MFM 2P Mrs. Roen Name: _____

Course: MFM2P Gr. 10 Applied **Lesson: 3 - 3**

Unit: Linear Relations **Topic: Slope and y - Iintercepts**

- ***homework check:*** **Lesson 3 - 2**

- ***note:*** **Slope and Y – Intercepts**

Since all linear relations can be written in the form $y = mx + b$, we are able to pull the value of the slope out of the equation as 'm'. The other variable 'b' also has a special name and meaning. 'b' is called the y – intercept which is the place on the graph where the line crosses the y – axis with coordinates (0, b). The y – intercept is also the value of y when x = 0. Therefore, if 'm' and 'b' can be determined, an equation of the line can be written. For example, identify the slope and y – intercept for each of the following.

$a) y = 2x + 5, \quad m = 2, \quad b = 5$

$b) y = -3x + 7, \quad m = -3, \quad b = 7$

$c) y = \frac{4}{5}x - 2, \quad m = \frac{4}{5}, \quad b = -2$

$d) y = \frac{-1}{3}x + 4, \quad m = \frac{-1}{3}, \quad b = 4$

Similarly, if we are given values for both the slope and y – intercept, we can write the equation. For example, write the equation of each of the following.

$a) \quad m = -3, \quad b = 1, \quad y = -3x + 1$

$b) \quad m = 1, \quad b = -3, \quad y = x - 3$

$c) \quad m = \frac{2}{3}, \quad b = -1, \quad y = \frac{2}{3}x - 1$

$d) \quad m = \frac{-3}{5}, \quad b = -2, \quad y = \frac{-3}{5}x - 2$

Also, if we can identify the slope and y – intercept on a graph, we can write the equation of the line. For example, identify both the slope and y – intercept, then write the equation of the line.

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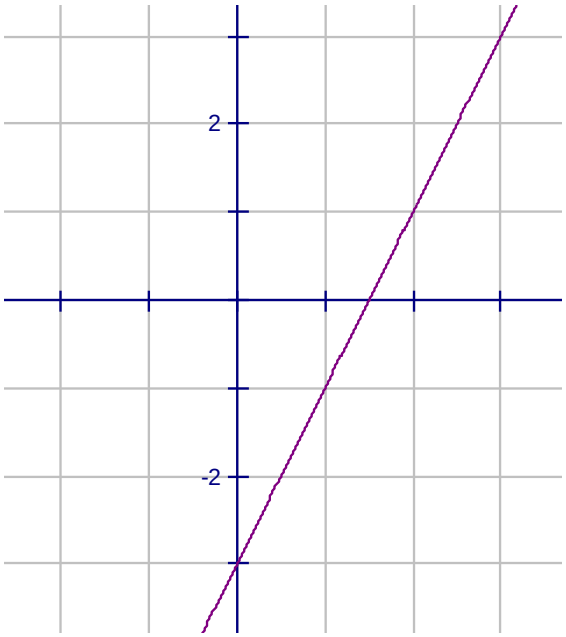
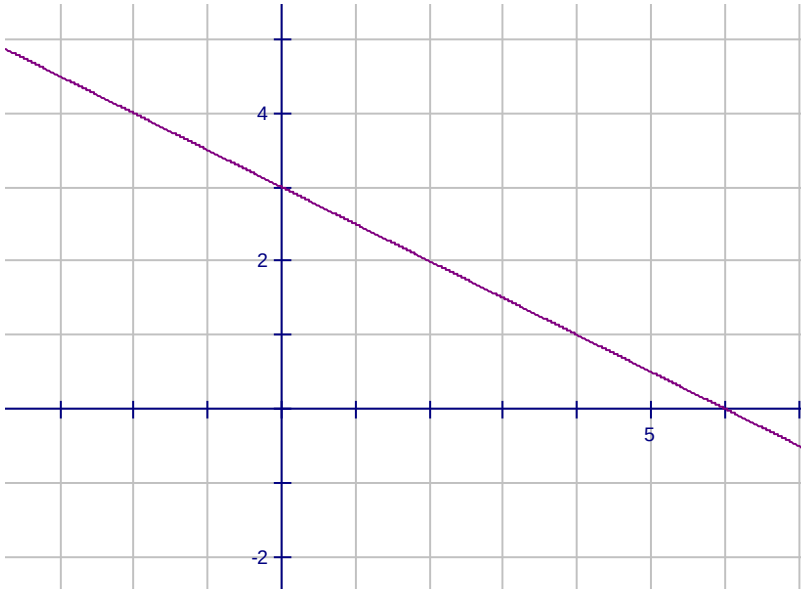
a)



$m = 2, \quad b = -3$

$y = 2x - 3$

b)



$m = \frac{-1}{2}, \quad b = 3$

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

We can also find the equation of a relation from words. For example,

a) Mary makes $20 per cake with a base pay of $30. Write an equation that represents this relationship.

$m = 20, \quad b = 30$

$y = 20x + 30$

b) Dave paints cars for $250 each and makes $50 base wage. Write an equation that represents this relationship.

$m = 250, \quad b = 50$

$y = 250x + 50$

- ***homework assignment:*** **<u>Lesson 3 - 3</u>**

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Lesson 3 – 3: Slope and Y-intercepts

1. Complete the chart to identify the slope and y-intercept for each linear relation.

Linear Relation	Slope (m)	Y-intercept (b)
$y = 3x + 2$		
$y = -2x + 5$		
$y = \frac{1}{2}x - 3$		
$y = \frac{2}{5}x$		
$y = x + 1$		
$y = -x - 2$		
$y = 3$		

2. Use the information given to write the equation for each linear relation.

a) slope 3, y-intercept -2

b) slope 1, y-intercept 3

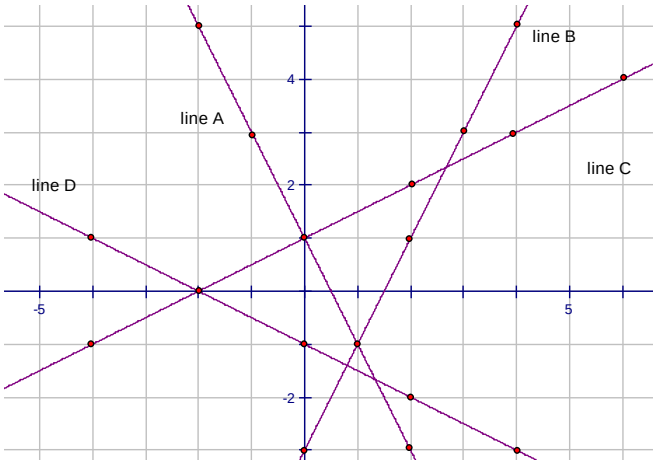
c) slope 0, y-intercept 1

d) slope -4, y-intercept ½

e) slope – 2/5, y-intercept -4

f) slope 0, y-intercept 5

3. Write the equation of each line shown in the space provided.



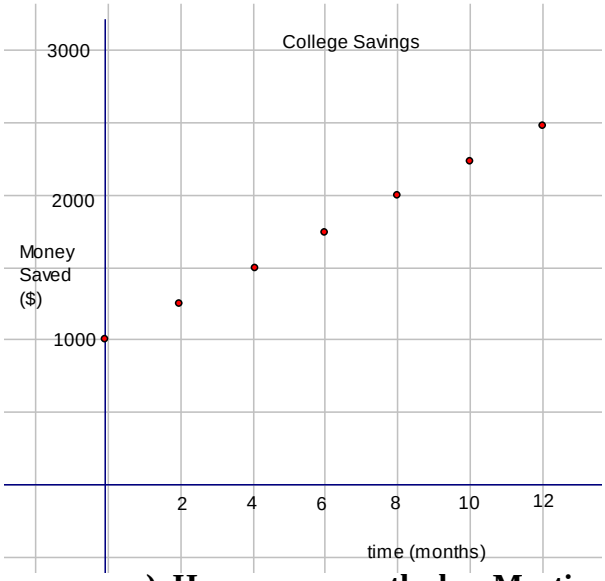
Line A:

Line B:

Line C:

Line D:

4. A graph of Martina's college fund is shown.



a) What is the slope of this line?

b) What is the y-intercept?

c) Write and equation that models her savings.

d) How much money does Martina save after 2 years?

e) How many months has Martina saved if she has $3000?

5. Jim uses the equation $y = 1500 - 90x$ to determine his distance from home after x hours of driving.

a) What is the y-intercept of this equation?

b) What is the slope of this equation?

c) How far from home is Jim after 6 hours of driving?

d) How many hours has Jim been driving if the distance is 510 km?

6. The cost of renting a car can be modelled by the equation $C = 19.99 + 0.27d$ where *C* is the total cost in dollars and *d* is the distance driven in km.

a) What is the meaning of the y-intercept in relation to renting a car?

b) What is the meaning of the slope in relation to renting a car?

c) How much does it cost to rent this car to drive 1500 km?

d) If the total cost is $87.49, how far have you driven?