key L Green

UNIT 7– DATA & PROBABILITY

Assignment	Title	Work to complete	Complete
7.1	*Mean, Median, Mode & Range*		
7A	*Worksheet*		
	Quiz 1		
7.2	*Displaying Data: Histograms & Bar Graphs*		
	Scatter Plots		
	Line Graphs		
	Circle Graphs		
	Infographics		
7B	*Worksheet*		
	Quiz 2		
7.3	*Experimental Probability*		
7C	*Worksheet*		
	Quiz 3		
Practice Test	Practice Test / Unit Review Assignment		
Chapter Test	Show me your stuff !		
Self-Assessment	On the next page, complete the self-assessment.		

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Statistics is a field of mathematics that deals with the collecting and summarizing of data. There are four measures of central tendency that we will be working with:

Mean (sometimes called average). To calculate the mean we add up all the values and then divide by the number of values we have.

Median is the center or middle value. To find the median we order all the numbers from smallest to largest and then pick the middle number.
(If there are two numbers in the middle we take the mean of those two numbers.)

Mode is the most frequent value. To find the mode we look for the value that occurs most often.

Range is the difference between the highest and lowest values. (Subtract the lowest value from the highest value) (tells you how close together your values are – smaller Range means data is more consistent)

How does a number so different from the others affect Mean/Median Mode

Example 1: Find the Mean, Median, Mode and Range of the following set of numbers:

32 , 33 , 34 , 33 , 23 , 26 , 34 , 34 , 3

Mean: Add all up & divide by 9 (there are 9 numbers)

32 + 33 + 34 + 33 + 23 + 26 + 34 + 34 + 3 = 252

252 ÷ 9 = 28 **Mean = 28**

Median: Order all numbers from smallest to largest.

3, 23, 26, 32, (33), 33, 34, 34, 34 Find middle number.

Median: 33

Mode: Which number occurs the most? **Mode = 34**

Range: Biggest Number – Smallest Number

34 – 3 = 31 **Range = 31**

Example 2: Find the Mean, Median, Mode and Range

4.2 , 10.3 , 11.3 , 5.0 , 60.5 , 35.2 , 21.7 , 24.0 , 4.9 , 18.9

Mean: Add up all numbers and divide by 10 (there are 10 numbers)

4.2 + 10.3 + 11.3 + 5 + 60.5 + 35.2 + 21.7 + 24 + 4.9 + 18.9 = 196

196 ÷ 10 = 19.6 **Mean = 19.6**

Median: Order all numbers from smallest to largest

4.2, 4.9, 5.0, 10.3, 11.3, 18.9, 21.7, 24.0, 35.2, 60.5

Two middle numbers. Find the mean (add & divide by 2)

11.3 + 18.9 = 30.2 30.2 ÷ 2 = 15.1

Median = 15.1

Mode: Most common (all occur just once)

No Mode

Range: Biggest - Smallest 60.5 - 4.2 = 56.3

Range = 56.3

4

Sample Final Exam Question:

The tuition costs for ten universities are given in a table:

University	UBC	UVIC	TRU	Waterloo	McGill	UFV	UNBC	SFU	UofA	UofM
Costs ($)	7568	8650	9225	5880	6720	8840	7820	8432	8990	8260

Find the Mean, Median, Mode, and Range of the tuition prices:

Mean: add all numbers & divide by 10 (there are 10 numbers)

7568 + 8650 + 9225 + 5880 + 6720 + 8840 + 7820 + 8432 + 8990 + 8260 = 80385

80385 ÷ 10 = 8038.5 **Mean = $8038.50**

Median 5880, 6720, 7568, 7820, 8260, 8432, 8650, 8840, 8990, 9225

Find mean of the 2 middle numbers

8260 + 8432 = 16692 16692 ÷ 2 = 8346

Median = $8346

Mode: All occur just once. **No Mode**

Range: Biggest - Smallest = 9225 - 5880 = 3345

Range = $3345

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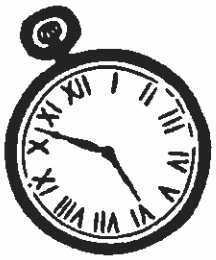
Assignment: Worksheet 7A

WMA 10 **Worksheet 7A** Assignment



What Happened To The Owl Who Swallowed A Watch?

Work out each question on the left and draw a straight line connecting the question to the correct answer. Each line will cross a number and a letter. The number tells you where to put the letter in the row of boxes at the bottom of the page.

*See next page for Calculations:

Find the Mean:
- 3, 15, 12, 16, 8, 4, 19
- 1.2, 3.3, 1.7, 2.5, 2.7, 3.0
- 53, 45, 62, 70, 58, 65, 46
- 157, 133, 142
- 85, 92, 67, 81, 90, 76, 94, 51

Find the Median:
- 3, 15, 12, 16, 8, 4, 20
- 1.2, 3.3, 1.7, 2.5, 2.7, 3.0
- 157, 133, 142
- 85, 92, 67, 81, 90, 76, 94, 51

Find the Mode:
- 3, 15, 12, 16, 8, 4, 20
- 1.2, 3.3, 1.7, 2.1, 2.7, 3.3
- 46, 70, 62, 70, 58, 70, 46
- 85, 92, 67, 85, 92, 76, 92, 51

Find the Range:
- 3, 15, 12, 16, 8, 4, 20
- 1.2, 3.3, 1.7, 2.5, 2.7, 3.0
- 53, 45, 62, 70, 58, 65, 46
- 157, 133, 142
- 85, 92, 67, 81, 90, 76, 94, 51

144
83
70
2.1
11
No Mode
24
2.4
79.5
2.6
25
57
3.3
17
12
43
142
92

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
S	H	E	T	U	R	N	E	D	C	L	O	C	K	W	I	S	E

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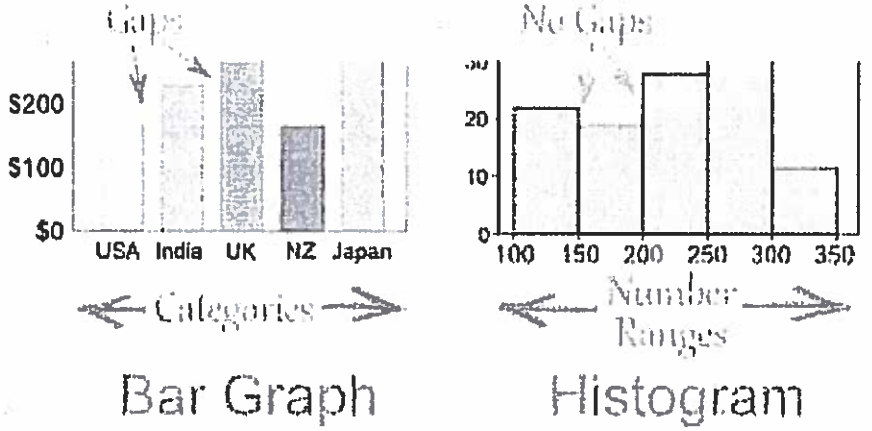
Ask for Quiz 1

Histograms & Bar Graphs:

We use **Bar Graphs** when the data is in categories. There are spaces between the bars.

We use **Histograms** when the data is continuous. There are no spaces between the bars.

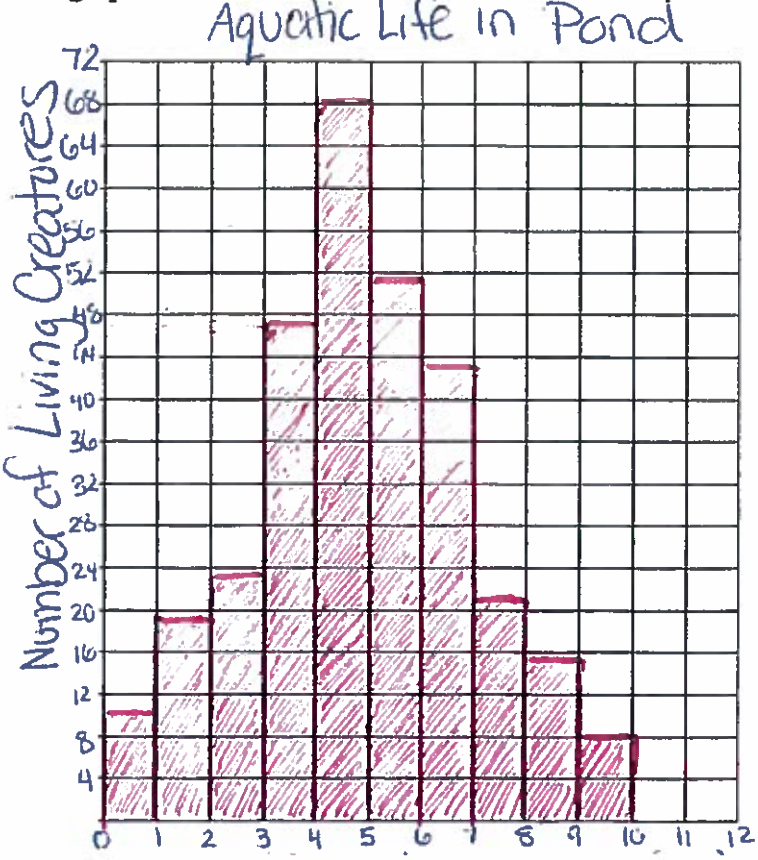


Example 1: For a recent science project, you collected data regarding the distribution of fish and aquatic life in a nearby pond. Your data consists of the number of living creatures found in each 1 meter depth increment in the pond.

→ Data is continuous (in ranges) so histogram.

Decide whether to use a histogram or a bar graph. Draw the axes and decide on scale. Label the axes and draw your graph.

Depth Range	Number of Living Creatures
0-1 meters	10
1-2 meters	19
2-3 meters	23
3-4 meters	47
4-5 meters	68
5-6 meters	51
6-7 meters	43
7-8 meters	21
8-9 meters	15
9-10 meters	8



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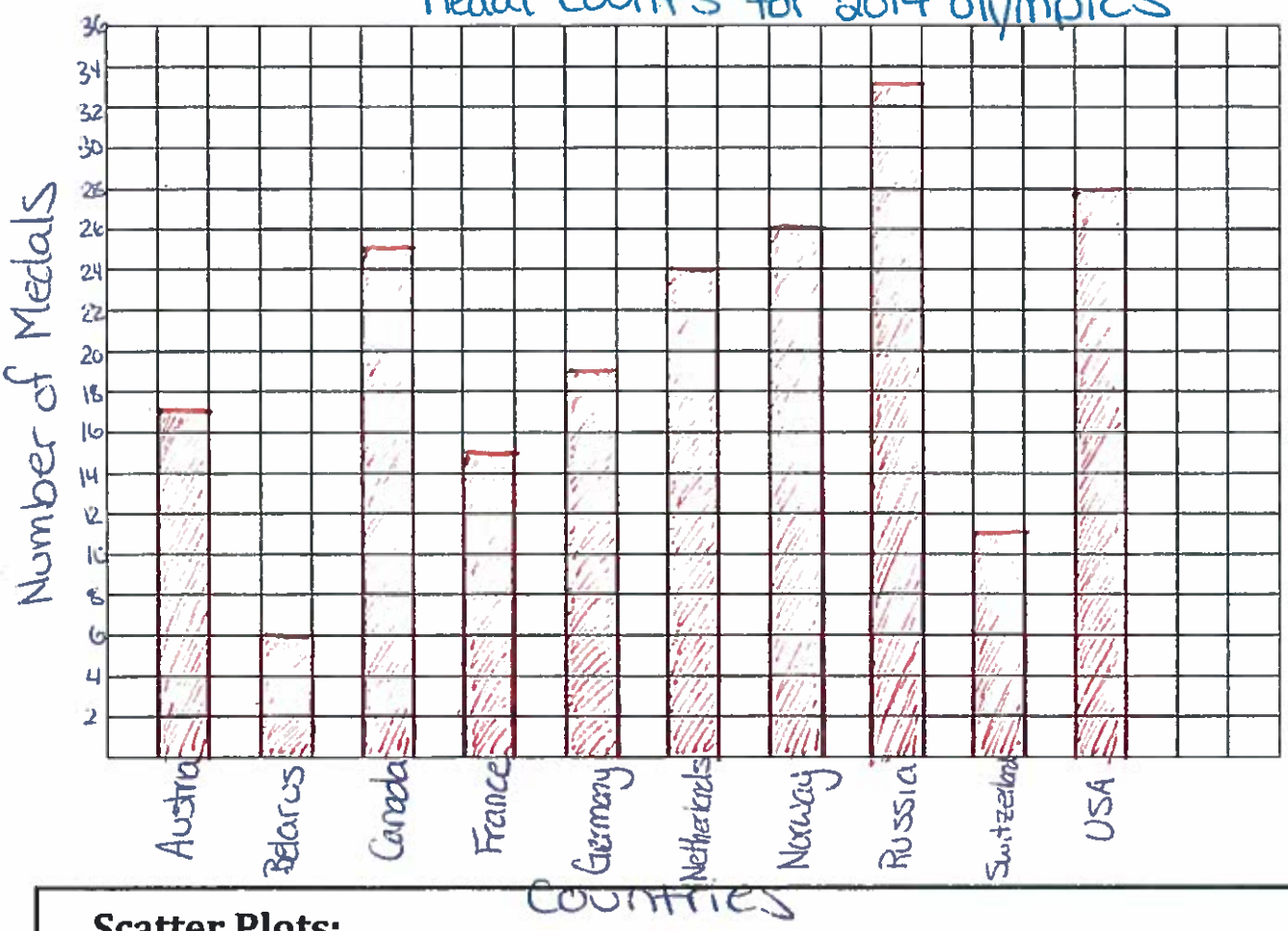
Example 2: The medal counts from the 2014 Winter Olympics in Sochi Russia are found below.

- Austria – 17
- Belarus – 6
- Canada – 25
- France – 15
- Germany – 19
- Netherlands – 24
- Norway – 26
- Russia – 33
- Switzerland – 11
- United States – 28

Decide whether to use a histogram or a bar graph. Draw the axes and decide on scale. Label the axes and draw your graph. Data is in categories, so use bar graph.



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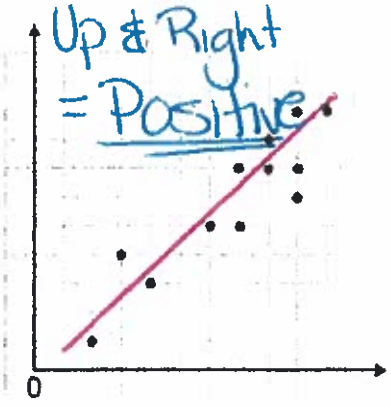
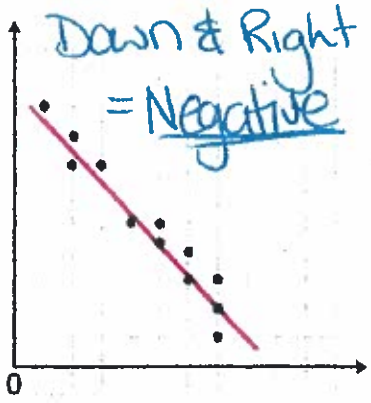
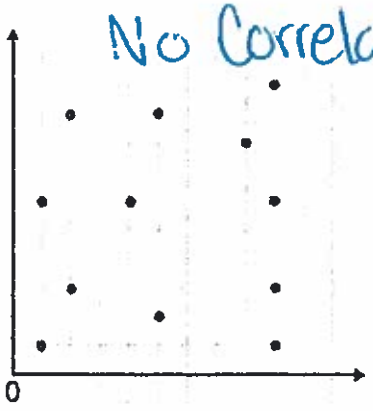
Scatter Plots:

We use **Scatter Plots** to find relationships (correlations) between two variables.







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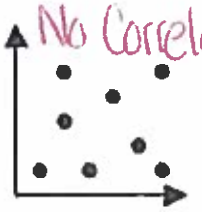
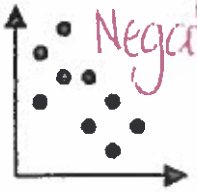
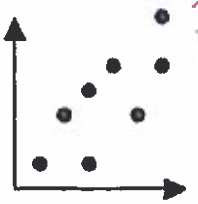
Example 3: Classify the scatter plots as having a positive, negative, or no correlation:

1. No Correlation 

2. Negative 

3. Positive 

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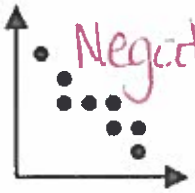
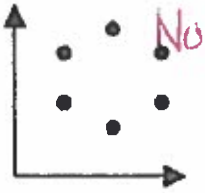
5. Negative 

6. No Correlation 

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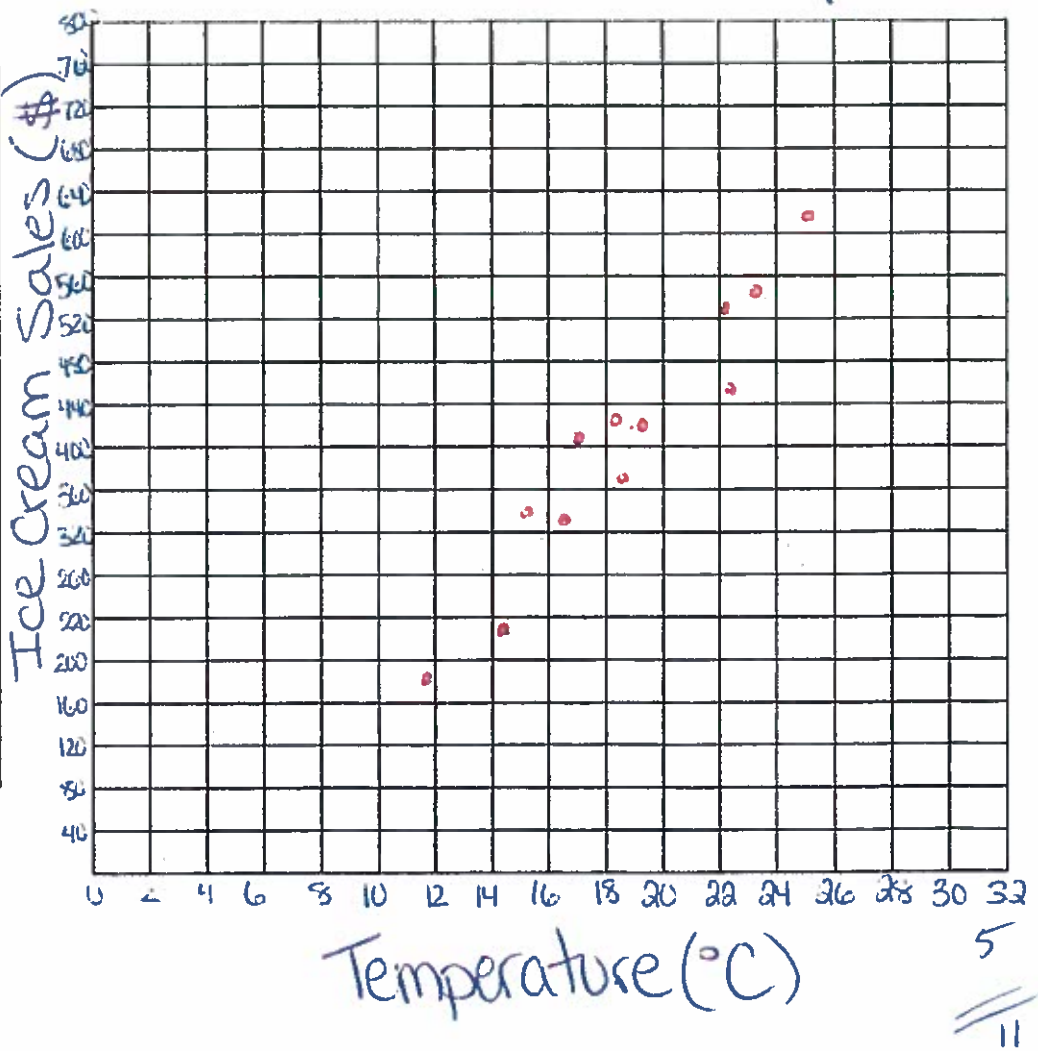
Example 4: Construct a scatter plot of the following data. Is there a correlation? → Positive Correlation

Ice Cream Sales vs Temperature	
Temperature °C	Ice Cream Sales
14.2°	$215
16.4°	$325
11.9°	$185
15.2°	$332
18.5°	$406
22.1°	$522
19.4°	$412
25.1°	$614
23.4°	$544
18.1°	$421
22.6°	$445
17.2°	$408



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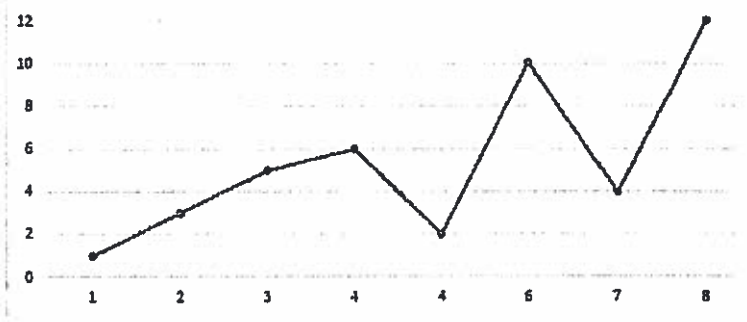
Line Graphs:

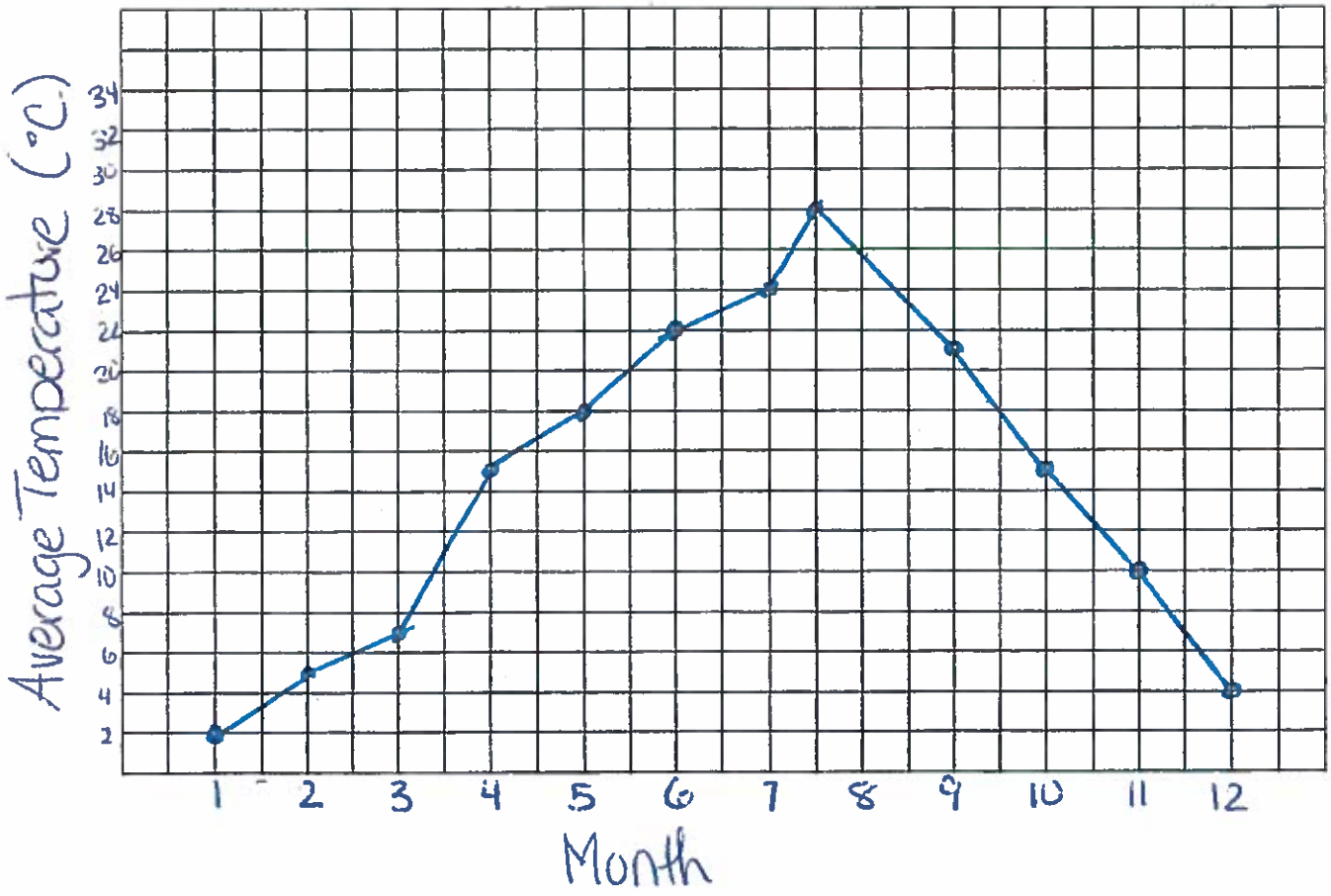
We use **Line Graphs** when the data occurs **over time.** (time is always placed on the horizontal axis, the other variable is placed on the vertical axis)



Example 5: Make a line graph for the set of data below. Label both the horizontal and vertical axis. Give the graph a title.

"Time" (horizontal axis)

Month	1	2	3	4	5	6	7	8	9	10	11	12
Average Temperature (°C)	2	5	7	15	18	22	24	28	21	15	10	4



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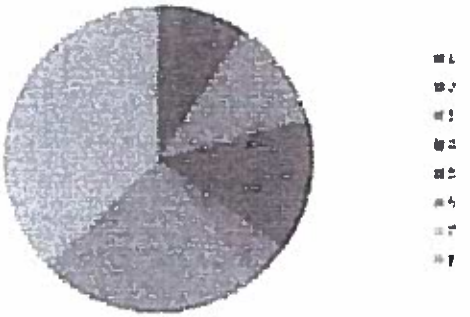
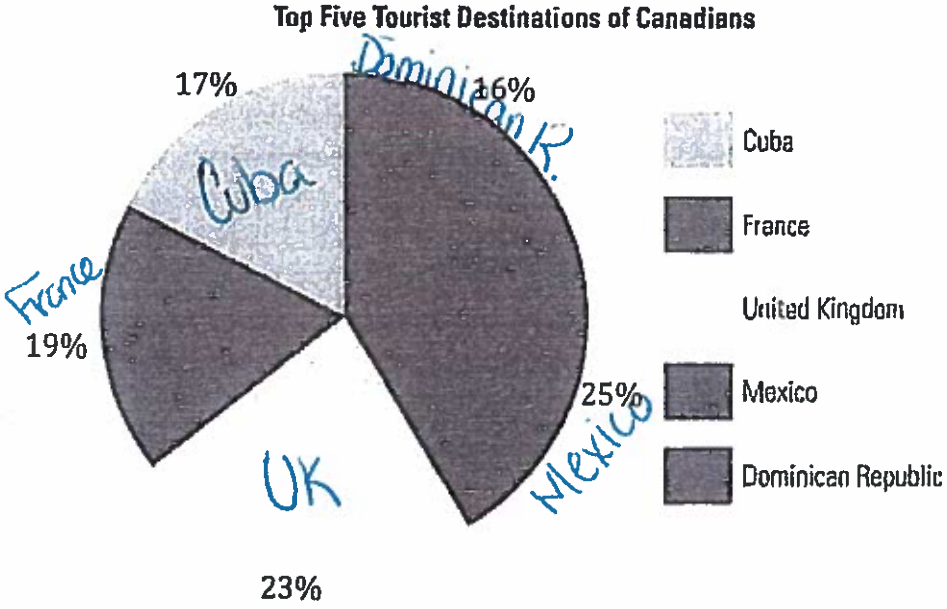
Circle Graphs:

A **circle graph** provides a good visual representation of a set of data because the size of the slices varies visibly compared to the whole. So you can more readily see proportional amounts, and it is less likely that you can misrepresent the data and mislead observers unless important data is omitted.



Example 6: Raymond works in the tourism industry. His information shows him that five of the most popular countries for Canadians to visit are Mexico, the United Kingdom, France, Cuba, and the Dominican Republic. The following graph indicates the percentage of visits to each of these countries.



a) Which country is most popular with Canadian tourists?

Mexico is the most popular.

b) What percentage of people visiting these countries visited Cuba?

17% visited Cuba

c) If 200 people were surveyed, how many of these people visit the Dominican Republic?

(find 16% of 200 people)

16% visit the Dominican Republ

16 ÷ 100 = 0.16

0.16 × 200 = 32

32 people visit Dominican Rep

d) This graph indicates the percentage of visits to the various countries. List at least two things you cannot determine from the graph.

Time spent in each country, solo or group travelers, Amount of money spent etc.

4

(Infographics may not show all information)

Infographics:

An **infographic** is a graphic visual representation of information, data or knowledge. The way the information is displayed is intended to present information quickly and clearly.

Example 7:

a) If the surface area of Canada is roughly 9,985,000 km² how much of Canada is taken up by forests?

(find 31% of 9985000)

31 ÷ 100 = 0.31

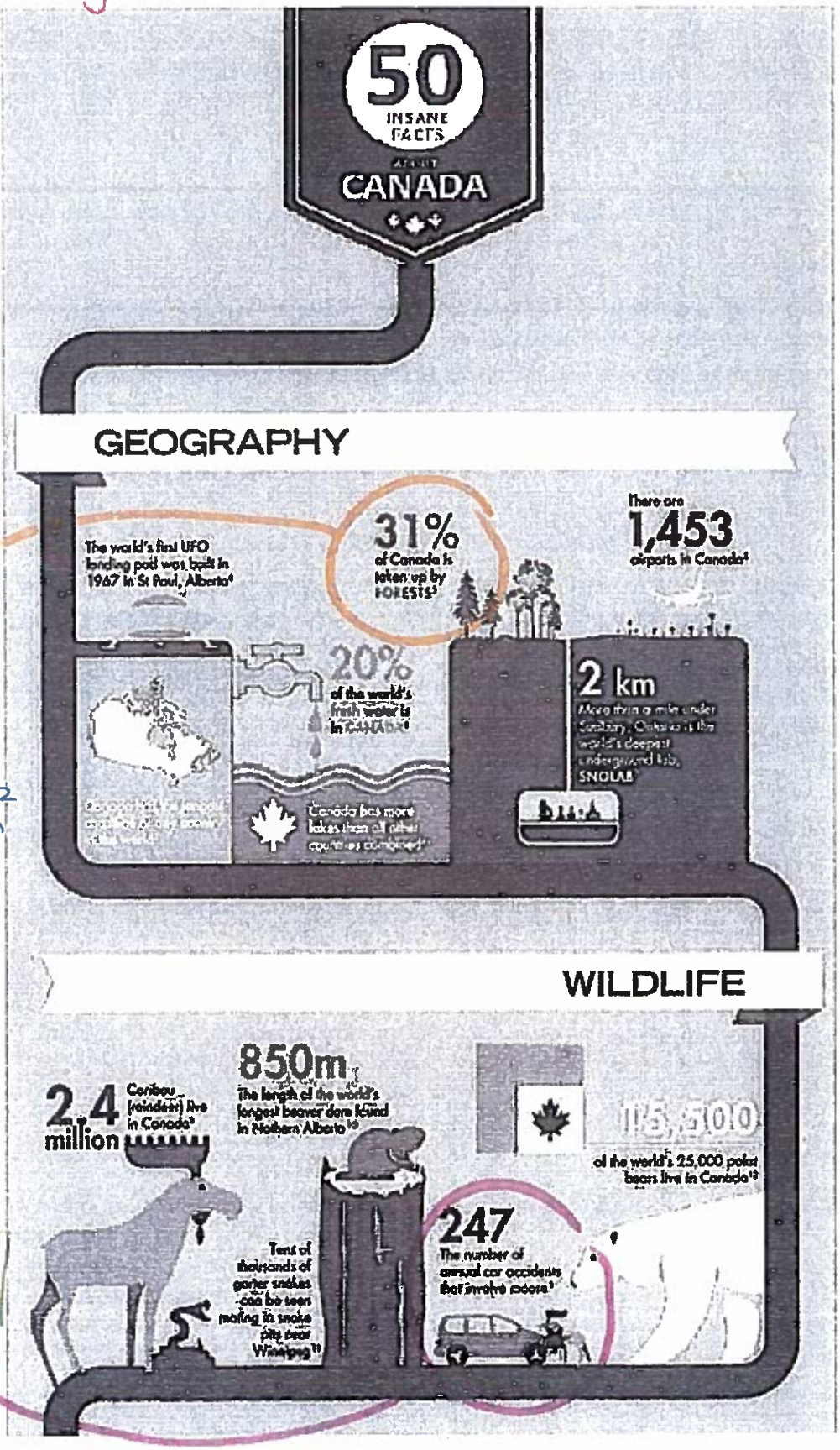
0.31 × 9985000

= 3095350 km²

3,095,350 km² is forests

b) How many car accidents happen each year that involve a moose?

247 accidents



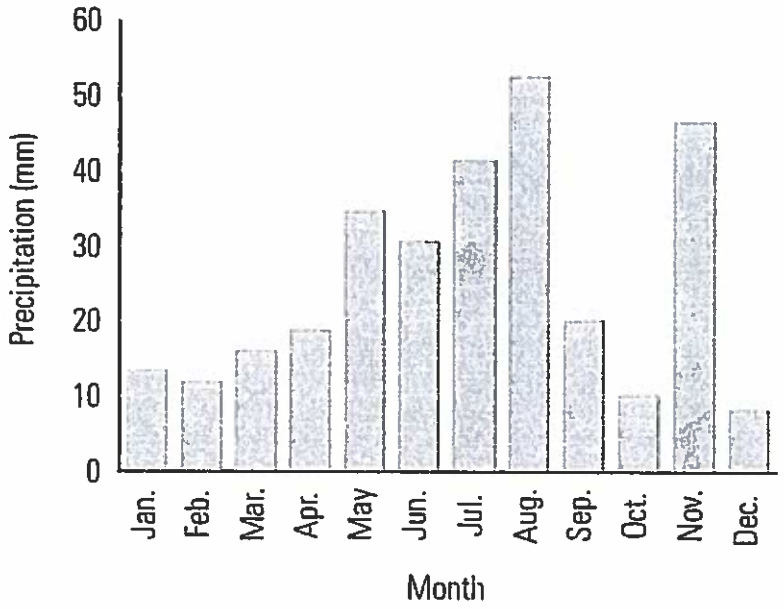
(**Not all of the infographic is shown)

Assignment: Worksheet 7B

WMA 10 **Worksheet 7B** Assignment

1. James works at the flight services station located at Yellowknife airport. He uses weather data often in his job as a flight service specialist. Below is a graph displaying monthly precipitation amounts for Yellowknife.

Monthly Precipitation Levels in Yellowknife, January–December, 2006



a) What information does this graph show you?

Monthly precipitation levels in Yellowknife for the year 2006.

b) What was the precipitation level in July?

About 41 mm (it is an approximation)

c). How much precipitation fell in total in 2006? (Answers may vary as most will be estimates)

13+11+16+19+35+31+41+52+20+10+48+8

= 304 (or 30.4cm)

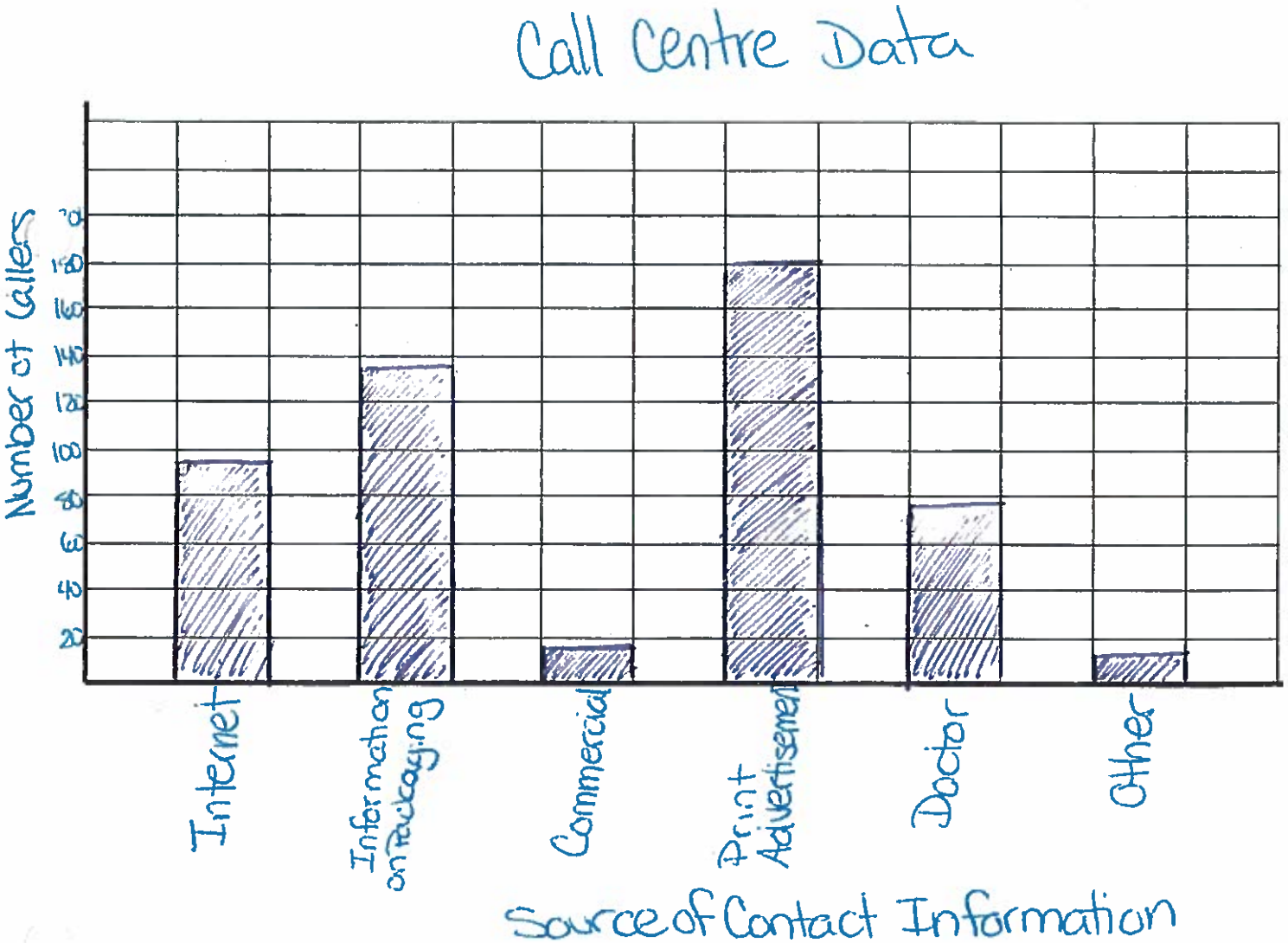
d) What type of graph is this?

Bar graph

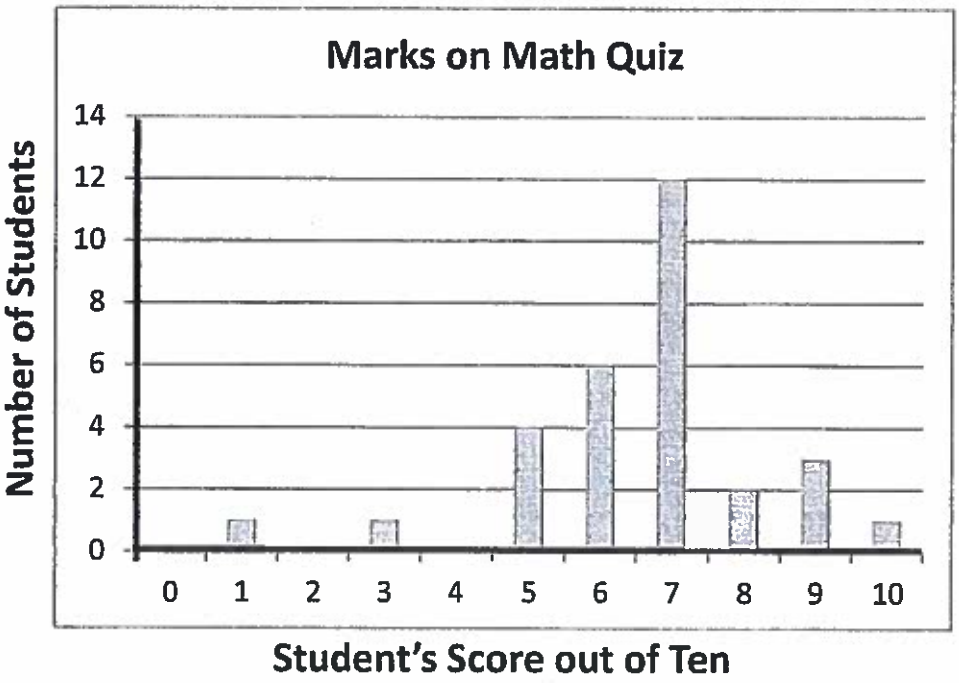
2. June works at a call centre. Her job is to provide information to callers about her company's products. June must ask each caller which province he or she is from, and where he or she found the company's contact information. Consider June's data table below, which includes her caller data for the month of May.

CALL CENTRE DATA						
Source	**Internet**	**Information on Product Packaging**	**Television Commercial**	**Print Advertisement**	**Doctor**	**Other**
Number of Callers	97	134	17	180	78	12

Draw a bar chart for this information. Label your axes and include a title.



3. Ms. Runson posted a graph on her notice board.



a) What does the graph tell you?

How many students got each mark out of 10 on a quiz.

b) How many students wrote a perfect paper?

(10/10 is a perfect paper)

One student got a perfect paper

c) What was the most common score?

7/10 was most common (12 students)

d) How many students got 0 on the quiz?

No students scored zero

e) How many students wrote Ms. Runson's quiz?

1+1+4+6+12+2+3+1 = 30

30 students wrote the quiz

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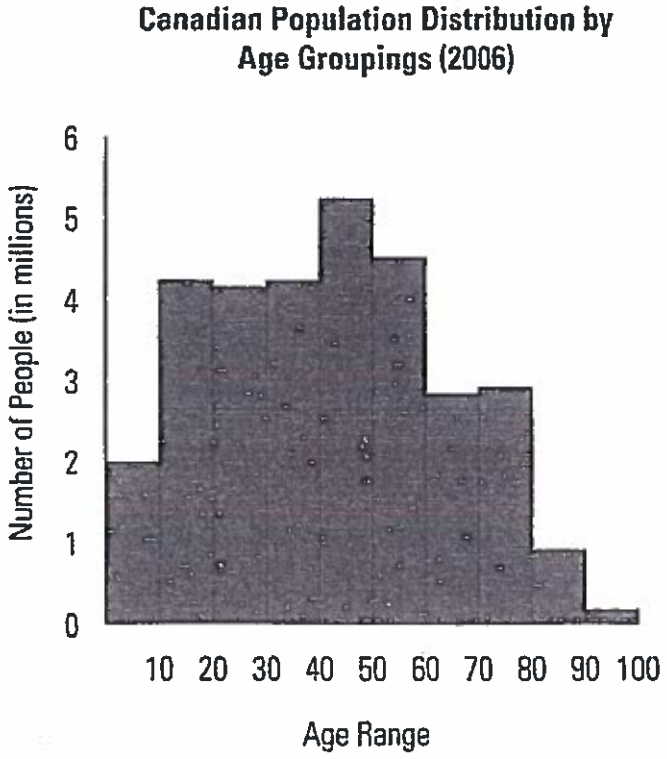
4. The histogram below shows the distribution by ten-year age groupings of Canada's population in 2006, rounded to the nearest thousand. Use the histogram to answer the following.



a) Which age group has the greatest population? What is the approximate size of this group?

40-50 years old is greatest
About 5.3 million people

b) Approximately how many Canadians are between 10 and 20?

4.2 million

c) Approximately how many Canadians are between 30 and 50?

4.2 + 5.3 = 9.5

About 9.5 million

d) Approximately how many Canadians are in their 90's?

0.1 million (or 100000)

e) Approximately how many children under 10 were there in 2006?

2 million

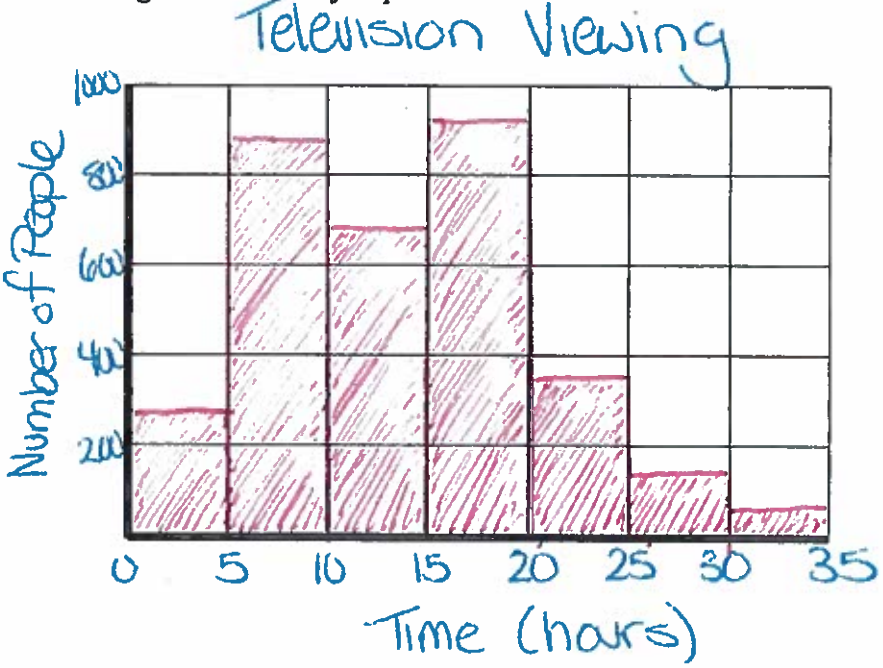
f) Sometimes when discussing the population of a country, the first category is "under 15" and the last category is "65 and over". Even though the ranges of these two age categories are not the same as the others, why might they be used?

Because they are most likely ages that are not working.

5. Adèle is a student at college and is completing a research project for one of her courses. She is interviewing people across Canada to determine the average number of hours of television they watch per week. Adèle recorded her survey results below.

TELEVISION VIEWING							
Time	$0 \le h < 5$	$5 \le h < 10$	$10 \le h < 15$	$15 \le h < 20$	$20 \le h < 25$	$25 \le h < 30$	$30 \le h < 35$
No. of People	254	875	684	912	345	123	62

a) Draw a histogram that fairly represents this data.



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b) How many people watch between 10 and 15 hours of television a week?

684

c) How many people watch less than 15 hours a week?

254+875+684 = 1813

d) How many people watch 15 or more hours of television during the week?

912+345+123+62 = 1442

e) What information is more obvious from the histogram than from the numerical data or vice versa?

/5

which time range is most (or least) common.

f) What information is not displayed in this histogram?

Ages of people asked
Number of people that watch more than 35 hours a week.

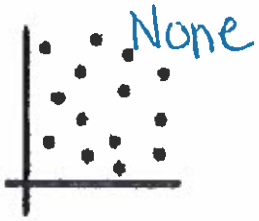
/10

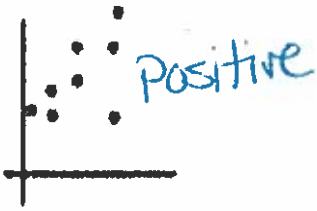
6. Examine each of the following scatter plots. Determine they type of correlations (positive, negative, or none)

a) 

b) 

c) 

d) 

e) 

f) 

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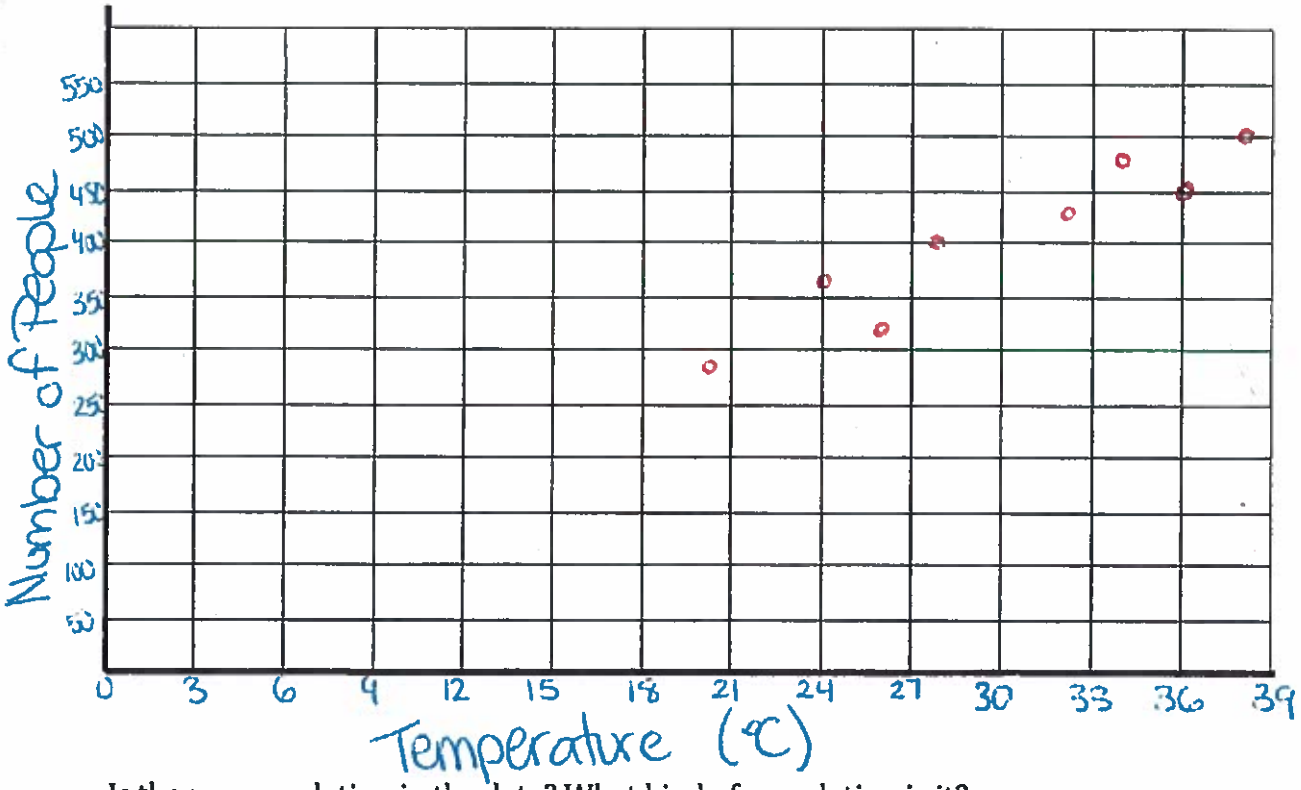
7. The number of people in attendance at a small theme park were recorded along with the temperature. The data is recorded below. Display the information in a scatter plot. (Temperature on the horizontal axis and Number of people on the vertical axis)

Temperature (°C)	20	24	36	32	28	38	34	26
Number of People	280	360	450	420	400	500	475	320



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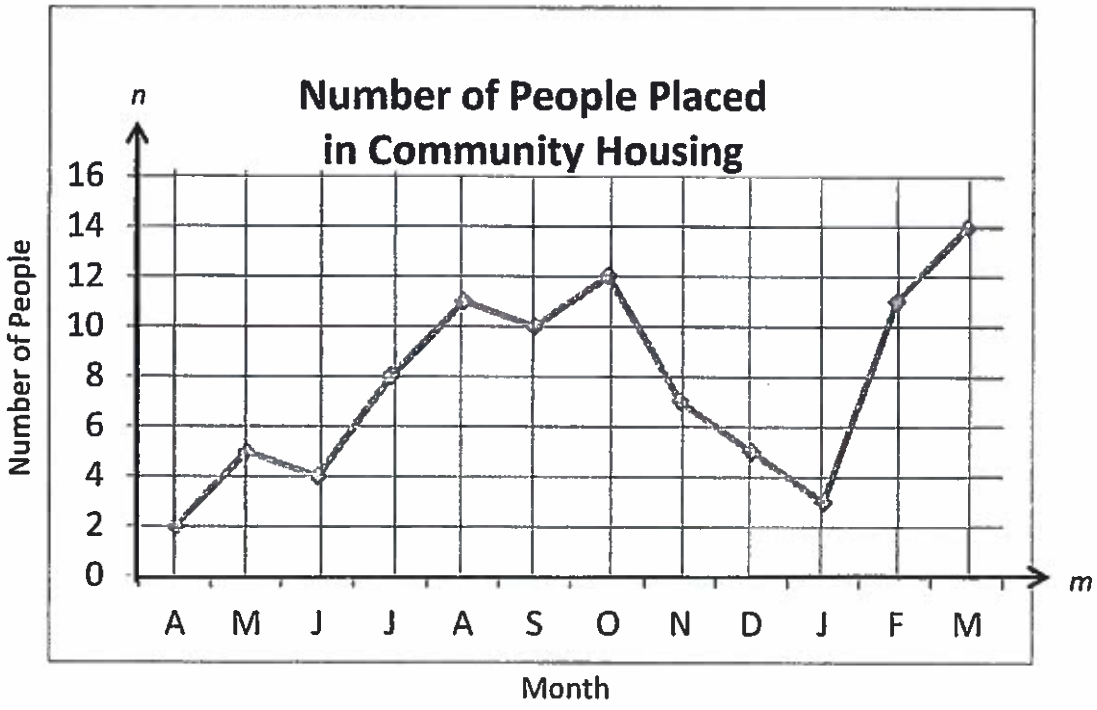
Is there a correlation in the data? What kind of correlation is it?

yes, positive correlation.

1

12

8. Julie started working as a community government assistant housing manager for the city of Brandon, Manitoba, in April of last year. Her boss has been asked to write a report on the average number of people placed in community housing monthly. Julie has been given the task of recording the number of people who have been placed in community housing each month.



a) In which month were the most people placed? How many people were placed?

March, 14 people

b) In which month were the fewest people placed? How many people were placed?

April (2 people)

c) Previous statistics show that, on average, ten people were placed in community housing in Brandon each month. Compare the average data that Julie collected with the previous average. Predict the reasons for any differences in the averages. (Find the Mean number of people placed in Community Housing each month).

2+5+4+8+11+10+12+7+5+3+11+14 = 92

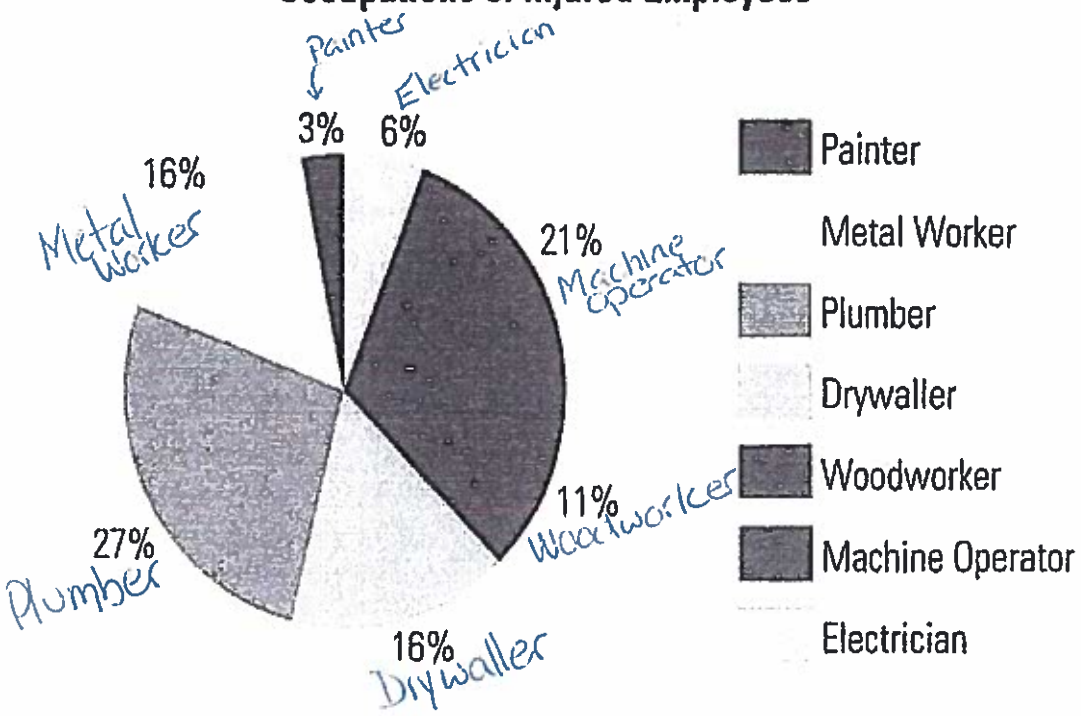
92 ÷ 12 = 7.666666667 = 7.7 people

The data that Julie collected is less than the previous average

/3

9. Mark is the foreman on a construction site. He is concerned that some workers are accidentally injured at work and has prepared the graph below to indicate percentages of workers from each occupation who were injured on the job in the past five years.

Occupations of Injured Employees



a) What percentage of the injured workers were painters?

3%

b) If a total of 33 workers were injured, how many of them were electricians?

(electricians are 6% of the injured → find 6% of 33)

$6 \div 100 = 0.06$ $0.06 \times 33 = 1.98$

approximately 2 were electricians.

c) Which appears to be the most dangerous job? Can you say this for certain? Why or why not?

Plumbing appears to be the most dangerous. We can't say for certain because we don't know how many people work in each profession.

3

10.

a) What does the term "bluenoser" mean?

A Bluenoser is someone from the province of Nova Scotia.

b) If Canada's population is approximately 35 million. How many Canadians have a higher education qualification?

(find 42% of 35 million)

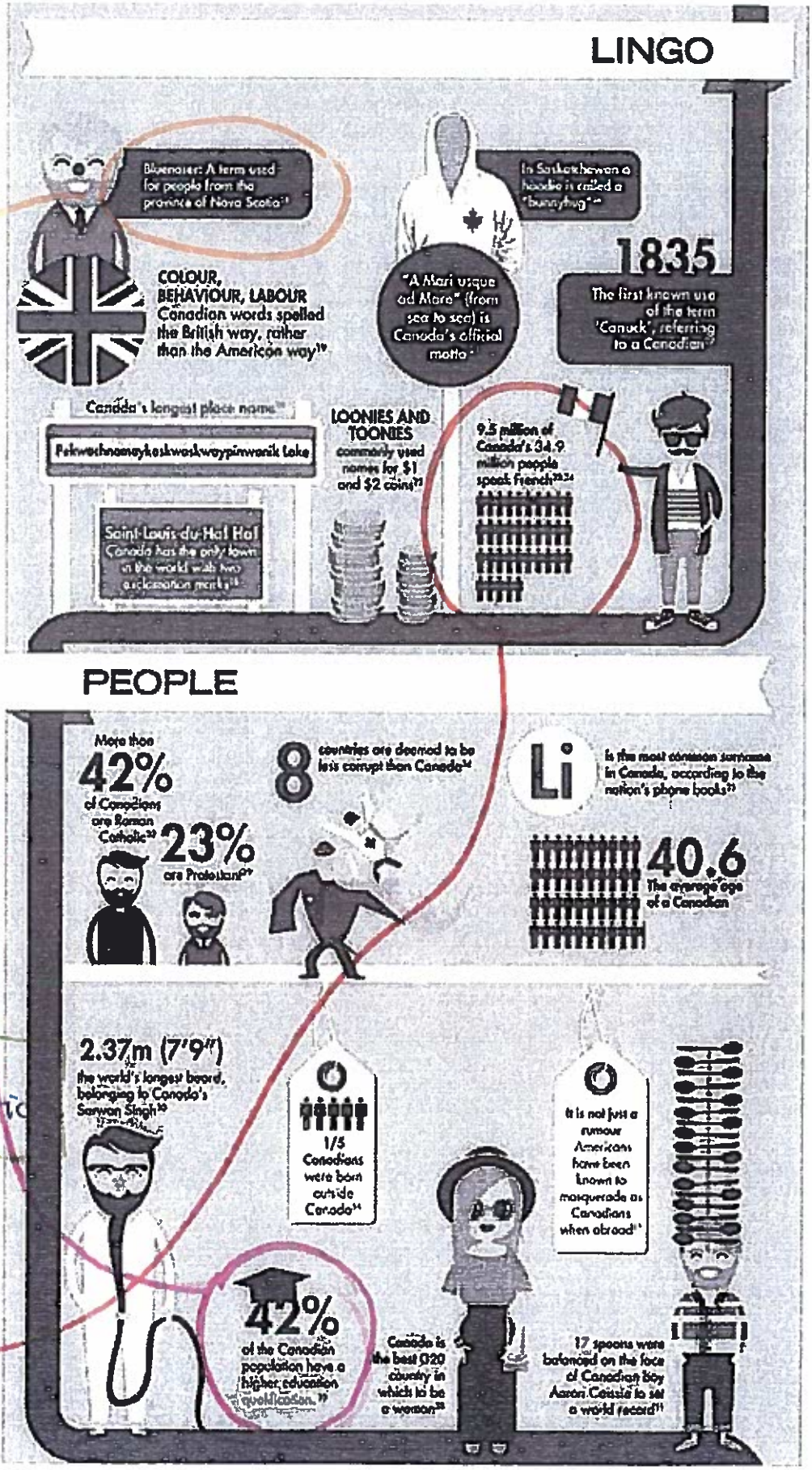
42 ÷ 100 = 0.42

0.42 × 35 = 14.7

14.7 million Canadians have a higher education qualification

c) How many people in Canada speak French?

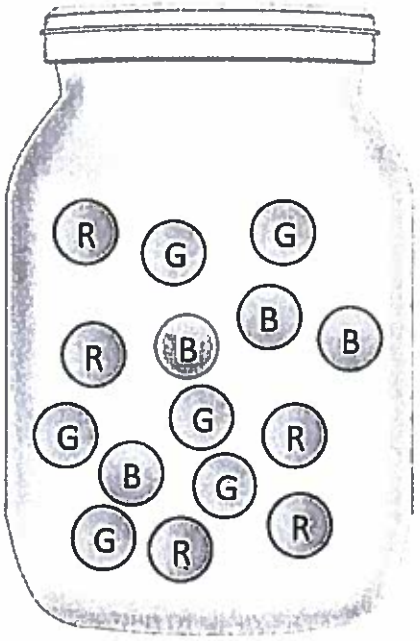
9.5 million people



Theoretical Probability – Probability that a certain outcome will occur, based on reasoning or calculation (What we expect to happen)

$$P(A) = \frac{\textit{Number of Favourable Outcomes for Event A}}{\textit{Total Number of Outcomes in Sample Space}}$$

Example 1: A jar contains 5 red, 6 green and 4 blue marbles:



a) What is the probability of choosing a green marble?

$P(\text{Green}) = \frac{\text{Number of green marbles}}{\text{Total number of marbles}} = \frac{6}{15} \div 3 \div 3$

$P(\text{Green}) = \frac{2}{5}$

b) What is the probability of choosing a red marble?

$P(\text{Red}) = \frac{\#\text{ of red marbles}}{\text{Total \# of marbles}} = \frac{5}{15} \div 5 \div 5$

$P(\text{Red}) = \frac{1}{3}$

c) What is the probability of choosing a blue marble?

$P(\text{Blue}) = \frac{\#\text{ of blue marbles}}{\text{Total \# of marbles}} = \frac{4}{15}$

$P(\text{Blue}) = \frac{4}{15}$

d) What do all the probabilities add up to?

$P(\text{Green}) + P(\text{Red}) + P(\text{Blue})$

* use fractions with denominator of 15 so easier to add up

$= \frac{6}{15} + \frac{5}{15} + \frac{4}{15} = \frac{15}{15}$ or 1 (they add up to 100%)

e) What is the probability of choosing a red or a green?

$P(\text{Red or Green}) = \frac{\#\text{ of red or green}}{\#\text{ total marbles}} = \frac{5+6}{15} = \frac{11}{15}$

f) What is the probability of not choosing a red or a green?

$P(\text{Not Red or Green}) = \frac{\#\text{ not red/green}}{\text{total marbles}} = \frac{4}{15}$

Note: since there are only the two option (Red/Green or Not Red/Green) we really only had to find what we add to 11 to get 15

Fair Game – when all options are equally likely

Example 2: John and Mattie are playing a game. They roll a dice. If the number is a multiple of 3 then John wins, if not then Mattie wins. Is this a fair game?

3, 6 (only ones on die)

$P(\text{John Wins}) = \frac{\#\text{ of sides that are multiples of 3}}{\text{total possible outcomes (numbers)}} = \frac{2 \div 2}{6 \div 2} = \frac{1}{3}$

$P(\text{Mattie wins}) = \frac{\#\text{ of sides that are not multiples of 3}}{\text{total possible outcomes}} = \frac{4 \div 2}{6 \div 2} = \frac{2}{3}$ (2)

*They are not equal so this is NOT A FAIR GAME

Example 3: Brendan and Sally are playing a game. They roll a dice. If the number is a multiple of 2 then Brendan wins, if not then Sally wins. Is this a fair game?

2, 4, 6

$P(\text{Brendan Wins}) = \frac{\#\text{ sides that are multiples of 2}}{\text{number of sides (\# of numbers)}} = \frac{3 \div 3}{6 \div 3} = \frac{1}{2}$ these are equally likely

$P(\text{Sally Wins}) = \frac{\#\text{ of sides that are not multiples of 2}}{\text{total outcomes}} = \frac{3 \div 3}{6 \div 3} = \frac{1}{2}$ so this is a fair game

(2)

Experimental Probability – Probability based purely on actual trials
(What actually happens when we try it out).

$$P(A) = \frac{\textit{Number of Times Event A Occurs}}{\textit{Total Number of Trials}}$$

Example 4:

a) Roll a 6-sided cube (a die) 5 times and record the results. What is the Experimental Probability of rolling a 5? *Your results will most likely be different*
(Write your answer as a fraction as well as a decimal rounded to 4 decimal places.)

Trial #	1	2	3	4	5
Outcome	1	3	1	4	5

$P(5) = \frac{\#\text{ of 5's}}{\#\text{ of trials}} = \frac{1}{5}$ (2)

Decimal $1 \div 5 = 0.2$

$P(\text{roll 5}) = \frac{1}{5}$ or 0.2

b) Roll a 6-sided cube (a die) 10 times and record the results. What is the Experimental Probability of rolling a 5?
(Write your answer as a fraction as well as a decimal rounded to 4 decimal places.)

Trial #	1	2	3	4	5	6	7	8	9	10
Outcome	1	2	1	6	5	3	6	4	3	1

(2)

$P(\text{roll 5}) = \frac{\#\text{ of 5's}}{\#\text{ of trials}} = \frac{1}{10}$

Decimal: $1 \div 10 = 0.1$

$P(\text{roll 5}) = \frac{1}{10}$ or 0.1

c) Roll a 6-sided cube (a die) 20 times and record the results. What is the Experimental Probability of rolling a 5?
(Write your answer as a fraction as well as a decimal rounded to 4 decimal places.) (2)

Trial #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Outcome	5	2	6	2	4	1	6	4	5	2	6	5	2	3	6	1	3	1	4	6

$P(\text{rolling 5}) = \frac{\#\text{ of 5's}}{\text{total trials}} = \frac{3}{20}$

Decimal: $3 \div 20 = 0.15$

$P(\text{rolling 5}) = \frac{3}{20}$ or 0.15

d) Roll a 6-sided cube (a die) 40 times and record the results. What is the Experimental Probability of rolling a 5?
(Write your answer as a fraction as well as a decimal rounded to 4 decimal places.)

Trial #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Outcome	2	3	4	1	2	1	1	1	5	4	2	1	1	2	1	2	1	4	4	5

Trial #	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Outcome	1	5	3	1	4	3	6	6	3	3	3	6	5	1	2	1	2	3	3	2

$P(\text{rolling 5}) = \frac{\#\text{ of 5's}}{\text{total trials}} = \frac{4 \div 4}{20 \div 4} = \frac{1}{5}$

Decimal: $1 \div 5 = 0.2$

$P(\text{rolling 5}) = \frac{1}{5}$ or 0.2

(2)

e) What is the Theoretical Probability of rolling a 5?

$P(\text{rolling 5}) = \frac{\#\text{ of 5's on dice}}{\#\text{ of possible outcomes}} = \frac{1}{6}$

Decimal: $1 \div 6 = 0.166666666 = 0.17$

$P(\text{rolling 5}) = \frac{1}{6}$ or 0.17

(2)

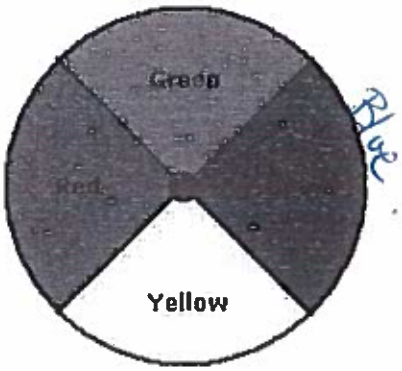
f) What do you notice when you compare your experimental probabilities and the theoretical probability?

As you complete more & more trials the experimental probability should get closer to the theoretical probability (1)

Assignment: Worksheet 7C

WMA 10 **Worksheet 7C** Assignment

1. A spinner has 4 equal sections as shown. One is green, one is blue, one is red, and one is yellow.



a) What is the Theoretical Probability of spinning a red?

$P(\text{Red}) = \frac{\#\text{ red sections}}{\#\text{ possible sections}} = \boxed{\frac{1}{4}}$

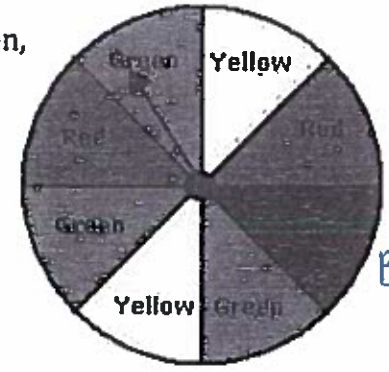
b) What is the Theoretical Probability of spinning a green or yellow?

$P(\text{Green or Yellow}) = \frac{\#\text{ of green or yellow sections}}{\text{total number of sections}} = \frac{2}{4} \div 2 = \boxed{\frac{1}{2}}$

c) What is the Theoretical Probability of spinning a red, green, yellow, or blue?

$P(\text{Red, Green, Blue or Yellow}) = \frac{\#\text{ of R, G, Y or B sections}}{\text{total sections}} = \frac{4}{4} = \boxed{1}$ (or 100%)

2. A spinner has 8 equal sections as shown. Three sections are green, one is blue, two are red, and two are yellow.



a) What is the Theoretical Probability of spinning a red?

$P(\text{Red}) = \frac{\#\text{ Red Sections}}{\text{total sections}} = \frac{2}{8} \div 2 = \frac{1}{4}$

$\boxed{P(\text{Red}) = \frac{1}{4}}$

b) What is the Theoretical Probability of spinning a green or yellow?

(2 yellow + 3 green = 5)

$P(\text{Green or Yellow}) = \frac{\#\text{ green or yellow}}{\text{total sections}} = \boxed{\frac{5}{8}}$

c) What is the Theoretical Probability of spinning a purple?

$P(\text{purple}) = \frac{\#\text{ purple sections}}{\text{total sections}} = \frac{0}{8} = \boxed{0}$

15 marbles in total

3. A jar contains 5 red, 6 green and 4 blue marbles. Brenda and Bobby are playing a game. They pick one marble out of the jar. If the marble is green then Brenda wins, if not Bobby wins. Is this a fair game? (Explain your answer)

$P(\text{Brenda Wins}) = \frac{\#\text{ green}}{\text{total marbles}} = \frac{6}{15} \div 3 = \frac{2}{5}$

$P(\text{Bobby Wins}) = \frac{\#\text{ Not green}}{\text{total marbles}} = \frac{9}{15} \div 3 = \frac{3}{5}$

These are not equal probabilities, so this is Not a fair game. (2

4. Carly and Court are playing a game. A 6-sided die is rolled. If the number is **Less than 4** then Carly wins. Otherwise Court wins. Is this a fair game? (Explain your answer).

#'s on die: 1, 2, 3 | 4, 5, 6

"less than 4"

$P(\text{Carly wins}) = \frac{\#\text{ of outcomes less than 4}}{\#\text{ of possible outcomes}} = \frac{3}{6} \div 3 = \frac{1}{2}$

$P(\text{Court wins}) = \frac{\#\text{ outcomes not less than 4}}{\#\text{ of possible outcomes}} = \frac{3}{6} \div 3 = \frac{1}{2}$

These are equal probabilities so this Is a fair game (2

5. Flip a coin 5 times and record the results. What is the Experimental Probability of getting a Heads? (Give your answer as a fraction **AND** as a decimal to 4 places)

* Answers may Vary

Trial #	1	2	3	4	5
Outcome	T	T	T	T	H

$P(\text{Heads}) = \frac{\#\text{ heads}}{\text{total trials}} = \frac{1}{5}$

Decimal: $1 \div 5 = 0.20$

$P(\text{Heads}) = \frac{1}{5}$ or 0.2 (2)

6. Flip a coin 10 times and record the results. What is the Experimental Probability of getting a Heads? (Give your answer as a fraction **AND** as a decimal to 4 places)

* Answers may vary

Trial #	1	2	3	4	5	6	7	8	9	10
Outcome	H	H	T	H	H	H	H	H	H	T

(2)

$P(\text{Heads}) = \frac{\#\text{ heads}}{\text{total trials}} = \frac{8}{10} \div 2 = \frac{4}{5}$ decimal: $4 \div 5 = 0.8$

$P(\text{Heads}) = \frac{4}{5}$ or 0.8

7. Flip a coin 25 times and record the results. What is the Experimental Probability of getting a Heads? (Give your answer as a fraction **AND** as a decimal to 4 places)

*Answers May Vary!

Trial #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Outcome	T	H	T	H	H	T	T	T	T	H	T	H	H	H	T	H	H	T	H	T	H	T	T	T	T

$P(\text{Heads}) = \frac{\#\text{heads}}{\text{total trials}} = \frac{11}{25}$ Decimal $= 0.44$ (11÷25)

(2)

$P(\text{Heads}) = \frac{11}{25}$ or 0.44

8. Flip a coin 50 times and record the results. What is the Experimental Probability of getting a Heads? (Give your answer as a fraction **AND** as a decimal to 4 places)

*Answers may vary!

Trial #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Outcome	H	H	H	T	H	T	H	H	T	H	H	H	H	T	T	T	T	T	H	T	H	H	H	T	H

Trial #	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Outcome	T	H	H	T	H	T	H	T	T	H	T	H	H	H	T	T	T	T	H	H	T	H	T	T	T

$P(\text{Heads}) = \frac{\#\text{heads}}{\text{total trials}} = \frac{26}{50}$ Decimal: $26 \div 50 = 0.52$

(2)

$P(\text{Heads}) = \frac{26}{50} = 0.52$

9. What is the Theoretical Probability of getting a heads?

$P(\text{Head}) = \frac{\#\text{heads on coin}}{\#\text{possible sides}} = \frac{1}{2}$ Decimal: $1 \div 2 = 0.5$

(2)

$P(\text{Heads}) = \frac{1}{2}$ or 0.5

10. What do you notice when you compare your experimental probabilities and the theoretical probability?

As the number of trials increases the experimental probability gets closer to the theoretical probability.

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