Math 9

Name:

UNIT 5 LEARNING GUIDE – GRAPHING & TABLES

INSTRUCTIONS:

Using a pencil, complete the following questions as you work through the related lessons. Show ALL of your work as is explained in the lessons. Do your best and always ask questions if there is anything that you don't understand.

5.1 GRAPH TYPES

1. Analyze the following graphs.
    i. Determine why each graph is misleading.
    ii. What could be done to make each graph reflect the data more accurately?

a.

b.

c.
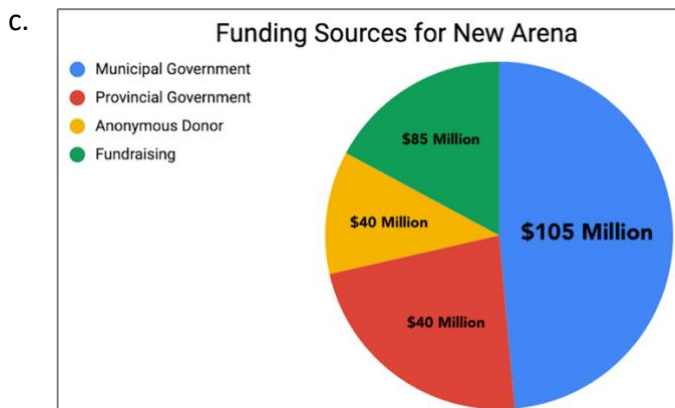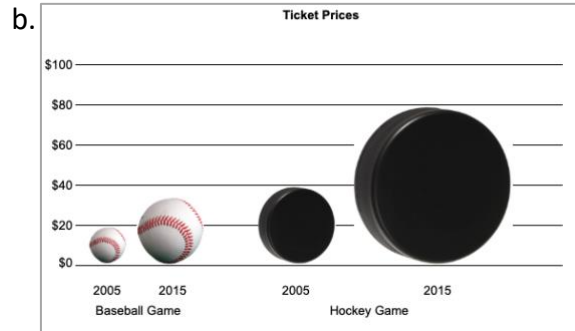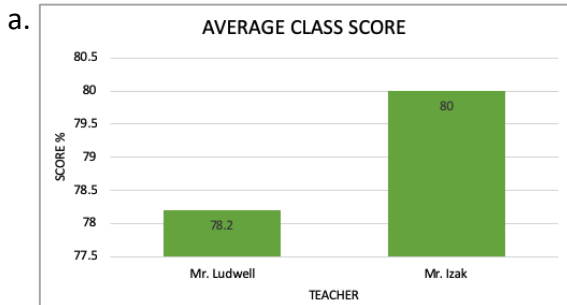
5.2 GRAPHS & SPREADSHEETS

1. Compare the data with its graph below. Does the graph accurately display the data? Explain your answer. *Hint: Consider the different components of a graph in your answer.*
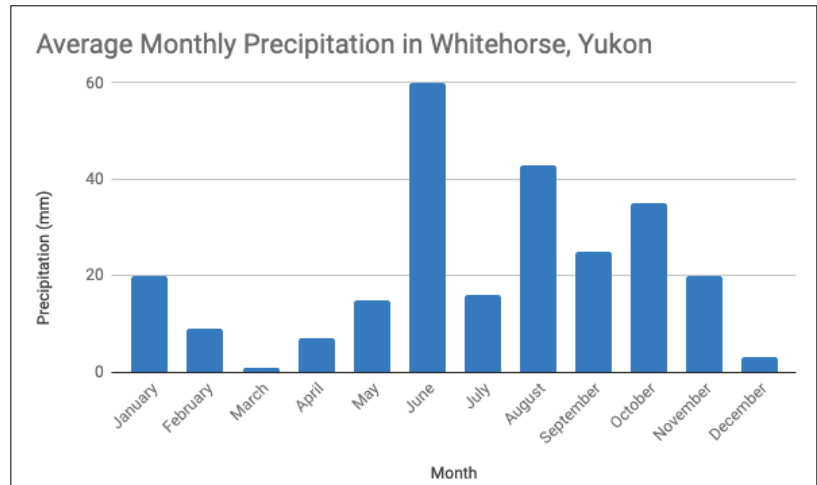
_____

_____

_____

_____

	A	B
1	**Month**	**Precipitation (mm)**
2	January	20
3	February	9
4	March	1
5	April	7
6	May	15
7	June	60
8	July	16
9	August	43
10	September	25
11	October	35
12	November	20
13	December	3
14		
15		

Average Monthly Precipitation in Whitehorse, Yukon

2. Use the line graph below to answer the following questions.

   a. What is the altitude at the half way point of the trail?

   Altitude Along the Cascade Trail

   b. How much altitude is gained in the steepest uphill kilometer of the trail?

   c. For how many kilometers are you descending on the Cascade Trail?
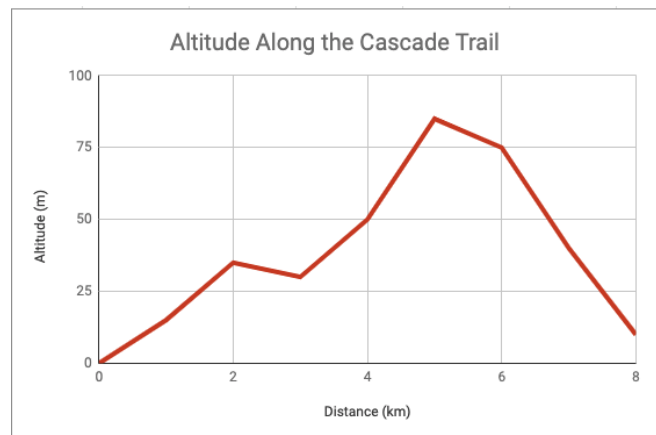
   d. What section of the trail do you think would be most challenging (1st half or 2nd half)? Explain your answer.

3. Use Google Sheets, Microsoft Excel, Numbers, or another spreadsheet program to create some graphs. Print off your graphs and add them to the end of this Learning Guide to submit to your teacher. If you are unable to access a spreadsheet program, you may draw the graphs in the space provided.

   a. Input the following data into a spreadsheet program and then use it to create a **pie graph**. _Reminder:_ _Make sure the title of the graph accurately reflects what the data is showing._

|	A	B
1	**Favourite Sport**	**Number of Students**
2	Hockey	7
3	Gymnastics	4
4	Swimming	10
5	Baseball	4
6	Track & Field	2
7	Other	3
8		

   b. Is a pie chart an appropriate graph for displaying data on students' favourite sports? Explain your answer.

   c. Fill in the table below with real data from your life. Write times in the following format: hh:mm AM (ex. 8:00 AM, 12:17 PM)

	A	B
1	**Day**	**Time I Get Up**
2	Sunday	
3	Monday	
4	Tuesday	
5	Wednesday	
6	Thursday	
7	Friday	
8	Saturday	
9		

   - Input the data into a spreadsheet program using the same time format.
   - Try creating different kinds of graphs using this data.

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    d. Which graph is best for displaying this data? Why? (Attach a copy of this graph to the end of your Learning Guide for submission.)

    e. Which graph was the least useful for displaying this data? Why?

4. Use the graph below to answer the following questions.

Heights of Youth Age 10-15 Year Old
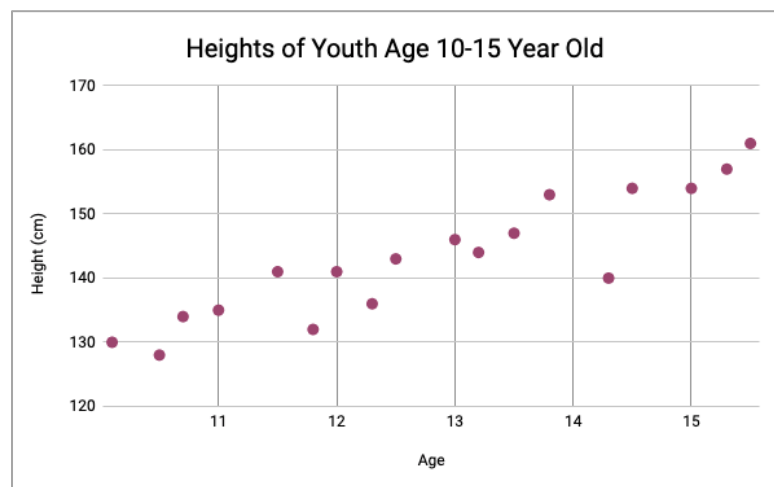
    a. Why is a scatterplot graph a good choice for representing this data?

    b. Draw a *best-fit line* through the scatterplot graph. What does this line represent?

    c. What is the average height of someone that is 14 years old?

5.3 CARTESIAN COORDINATES

1. On the Cartesian Plane below, insert labels for the *x-axis*, *y-axis*, and *origin*.

2. Write out the coordinates for each point. *Reminder: The first coordinate in the ordered pair is the value of the x-axis.*
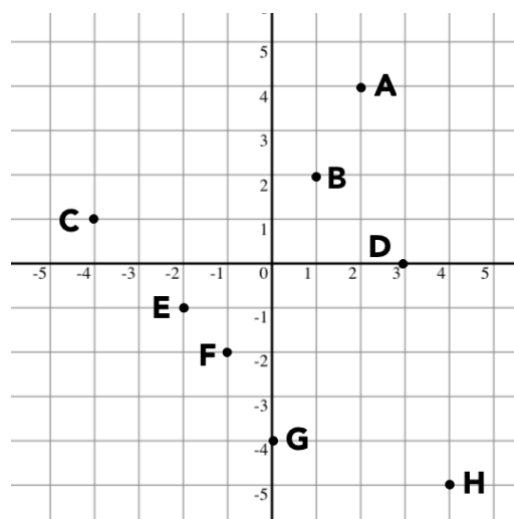
    A *(2, 4)*

    B _____

    C _____

    D _____

    E _____

    F _____

    G _____

    H _____

3. Plot and label the points onto the Cartesian Plane.

    A (-2, 7)

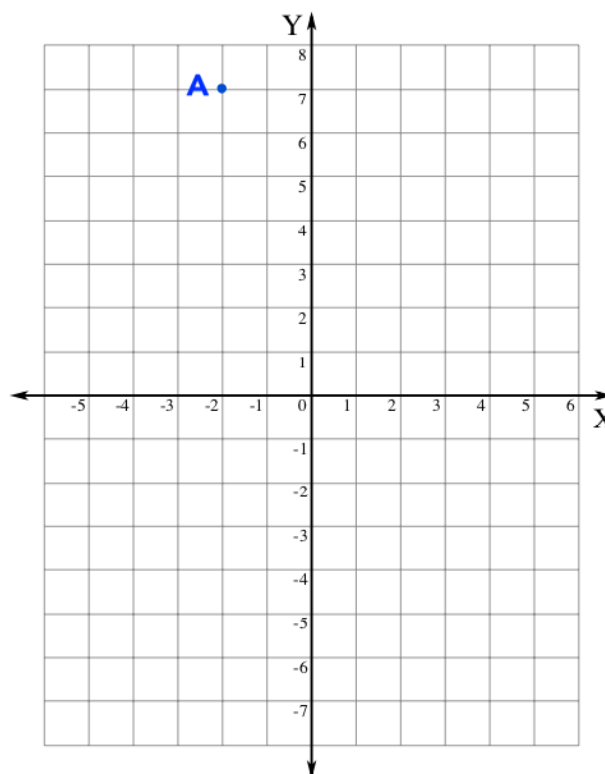   B (-5, -1)

    C (4, -3)

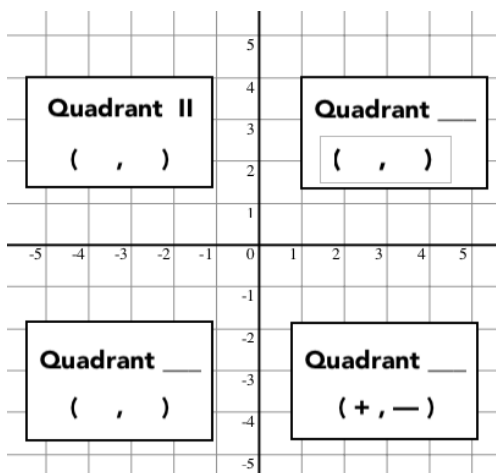   D (0, 0)

    E (5, 6)

    F (0, -7)

    G (-3, 2)

    H (1, 8)

4. Fill in the missing information below to show the pattern of the coordinates in each quadrant of the Cartesian Plane.

5. Using the Cartesian Plane above, determine in which quadrant each ordered pair would land. _Reminder: Always use a Roman numeral to represent the quadrant number._

	Ordered pair	Pattern	Quadrant
Ex.	(5, -2)	$(+,-)$	**IV**
a.	(-6, -2)		
b.	(3, 8)		
c.	(1, -4)		
d.	(-5, 6)		

5.4 Data Trends

1. What kind of information do we get from a correlation coefficient? (ex. r=0.9)

   _____

   _____

   _____
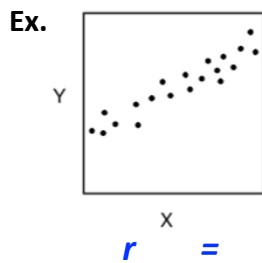
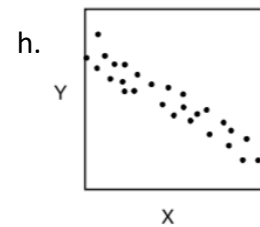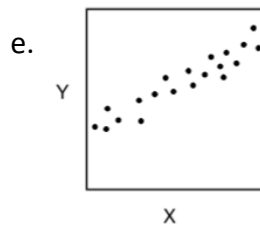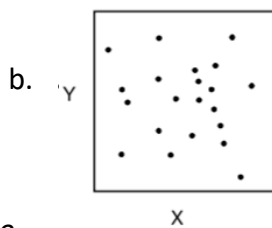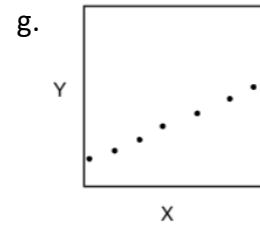2. Circle which of the following could be correlation coefficients.

   r = 0.5   **r = 1.9**   **r = - 8**   **r = - 0.5**   **r = 1**

   r = - 1   **r = - 2.5**   **r = 0.9**   **r = 0.75**   **r = 50%**

   r = 1   **r = 0**   **r = -0.5**   **r = -1**   **r = 0.9**   **r = -0.9**   **r = 0**   **r = 0.5**

3. Match each graph with the correlation coefficient that best represents it.

Ex.

Y | X

r   =
0.9

c.

Y | X

f.

Y | X

a.

Y | X

d.

Y | X

g.

Y | X

b.

Y | X

e.

Y | X

h.

Y | X
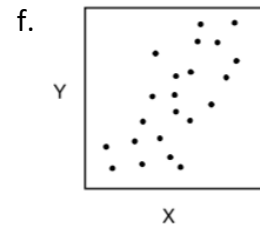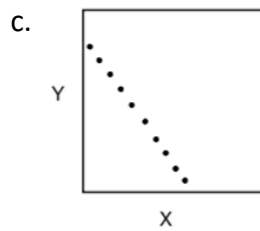
4. A local fruit stand tracks how many peaches they sell each day versus the price at which they sell the peaches. Make the following predictions and choose whether you based them on interpolation or extrapolation. _Hint: Draw a "best-fit line" through the graph with a ruler before beginning._

Amount of Peaches Sold at Different Prices
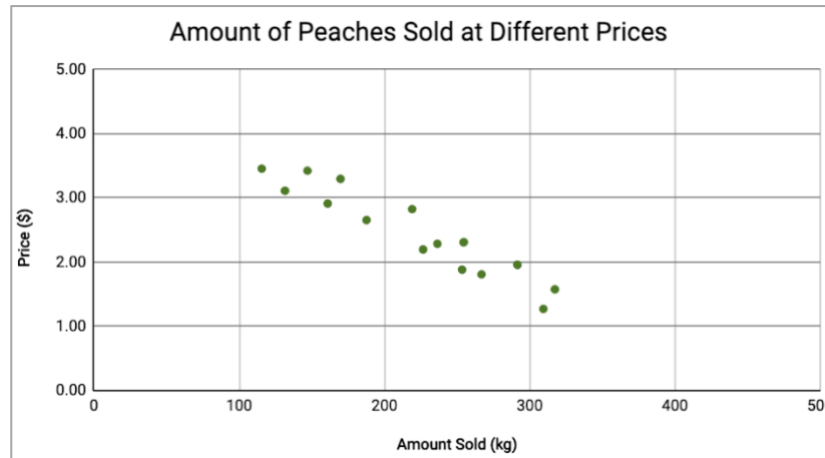
a. How many peaches do you expect the fruit stand to sell if they price them at $1.50?

_____   ❑Interpolation   ❑Extrapolation

b. How many peaches do you expect the fruit stand to sell if they price them $4.00?

_____   ❑Interpolation   ❑Extrapolation

c. What would you predict the peaches were priced at if they sold 200kg in a day?

_____   ❑Interpolation   ❑Extrapolation

d. What would you predict the peaches were priced at if they sold 350kg in a day?

_____   ❑Interpolation   ❑Extrapolation

e. Why is your answer to question 4. b. considered a low-confidence prediction?

5. Go back and view the graph from Section 5.2, question 4 (_Heights of Youth Age 10 -15 Years Old)_. Would the trend outlined by the data in this graph be useful in predicting the height of someone at any age in their life? Explain your answer.

5.5 EQUATIONS, TABLES & GRAPHS

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1. Complete each table and its related information. *Reminder: The pattern always needs to be in the form of* When *x* increases by 1, *y* _____ by ____.

a.

$y = 2x + 3$	
x	y
1	**5**
2	
3	
4	
5	

)

Pattern: **When _x_ increases by 1, _y_ increases by 2**

Ordered Pairs: **(1, 5)** (,) (,) (,) (,

b.

$y = -x - 2$	
x	y
0	
1	
2	
3	
4	

Pattern: _____

Ordered

Pairs: _____

c.

$2y = x + 4$	
x	y
0	
2	
4	
6	
8	

Hint: Before creating your table of values, change the equation so that y is isolated on the left.
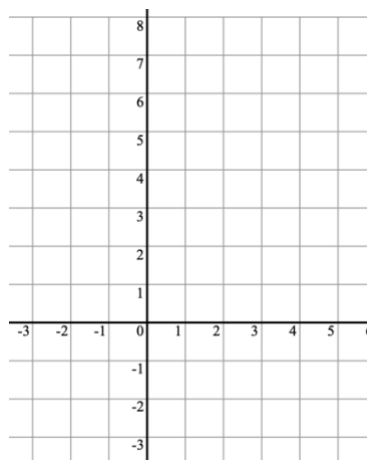
Pattern: _____

-

Ordered

Pairs: _____

2. Create a table of values and graph the following relations. *Reminder: The table of values gives you the ordered pairs that you need to plot points on a graph. Start by choosing values for x, then calculate y from those values.*
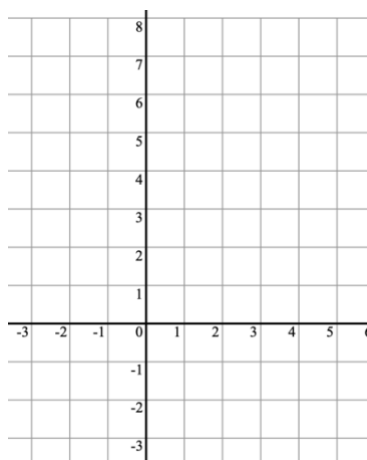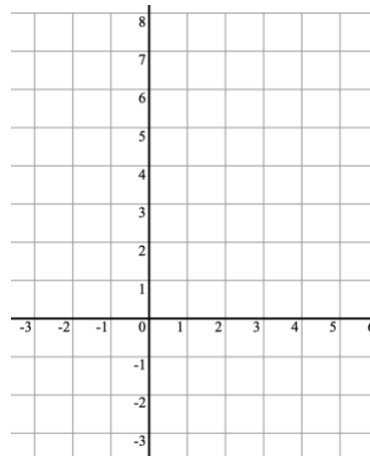
a.

$y = 3x + 1$	
x	y
-1	
0	

b.

$y = -2x + 5$	
x	y

c.

$y = -\dfrac{1}{3}x$	
x	y

3. Determine the pattern and the equation for each table of values. _Hint: Remember to use the pattern and the value of y when x = 0 to help create your equation._

Ex.

x	y
0	4
1	6
2	8
3	10

Pattern: __When x increases by 1, y increases by 2__

Y-intercept: When x is 0, y is ___**4**___

Equation: $y = 2x + 4$

x	y
0	2
1	5
2	8
3	11

a.

Pattern: _____

Y-intercept: When x is 0, y is _____

Equation: _____

x	y
-1	1
0	-1
1	-3
2	-5

b.

Pattern: _____

Y-intercept: When x is 0, y is _____

Equation: _____
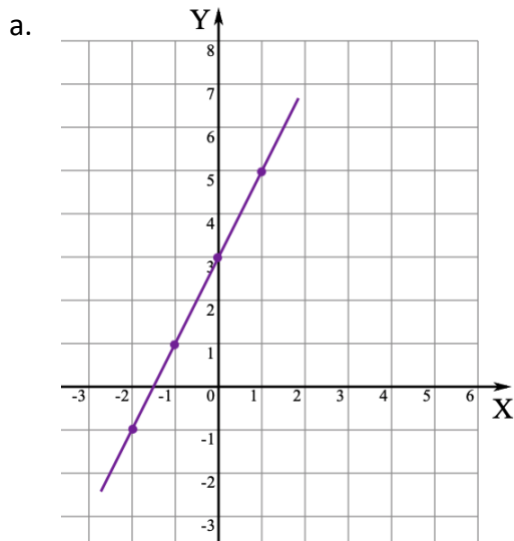
x	y
2	1
4	2
6	3
8	4

c.

Pattern: _____

When x is 0, y is _____

Equation: _____

4. Use the graphs to determine the equation of the graphed line. Follow these steps to arrive at the correct equation:

   i. Create a **table of values** from the plotted points.
   ii. Determine the **pattern**. (Must be: *When x increases by 1, y increases/decreases by _____.*
   iii. Find the y-intercept. (The value of y when $x = 0$.)
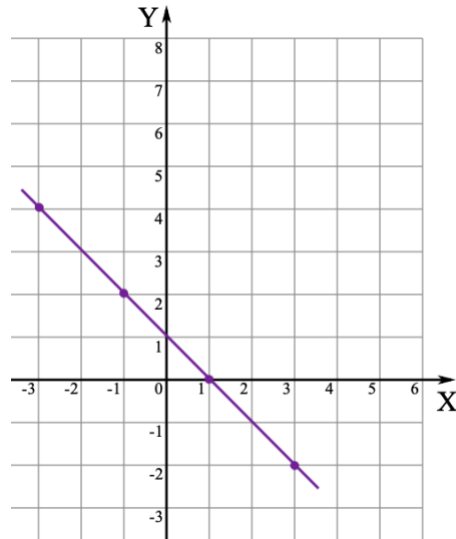   iv. Create the **equation**.

a.

x	y

Pattern: _____

y-intercept _____

Equation: _____

b.

x	y

Pattern: _____

y-intercept _____

Equation: _____

5. Canoes cost $40 a day to rent. Regardless of the number of days that you rent the canoe, you pay a flat rate of $25 for all of the safety equipment that you need to be out on the water.

D	C
1	65
2	
3	
4	
5	

a. Finish filling in the table of values that relates the total cost (C) to the number of days the canoe is rented (D).

b. Determine an equation to represent the relationship between the cost and the number of rental days.

c. Calculate your total cost if you rented the canoe for 2 weeks.

6. Every weekend, you go on a hike with your family. The graph below shows the relation between the numbers of hours spent hiking and the distance traveled.
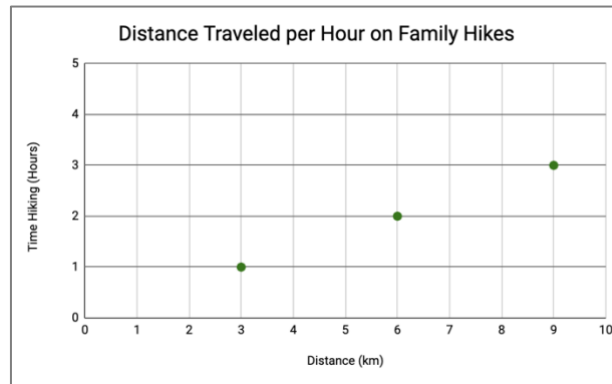

a. Describe the relationship between the time spent hiking and the distance traveled. Do this in as many ways as you can think of. *Ideas: Word sentence, equation, ordered pairs, etc.*

b. How long would an 18 km hike take?

c. On a multi-day trip, you hiked a total of 27 hours. What distance did you cover?

5.6 BEST FORM

1. Identify the strengths of each format for showing relationships.

    a. Equations: _____

    b. Graphs: _____

    c. Tables: _____

2. What is the best format to use to present the following information? Explain your answer and draw an example when possible.

    a. Carter is preparing for a swim meet. He tracks the time of his best 100 m back stroke each day. What would be a good way to see an overview of his progress?

    b. An archaeologist is trying to determine the age of a fossil using carbon dating. What information format would be most useful to her?

    c. During a department store sale, many customers find it difficult to determine the new price of an item when it is 30% off. How could you best help them?


5.7 Y=MX+B

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1. Identify each slope as a positive slope, negative slope, undefined slope, or no slope.

a.

c.

e.

b.

d.

f.
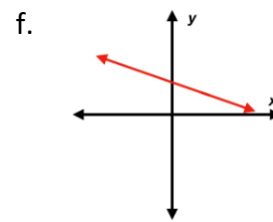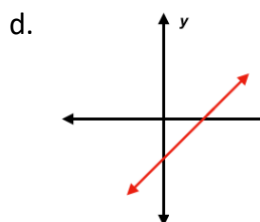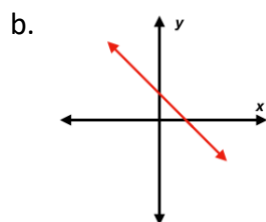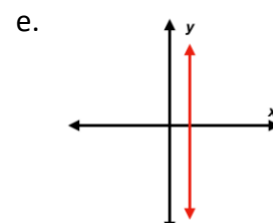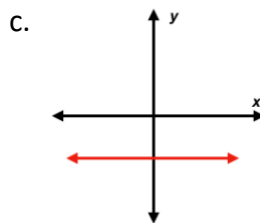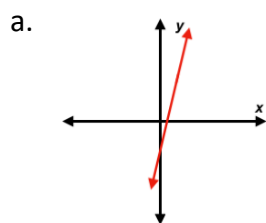
2. Use the graphs from #1 to answer the following questions.

   a. Which graph has a slope of $m = 1$? _____

   b. Which graph has a slope of $m = -1$? _____

   c. Is the slope in graph a bigger than or smaller than $m = 1$? _____

   d. Is the slope in graph f bigger than or smaller than $m = 1$? _____

3. Determine the slope of the lines in the following graphs. _Reminder: Draw a triangle linking 2 points on the graph. Pay attention to the direction you move while you count spaces: are you moving in a positive or a negative direction?_

   a.

   b.

c.

d.
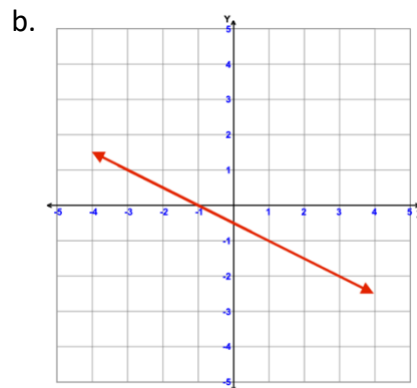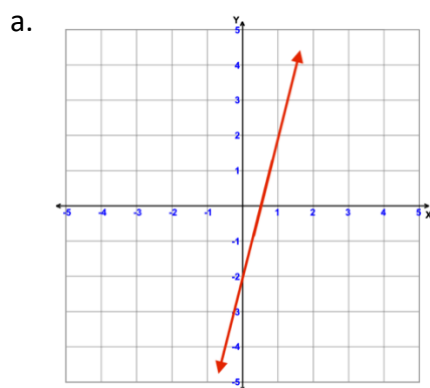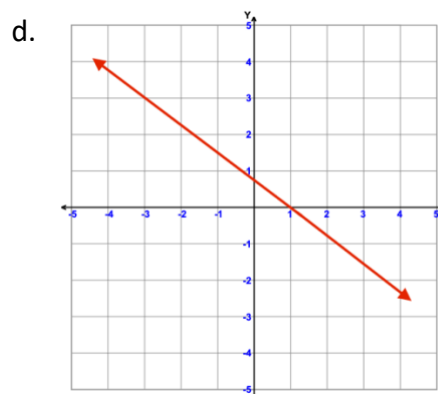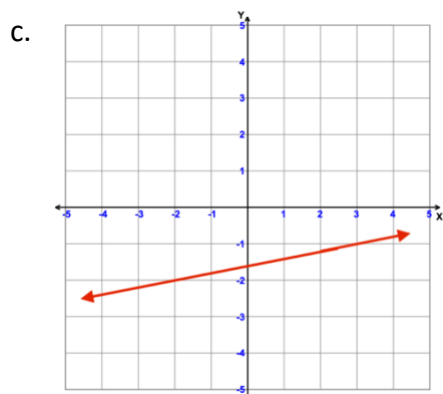
4. Use the equation for slope to determine the slope of a line that passes through the given points. _Hint: Label the ordered pairs before putting the numbers into the equation._

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Ex. $(-1, 4)$ and $(6, 2)$

$(x_1 - y_1) \quad (x_2 - y_2)$

$m = \dfrac{2 - 4}{6 - (-1)}$

$m = \dfrac{-2}{7}$

a. $(2, 6)$ and $(4, 7)$

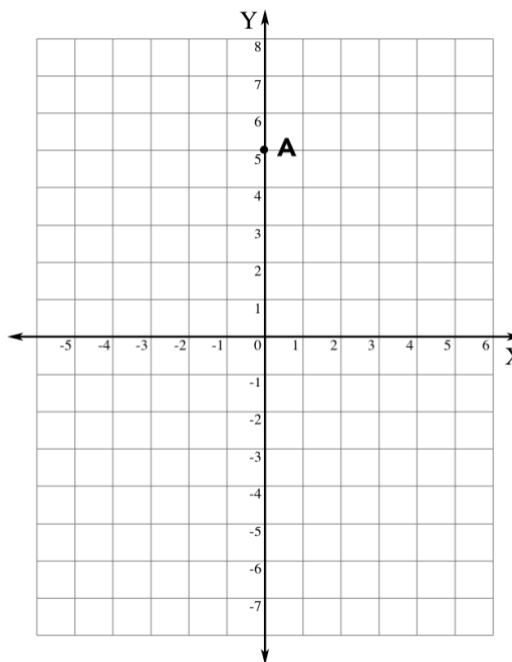b. $(-1, 3)$ and $(1, 5)$

c. $(-6, 4)$ and $(3, 1)$

d. $(-2, -2)$ and $(1, 0)$

e. $(2, 5)$ and $(3, -7)$

5. What does *y-intercept* mean?

_____

6. Plot and label the y-intercepts of the following equations onto the graph. The first one has been done for you.

   a. $y = \frac{3}{4}x + 5$

   b. $y = -2x + 7$

   c. $y = x - 4$

   d. $y = \frac{1}{3}x + 2$

   e. $2y = 8x - 2$

   f. $y = -3x$

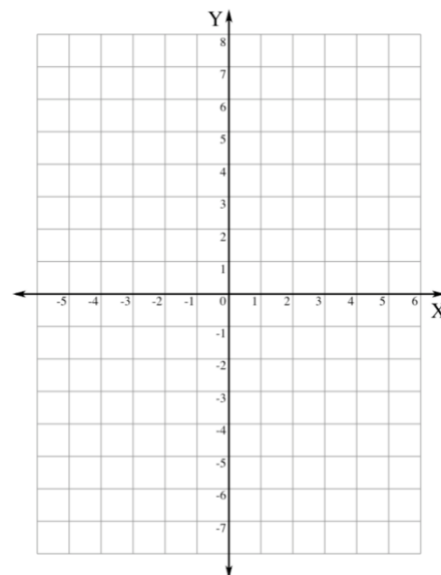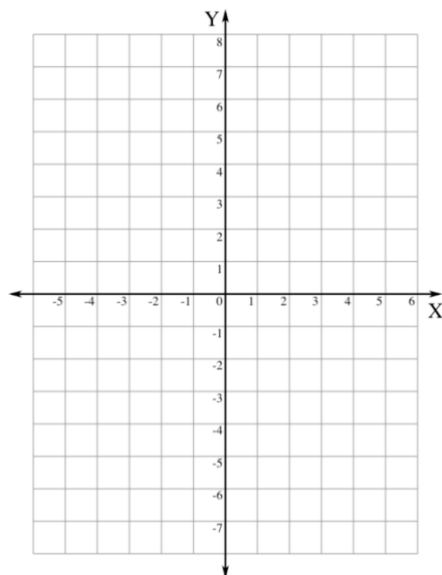   g. $y = -6$

7. Determine the slope of the line equations in #6.

   a.   c.   e.   g.
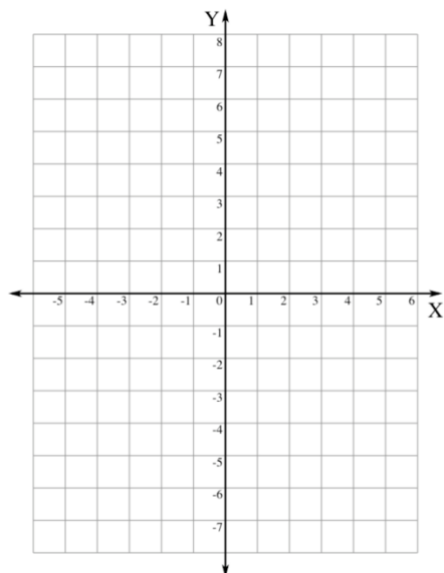
   b.   d.   f.

8. Graph the line using only the slope-intercept equation. (ie. Do not use a table.)
   Reminder: First plot the point of the y-intercept, then find a second point based on the slope.

   a. $y = \frac{1}{3}x + 4$ b. $y = -4x - 2$
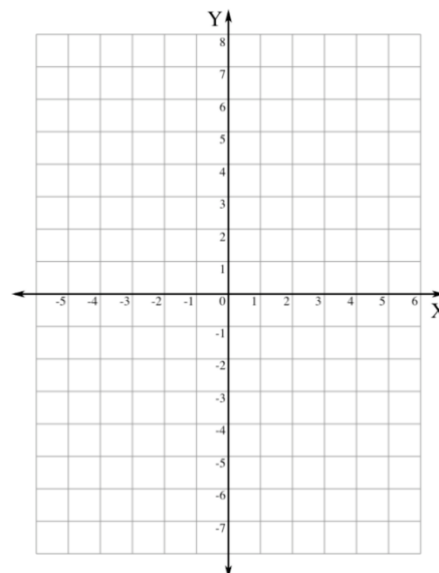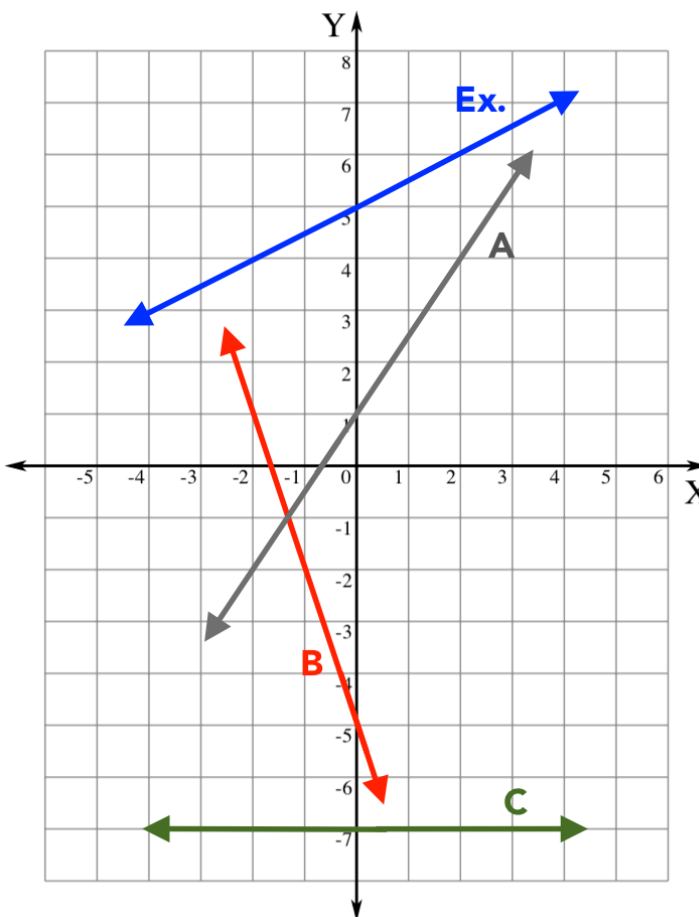
c. $2y + 4 = 5x$

d. $x = -3$

9. Determine the equations of the following lines by using the slope-intercept formula $y = mx + b$.

Ex. $\underline{\quad y = \dfrac{1}{2}x + 5 \quad}$
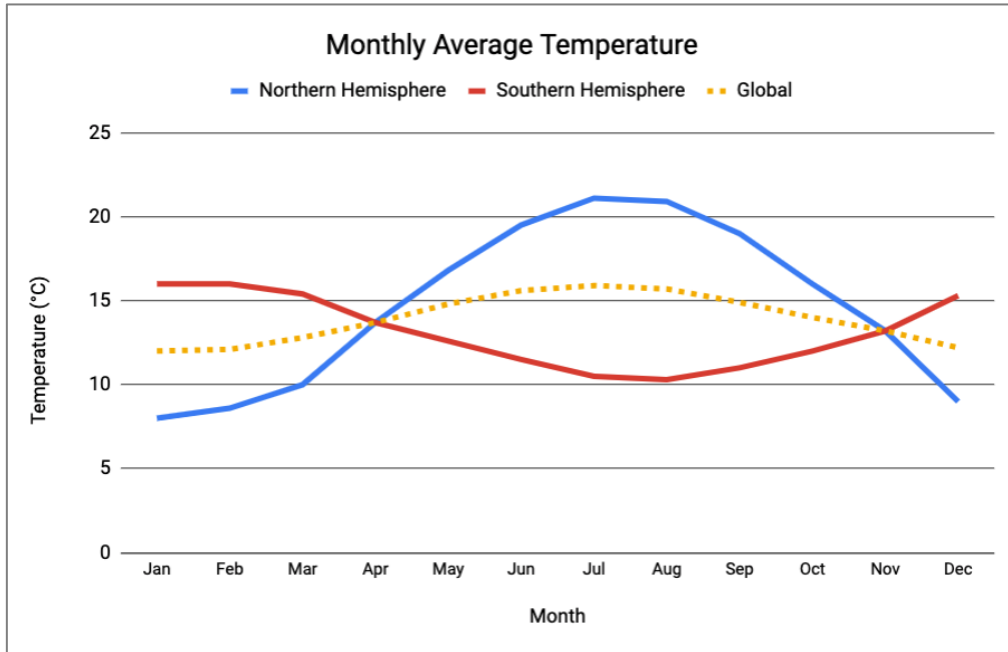
a. _____

b. _____

c. _____

10. Interpret the following graph. What are at least 5 things that you could tell someone about the earth based on this graph?

UNIT 5 – ANSWER KEY

SECTION 5.1

1. a. i) The scale on the y-axis (Score) starts at 22.5. This makes it look like there is a big difference between the 2 class scores, when in fact the difference is minimal (only 1.8%). ii) Have the scale on the y-axis begin at 0. b. i) The relative sizes of the images on the graph are misleading. The height of the images show that prices have increased 1.5 times for baseball and doubled for hockey; however, the sizes of the images make the difference look much larger. ii) Use bars instead of images. c. i) The sizes of the pie pieces do not correspond with the funding amount. ii) Have the pie pieces accurately convey the percentage of the funding coming from each source.
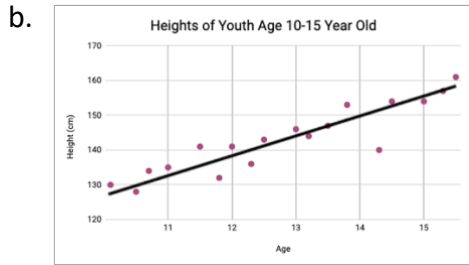
SECTION 5.2

1. Yes, the graph accurately displays all of the data.
2. a. 50m b. ~35m c. 4km d. Answers may vary. Ex. First half could be harder because there is more time spent climbing. Second half could be harder because it has the steepest incline as well as a steep decline.
3. a.
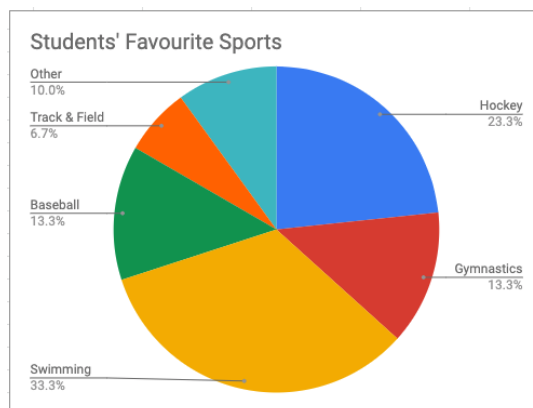
b. Yes. Answers may vary. Ex. It shows the breakdown of which sports students like best. It is easy to see how popular each sport is.

d. Line graph. It is good for tracking changes over a short period of time.
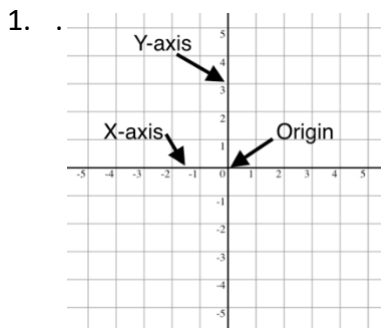
e. Pie graph. It is used to compare parts of a whole, which this data does not represent.

The pie graph does not give us useful information about patterns.

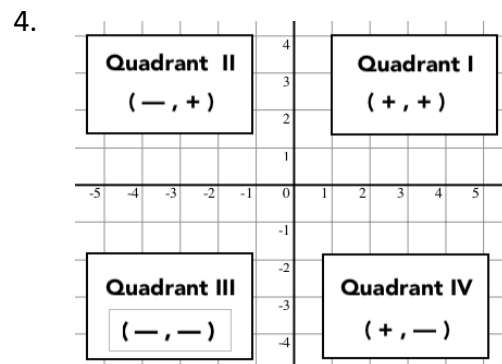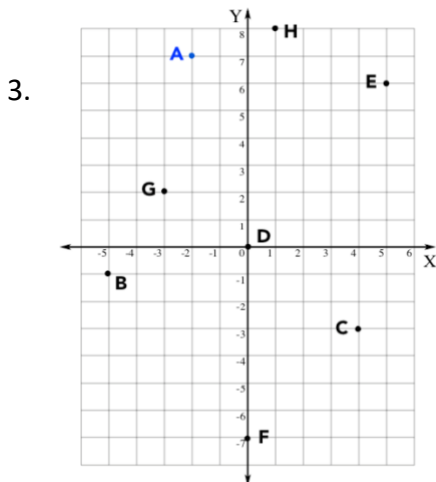4. a. It is useful for determining general trends.

   b.

   It represents the trend of youths' height versus their age.   c. ~150cm

SECTION 5.3

1. .

2. B (1, 2)   C (-4, 1)   D (3, 0)   E (-2, -1)   F (-1, -2)   G (0, -4)   H (4, -5)

3.

4.

5. a. $(-,-)$ Quadrant III   b. $(+,+)$ Quadrant I   c. $(+,-)$ Quadrant IV d. $(-,+)$ Quadrant II

Section 5.4

1. A correlation coefficient describes how closely a best-fit line represents the given data. In other words, how closely the collected data follows a trend.

2.

r = 0.5	r = 1.9	r = - 8	r = - 0.5	r = 1
r = - 1	r = - 2.5	r = 0.9	r = 0.75	r = 50%

3. a. $r = -0.5$ b. $r = 0$ c. $r = -1$ d. $r = 0$ e. $r = 0.9$ f. $r = 0.5$ g. $r = 1$ h. $r = -0.9$

4. a. ~310 kg, Interpolation   b. ~80 kg, Extrapolation   c. ~$2.75, Interpolation   d. ~$1.00, Extrapolation   e. There are no data points in that range; therefore, one cannot be certain that the trend would continue as before.

5. No. Various possible answers. Ex: Humans do not grow at the same rate throughout their lives.

Section 5.5

1. a. $y = 7, 9, 11, 13$ Ordered Pairs: (2, 7) (3, 9) (4, 11) (5, 13)

   b. $y = -2, -3, -4, -5, -6$ Pattern: When x increases by 1, y **decreases** by 1. Ordered Pairs: (0, -2) (1, -3) (2, -4) (3, -5) (4, -6)

   c. $y = 2, 3, 4, 5, 6$ Pattern: When x increases by 1, y increases by $\frac{1}{2}$. Ordered Pairs: (0, 2) (2, 3) (4, 4) (6, 5) (8, 6)

2. A variety of values for x are possible to use.
   a. $(-1, -2)\ (0, 1)\ (1, 4)\ (2, 7)\ (3, 10)$
   b. $(0, 5)\ (1, 3)\ (2, 1)\ (3, -1)\ (4, -3)$
   c. $(-3, 1)\ (0, 0)\left(1, -\frac{1}{3}\right)(3, -1)(6, -2)$
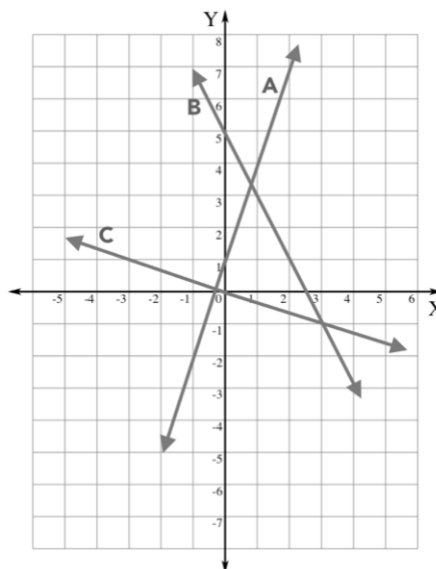
3. a. When *x* **increases by 1**, *y* **increases by 3**.   When *x* is 0, *y* is **+2**. $y = 3x + 2$

   b. When *x* **increases by 1**, *y* **decreases by 2**.   When *x* is 0, *y* is **-1**. $y = -2x - 1$

   c. When *x* **increases by 1**, *y* **increases by** $\frac{1}{2}$.   When *x* is 0, *y* is **0**. $y = \frac{1}{2}x$

4. a.

x	y
-2	-1
-1	1
0	3
1	5

When *x* increases by 1, *y* increases by 2.   When *x* is 0, *y* is +3.

$y = 2x + 3$

x	y
-3	4
-1	2
1	0
3	-2

b. When *x* increases by 1, *y* **decreases** by 1.   When *x* is 0, *y* is +1.

$y = -x + 1$

5. a. C = 105, 145, 185, 225   b. $C = 40D + 25$ c. $585

6. a. Multiple possible answers. Ex. (3, 1) (6, 2) (9, 3)   For each hour hiked, you travel 3 km.

   $h = \frac{1}{3}D$. You could also create a table of values.

   b. 6 hours   c. 81 km

SECTION 5.6

1. a. Best for exact calculations   b. Best for seeing overall trends   c. Best for quick reference

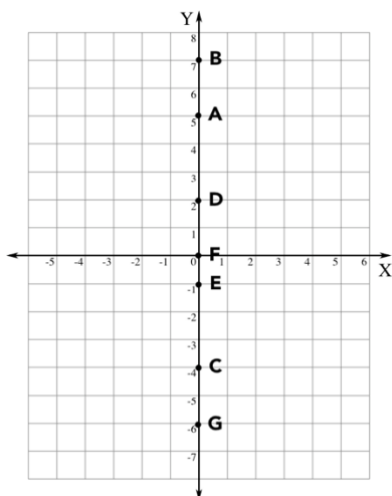2. a. Graph   b. Equation   c. Table

SECTION 5.7

1. a. Positive   b. Negative   c. No slope   d. Positive   e. Undefined slope   f. Negative

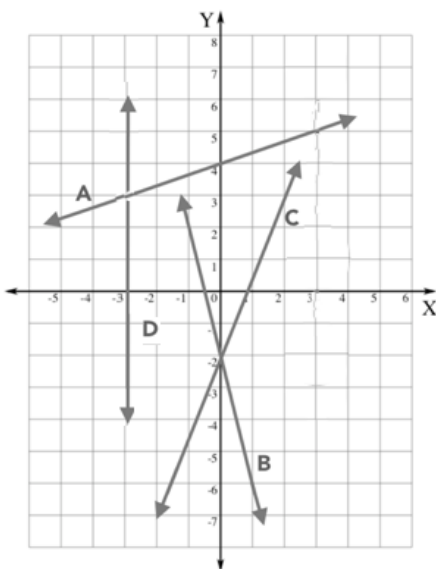2. a. Graph D   b. Graph B   c. Bigger than   d. Smaller than

3. a. $m = 4$ b. $m = -\frac{1}{2}$ c. $m = \frac{1}{5}$ d. $m = -\frac{3}{4}$

4. a. $m = \frac{1}{2}$ b. $m = 1$ c. $m = -\frac{1}{3}$ d. $m = \frac{2}{3}$ e. $m = -12$

5. It is the point where the line crosses the *y*-axis.

6.

7. a. $m = \frac{3}{4}$ b. $m = -2$ c. $m = 1$ d. $m = \frac{1}{3}$ e. $m = 4$ f. $m = -3$ g. No slope

8.

9. a. $y = \frac{3}{2}x + 1$ b. $y = -3x - 5$ c. $y = -7$

10. Many possible answers. Ex: The seasons occur at opposite times in the two hemispheres. The earth is warmer overall when it is summer in the Northern hemisphere. There is a wider temperature range in the Northern hemisphere. The Southern hemisphere has a more temperate climate. Etc.