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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	Mason	=	Total	=	Ethan	Olivia	Mason	Mean =
24	18	15							
Nikki	Logan	Amelia	=	Total	=	Nikki	Logan	Amelia	Mean =
30	21	24							
Jacob	Aiden	Harper	=	Total	=	Jacob	Aiden	Harper	Mean =
18	24	21							
Nora	Caleb	Isla	=	Total	=	Nora	Caleb	Isla	Mean =
69	85	104							

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.

3.2, 4.5, 3.8, 4.5, 2.9, 3.2, 5.1	9.4, 7.6, 8.2, 9.4, 6.8, 7.6, 8.9	6.4, 7.8, 5.9, 6.4, 8.2, 7.1, 5.9
Mean =	Mean =	Mean =
Median =	Median =	Median =
Mode =	Mode =	Mode =
Range =	Range =	Range =
15.3, 18.7, 17.2, 16.5, 18.7, 19.1, 15.3	30.5, 28.7, 32.1, 29.9, 31.4, 28.7, 30.5	22.4, 24.6, 23.1, 25.8, 24.6, 21.9, 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 0 .

6, 8, 10, 12, 14

Mean

20, 16, 18, 22, 14

Mean

24, 30, 36, 42, 48

Mean

28, 32, 36, 40, 44

Mean

80, 90, 100, 110, 120

Mean

60, 70, 80, 90, 100

Mean

55, 65, 75, 85, 95

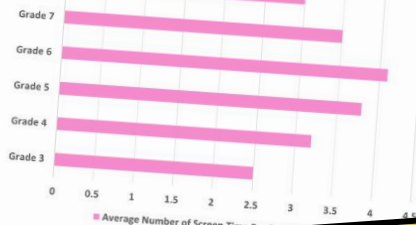
Mean

22, 27, 31, 36, 46, 48

Mean

21.5, 28.75, 34.0, 47.25

Mean



Questions

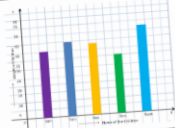
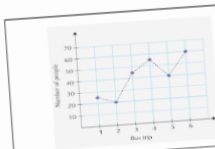
Answer

- 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?
- 4) Is this data **discrete or continuous**?

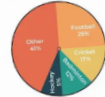
Primary
Secondary
Discrete
Continuous

TYPES OF GRAPHS

Label the names of the graphs below.



Number of Students



Histogram

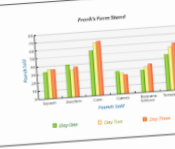
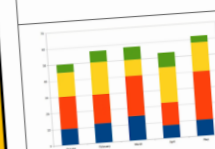
Multiple Bar Graph

Bar Graph

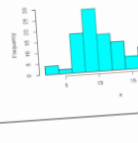
Stacked Bar Graph

Circle Graph

Broken Line Graph



Frequency

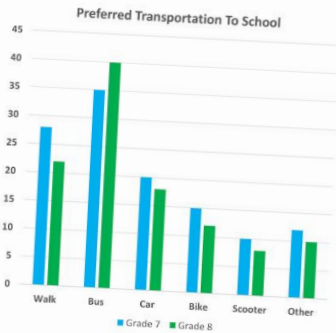




Manitoba Math Curriculum Statistics– Grade 7

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.



Scooter

Other

1 2 3 4 5 6 7 8 9 0

1) Which transportation method did the **Grade 7** students choose the most?

2) Which transportation method did the **Grade 8** students choose the most?

3) How many more students chose **Bus** than **Walk** in total?

4) How many students participated in the survey?

5) What percentage of **Grade 7** students chose **Walk**?

6) What percentage of **Grade 8** students chose **Bus**?

Grade 7	Grade 8

Walk

Bus

Car

Bike

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.

Favourite School Subject

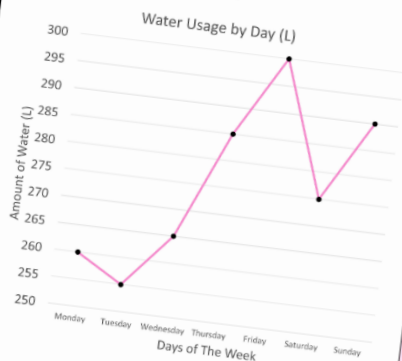


Subject	Grade 5		Grade 6		Grade 7	
	#	%	#	%	#	%
Math	18/150	12				
Science						
English						
Art	30/150	20				
Gym						

1 2 3 4 5 6 7 8 9 0

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.



Fill in the frequency table and answer the questions.

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

1) What percentage of the total weekly water usage was used on Friday and Saturday?

2) Which day had the highest water usage?

3) 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.

Friday						
Saturday						
M	T	W	Th	F	S	Su
Yes				NO		

Name: _____

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Curriculum Connection
SP.1

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 $33 \div 3$ kids = 11 candies each.

Josh 13 Candy Bag	Cameron 11 Candy Bag	Morgan 9 Candy Bag	=	Total 33 Candy Bag	=	Josh 11 Candy Bag	Cameron 11 Candy Bag	Morgan 11 Candy Bag
Mean = 11								

Questions

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

Claire 1 Candy Bag	Katie 30 Candy Bag	Ashley 25 Candy Bag	=	Total _____ Candy Bag	=	Claire _____ Candy Bag	Katie _____ Candy Bag	Ashley _____ Candy Bag
Mean = _____								

Mia 91 Candy Bag	Harper 68 Candy Bag	Charlotte 66 Candy Bag	=	Total _____ Candy Bag	=	Mia _____ Candy Bag	Harper _____ Candy Bag	Charlotte _____ Candy Bag
Mean = _____								

Liam 42 Candy Bag	Noah 98 Candy Bag	William 106 Candy Bag	=	Total _____ Candy Bag	=	Liam _____ Candy Bag	Noah _____ Candy Bag	William _____ Candy Bag
Mean = _____								

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?

Name: _____

5

Curriculum Connection
SP.1

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, 17, 19	4, 7, (8, 8), 12, 15	$8 + 8 = 16$ $16 \div 2 = 8$
2)	15, 17, 18, 19, 20, 21, 22, 23, 24, 25		
3)	27, 20, 24, 28, 26, 29, 30, 31, 32, 33		
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, 92, 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?

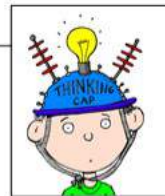
247, 311, 485, 375, 201, 399

Name: _____

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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	24.5, 12.5, 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, 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	57	66	67	62
6)	74, 88, 65, 81, 62	67	77	82	64
7)	83, 99, 72, 76, 85	77	87	78	89
8)	93, 95, 85, 105, 87	89	95	93	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	15	1) $15 \times 6 = 90$ 2) $9 + 16 + 22 + 12 + 19 = 78$ 3) $90 - 78 = 12$	12
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		

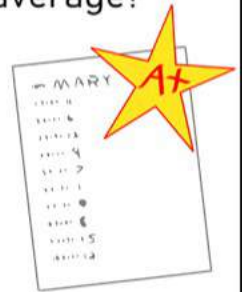
Finding Missing Data Point Using Mean

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?

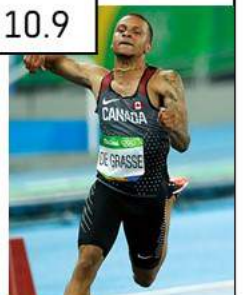


2) Tyler slept an average of 7 hours a night last week. He slept for 5.5 hours on both Monday and Tuesday. He slept for 6 hours on Wednesday and 8.5 hours on Friday and Saturday. On Sunday, he slept a whopping 10 hours. How long did he sleep on Wednesday?

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, 10, 12, 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 run 6 times according to the stop watches that automatically record his times on a computer. His times in seconds 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, 11120

- 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

Questions 1-5 Calculate the mean using the outlier and without the outlier

	Data	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		
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)	45, 41, 48, 46, 21, 45, 46, 88, 47, 46		
5)	254, 265, 276, 287, 298, 309, 320, 331, 342, 353, 364, 375, 386, 397, 408, 419, 430, 441, 452, 463, 474, 485, 496, 507, 518, 529, 540, 551, 562, 573, 584, 595, 606, 617, 628, 639, 650, 661, 672, 683, 694, 705, 716, 727, 738, 749, 760, 771, 782, 793, 804, 815, 826, 837, 848, 859, 870, 881, 892, 903, 914, 925, 936, 947, 958, 969, 980, 991, 1002, 1013, 1024, 1035, 1046, 1057, 1068, 1079, 1090, 1101, 1112, 1123, 1134, 1145, 1156, 1167, 1178, 1189, 1200, 1211, 1222, 1233, 1244, 1255, 1266, 1277, 1288, 1299, 1310, 1321, 1332, 1343, 1354, 1365, 1376, 1387, 1398, 1409, 1420, 1431, 1442, 1453, 1464, 1475, 1486, 1497, 1508, 1519, 1530, 1541, 1552, 1563, 1574, 1585, 1596, 1607, 1618, 1629, 1640, 1651, 1662, 1673, 1684, 1695, 1706, 1717, 1728, 1739, 1750, 1761, 1772, 1783, 1794, 1805, 1816, 1827, 1838, 1849, 1860, 1871, 1882, 1893, 1904, 1915, 1926, 1937, 1948, 1959, 1970, 1981, 1992, 2003, 2014, 2025, 2036, 2047, 2058, 2069, 2080, 2091, 2102, 2113, 2124, 2135, 2146, 2157, 2168, 2179, 2190, 2201, 2212, 2223, 2234, 2245, 2256, 2267, 2278, 2289, 2300, 2311, 2322, 2333, 2344, 2355, 2366, 2377, 2388, 2399, 2410, 2421, 2432, 2443, 2454, 2465, 2476, 2487, 2498, 2509, 2520, 2531, 2542, 2553, 2564, 2575, 2586, 2597, 2608, 2619, 2630, 2641, 2652, 2663, 2674, 2685, 2696, 2707, 2718, 2729, 2740, 2751, 2762, 2773, 2784, 2795, 2806, 2817, 2828, 2839, 2850, 2861, 2872, 2883, 2894, 2905, 2916, 2927, 2938, 2949, 2960, 2971, 2982, 2993, 3004, 3015, 3026, 3037, 3048, 3059, 3070, 3081, 3092, 3103, 3114, 3125, 3136, 3147, 3158, 3169, 3180, 3191, 3202, 3213, 3224, 3235, 3246, 3257, 3268, 3279, 3290, 3301, 3312, 3323, 3334, 3345, 3356, 3367, 3378, 3389, 3400, 3411, 3422, 3433, 3444, 3455, 3466, 3477, 3488, 3499, 3510, 3521, 3532, 3543, 3554, 3565, 3576, 3587, 3598, 3609, 3620, 3631, 3642, 3653, 3664, 3675, 3686, 3697, 3708, 3719, 3730, 3741, 3752, 3763, 3774, 3785, 3796, 3807, 3818, 3829, 3840, 3851, 3862, 3873, 3884, 3895, 3906, 3917, 3928, 3939, 3950, 3961, 3972, 3983, 3994, 4005, 4016, 4027, 4038, 4049, 4060, 4071, 4082, 4093, 4104, 4115, 4126, 4137, 4148, 4159, 4170, 4181, 4192, 4203, 4214, 4225, 4236, 4247, 4258, 4269, 4280, 4291, 4302, 4313, 4324, 4335, 4346, 4357, 4368, 4379, 4390, 4401, 4412, 4423, 4434, 4445, 4456, 4467, 4478, 4489, 4500, 4511, 4522, 4533, 4544, 4555, 4566, 4577, 4588, 4599, 4610, 4621, 4632, 4643, 4654, 4665, 4676, 4687, 4698, 4709, 4720, 4731, 4742, 4753, 4764, 4775, 4786, 4797, 4808, 4819, 4830, 4841, 4852, 4863, 4874, 4885, 4896, 4907, 4918, 4929, 4940, 4951, 4962, 4973, 4984, 4995, 5006, 5017, 5028, 5039, 5050, 5061, 5072, 5083, 5094, 5105, 5116, 5127, 5138, 5149, 5160, 5171, 5182, 5193, 5204, 5215, 5226, 5237, 5248, 5259, 5270, 5281, 5292, 5303, 5314, 5325, 5336, 5347, 5358, 5369, 5380, 5391, 5402, 5413, 5424, 5435, 5446, 5457, 5468, 5479, 5490, 5501, 5512, 5523, 5534, 5545, 5556, 5567, 5578, 5589, 5600, 5611, 5622, 5633, 5644, 5655, 5666, 5677, 5688, 5699, 5710, 5721, 5732, 5743, 5754, 5765, 5776, 5787, 5798, 5809, 5820, 5831, 5842, 5853, 5864, 5875, 5886, 5897, 5908, 5919, 5930, 5941, 5952, 5963, 5974, 5985, 5996, 6007, 6018, 6029, 6040, 6051, 6062, 6073, 6084, 6095, 6106, 6117, 6128, 6139, 6150, 6161, 6172, 6183, 6194, 6205, 6216, 6227, 6238, 6249, 6260, 6271, 6282, 6293, 6304, 6315, 6326, 6337, 6348, 6359, 6370, 6381, 6392, 6403, 6414, 6425, 6436, 6447, 6458, 6469, 6480, 6491, 6502, 6513, 6524, 6535, 6546, 6557, 6568, 6579, 6590, 6601, 6612, 6623, 6634, 6645, 6656, 6667, 6678, 6689, 6700, 6711, 6722, 6733, 6744, 6755, 6766, 6777, 6788, 6799, 6810, 6821, 6832, 6843, 6854, 6865, 6876, 6887, 6898, 6909, 6920, 6931, 6942, 6953, 6964, 6975, 6986, 6997, 7008, 7019, 7030, 7041, 7052, 7063, 7074, 7085, 7096, 7107, 7118, 7129, 7140, 7151, 7162, 7173, 7184, 7195, 7206, 7217, 7228, 7239, 7250, 7261, 7272, 7283, 7294, 7305, 7316, 7327, 7338, 7349, 7360, 7371, 7382, 7393, 7404, 7415, 7426, 7437, 7448, 7459, 7470, 7481, 7492, 7503, 7514, 7525, 7536, 7547, 7558, 7569, 7580, 7591, 7602, 7613, 7624, 7635, 7646, 7657, 7668, 7679, 7690, 7701, 7712, 7723, 7734, 7745, 7756, 7767, 7778, 7789, 7800, 7811, 7822, 7833, 7844, 7855, 7866, 7877, 7888, 7899, 7910, 7921, 7932, 7943, 7954, 7965, 7976, 7987, 7998, 8009, 8020, 8031, 8042, 8053, 8064, 8075, 8086, 8097, 8108, 8119, 8130, 8141, 8152, 8163, 8174, 8185, 8196, 8207, 8218, 8229, 8240, 8251, 8262, 8273, 8284, 8295, 8306, 8317, 8328, 8339, 8350, 8361, 8372, 8383, 8394, 8405, 8416, 8427, 8438, 8449, 8460, 8471, 8482, 8493, 8504, 8515, 8526, 8537, 8548, 8559, 8570, 8581, 8592, 8603, 8614, 8625, 8636, 8647, 8658, 8669, 8680, 8691, 8702, 8713, 8724, 8735, 8746, 8757, 8768, 8779, 8790, 8801, 8812, 8823, 8834, 8845, 8856, 8867, 8878, 8889, 8900, 8911, 8922, 8933, 8944, 8955, 8966, 8977, 8988, 8999, 9010, 9021, 9032, 9043, 9054, 9065, 9076, 9087, 9098, 9109, 9120, 9131, 9142, 9153, 9164, 9175, 9186, 9197, 9208, 9219, 9230, 9241, 9252, 9263, 9274, 9285, 9296, 9307, 9318, 9329, 9340, 9351, 9362, 9373, 9384, 9395, 9406, 9417, 9428, 9439, 9450, 9461, 9472, 9483, 9494, 9505, 9516, 9527, 9538, 9549, 9560, 9571, 9582, 9593, 9604, 9615, 9626, 9637, 9648, 9659, 9670, 9681, 9692, 9703, 9714, 9725, 9736, 9747, 9758, 9769, 9780, 9791, 9802, 9813, 9824, 9835, 9846, 9857, 9868, 9879, 9890, 9901, 9912, 9923, 9934, 9945, 9956, 9967, 9978, 9989, 10000		

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
Ava	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. 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 were 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)

Name: _____

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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 are you organizing your data? You will need 4 or 5 categories so you can use your data to make conclusions.
For example: Sydney's goal totals for his first 5 seasons.

Categories

Data

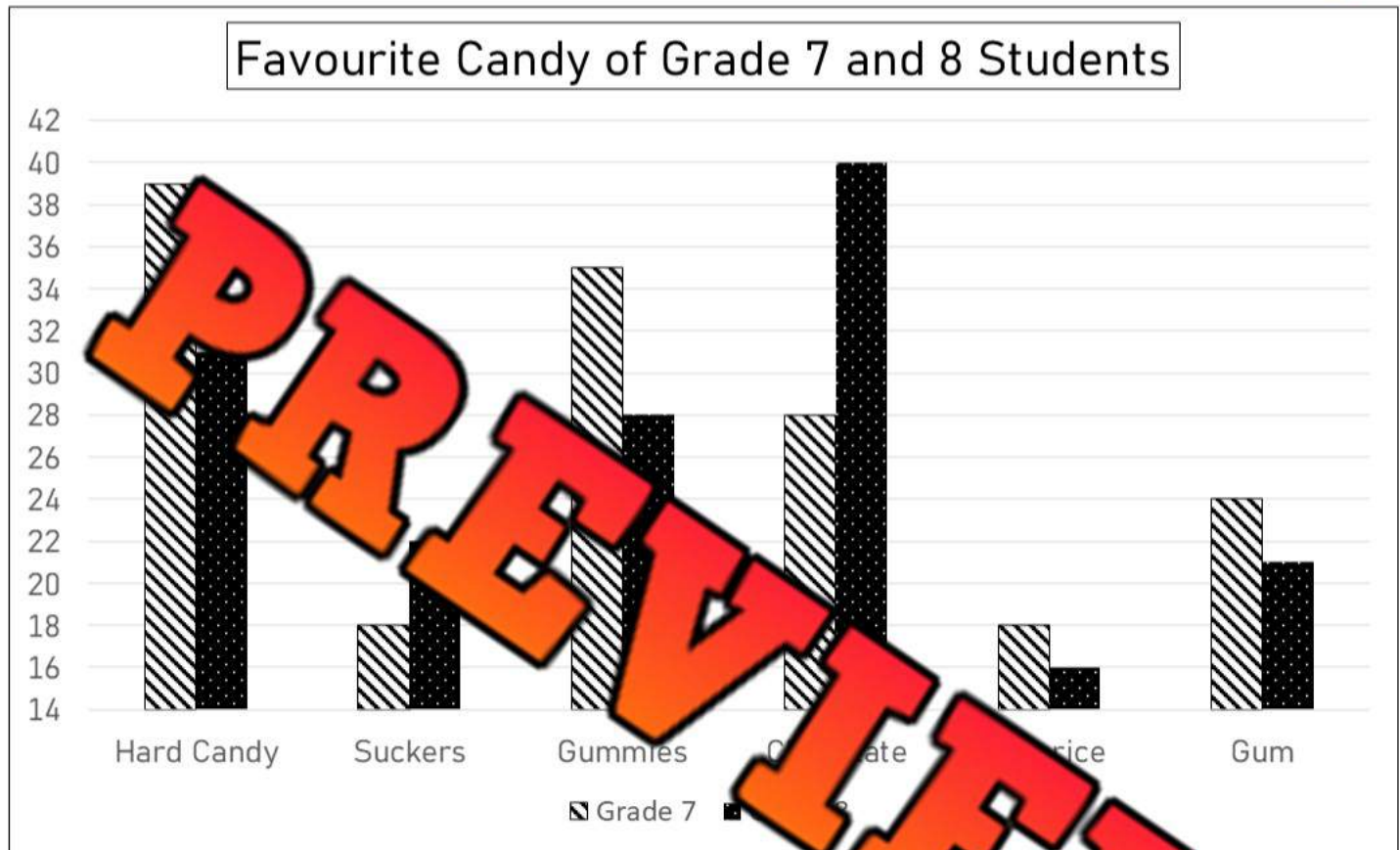
3) What did you learn about your secondary data?

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.



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?

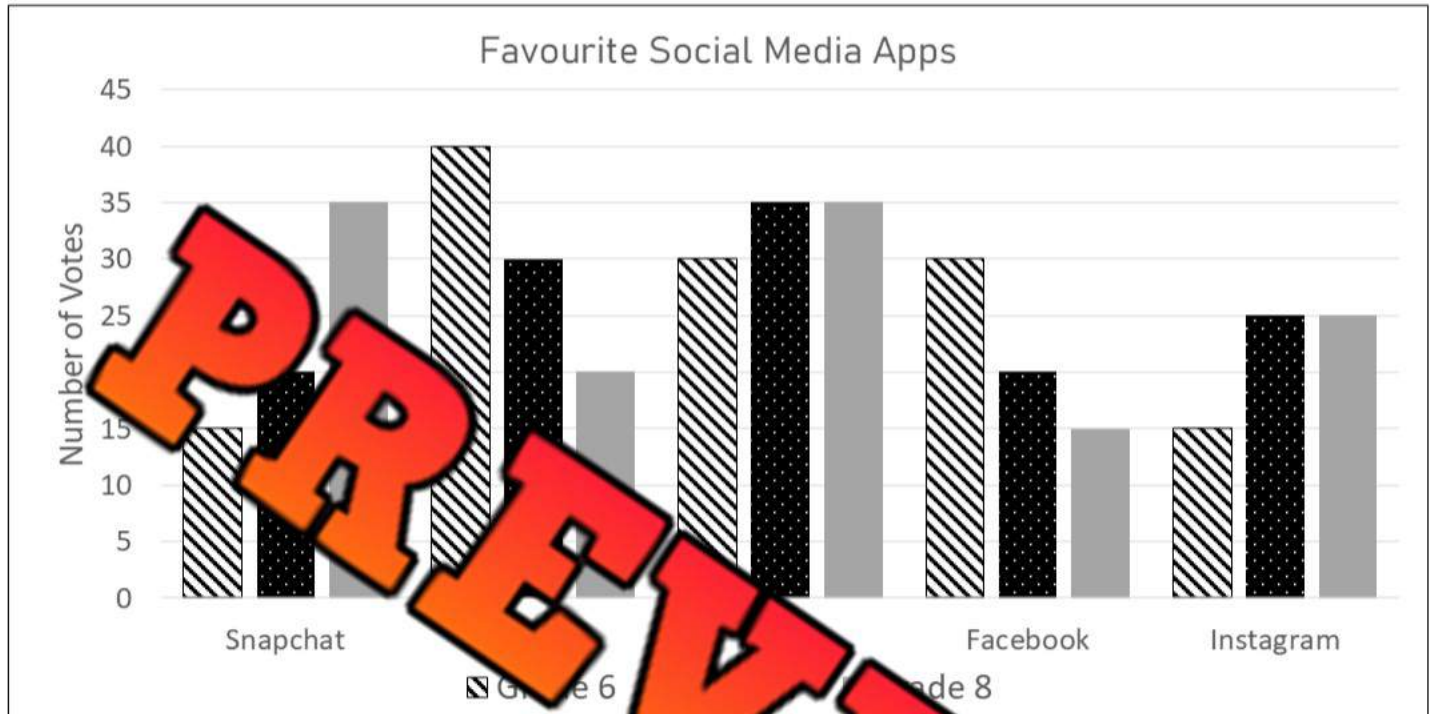
Name: _____

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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: _____

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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



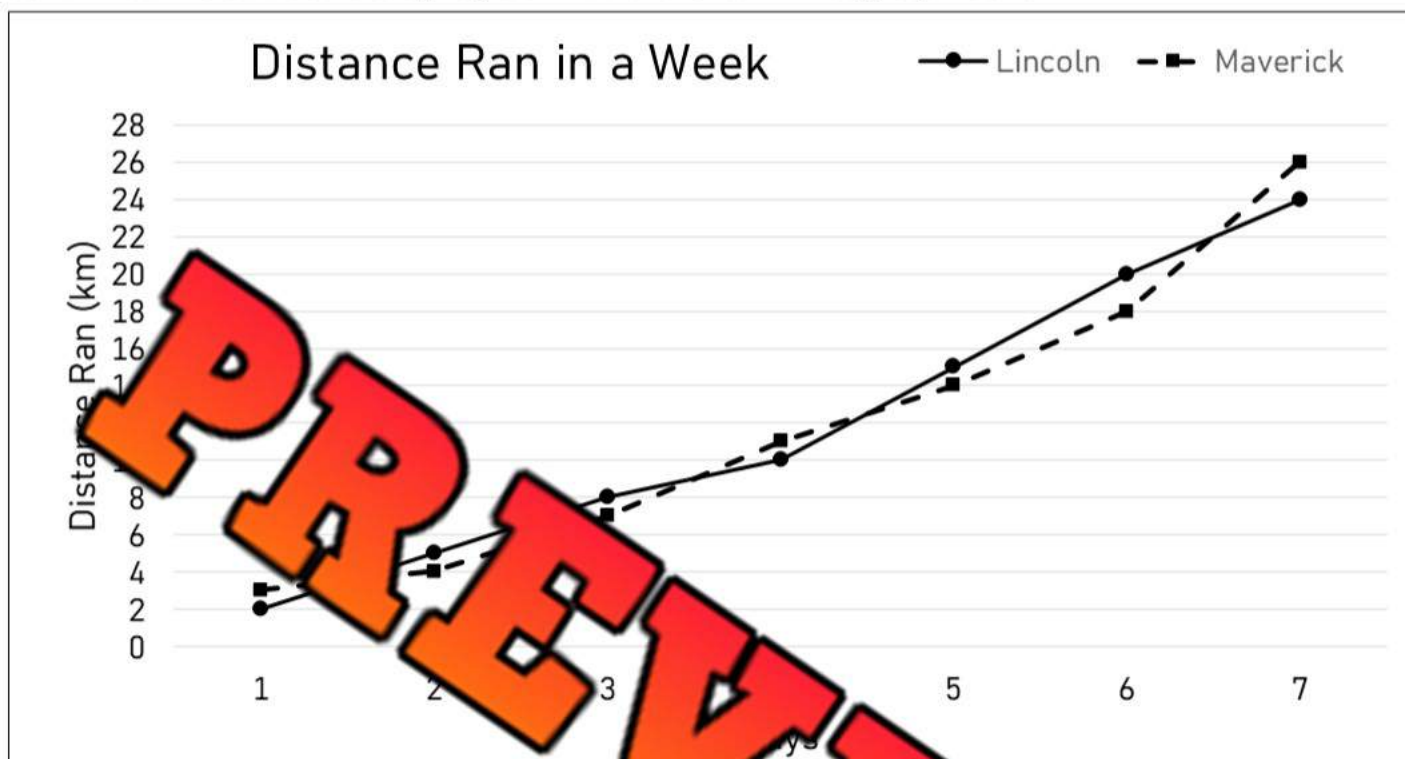
Legend

☐☐

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							

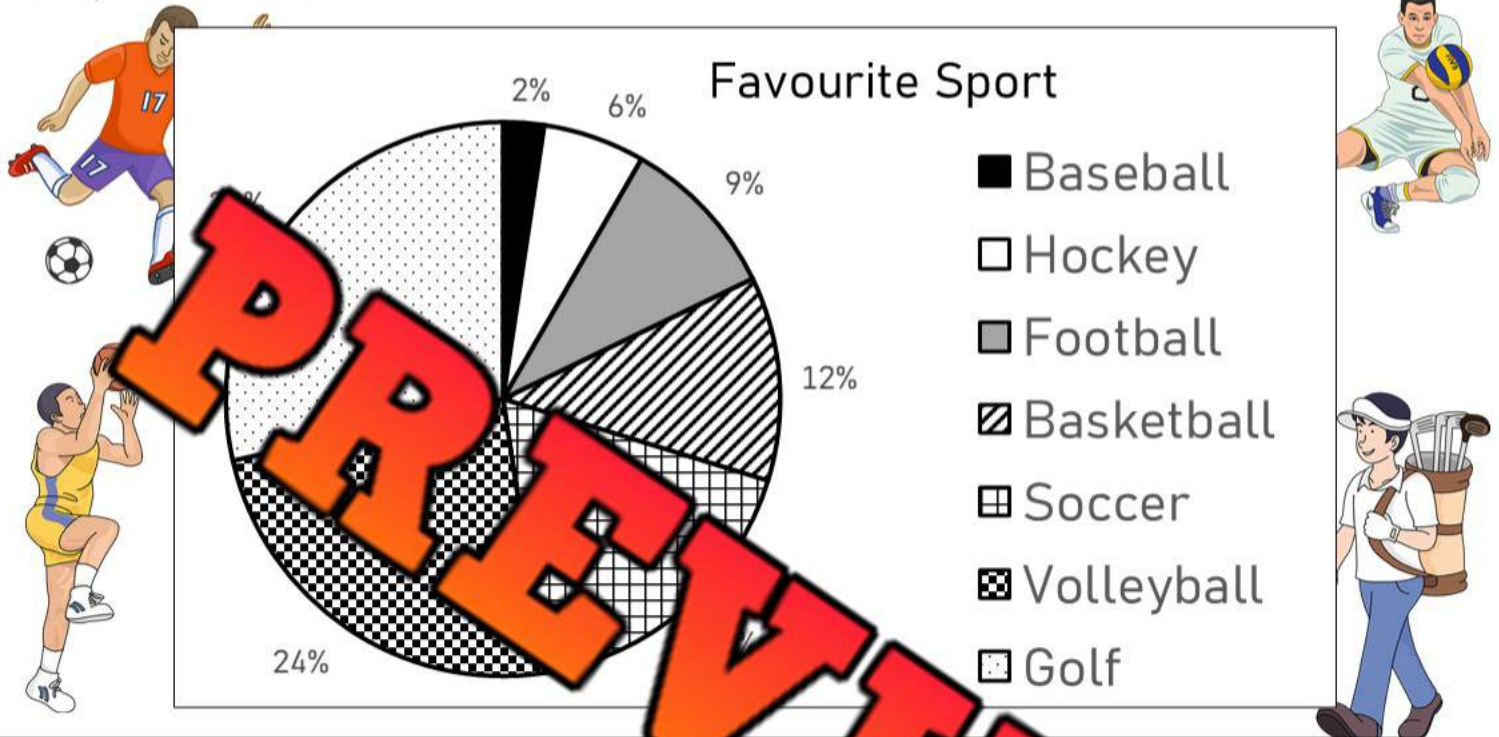
Part 2

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

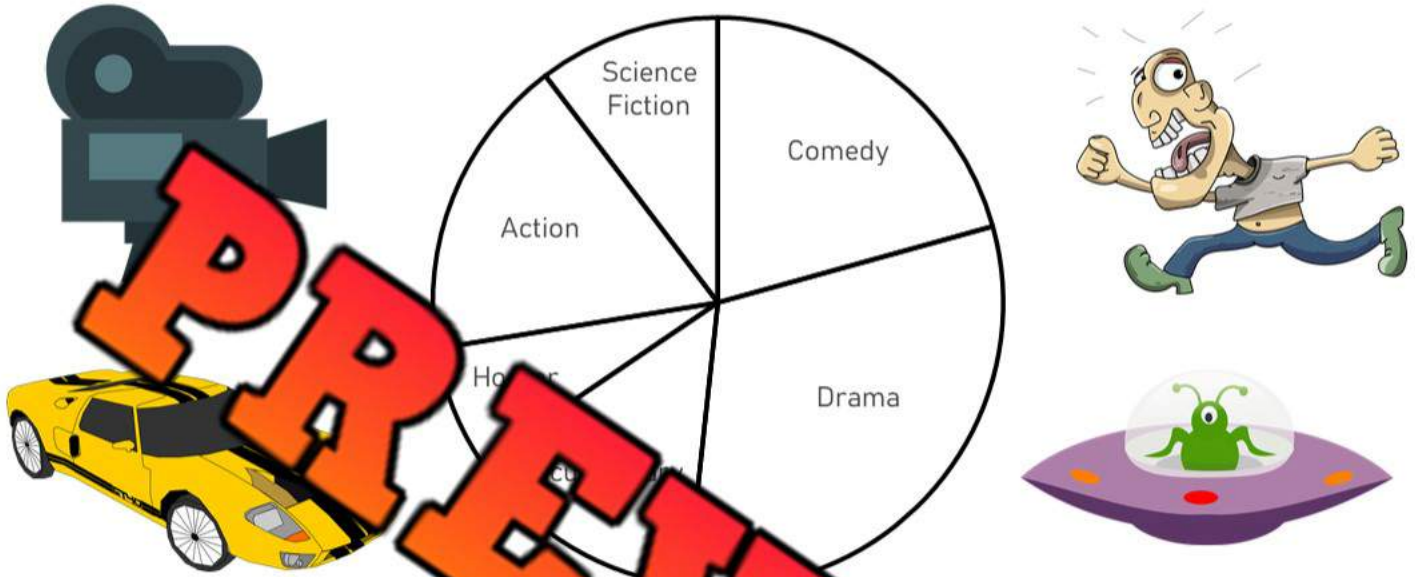
Answer the questions below

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 reading 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

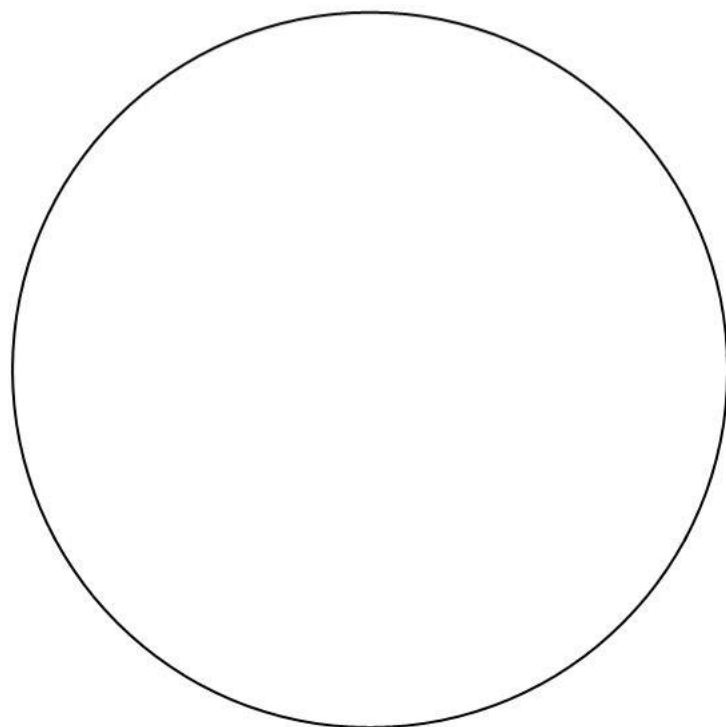
Selena has a business selling her artwork. She kept track of her sales each day last week.



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's business is doing well on those days?

3) What conclusions can you draw from this data?

Drawing a Circle Graph - Languages

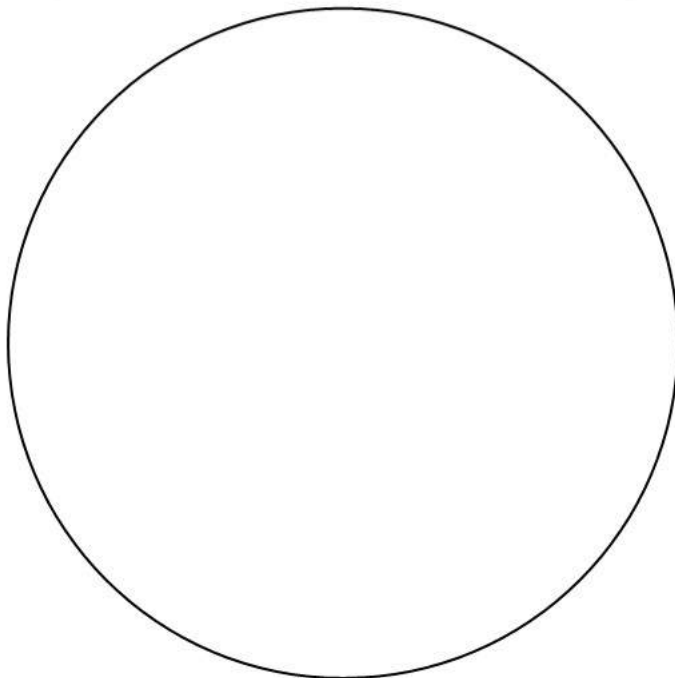
The top 7 most popular languages have been recorded in the table below. The data shows what percentage of the world speaks each language. Use the percent to find the angle measurement so you can represent the data in a circle graph.



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 percentage 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.

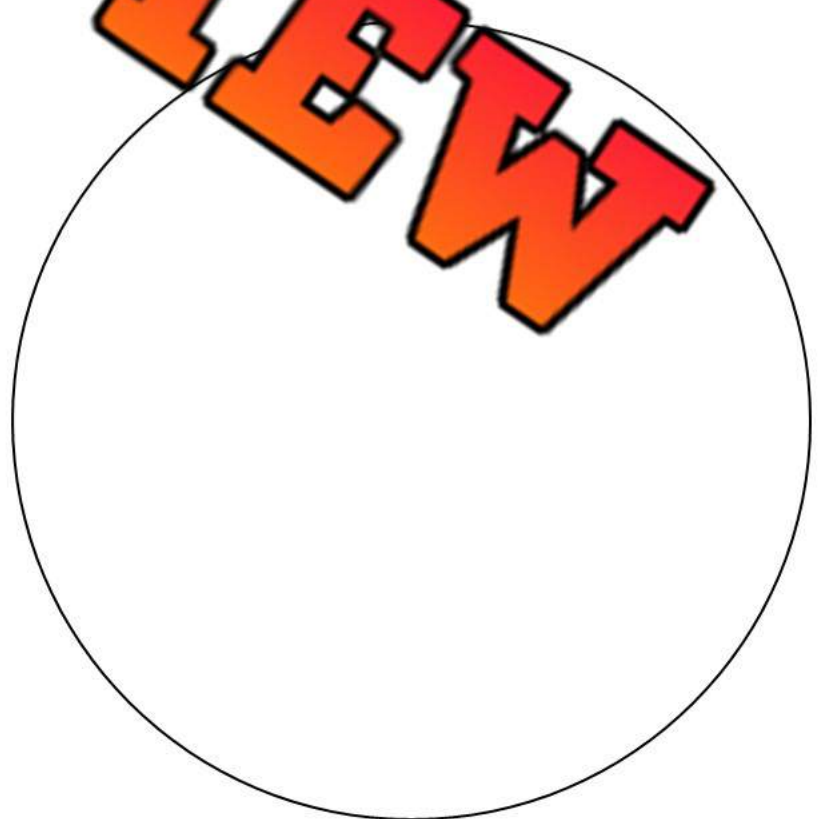


Part 1 Fill in the table below to determine Nick's average playoff scoring each season

	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	10	7	12	9	12	
Season 4	10	10	11	13	16	
Season 5	10	20	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	



Name: _____

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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.

PREVIEW

Interpreting The Data

1) 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?

Name: _____

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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

☐

Percentages/totals

PREVIEW

Name: _____

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Collecting Quantitative Data - Circle Graph

Data Collection

Collect **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.

PREVIEW

Interpreting The Data

1) What source did you find your data from? _____

2) Why is it important to provide a source when you use secondary data? _____

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

Name: _____

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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

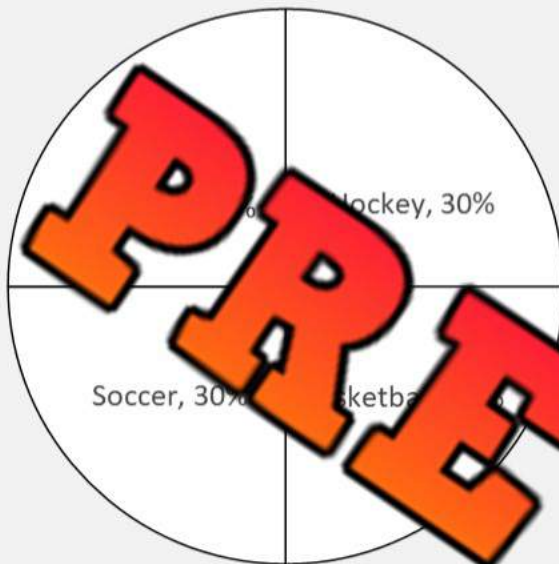
PREVIEW

Source: _____

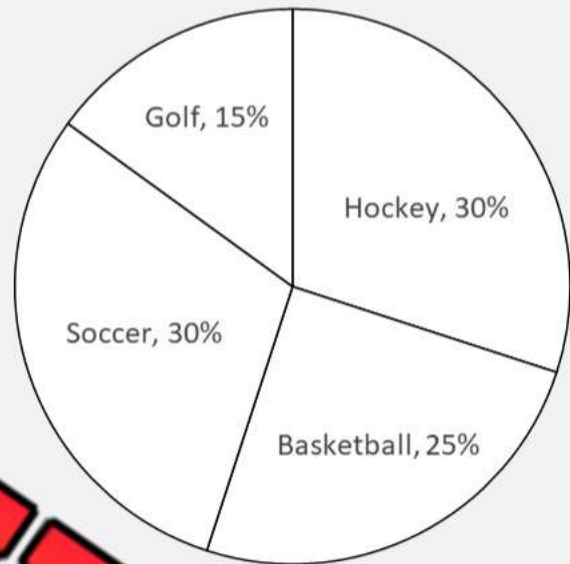
Misleading Graph - Circle Graph

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.

Name: _____

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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

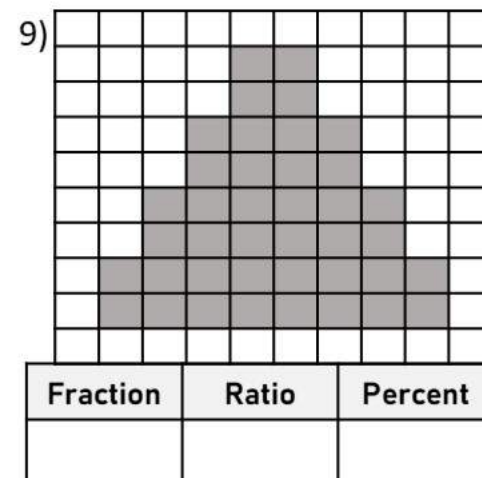
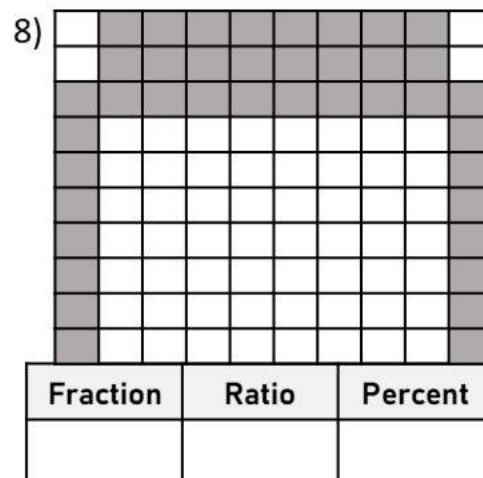
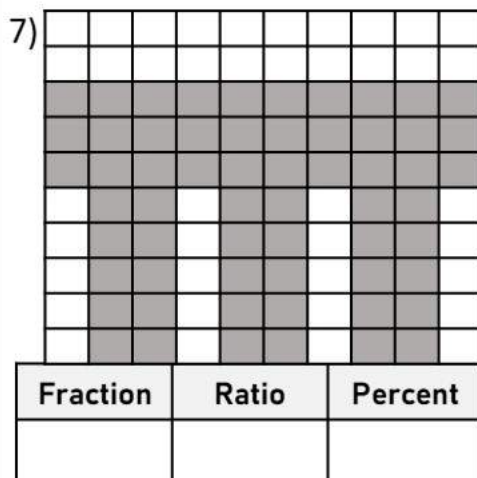
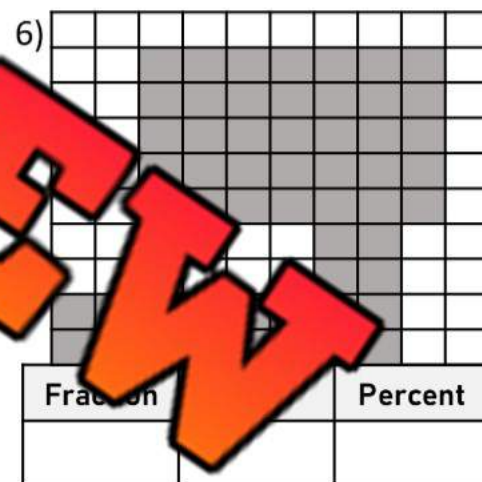
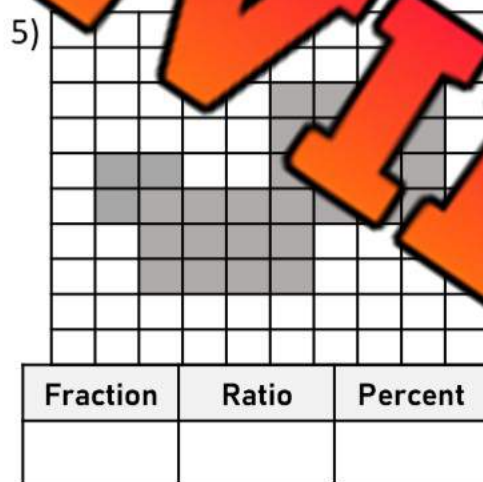
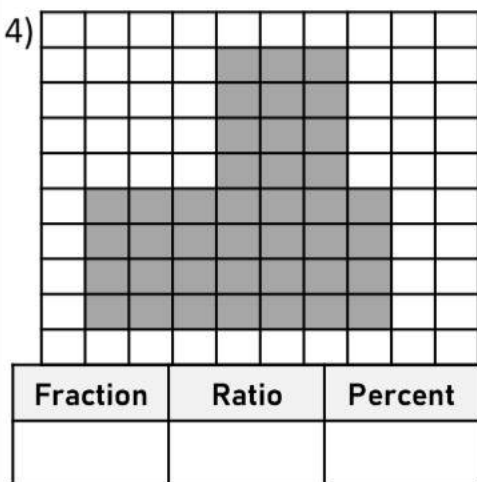
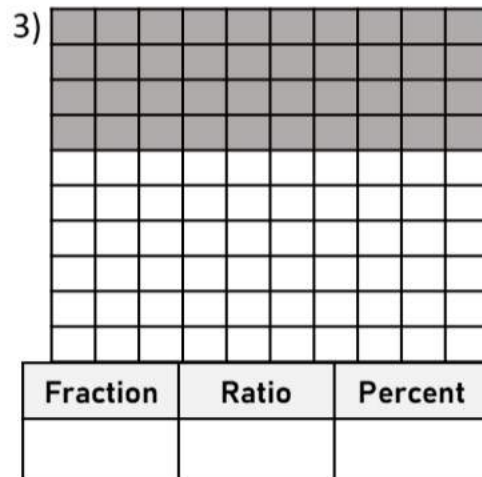
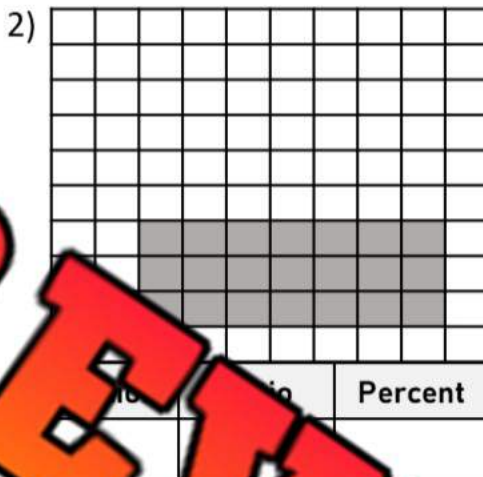
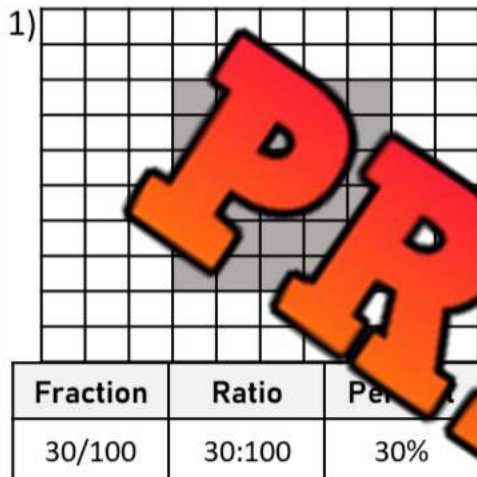


Independent events are two or more events that could happen at the same time without affecting the outcomes of the other events. Imagine below, that the shaded in area is a target and the white part is the wall. What is the probability of you hitting each target?

Think: Why are these independent events?

Questions

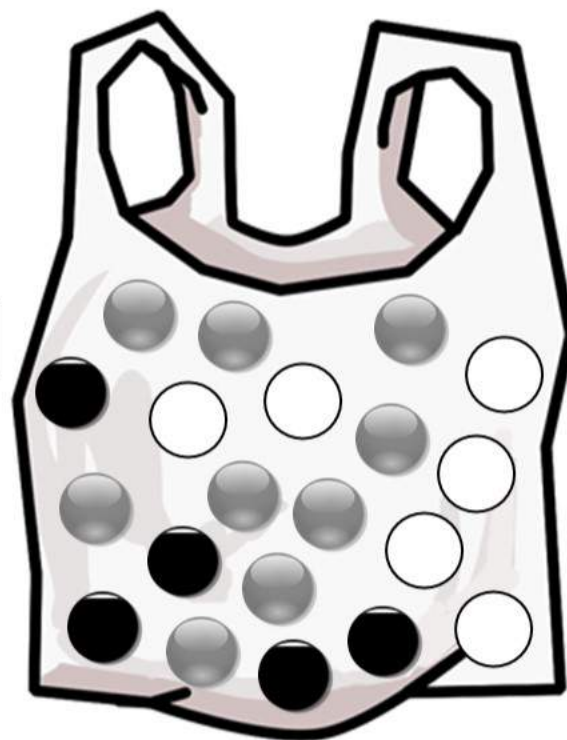
Represent the probability of hitting the target using a fraction, ratio and percent



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 each event 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

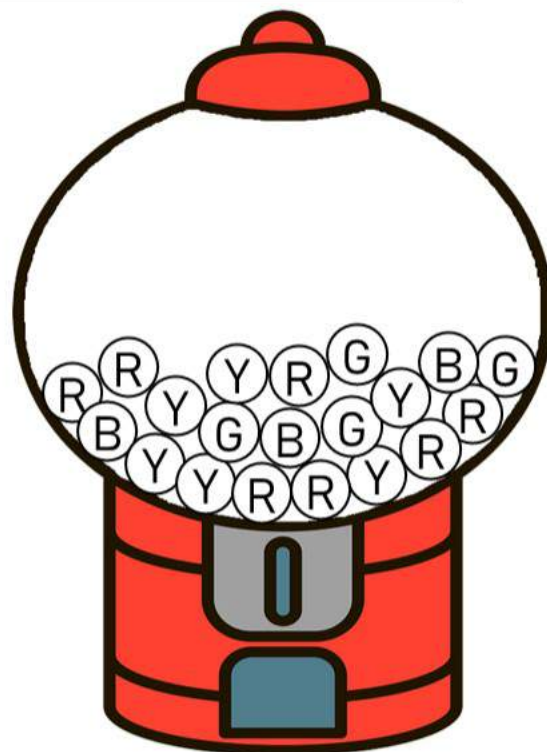
Gumball Machine

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

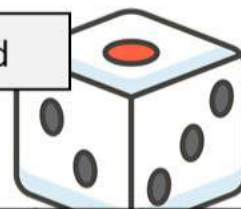
Represent the probability of pulling out a gumball as a fraction, ratio and percent

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

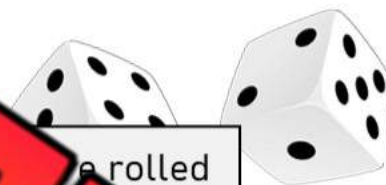


- 1) What is the probability of you rolling two six-sided dice and getting a sum of the two dice greater than 8?
- 2) What is the probability of you rolling two six-sided dice and getting a sum of the two dice greater than 11?
- 3) What is the probability of you rolling two six-sided dice and getting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



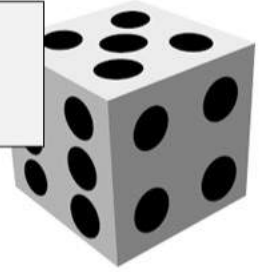
- 1) What is the probability of you rolling two six-sided dice and getting a product of the two dice greater than 30?
- 2) What is the probability of you rolling two six-sided dice and getting a product of the two dice less than or equal to 9?
- 3) What is the probability of you rolling two six-sided dice and getting a sum of the two dice greater than or equal to 25?

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

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?

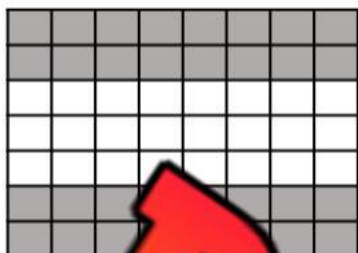
Fraction	Ratio	Percent

Independent Events - Darts

Questions

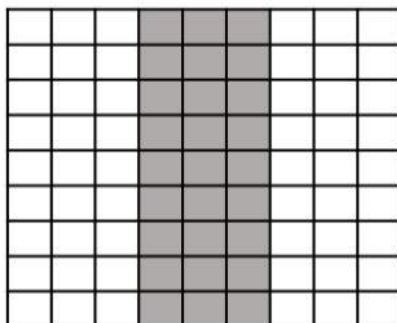
What is the probability of hitting the target if you get 2 throws?

1)



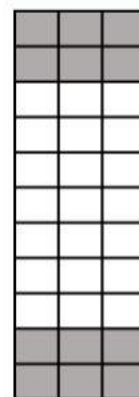
Fraction	
Ratio	
Percent	

2)



Fraction	
Ratio	
Percent	

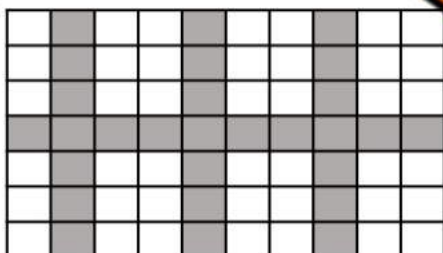
3)



Fraction	
Ratio	
Percent	



4)

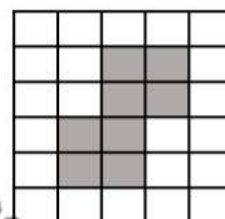


Fraction	
Ratio	
Percent	

6)

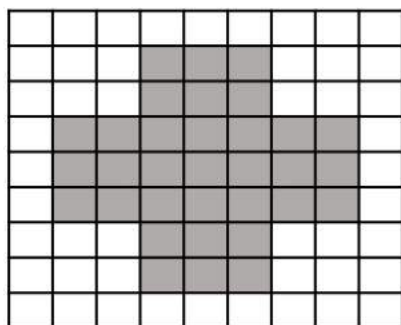


Fraction	
Ratio	
Percent	



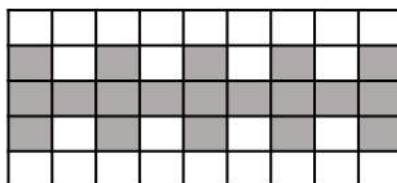
Fraction	
Ratio	
Percent	

7)



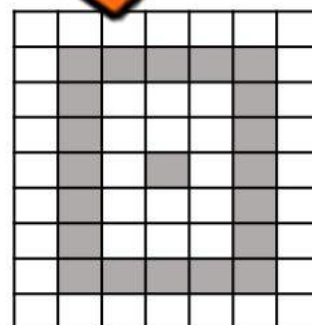
Fraction	
Ratio	
Percent	

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 lottery.		
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 2 hard 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 3.		
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 dice getting an odd number 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

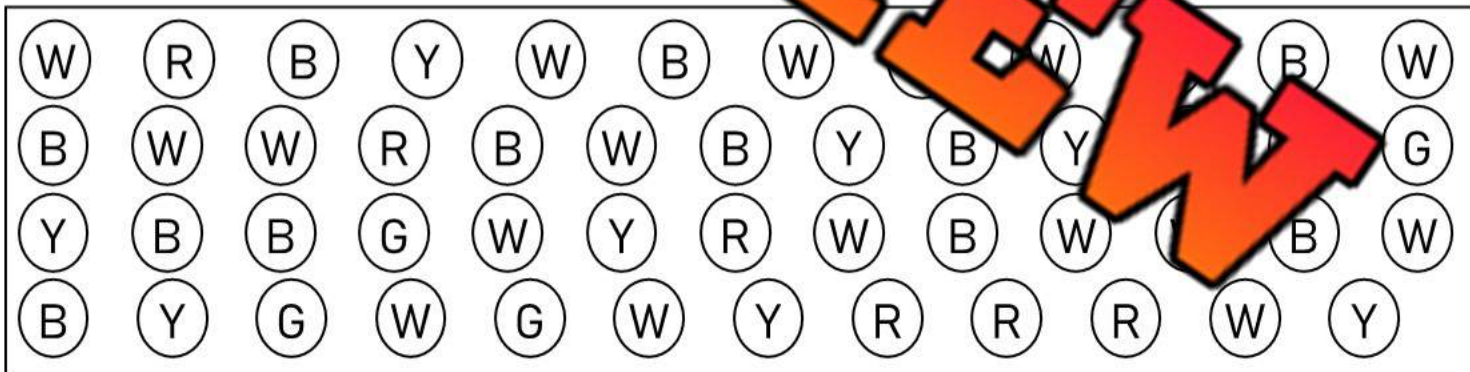
1) If you reach into the drawer 50 times without looking, what is the theoretical probability that you will pull each of the colours below.

	White	Yellow	Black	Green	Red
Fraction					
Ratio					
Percent					

Part 2

Complete the experiment to find 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.

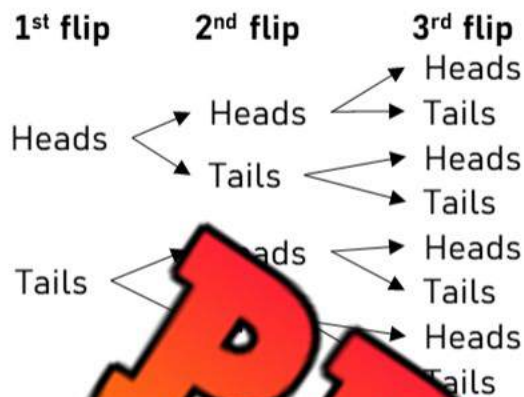


Colour of Sock	White	Yellow	Black	Green	Red
Tally					
Percent					

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 3 different flavors of ice cream and two different cones. Show the combinations of ice cream you could have in a 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			

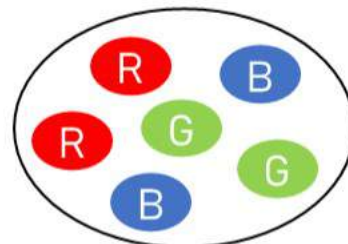
Tree Diagrams - Independent Events

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
1st Draw	2nd 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.
