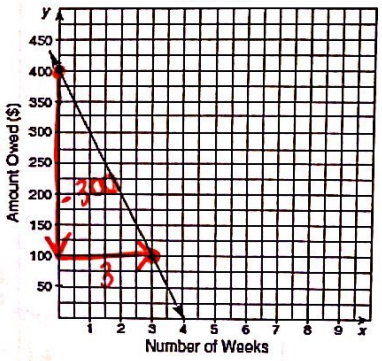
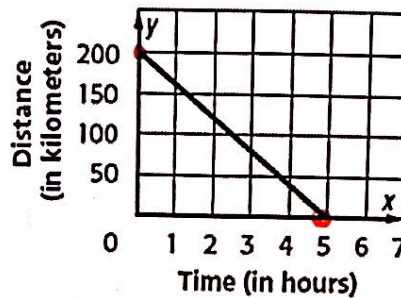


Unit 6: Applications of Linear Functions Review Guide

What you need to know & be able to do	Things to remember	Examples											
1. Characteristics of functions without a graph.	X-intercept: (a, 0) Y-intercept (0, b)	<p>a. What are the x and y intercepts for the equation $2x + 5y = 15$</p> <p><u>X-int (y=0)</u> <u>Y-int (x=0)</u></p> $2x + 5(0) = 15$ $x = 7.5$ <p>(7.5, 0)</p> $2(0) + 5y = 15$ $y = 3$ <p>(0, 3)</p>	<p>b. What are the x and y intercepts for the equation $3x - 6y = 24$?</p> <p><u>X-int (y=0)</u> <u>Y-int (x=0)</u></p> $3x - 6(0) = 24$ $x = 8$ <p>(8, 0)</p> $3(0) - 6y = 24$ $y = -4$ <p>(0, -4)</p>										
2. Characteristics in the Real World	Domain: x-values Range: y-values X-intercept: (a, 0) Y-intercept (0, b) Slope: Change in y over change in x	<p>a. Calculate the slope and y-intercept. Interpret them in terms of the problem scenario.</p> <table border="1"> <thead> <tr> <th>Number of Balloons</th> <th>Total Cost of Balloons (in Dollars)</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>6</td> </tr> <tr> <td>4</td> <td>12</td> </tr> <tr> <td>6</td> <td>18</td> </tr> <tr> <td>8</td> <td>24</td> </tr> </tbody> </table> <p>Slope: $\frac{\Delta y}{\Delta x} = \frac{6}{2} = 3$ \$3 per balloon</p> <p>Y-int: (0, 0) If you don't buy any balloons, you will spend \$0.</p>	Number of Balloons	Total Cost of Balloons (in Dollars)	2	6	4	12	6	18	8	24	<p>b. Calculate the slope, x-intercept, and y-intercept. Interpret them in terms of the problem scenario.</p> <p>Television</p>  <p>Slope: $\frac{\Delta y}{\Delta x} = \frac{-300}{3} = -100$</p> <p>you pay off \$100 each week on the balance of the TV</p> <p>Y-int (0, 400) you bought the TV for \$400.</p>
Number of Balloons	Total Cost of Balloons (in Dollars)												
2	6												
4	12												
6	18												
8	24												

c. Frank is planning to drive his car on the Overseas Highway, the scenic road that connects the islands in the Florida Keys to the Florida mainland. Answer the following questions:

DISTANCE TO BE TRAVELED



a. What is the x-intercept? Explain what it means in terms of the problem scenario.

$(5, 0)$
hours miles It will take Frank 5 hours to reach the end of his trip.

b. What is the y-intercept? Explain what it means in terms of the problem scenario.

$(0, 200)$ At the start of his trip, he is 200 kilometers away

c. What is the slope? Explain what it means in terms of the problem scenario.

$-\frac{200 \text{ miles}}{5 \text{ hours}}$ Frank travels 40 kilometers per hour closer to his destination

d. What is the domain and range?

Domain: $0 \leq x \leq 5$ hours

Range: $0 \leq y \leq 200$ Kilometers

e. Create an equation in slope intercept form to represent the scenario!

$$y = -40x + 200$$

3. Creating Equations from a Word Problem

Standard Form:

$$Ax + By = C$$

*Total

*Two different amounts

Slope Intercept Form:

$$y = mx + b$$

*Rate

*Starting Amount/
One Time Fee

a. Ed has \$36 to buy paints and brushes for a school project. Jars of paint cost \$4 each. The brushes are \$2 each. Write an equation to determine the combination of brushes and paint he can buy. If he buys 3 jars of paint, how many brushes can he buy?

$$4x + 2y = 36$$

$$4(3) + 2y = 36$$

$$12 + 2y = 36$$

$$2y = 24$$

$$y = 12$$

12 brushes

b. Gail orders CDs for \$8 each plus a total shipping cost of \$5. Write an equation to determine the total cost of purchasing CDs. If Gail spent \$53, how many CDs did she order?

$$y = 8x + 5$$

$$53 = 8x + 5$$

$$48 = 8x$$

$$6 = x$$

6 CDs

x: # of CDs
y: total cost

Comparing
for
functions

a. Which function has the greater rate of change and y-intercept?

Function 1: $y = 2x + 3$
Function 2: $(0, 4), (1, 8), (2, 12)$

$$\begin{array}{r|rrr} x & 0 & 1 & 2 \\ \hline y & 4 & 8 & 12 \end{array} \quad y = 4x + 4$$

Greater Slope: Function 2
($4 > 2$)

Greater y-int: Function 2
($4 > 3$)

b. The table to the right shows the distance (in meters) Runner A and Runner B ran at different time intervals. Which runner has a faster average speed from 20 to 31 seconds?

Time	Runner A	Runner B
0	0	0
9	120	120
20	168	213
31	287	287

Runner A is faster!

Runner A

$$\frac{119}{11} = 10.8 \text{ meters per second}$$

Runner B

$$\frac{74}{11} = 6.7 \text{ meters per second}$$

c. Which function has the greatest y-intercept?

Function A: $f(x) = 3x$

$$y\text{-int: } (0, 0)$$

Function B: $2x + 3y = 12$

$$2(\cancel{x}) + 3y = 12$$

$$y = 4$$

$$(0, 4)$$

Function C: a line that has a slope of 2
And passes through $(1, -4)$.

$$y = mx + b$$

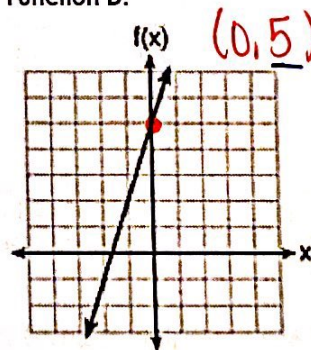
$$-4 = 2(1) + b$$

$$-4 = 2 + b$$

$$-6 = b$$

$$(0, -6)$$

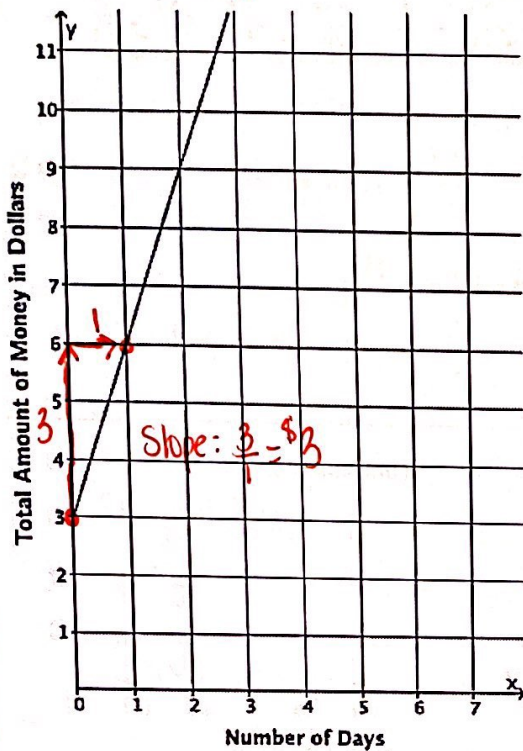
Function D:



Function D has the greatest y-int.
($5 > 4 > 0 > -6$)

d. Two people, Adam and Bianca, are competing to see who can save the most money in one month. Use the table and the graph below to answer the following questions: (Assume each is following a linear function in his or her saving habit.)

Adam's Function: $y = 3x + 3$



Bianca's Function: $y = 3x + 2$

Input (Number of Days)	Output (Total amount of money in dollars)
5	17
8	26
12	38
20	62

$$\frac{\Delta y}{\Delta x} = \frac{12}{4} = \$3$$

a. Who is saving more per month?

they both save \$3 per month.

b. Who started with more money?

Adam started with \$3 whereas Bianca started with \$2.

e. Mr. Rich recently planted a crop of money trees in his garden. Create an equation to represent each tree. Which tree is growing the fastest and which tree started out as the tallest?

A.

The first tree was five inches tall when planted. It has grown four inches every month since being planted.

$$y = 4x + 5$$

B.

Measurements were taken of the second tree and given below:

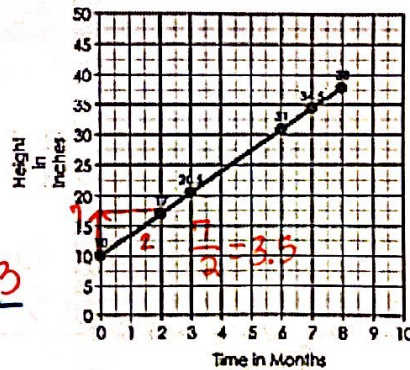
Months	0	2	3	5
Height	3	12	16.5	25.5

$$y = 4.5x + 3$$

$$\frac{\Delta y}{\Delta x} = \frac{9}{2} = 4.5$$

C.

Money Tree Growth



$$y = 3.5x + 10$$

- Plant B grows the fastest (4.5 > 4 > 3.5)
- Plant C started as the tallest (10 > 5 > 3)