Unit 2, Activity 2, Slope Anticipation Guide

Directions: Prior to the lesson, read each statement and circle if you agree or disagree with each statement. Once the lesson has been fully taught and discussed, revisit the questions and modify your thinking if necessary.

1. Slope refers to the steepness of a linear graph and can be found by determining the run divided by the rise ($\frac{run}{rise}$).

   AGREE DISAGREE

2. The formula for slope is given by the following formula: $m = \frac{x_2 - x_1}{y_2 - y_1}$. This represents the "change in x" and the "change in y" coordinates for two points on a line.

   AGREE DISAGREE

3. The slope of a linear graph can also be considered a "rate of change" in real-life situations.

   AGREE DISAGREE

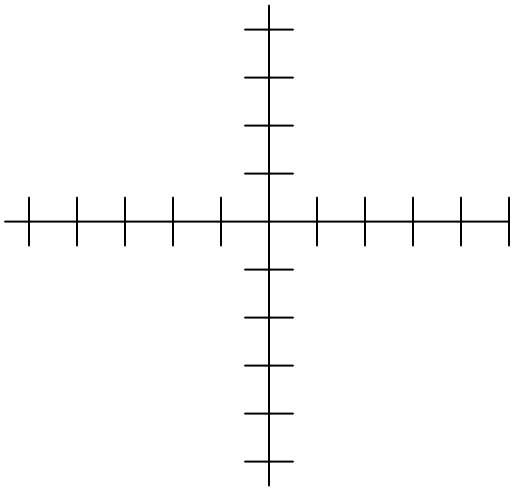
4. The equation y = 4x – 3 has a slope of – 3 and a y-intercept of 4. .

   AGREE DISAGREE

Unit 2, Activity 2, Using Slope

Directions: Using what you have learned about slope, answer the following questions.

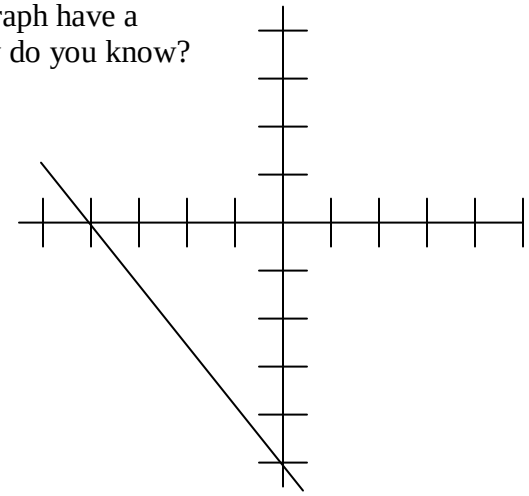
1. Find the slope and *y*-intercept for the graph of $3x - 5y = 15$ and use this information to make a graph.



2. What is the slope of the line containing the points (3, -5) and (-2, -7)?

3. In 1930 the price of a gallon of gas was 13¢ and in 2007 the price of a gallon of gas was $2.79. How much has the price of gas increased over that time span? What is the "rate of change" for the price of gas over that time span? Explain in words what you did to determine the rate.

4. Use the graph of the line shown below to answer the following questions:
   a. Just by looking at the graph, does the graph have a positive slope or a negative slope? How do you know?
   b. What is the slope of the line?
   c. What is the y-intercept of the line?
   d. What is the x-intercept of the line?
   e. Write an equation for the line in slope intercept form.

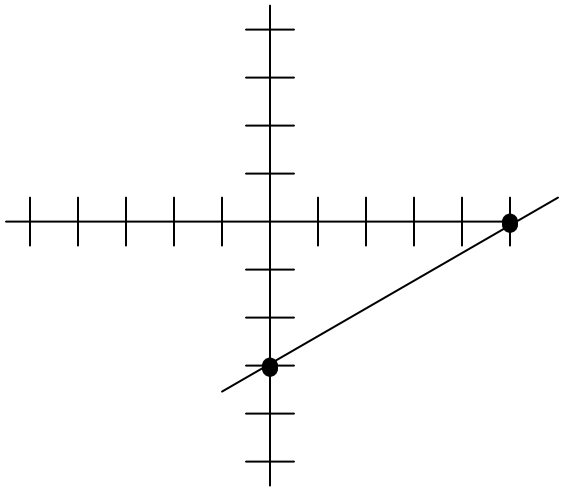


Unit 2, Activity 2, Using Slope with Answers

Directions: Using what you have learned about slope, answer the following questions.

1. Find the slope and y-intercept for the graph of 3x – 5y = 15 and use this information to make a graph.

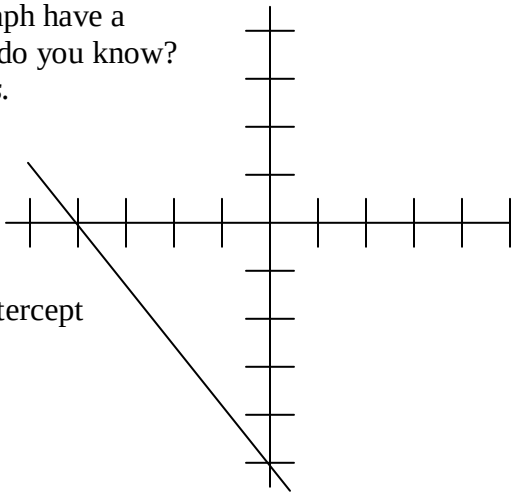
   m = 3/5
   b = -3



2. What is the slope of the line containing the points (3, -5) and (-2, -7)?
   m = 2/5

3. In 1930 the price of a gallon of gas was 13¢ and in 2007 the price of a gallon of gas was $2.79. How much has the price of gas increased over that time span? What is the "rate of change" for the price of gas over that time span? Explain in words what you did to determine the rate.
   The gas increased $2.66 over the course of 77 years. The rate of change over that time span was approximately 3.5¢ per year which means that the price of gas increased on average about 3.5 cents per year from 1930 to 2007.

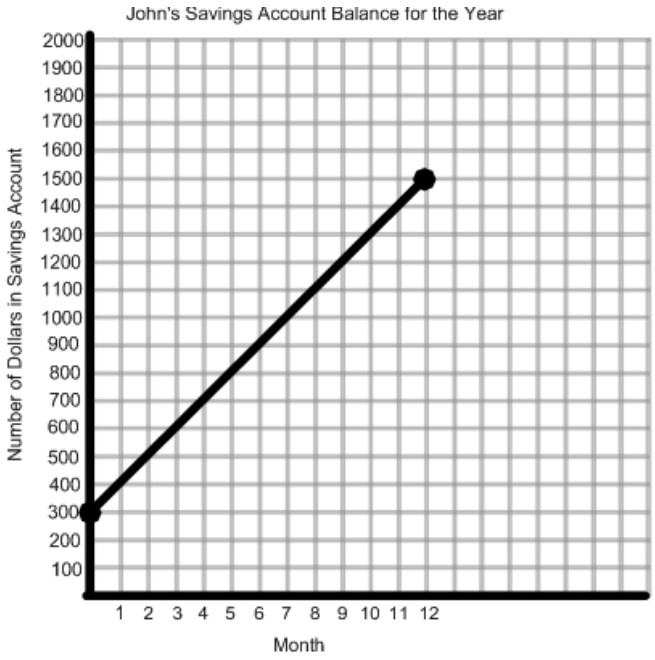
4. Use the graph of the line shown below to answer the following questions:
   a. Just by looking at the graph, does the graph have a positive slope or a negative slope? How do you know?
      Negative slope; See student explanations.
   b. What is the slope of the line? *-5/4*
   c. What is the y-intercept of the line?
      (0,-5)
   d. What is the x-intercept of the line?
      (-4,0)
   e. Write an equation for the line in slope intercept form.
      $y = -\frac{5}{4}x - 5$



Unit 2, Activity 3, Rate of Change

Directions: Work with your group members and discuss the following problems, solutions to the problems, and ways of thinking about the problems you are solving.

1. Determine the slope of this graph and interpret its meaning in real-world terms.



2. Kevin's savings account balance changed from $1140 in January to $1450 in April. Find the average rate of change per month. Round your answer to the nearest dollar.

3. The table shows Rachel's height in inches between the ages of 9 and 14.
   a. Find the rate of change in her height between ages 9 and 12.
   b. Find the rate of change in her height between ages 12 and 14.
   c. Is the rate constant? Explain.

Age (yr)	9	12	14
Height (in.)	52	59	68

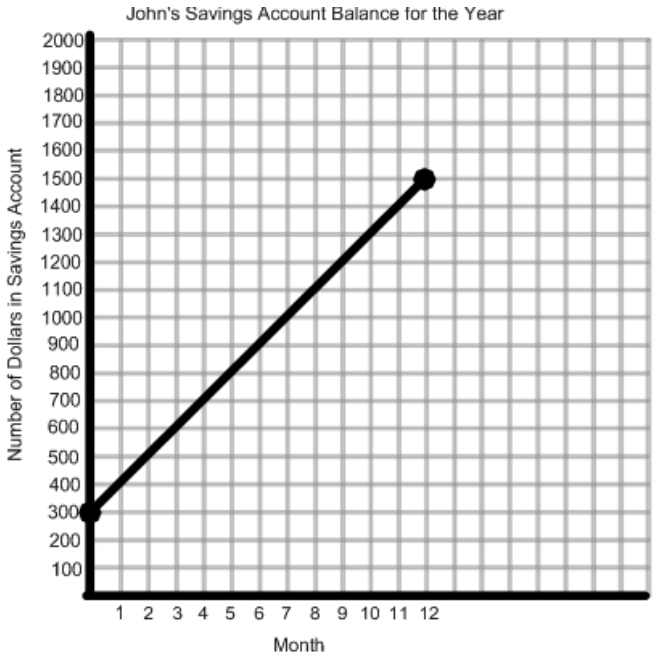
Unit 2, Activity 3, Rate of Change with Answers

Directions: Work with your group members and discuss the following problems, solutions to the problems, and ways of thinking about the problems you are solving.

1. Determine the slope of this graph and interpret its meaning in real-world terms.

Answer:
The slope or the "rate of change" of the graph is 100 dollars/month.

The meaning of the slope is this: Each month John's rate of saving was $100 per month over the twelve month period.



2. Kevin's savings account balance changed from $1140 in January to $1450 in April. Find the average rate of change per month. Round your answer to the nearest cent.

Answer: The rate of change is $103.33 per month.

3. The table shows Rachel's height in inches between the ages of 9 and 14. In this case, Rachel's height depends on her age.
   a. Find the rate of change in her height between ages 9 and 12.
      Answer: 2 1/3 inches/year
   b. Find the rate of change in her height between ages 12 and 14.
      Answer: 4.5 inches/year
   c. Is the rate constant? Explain.
      Answer: The rate at which Rachel is growing over the course of time is not constant. She is growing at a faster rate during the years from 12 to 14.

Age (yr)	9	12	14
Height (in.)	52	59	68

Unit 2, Activity 6, Equations of Lines

Directions: With your group members, discuss and answer the problems and questions concerning equations of lines.

1. Determine the equation of the line which passes through the point (-3,1) and has a slope of $-\frac{3}{5}$. Write the equation in slope-intercept form.

2. Determine the equation of the line which passes through the points (-2,-1) and (-4, 3). Write your equation in point slope form first, and then translate the equation into the other two forms (slope-intercept and standard form).

3. For the table below, fill in the chart by translating from the given form of the equation to the other form that is missing.

Standard Form	Slope-intercept Form
$4x - 3y = 9$	
	$y = 3x - 10$
	$y = \frac{3}{4}x + 2$
$2x - 9y = -10$	

Unit 2, Activity 6, Equations of Lines with Answers

Directions: With your group members, discuss and answer the problems and questions concerning equations of lines.

1. Determine the equation of the line which passes through the point (-3,1) and has a slope of $-\frac{3}{5}$. Write the equation in slope-intercept form.

   Answer: $y = -\frac{3}{5}x - \frac{4}{5}$

2. Determine the equation of the line which passes through the points (-2,-1) and (-4, 3). Write your equation in point slope form first, and then translate the equation into the other two forms (slope-intercept and standard form).

   Answer:
   Point-slope form: $y - 3 = -2(x + 4)$ *or* $y + 1 = -2(x + 2)$ *depends on point used.*
   Slope-intercept form: $y = -2x - 5$
   Standard form: $2x + y = -5$

3. For the table below, fill in the chart by translating from the given form of the equation to the other form that is missing.

Standard Form	Slope-intercept Form
$4x - 3y = 9$	$y = \frac{4}{3}x - 3$
$3x - y = 10$	$y = 3x - 10$
$3x - 4y = -8$	$y = ¾\ x + 2$
$2x - 9y = -10$	$y = \frac{2}{9}x + \frac{10}{9}$

Unit 2, Activity 7, Is the Table Linear?

Directions: Determine whether each of the following table of values represents a linear relationship (without graphing) and explain how you know (whether its linear or non-linear). If it does represent a linear relationship, find its slope and write its equation (in slope-intercept form).

Table 1

X	Y
0	**400**
10	**450**
40	**600**
60	**700**

Table 2

X	Y
0	**400**
10	**325**
20	**250**
30	**175**

Table 3

X	Y
0	**400**
5	**550**
20	**700**
55	**850**

Table 4

X	Y
5	**-10.5**
15	**-1.5**
40	**21**
55	**34.5**

Unit 2, Activity 7, Is the Table Linear? with Answers

Directions: Determine whether each of the following table of values represents a linear relationship (without graphing) and explain how you know (whether its linear or non-linear). If it does represent a linear relationship, find its slope and write its equation (in slope-intercept form).

Table 1

X	Y
0	**400**
10	**450**
40	**600**
60	**700**

Linear relationship since slope is constant.
Slope = 5
Y = 5X + 400

Table 2

X	Y
0	**400**
10	**325**
20	**250**
30	**175**

Linear relationship since slope is constant.
Slope = -7.5
Y = -7.5X + 400

Table 3

X	Y
0	**400**
5	**550**
20	**700**
55	**850**

Relationship is not linear since slope is not constant

Table 4

X	Y
5	**-10.5**
15	**-1.5**
40	**21**
55	**34.5**

Linear relationship since slope is constant.
Slope =0.9
Y = .9X – 15