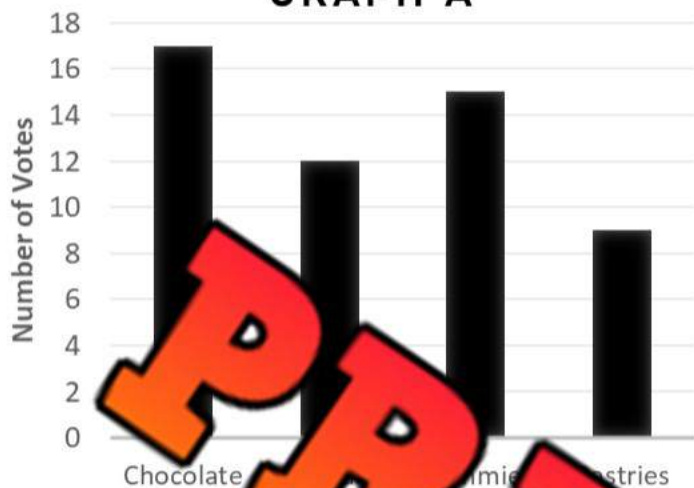
Part 2

Label the names of the graphs

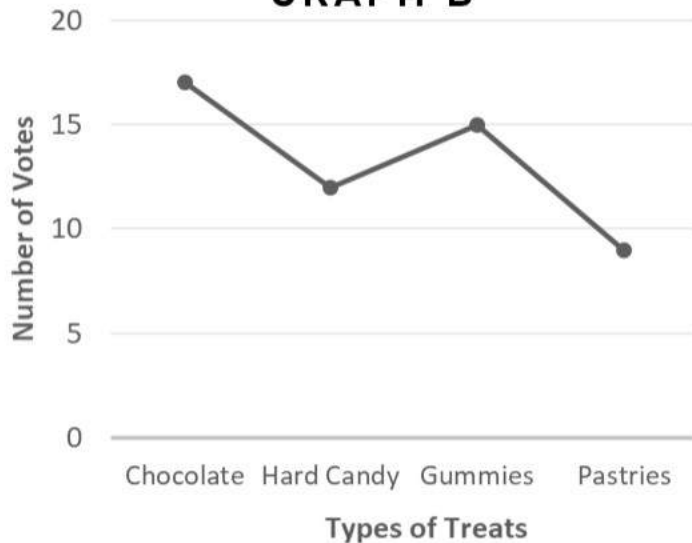
		
1)	2)	3)
		
4)	5)	6)

Displaying Data Using Different Graphs

FAVOURITE TREATS - GRAPH A



FAVOURITE TREATS - GRAPH B



Questions

Answer the questions below

a) Which graph displays the data more accurately? Explain your choice.

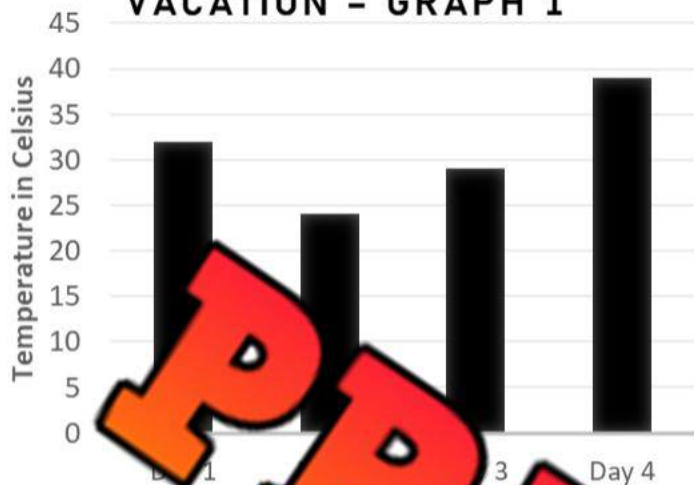
b) Should a line graph be used with discrete data? Explain why or why not.

c) Which scale do you find easier to read? Explain which scale you would have chosen.

d) What information is missing from these graphs?

Displaying Data Using Different Graphs

TEMPERATURE ON VACATION - GRAPH 1



TEMPERATURE ON VACATION - GRAPH 2



Questions

Use the graphs to answer the questions below.

a) Which graph displays the data more clearly? Explain your choice.

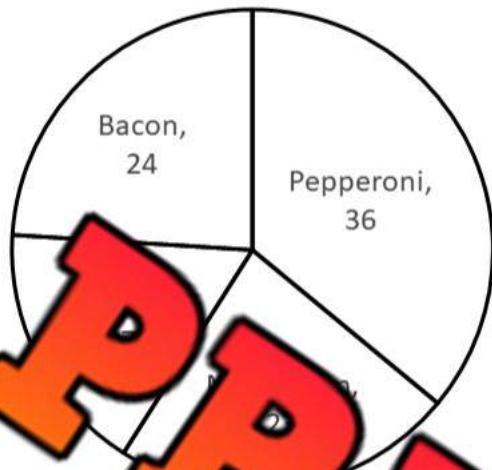
b) Should a bar graph be used with continuous data? Explain why or why not.

c) Which scale do you find easier to read? Explain which scale you would have chosen.

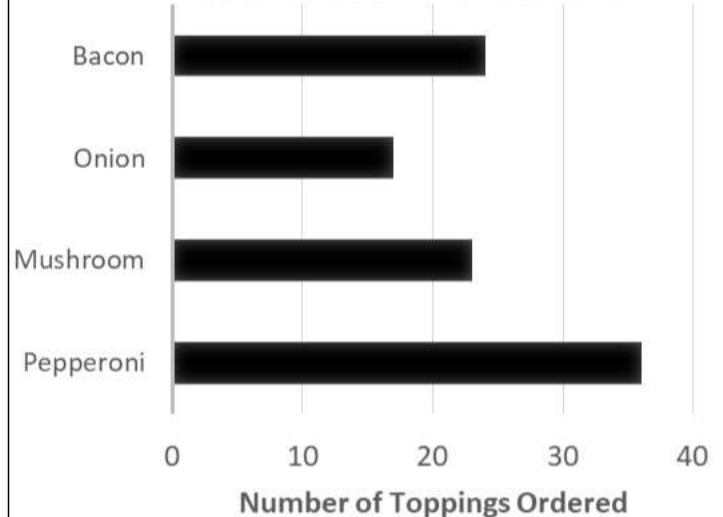
d) At the end of day 1, can we infer the temperature began to cool? Explain how the line graph supports this inference.

Displaying Data Using Different Graphs

Last 100 Pizza Toppings Ordered –
Graph A



LAST 100 PIZZA TOPPINGS
ORDERED – GRAPH B



Questions

Answer the questions below

a) Which graph displays the data more appropriately? Explain your choice.

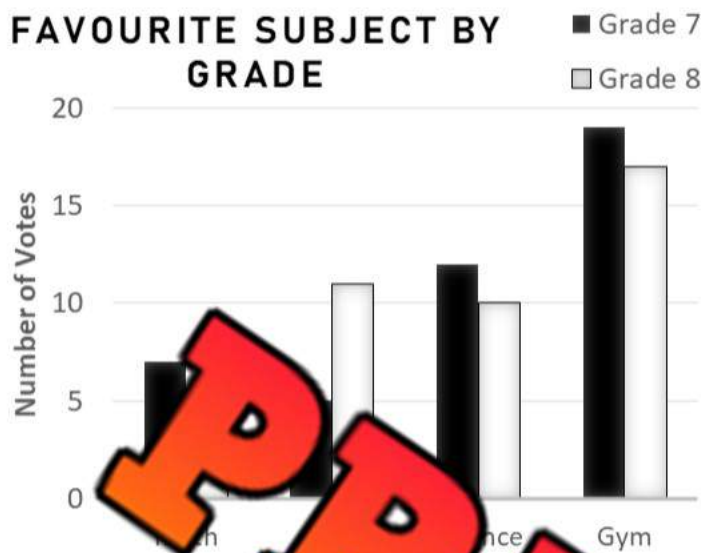
b) If we think of the results as a ratio, we could say 36 out of 100 (36%) orders were pepperoni. Which graph shows a ratio of one topping compared to all toppings? Explain.

c) Which graph is easier to read? Which one would you choose to display this data? Explain.

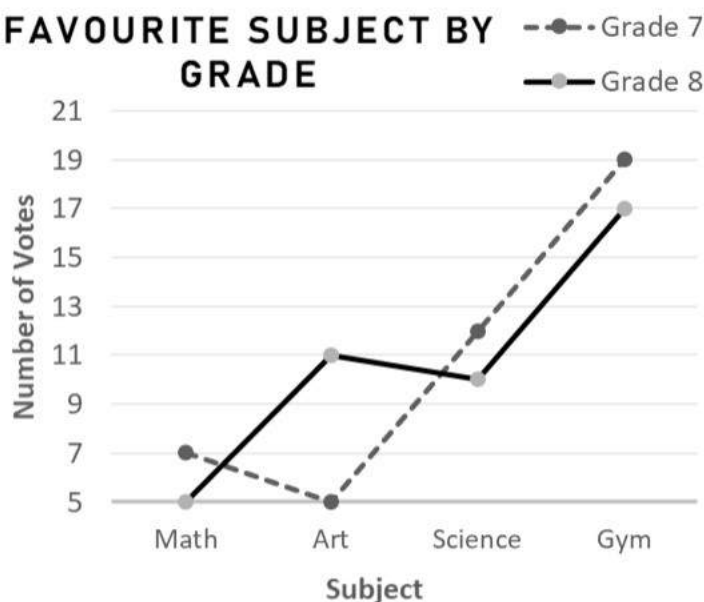
d) What is another example of data that would be best displayed as a circle graph?
Ex. Percentage of people who drive, walk, bus or bike to work.

Displaying Data Using Different Graphs

FAVOURITE SUBJECT BY GRADE



FAVOURITE SUBJECT BY GRADE



Questions

a) Which graph displays the data more clearly? Explain your choice.

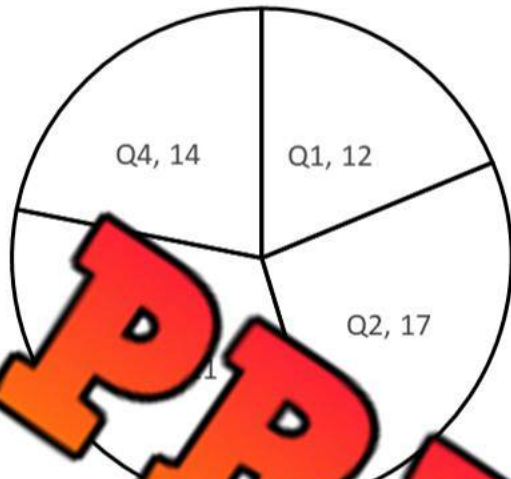
b) Is the data continuous or discrete? Explain how you know.

c) Which scale makes the data easier to understand? Explain.

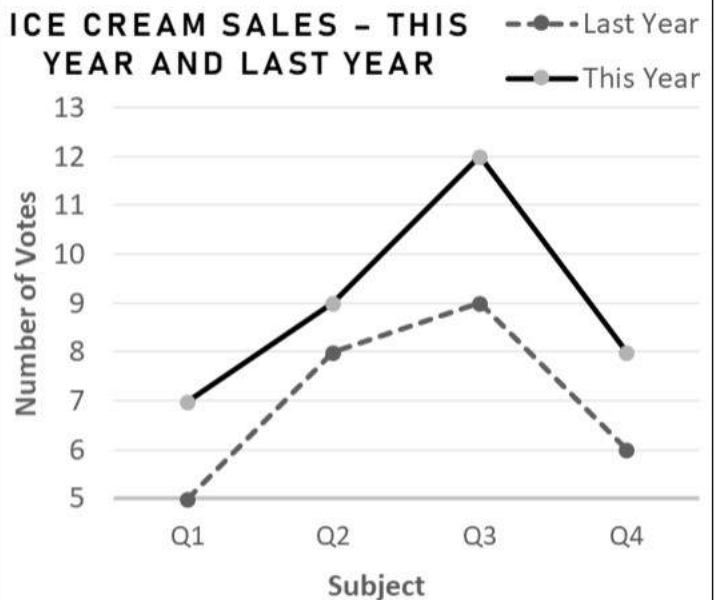
d) Which graph is easier to read? Which one would you choose to display this data? Explain.

Displaying Data Using Different Graphs

ICE CREAM SALES – LAST TWO
YEARS COMBINED



ICE CREAM SALES – THIS
YEAR AND LAST YEAR



Questions

Answer the questions below

a) Both of these graphs display the same data. Which gives us more information about the ice cream sales? Explain.

b) When is it a good option to use a double-line graph?

c) Provide an example of a data set that you would use a double line graph to represent.

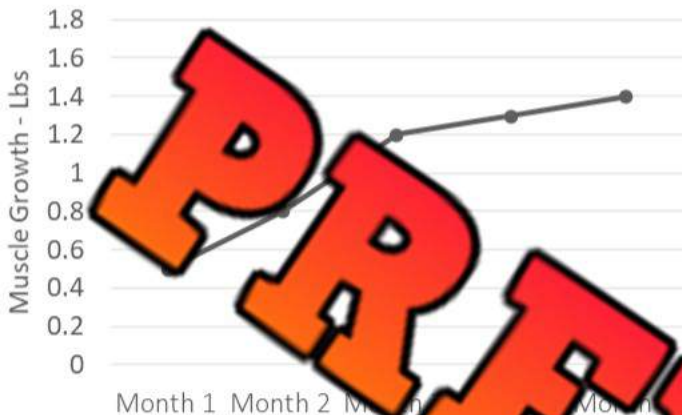
d) Is the data continuous or discrete? Explain how you know.

Misleading Graphs

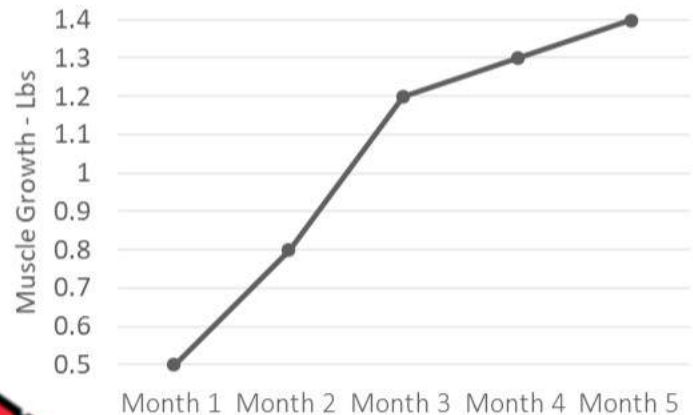


A supplement company that sells muscle-growth pills wants to share data they collected about the results of their pills. The users of their pills have gained muscle, which is what they want to show off. Their marketing team created 2 graphs. Which graph should they choose?

Muscle Growth – Graph A



Muscle Growth – Graph B



Questions

What do you notice about these graphs?



a) Which graph would you use to show customers your muscle growth pills work really fast?

b) How are the graphs different? Do they have the same data?

c) How much muscle was gained in the 5 months?

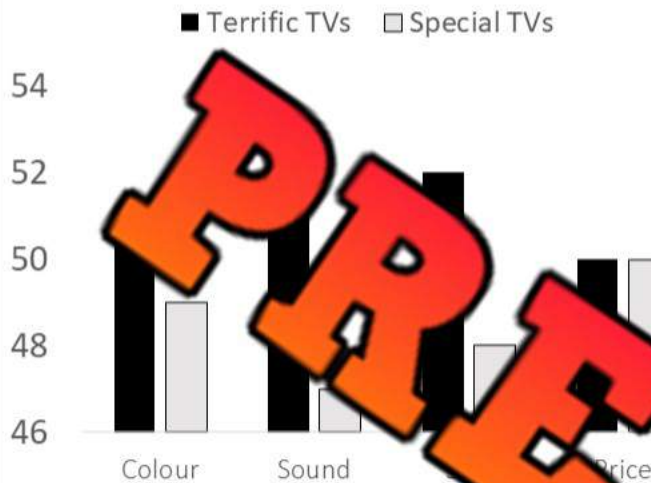
d) Does graph B make it seem like the users gained muscle quicker? Explain how they made it look this way.

e) Why is it important to read a graph carefully?

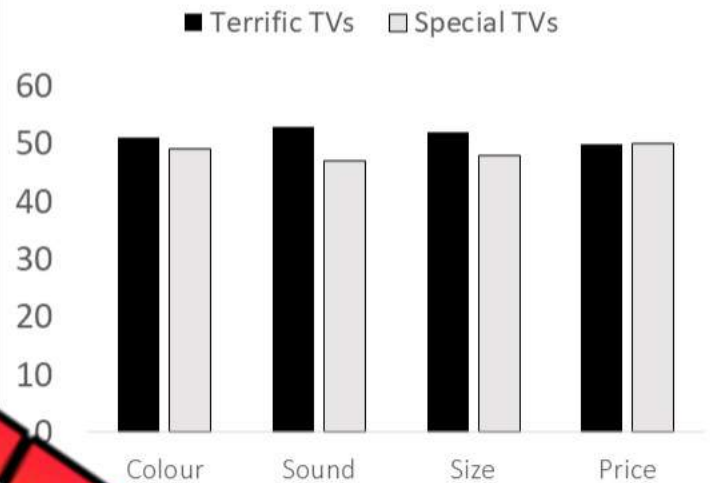
Misleading Graph - Multiple-Bar Graph

Terrific TVs sells televisions. Their biggest competition is a company named, Special TVs. Terrific TVs completed a study that compared the two brands. The results are below.

Best TV – Customer Votes – Graph A



Best TV – Customer Votes – Graph B



Questions

What do you notice about the graphs?

a) Which graph would you use if you were Terrific TVs? Why?

b) How many more votes in total did Terrific TVs get over Special TVs?

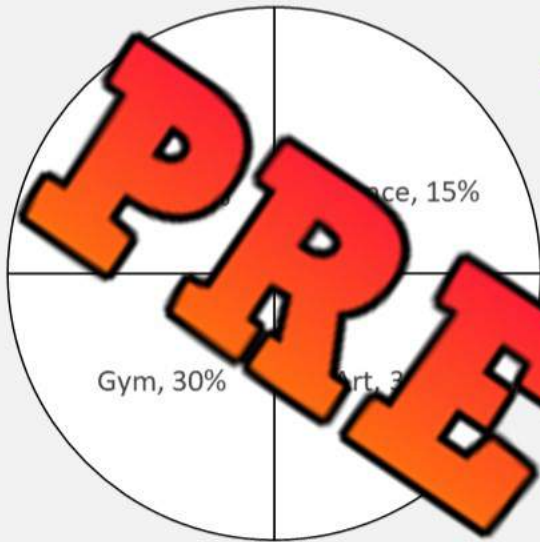
c) Is Terrific TVs a lot better than Special TVs? Explain.

d) Do you think it is fair that businesses create misleading graphs like this one? Explain.

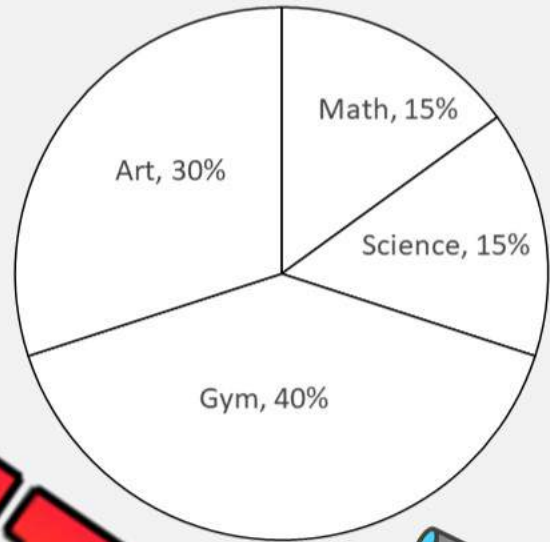
Misleading Graph - Circle Graph

A Science and Technology school is trying to advertise that Science is a popular subject for students. A study that surveyed 100 students asking what their favourite subject was completed. The results have been displayed in 2 graphs below.

Graph A - Most Popular Subjects



Graph B - Most Popular Subjects



Questions

What do you notice about the two graphs?

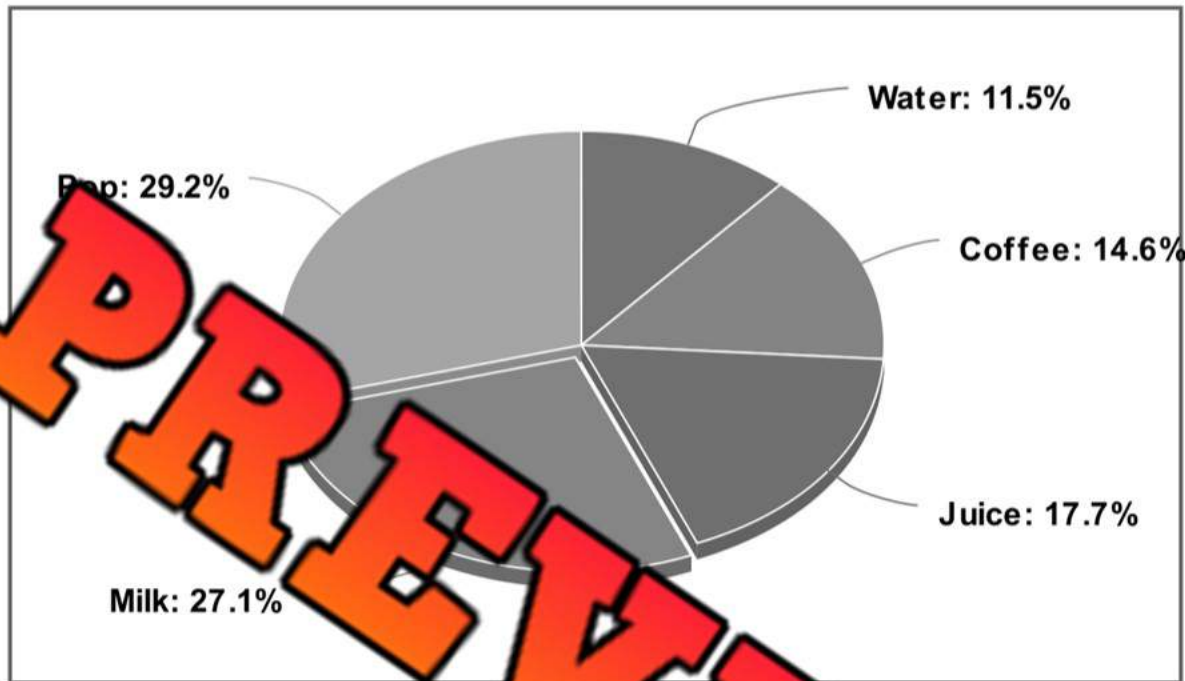
a) Which of the two graphs is misleading? Explain why.

b) Which graph would you use if you were the science and technology school? Explain.

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

Misleading Graph - Circle Graph

The dairy industry performed a study to find out which beverage was the most popular. They asked 100 people aged 8-64. The results are below.



Questions

Answer the questions below.

a) Why is this circle graph misleading?

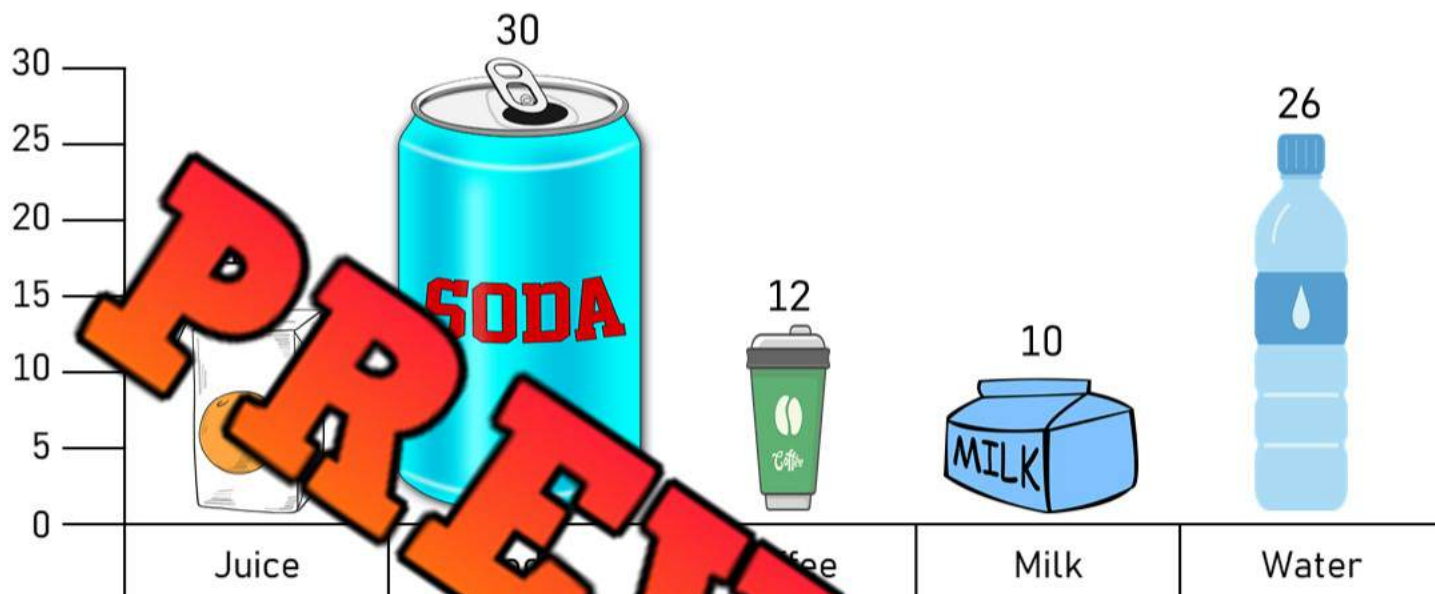
b) Why is it important to look at who completed a study before you trust their data?

c) Can you trust all data? What kinds of things can businesses do to create data that is misleading?

Misleading Pictograph - Favourite Drink

The grade 11 students at Jasper High School were asked what their favourite drink was. The results have been displayed in the pictograph below.

Favourite Drinks – Grade 11 Students



Questions

What do you notice about the pictograph above?

a) What do you notice or wonder about the graph above? List at least 2 things.

b) Why is the graph misleading? Explain at least 2 misleading parts.

c) Approximately how many times larger is the soda can than the water? Think volume instead of just height. How does this affect our understanding of the data?

Creating a Misleading Graph

Part 1

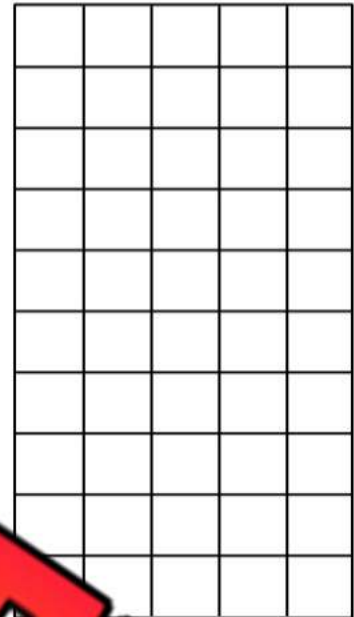
Draw two graphs – one that is misleading and one that is honest

Imagine you are selling donuts as a business. Draw an honest graph and a misleading graph that you could use to show your customers that donuts are the most popular dessert.

Honest Graph



Misleading Graph



Desserts	# of votes
Cookies	24
Ice Cream	26
Donuts	25
Cake	23
Ice Cream	24

Part 2

What do you notice about the two graphs?

a) How did you make the graphs different?

b) Why is it important that we understand how to read graphs carefully?

Unit Test - Data Analysis

Part 1 Read the description of the data and circle if it is discrete or continuous

1) Temperature changes over a month long time period	Discrete	Continuous
2) How many siblings each student has in class	Discrete	Continuous
3) How tall a tree grows over a one year time period	Discrete	Continuous
4) The weight of different hockey skates	Discrete	Continuous
5) The number of students in a class	Discrete	Continuous

Part 2 Circle the graph you would use to represent the data

	Description	Graph A	Graph B
1)	You want to display data that shows the relationship between a part to the whole group	Line Graph	Circle Graph
2)	You have data with age intervals. This means your data has numbers on the x and y axis	Line Graph	Histogram
3)	You want a simple graph that displays your data visually	Line Graph	Bar Graph
4)	You want to graph continuous data	Line Graph	Bar Graph
5)	You are displaying two sets of data from men and women	Bar Graph	Circle Graph

Part 3 Fill in the table below by explaining the graph and when we use them

Types of Graph	Explanation	When We Use Them
Line Graph		

Grade 8
STATISTICS AND PROBABILITY
(Chance and Uncertainty)

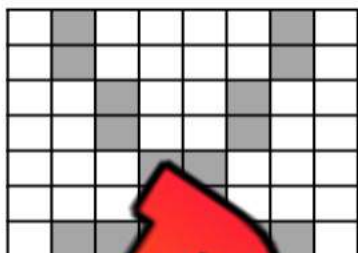
	Curriculum Expectations	Pages That Cover the Expectations
SP.2	Solve problems involving the probability of independent events	60 - 87

Independent Events - Darts

Questions

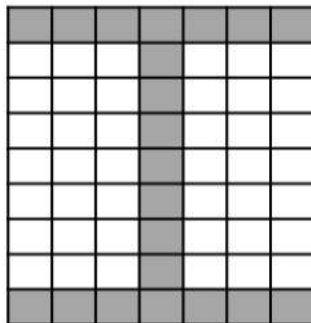
What is the probability of hitting the target if you had **two** throws?

1)



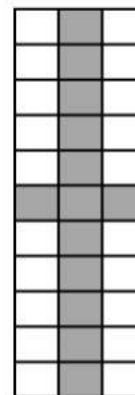
Fraction	
Decimal	
Percent	

2)



Fraction	
Decimal	
Percent	

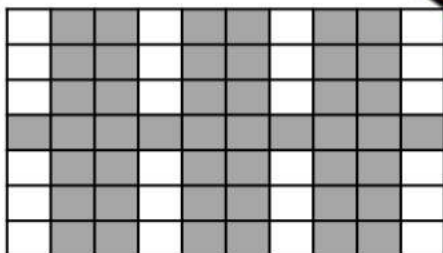
3)



Fraction	
Decimal	
Percent	

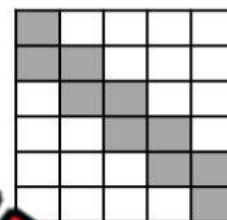


4)



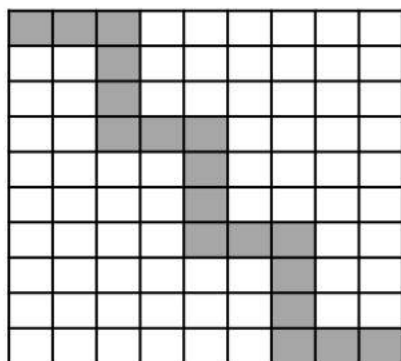
Fraction	
Decimal	
Percent	

6)



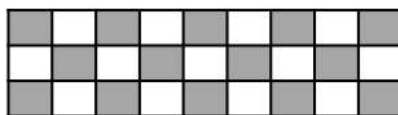
Fraction	
Decimal	
Percent	

7)



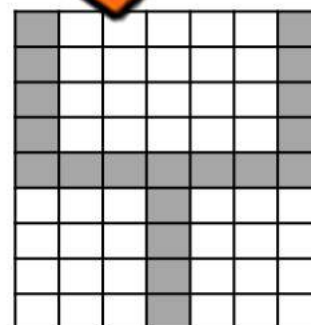
Fraction	
Decimal	
Percent	

8)



Fraction	
Decimal	
Percent	

9)

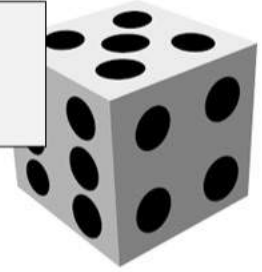


Fraction	
Decimal	
Percent	

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	Decimal	Percent

2) Rolling a 5 or 6?

Fraction	Decimal	Percent

3) Rolling an odd number?

Fraction	Decimal	Percent

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

Fraction	Decimal	Percent

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

Fraction	Decimal	Percent

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

Fraction	Decimal	Percent

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

Fraction	Decimal	Percent

Calculating Probability - Venn Diagram

At a wedding reception, the guests had 2 options for dinner – steak or vegetarian. Of the 50 guests at the reception, 30 are having steak, 20 are having vegetarian and 6 hungry guests are having both.

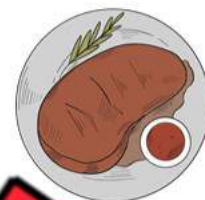
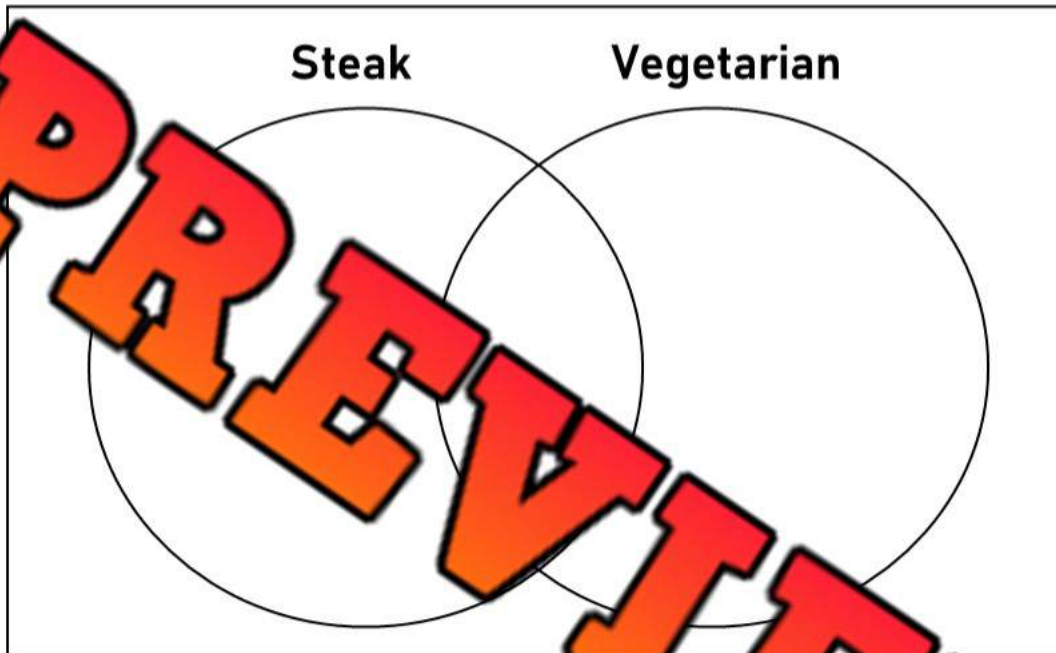
Part 1

Fill in the Venn diagram with the data above



Steak

Vegetarian



Part 2

Answer the questions below

Questions – What is the probability that a randomly selected guest...		Fraction	Percent
1)	ordered steak		
2)	ordered vegetarian		
3)	ordered steak or vegetarian but not both		
4)	ordered steak and vegetarian		
5)	didn't order a meal		
6)	ordered steak but not vegetarian		
7)	ordered vegetarian but not steak		

Calculating Probability - Venn Diagram

Part 1

Fill in the Venn diagram with the data in the table

20 students were surveyed about their hair

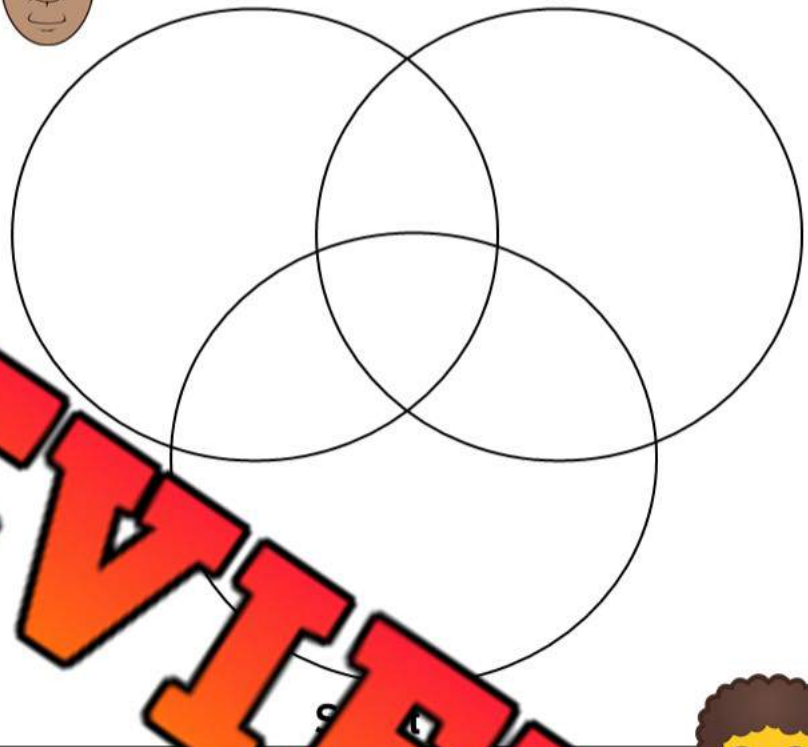
Curly	Long	Short
Elle	Elle	Logan
Henry		Henry
Luna		Arter
Sofia	Lily	
Nova	Luna	Nova
Riley	Nova	Riley
Julian	Julian	
Nora	Nora	David
	Elena	Ben
	Owen	Eddie
	Violet	



Curly Hair



Long Hair



Part 2

Answer the questions below



What is the probability that a randomly selected student...		Fraction	Percent
1)	has curly hair		
2)	has long hair		
3)	has short hair		
4)	does not have curly hair		
5)	has curly short hair		
6)	has curly long hair		
7)	has short hair that isn't curly		
8)	has long hair that isn't curly		

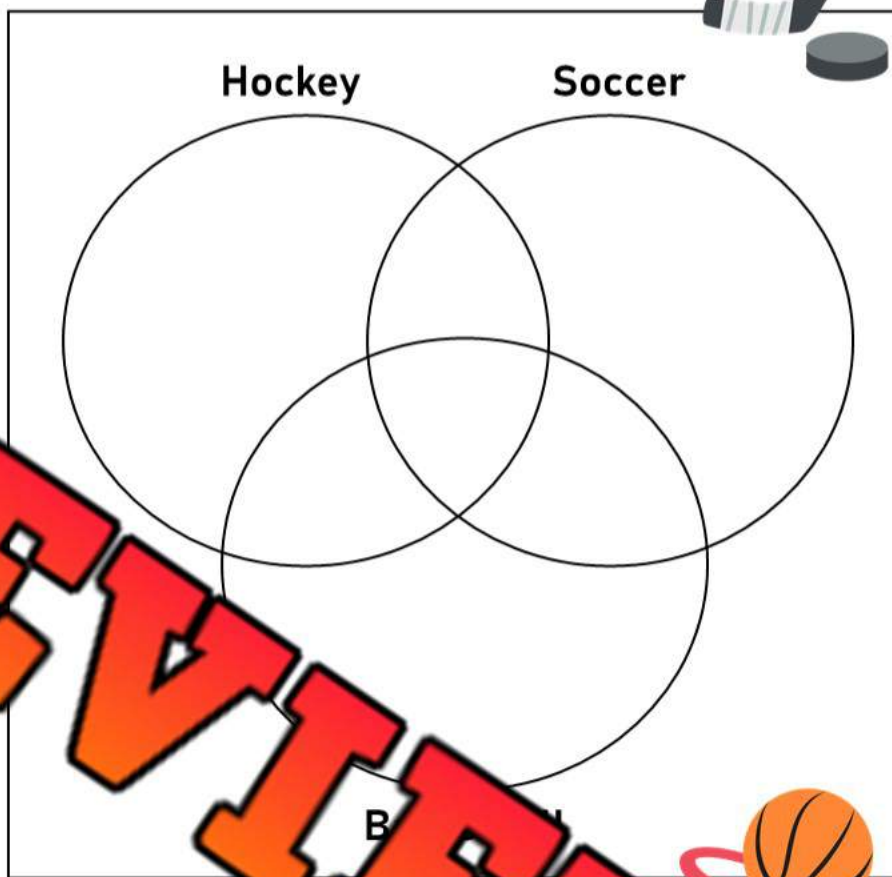
Calculating Probability - Venn Diagram

Part 1

Fill in the Venn diagram with the data in the table

100 people were surveyed about which sports they play

- 33 play basketball
- 45 play soccer
- 41 play hockey
- 15 play both hockey and soccer
- 8 play both basketball and hockey
- 9 play both soccer and basketball
- 6 play all three sports



Part 2

Answer the questions below

What is the probability that a randomly selected person...		Fraction	Decimal	Percent
1)	plays hockey			
2)	plays just hockey and not soccer or basketball			
3)	plays soccer			
4)	plays basketball and soccer but not hockey			
5)	plays basketball			
6)	plays all three sports			
7)	doesn't play hockey, soccer, nor basketball			
8)	plays hockey and soccer but not basketball			

Calculating Probability - Venn Diagram

Questions

Answer the questions below using Venn diagrams

1) In a class of 24 students:

- 12 play the guitar
- 13 play the piano
- 5 play both the guitar and the piano



What is the probability that a randomly selected student...		Percent
a)	plays the piano	
b)	plays just the guitar and not the piano	
c)	plays neither the guitar nor the piano	

2) In a company there were 80 workers

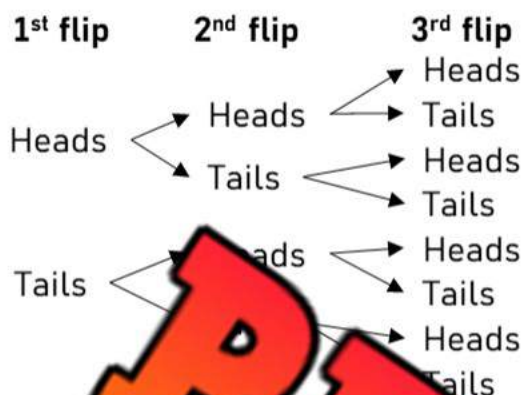
- 50 workers like coffee
- 41 workers like tea
- 20 workers like both coffee and tea



What is the probability that a randomly selected worker...		Percent
a)	likes coffee and tea	
b)	likes just tea and not coffee	
c)	likes neither coffee nor tea	

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

Rebecca was allowed to choose one candy and one drink at a Halloween party. The types of drinks and candy are listed

		Combinations
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Candy

- Chocolate
- Gummies



Drinks



1) How many combinations could Rebecca have? _____

2) What is the probability she will choose...	Fraction	Decimal	Percent
a) Chocolate with soda:			
b) Chocolate with juice:			
c) Gummies with soda:			
d) Gummies with juice:			

Tree Diagrams - Independent Events

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

An ice cream shop sells different cones, ice cream, and toppings. Their menu is listed below.



Cones	Ice Cream	Toppings
Sugar Cone (S)	Vanilla (V)	Butterscotch (B)
Waffle Cone (W)	Chocolate (C)	Fudge (F)



PREVIEW

		Combinations
_____	_____	
_____	_____	
_____	_____	
_____	_____	
_____	_____	
_____	_____	
_____	_____	
_____	_____	
_____	_____	
_____	_____	

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

2) What is the probability of a customer ordering a...	Fraction	Percent
a) sugar cone with vanilla ice cream and fudge		
b) sugar cone with chocolate ice cream and butterscotch		
c) waffle cone with chocolate or vanilla and fudge		
d) waffle or sugar cone with vanilla ice cream and fudge or butterscotch		
e) sugar cone with chocolate and fudge or butterscotch		
f) sugar or waffle cone with vanilla or chocolate ice cream and butterscotch or fudge toppings		

Tree Diagrams - Independent Events

Questions

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

Georgia is creating an avatar for a video game she is playing. She can choose the characters hair style, hair colour and accessories.



Hair Style	Accessories	Hair Colour
Curly	Necklace	Brown
Spiky	Bracelet	Blond
Long		Red
		Purple

PREVIEW

1) How many combinations could you use to create your avatar? _____

2) What is the probability of a choosing...

	Fraction	Decimal	Percent
a) curly red hair with a necklace			
b) curly purple, brown or blond hair with a bracelet			
c) spiky or long brown hair with a necklace or bracelet			
d) long brown, blond, red, or purple hair with a necklace			
e) spiky, curly, or long hair that is brown, blond or purple with a bracelet			

Drawing Tree Diagrams

Questions

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

You are having a surprise dessert at a party you are having. Your parents said it is either cookies or brownies. They also told you the options for the treats and icing. What is the probability of them choosing a specific combination of baked good, treat, and icing.



Baked Goods	Treats	Icing
Cookies (C)	Chocolate Chips (CC)	Vanilla (V)
Brownies (B)	Smarties (S)	Chocolate (CH)
	Raisins (R)	Caramel (CA)

PREVIEW

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

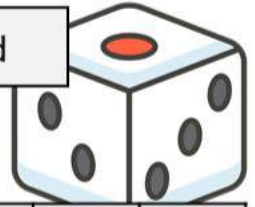
2) What is the probability of your parents choosing...

	Fraction	Decimal	Percent
a) Cookies with chocolate chips and vanilla icing			
b) Brownies with raisins and caramel icing			
c) Cookies or brownies with smarties and vanilla icing			
d) Cookies or brownies with raisins or smarties and vanilla or chocolate icing			
e) Cookies with chocolate chips, smarties or raisins and vanilla or caramel icing			

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 7?
- 2) What is the probability of you rolling two six-sided dice and getting a sum of the two dice less than 10?
- 3) What is the probability of you rolling two six-sided dice and getting a sum of the two dice less than 5?

+	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 15?
- 3) What is the probability of you rolling two six-sided dice and getting a product of the two dice greater than or equal to 24?

Independent Events - Money Bag

Wow, it's your lucky day! A millionaire walks up to you and gives you 3 chances at pulling out a \$100 bill from a bag of money. Each time you pull money out, you will put it back.

Inside the bag, there is 1 of each Canadian currency denomination (\$0.05, \$0.10, \$0.25, \$1, \$2, \$5, \$10, \$50, \$100).



Questions: Find the probability of the following scenarios

	Scenario	Answer – Show Your Work
1)	Selecting a Toonie on your first pull?	
2)	Selecting a \$100 bill on your first pull?	
3)	Selecting a Quarter or a Loonie in your first two pulls?	
4)	Having terrible luck and selecting a Nickel, Dime, and a Quarter in your 3 pulls?	
5)	Selecting a \$20, \$50, or \$100 bill in your 3 pulls	
6)	Selecting a \$100 bill on any of your 3 pulls?	

Independent Events - Prize Box

PRIZE BOX



Question: If you return the prize each time you choose, what are the probabilities below?

	Scenario - Problem of...	Answer - Show Your Work
1)	You get one pick. What is the probability of getting stuck in a pen?	
2)	You get one pick. What is the probability of getting a phone?	
3)	You get two picks. What is the probability of picking a set of headphones and a pencil with your first two picks?	
4)	You get two picks. What is the probability of picking a phone with either of the two picks?	
5)	You get three picks. What is the probability of picking a basketball, set of headphones, or phone in any of the 3 picks?	
6)	You are picking from the prize box fifth. One phone, one hairbrush, and two baseballs are already gone. You get four picks. What is the probability of you picking a phone with any of the four picks?	

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 2?			
5) What is the theoretical probability of rolling a dice getting an odd number and then flipping a coin?			

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

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) There is a chance of rain today	Theoretical	Experimental
2) You flip a coin 10 times and got heads 3 times	Theoretical	Experimental
3) You have a $\frac{1}{4}$ chance of drawing a heart from a deck of cards	Theoretical	Experimental
4) A scratch card has a $\frac{1}{5}$ chance of winning a prize	Theoretical	Experimental
5) Your batting average is 0.25, so you should get a hit 1 in 4	Theoretical	Experimental
6) You made 4 of 10 three point shots	Theoretical	Experimental
7) Seabiscuit won the race even though he was slower than the other horses $\frac{1}{3}$	Theoretical	Experimental
8) The Toronto Raptors won 4/7 games	Theoretical	Experimental
9) You have a $\frac{1}{80}$ chance of winning a giveaway by buying a bag of snacks	Theoretical	Experimental
10) You won a cross-country race with 90 people in it	Theoretical	Experimental

Part 2

Is the example theoretical or experimental? What is the probability of winning?

Example	Theoretical or Experimental	Fraction	Decimal	Percent
1) You should make 8 in 10 free throws				
2) You buy one raffle ticket out of 90 that are sold.				
3) You rolled a dice 10 times and got a 3 4 times.				
4) You pulled 20 cards from a deck of cards and got 5 red ones.				
5) There is a 35% chance of precipitation				

Theoretical vs Experimental Probability - # of Events

The theoretical and experimental probability of an event happening is not guaranteed to be the same. Performing more trials in an experiment will cause the experimental probability to be closer to the theoretical probability.

Example – if you flip a coin 2 times, it is easy to picture getting heads twice in a row. That would mean the experimental probability of getting a heads was 100% or $2/2$. However, if you flipped the coin 100 times, it is almost impossible to get 100 heads in a row.

Part 1

How many times should you get a 1, 2, 3, 4, 5, or 6 when performing the number of rolls below?

	2	3	4	5	6
6 rolls					
12 rolls					
60 rolls					
600 rolls					
1200 rolls					

Part 2

Follow the instructions below to complete experiments

- 1) Roll the dice 6 times. Tally your results

1	2	3	4	5	6

- 2) Roll the dice 60 times. Record how many of each number you get.

	1	2	3	4	5	6
Tallies						
Total						

- 3) Did the experimental probability get closer to the theoretical probability when you rolled the dice more times? Explain why this happens.



Rolling Doubles



Part 1

What is the theoretical probability of rolling doubles when rolling 2 dice

1) Fill in the table to help discover the theoretical probability of rolling doubles when rolling two dice.

Tip: $\frac{\text{favourable outcomes}}{\text{total possible outcomes}}$

2) What is the theoretical probability of rolling a 1 on a 6-sided die and perceiving a 1 on a 6-sided die?

Second Throw

	1	2	3	4	5	6
1	(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)
2						
3						
4						
5						
6						

Part 2

What is the probability of rolling doubles when rolling 2 dice

1) Roll 2 six-sided dice 24 times to try to get a sum of 7. Record how many rolls you complete using the table below. Put a tally every time you roll a sum of 7.

Number of Rolls	Doubles

2) Was your experimental probability the same as the theoretical probability of obtaining a 2?

3) Was your experimental probability the same as the other students in your class? Explain why or why not.

4) If you performed 1000 rolls, do you think your experimental probability would be closer or further from the theoretical probability? Explain.

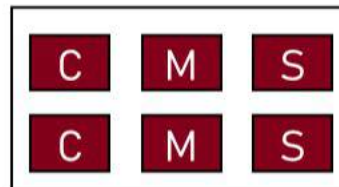
Tree Diagrams - Independent Events

Questions

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

There is a box full of different flavoured chocolates:

- 2 coconut (C)
- 2 mint (M)
- 2 salted-caramel (S)



Draw a tree diagram for the following scenario:

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

Tree Diagram		Combinations
1 st Draw	2 nd Draw	

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

2) What is the probability of drawing...	Fraction	Decimal	Percent
a) coconut and then mint			
b) mint and then coconut			
c) salted-caramel and then coconut or mint			
d) coconut, mint, or salted caramel and then mint			

Tree Diagram - 4 Events

Questions

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

Lane flips a coin 4 times. Draw a tree diagram that lists all the possible outcomes she could get as she flips the coins.



PREVIEW

2) How many combinations could Lane get? _____

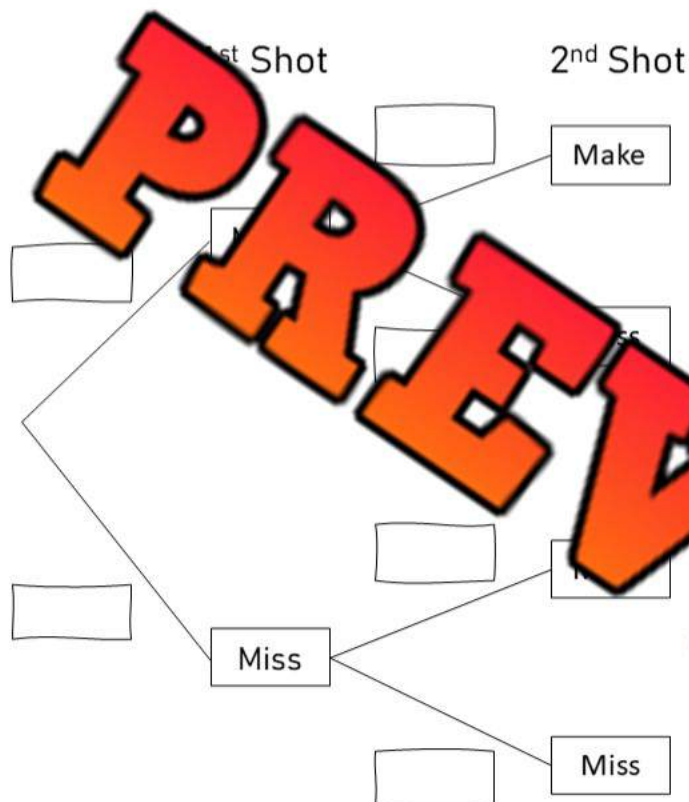
3) What is the probability that she flips the following...	Fraction	Percent
a) 2 heads and 2 tails		
b) 1 heads and 3 tails		
c) 1 tails and 3 heads		
d) 4 heads		
e) 4 tails		

Tree Diagram - Free Throws

Part 1 Draw a tree diagram to help you find the probability of different combinations

Roger is a 72% free throw shooter. When he goes to the free throw line to shoot two free throws, he has a 72% chance at making the first shot and a 72% chance at making the second shot.

Fill in the blanks on the tree diagram below.

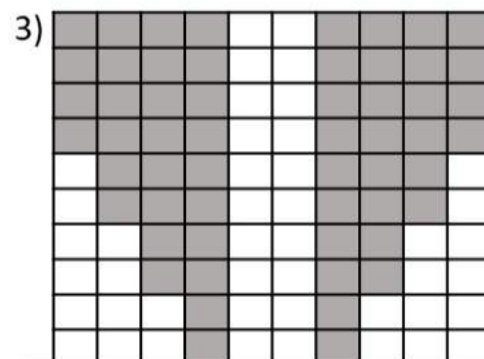
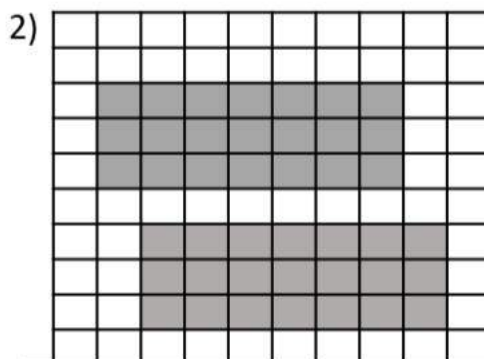
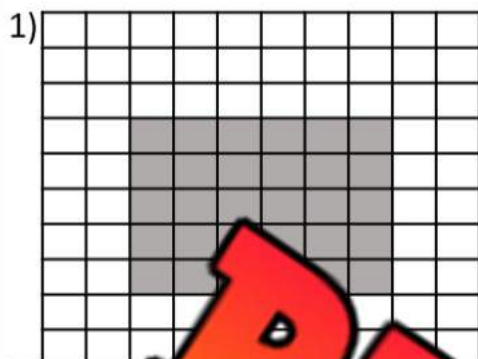


Part 2 Answer the questions below

What is the probability that Roger...	Decimal	Percent
1) makes the first free throw and misses the second		
2) misses the first free throw and makes the second		
3) makes both free throws		
4) misses both free throws		

Unit Quiz - Probability

Part 1 Represent the probability of hitting the target using a fraction, decimal and percent



Fraction

Decimal

Percent

Fraction

Decimal

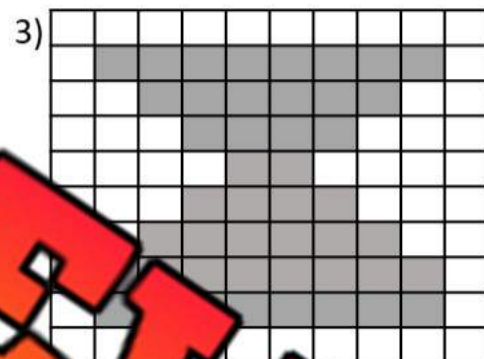
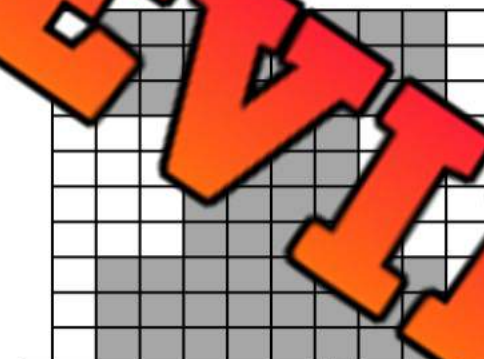
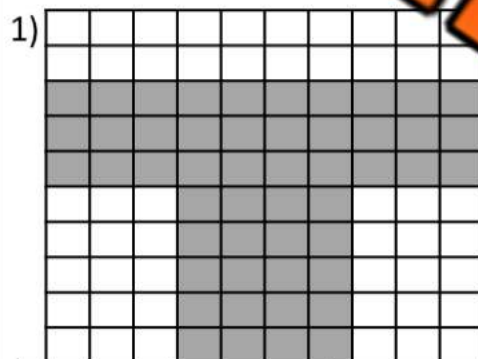
Percent

Fraction

Decimal

Percent

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



Fraction

Decimal

Percent

Fraction

Decimal

Percent

Fraction

Decimal

Percent

Part 3 What is the probability of...

1) Rolling a 1?

Fraction

Decimal

Percent

2) Rolling a 5 or 6?

Fraction

Decimal

Percent

3) Rolling an odd number?

Fraction

Decimal

Percent