Lesson 2.1 ~ Recursive Routines

Name_____ Period_____ Date_____

Find the missing values in each sequence. Identify the start value and the operation that must be performed to arrive at the next term.

1. 14, 17, 20, _____, 26, _____, _____

Start Value: _____

Operation: _____

2. 31, 25, _____, 13, 7, _____, −5, _____

Start Value: _____

Operation: _____

3. 7, 12, 17, _____, 27, _____, _____

Start Value: _____

Operation: _____

4. 2, _____, 16, _____, 30, 37, _____, _____

Start Value: _____

Operation: _____

5. −5, −9, _____, _____, _____, −25, _____

Start Value: _____

Operation: _____

6. 0, _____, 44, 66, _____, _____, 132

Start Value: _____

Operation: _____

For each sequence below, describe the recursive routine and give the next three terms in the sequence.

7. 3, 10, 17, 24, …

Start Value: _____

Operation: _____

Next Three Terms: _____

8. 2.9, 2.2, 1.5, 0.8, …

Start Value: _____

Operation: _____

Next Three Terms: _____

9. −13, −1, 11, 23, …

Start Value: _____

Operation: _____

Next Three Terms: _____

10. 1, −3, −7, −11, …

Start Value: _____

Operation: _____

Next Three Terms: _____

11. 60, 52, 44, 36, …

Start Value: _____

Operation: _____

Next Three Terms: _____

12. $\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, 1, …$

Start Value: _____

Operation: _____

Next Three Terms: _____

Lesson 2.1C ~ Recursive Routines

Name_____ Period_____ Date_____

Create a recursive routine that fits each description. List the start value, operation and first 6 terms.

1. Start value is a teen number and every other term is odd.

   Start Value: _____ Operation: _____

   First Six Terms: _____

2. Start value is a 40 and the fifth term is 25.

   Start Value: _____ Operation: _____

   First Six Terms: _____

3. Start value is divisible by 6 and the fourth term is divisible by 4.

   Start Value: _____ Operation: _____

   First Six Terms: _____

4. Start value is four tenths and the fifth term is the opposite of 2.

   Start Value: _____ Operation: _____

   First Six Terms: _____

5. Start value is a decimal number less than 1 and the fifth term is −2.

   Start Value: _____ Operation: _____

   First Six Terms: _____

6. Start value is a prime number which is four less than a multiple of nine. The third term is 35.

   Start Value: _____ Operation: _____

   First Six Terms: _____

7. Start value is a negative multiple of seven. The sixth term is 39.

   Start Value: _____ Operation: _____

   First Six Terms: _____

8. Start value is an odd number which is three more than one-half squared. The fourth term is $1\frac{3}{4}$.

   Start Value: _____ Operation: _____

   First Six Terms: _____

9. Start value is the largest prime number less than one-hundred. The fifth term is 103.
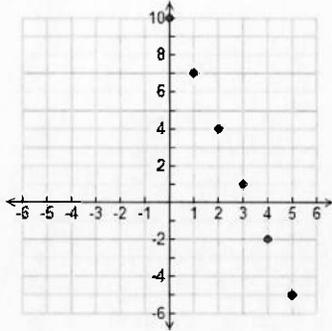
   Start Value: _____ Operation: _____

   First Six Terms: _____

Lesson 2.2 ~ Linear Plots

Name_____ Period_____ Date_____

Describe the linear relationship given by the *y*-coordinates on each linear plot by stating the start value and operation. Create an input-output table showing the ordered pairs on each linear plot.
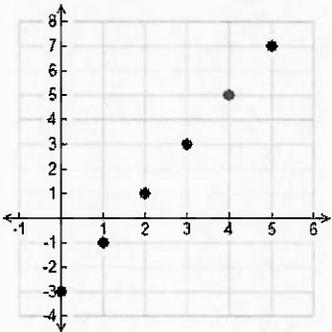
1.

Start Value: _____
Operation: _____

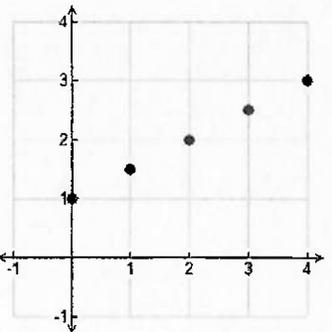| x	y
0	
1	
2	
3	
4	
5	

2.

Start Value: _____
Operation: _____

x	y
0	
1	
2	
3	
4	
5	

3.

Start Value: _____
Operation: _____

x	y

4. Create a scatter plot for the recursive routine given below. Use input values from 0 to 4.
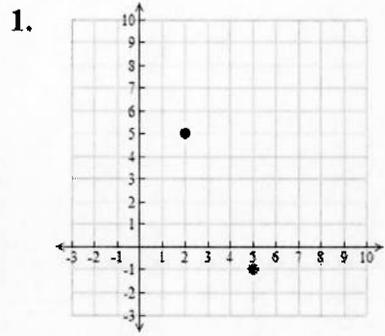
Start Value: 7
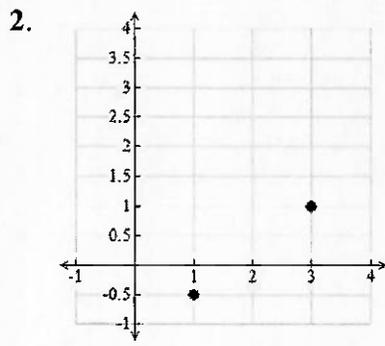Operation: Subtract 2
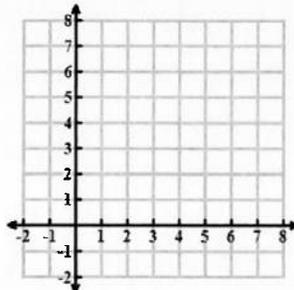
Lesson 2.2C ~ Linear Plots

Name_____ Period_____ Date_____

Determine the linear relationship shown by two points on the coordinate plane by stating the start value and operation. Create an input-output table for the *x*-values of 0 through 5.

1.

Start Value: _____
Operation: _____

x	y
0	
1	
2	
3	
4	
5	

2.

Start Value: _____
Operation: _____

x	y
0	
1	
2	
3	
4	
5	

3.
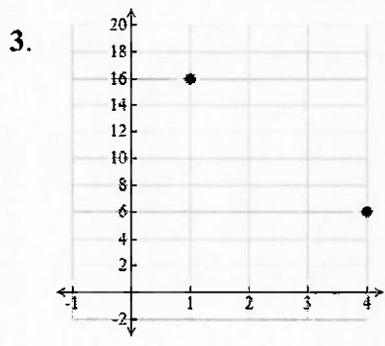
Start Value: _____
Operation: _____

x	y

4. Create a linear relationship that includes the point on the coordinate plane below.
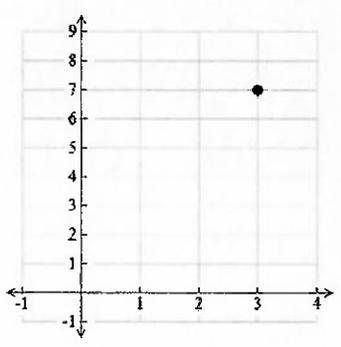
Start Value: _____
Operation: _____

x	y

Lesson 2.3 ~ Recursive Routine Applications

Name_____ Period_____ Date_____

1. Shasta owns 10 baseball cards. Each week she plans to add 6 cards to her collection.

   **a.** Write a recursive routine (start value and operation) that describes the total number of baseball cards Shasta will own based on the number of weeks she has been collecting cards.

    b. Create an input-output table that shows the number of cards in her collection over the first five weeks.

Weeks x	Cards y
0	
1	
2	
3	
4	
5	

    c. Create a scatter plot that shows the number of cards in Shasta's collection over the first five weeks. Label both axes.
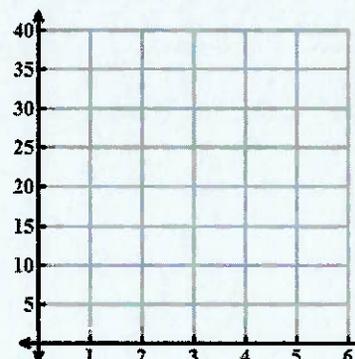
    d. Determine how many weeks it will take before Shasta has 76 cards in her collection.

2. Before Henry went on a diet, he weighed 160 pounds. Each month he diets, he loses 5 pounds.

    a. Write a recursive routine that describes Henry's weight based on the number of months he has been dieting.

    b. Create an input-output table that shows Henry's weight over the first five months.

Months x	Weight y
0	
1	
2	
3	
4	
5	

    c. Create a scatter plot that shows Henry's weight over the first five months. Label both axes.
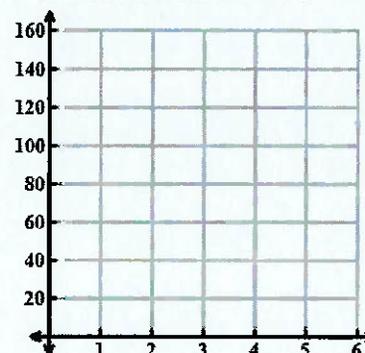
    d. Henry's doctor told him a good weight for his age is 120 pounds. How many months will it take him to reach this weight?

Lesson 2.3C ~ Recursive Routine Applications

Name_____ Period_____ Date_____

1. After three weeks on the market, the AdMi stock was at 22.5 points   After five weeks on the market, it was at 19.5 points. Each of the first five weeks, it fell an equal amount.

    a. Create an input-output table that shows the value of the stock over the first five weeks.

Weeks x	Value y
0	
1	
2	
3	
4	
5	

    b. Write a recursive routine (start value and operation) that describes the value of the AdMi stock based on the number of weeks it has been on the market.

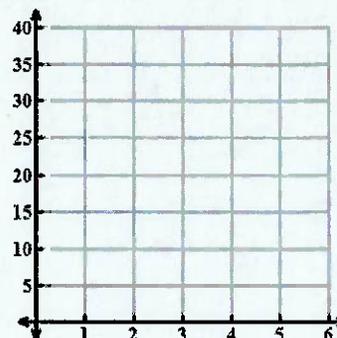   **c.** Create a scatter plot that shows the stock's value over the first five weeks. Label both axes.

    d. Assuming the stock continues to decrease at this rate, how many weeks until it is worth only 3 points?

2. When Suzi finished her 6-week exercise program, she weighed 18 pounds less than when she started. After 2 weeks of the program, she weighed 152 pounds. Each week she lost the same amount.

    a. Create an input-output table that shows Suzi's weight over the six weeks using the table at the right.

Weeks x	Weight y
0	
1	
2	
3	
4	
5	
6	

    b. Write a recursive routine that describes Suzi's weight based on the number of weeks she has been participating in the program.

    c. Create a scatter plot that shows Suzi's weight over the six weeks. Label both axes.
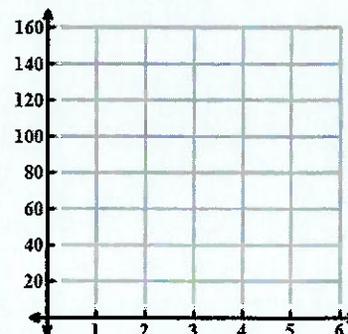
    d. How <u>many more</u> weeks should she continue with the program if she would like to weigh 125 pounds?

Core Focus on Linear Equations

Lesson 2.4 ~ Rate of Change

Name_____ Period_____ Date_____

Each table shows five terms in a recursive routine. Determine the rate of change and start value for each table.

1.

x	y
0	6
1	10
2	14
3	18
4	22

Rate of Change: _____
Start Value: _____

2.

x	y
0	29
1	23
2	17
3	11
4	5

Rate of Change: _____
Start Value: _____

3.

x	y
−1	−2
1	4
2	7
3	10
6	19

Rate of Change: _____
Start Value: _____

4.

x	y
2	0
3	1
4	2
5	3
6	4

Rate of Change: _____
Start Value: _____

5.

x	y
−4	−37
−2	−17
0	3
2	23
4	43

Rate of Change: _____
Start Value: _____

6.

x	y
−2	0
1	−6
3	−10
7	−18
11	−26

Rate of Change: _____
Start Value: _____

Complete each table using the rate of change and the start value for each problem.

7.

x	y
0	
1	
2	
3	
4	
5	

Rate of Change: 5
Start Value: 2

8.

x	y
−2	
	14
1	
3	
	2
6	

Rate of Change: −3
Start Value: 14

9.

x	y
−1	
0	
1	
	3.6
5	
	6

Rate of Change: 0.4
Start Value: 2

10. Create your own recursive routine by choosing your own rate of change and start value. Complete a table with five pairs of values that correspond to your recursive routine.

Rate of Change: _____
Start Value: _____

x	y

Core Focus on Linear Equations

Lesson 2.4C ~ Rate of Change

Name_____ Period_____ Date_____

Each table shows three terms in a recursive routine. Determine the rate of change and start value for each table. Find two more terms in the routine.

1.

x	y
0	−14
2	−2
4	10

Rate of Change: _____
Start Value: _____

x	y
6	
8	

2.

x	y
1	16
5	4
7	−2

Rate of Change: _____
Start Value: _____

x	y
4	
11	

3.

x	y
4	7.6
9	14.1
13	19.3

Rate of Change: _____
Start Value: _____

x	y
−2	
2	

4.

x	y
−4	10
−1	7
3	3

Rate of Change: _____
Start Value: _____

x	y
5	
9	

5.

x	y
8	3
13	$5\frac{1}{2}$
20	9

Rate of Change: _____
Start Value: _____

x	y
22	
30	

6.

x	y
−11	−9.2
−6	−3.2
−2	1.6

Rate of Change: _____
Start Value: _____

x	y
−1	
6	

Complete each table using the rate of change and the start value for each problem.

7.

x	y
1	
	−1
6	
	23
10	
	47

Rate of Change: 4
Start Value: −13

8.

x	y
	1
2	
	0
	$−1\frac{3}{4}$
12	
	−5

Rate of Change: $−\frac{1}{4}$
Start Value: 1

9.

x	y
	−6.8
	−1.7
	0
	5.1
	11.9
	51

Rate of Change: 1.7
Start Value: −10.2

Lesson 2.5 ~ Recursive Routines to Equations

Name_____ Period_____ Date_____

Match each recursive rule with its slope-intercept equation.

_____ 1. Start Value: 4   Rate of Change: 5   A. $y = 5x$

_____ 2. Start Value: −10 Rate of Change: $-\frac{2}{5}$ B. $y = 5 + 4x$

_____ 3. Start Value: 5   Rate of Change: 4   C. $y = -2 + 3x$

_____ 4. Start Value: −10 Rate of Change: $\frac{2}{5}$ D. $y = 3 - 2x$

_____ 5. Start Value: 3   Rate of Change: −2   E. $y = 4 + 5x$

_____ 6. Start Value: 5   Rate of Change: 0   F. $y = -10 + \frac{2}{5}x$

_____ 7. Start Value: −3   Rate of Change: 2   G. $y = 5$

_____ 8. Start Value: 0   Rate of Change: 5   H. $y = -10 - \frac{2}{5}x$

_____ 9. Start Value: −2   Rate of Change: 3   I. $y = -3 + 2x$

Determine the rate of change and the start value for each table. Write an equation in slope-intercept form.

10.

x	y
0	10
1	12
2	14
3	16
4	18

Rate of Change: _____
Start Value: _____
Equation: _____

11.

x	y
−1	8
0	3
1	−2
2	−7
3	−12

Rate of Change: _____
Start Value: _____
Equation: _____

12.

x	y
−2	0
0	10
2	20
4	30
6	40

Rate of Change: _____
Start Value: _____
Equation: _____

13.

x	y
1	$1\frac{1}{2}$
2	2
4	3
5	$3\frac{1}{2}$
8	5

Rate of Change: _____
Start Value: _____
Equation: _____

14.

x	y
−2	6
1	3
3	1
4	0
10	−6

Rate of Change: _____
Start Value: _____
Equation: _____

15.

x	y
5	6.8
6	7
7	7.2
8	7.4
9	7.6

Rate of Change: _____
Start Value: _____
Equation: _____

Lesson 2.5C ~ Recursive Routines to Equations

Name_____   Period_____   Date_____

Determine the rate of change and the start value for each table. Write an equation in slope-intercept form.

1.

x	y
0	−7
2	−3
5	3
7	7
10	13

Rate of Change: _____

Start Value: _____

Equation: _____

2.

x	y
−1	8
1	2
4	−7
6	−13
11	−28

Rate of Change: _____

Start Value: _____

Equation: _____

3.

x	y
−3	9.3
−1	5.1
2	−1.2
4	−5.4
7	−11.7

Rate of Change: _____

Start Value: _____

Equation: _____

4.

x	y
−6	−2
−3	−1
−1	$-\frac{1}{3}$
4	$1\frac{1}{3}$
9	3

Rate of Change: _____

Start Value: _____

Equation: _____

5.

x	y
−2	5
1	5
3	5
8	5
10	5

Rate of Change: _____

Start Value: _____

Equation: _____

6.

x	y
−10	−41
−8	−33
−6	−25
−3	−13
−1	−5

Rate of Change: _____

Start Value: _____

Equation: _____

Use the given information to fill in the blanks in the each table and below the table.

7.

x	y
−2	
1	
3	
6	
8	

Rate of Change: $\frac{1}{2}$

Start Value: _____

Equation: $y = 6 + \frac{1}{2}x$

8.

x	y
−3	
2	
5	
	−20
10	

Rate of Change: _____

Start Value: 4

Equation: $y = 4 - 3x$

9.

x	y
0	10.6
4	
	0.2
9	
	−5

Rate of Change: −1.3

Start Value: _____

Equation: _____

Lesson 2.6 ~ Input-Output Tables from Equations

Name_____ Period_____ Date_____

Determine the slope and y-intercept of the given equations.

1. $y = \frac{3}{4}x + 7$ slope: _____   y-intercept: _____

2. $y = 8 + 5x$ slope: _____   y-intercept: _____

3. $y = -2x$ slope: _____   y-intercept: _____

4. $y = 12$ slope: _____   y-intercept: _____

Complete the input-output tables for each equation.

5. $y = 3x + 4$

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

6. $y = \frac{1}{2}x - 1$

x	$y = \frac{1}{2}x - 1$	y
−2		
1		
4		
6		
9		

7. $y = 5 - 2x$

x	$y = 5 - 2x$	y
0		
1		
2		
3		
4		

Fill in each table with any five pairs of values that satisfy the slope-intercept equation. Graph the ordered pairs on the coordinate planes below.

8. $y = 2x + 6$

x	y
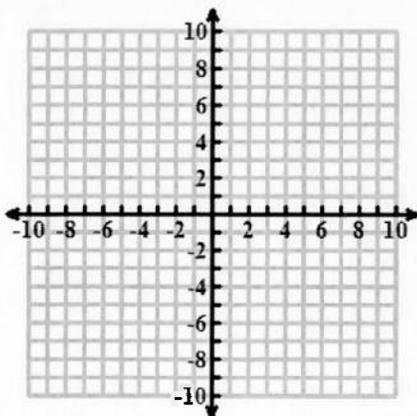
9. $y = 1 + x$

x	y
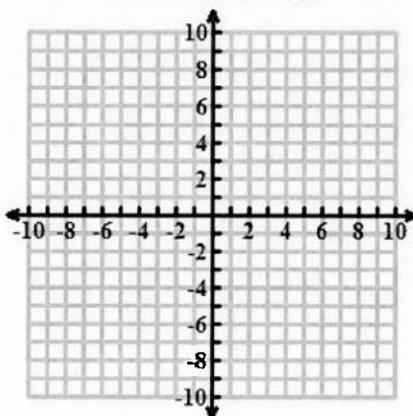
10. $y = \frac{1}{3}x$

x	y
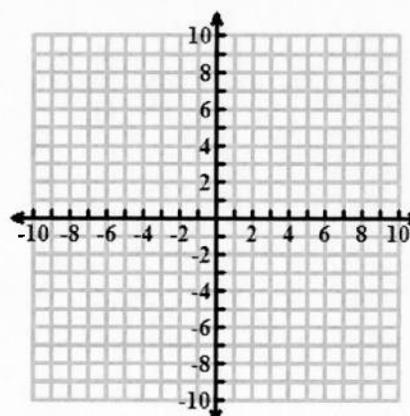
Lesson 2.6C ~ Input-Output Tables from Equations

Name_____ Period_____ Date_____

Complete the input-output tables for each equation. Graph the points on a separate sheet of graph paper to determine if the equation is __linear__ (forms a straight line) or __non-linear__.

1. $y = (x-2)^2$

x	$y = (x-2)^2$	y
0		
1		
2		
3		
4		

Type: _____

2. $y = 3 - 0.5x$

x	$y = 3 - 0.5x$	y
−2		
1		
4		
6		
9		

Type: _____

3. $y = 2^x$

x	$y = 2^x$	y
−1		
0		
1		
2		
3		

Type: _____

4. $y = 2x - 4$

x	$y = 2x - 4$	y
−1		
1		
3		
4		
6		

Type: _____

5. $y = x^2 + 1$

x	$y = x^2 + 1$	y
−2		
−1		
0		
1		
2		

Type: _____

6. $y = 3^x - 4$

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

Type: _____

7. Write an equation for a non-linear curve (different than the ones above). Create a table of values including input-output pairs. Graph the curve.

Equation: _____

x	y
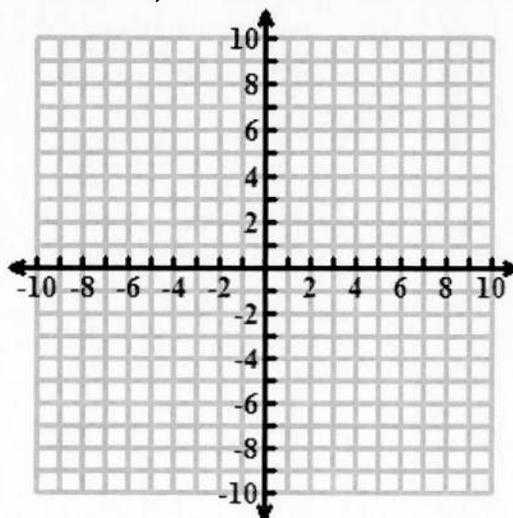
Lesson 2.7 ~ Calculating Slope from Graphs

Name_____ Period_____ Date_____

Sketch a line that has the given slope.
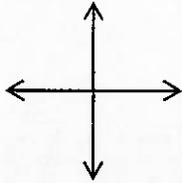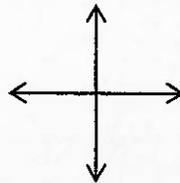
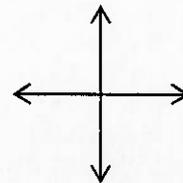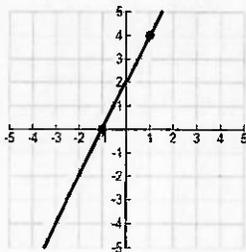**1.** Negative Slope   **2.** Zero Slope   **3.** Positive Slope   **4.** Undefined Slope
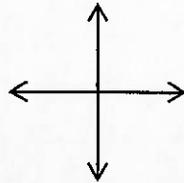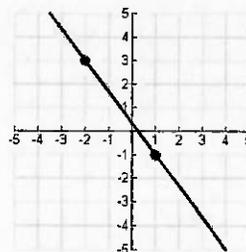
Draw a slope triangle for each line (when possible) and give the slope. Remember to designate if slope is positive or negative.
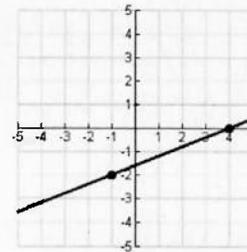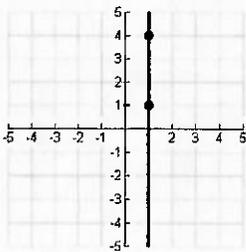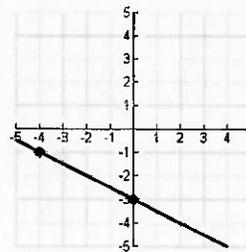
5.

SLOPE =

6.

SLOPE =

7.

SLOPE =

8.

SLOPE =

9.

SLOPE =

10.
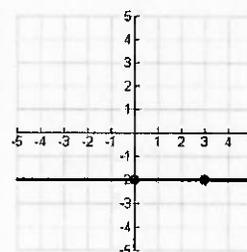
SLOPE =

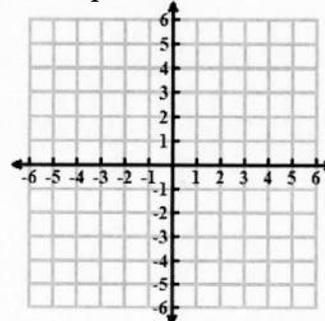**Draw a line that has the given slope.**
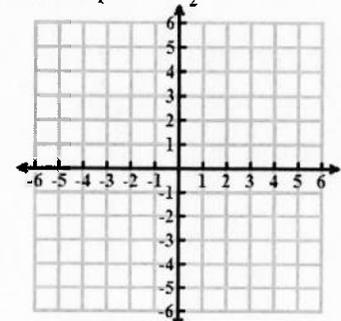
11. slope = $\frac{1}{3}$
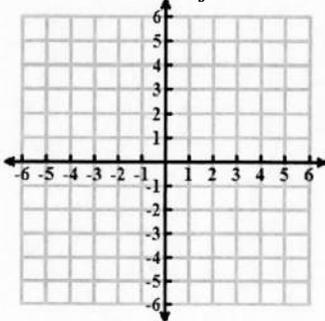
12. slope = -2
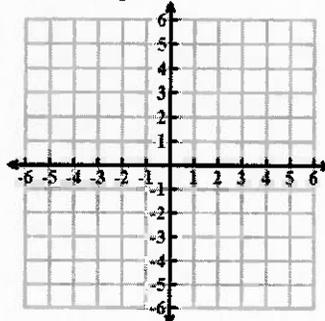
13. slope = 0

14. slope = $-\frac{3}{2}$

15. Will all your classmates' graphs for #11 look exactly the same? Why or why not?

Lesson 2.7C ~ Calculating Slope from Graphs

Name_____   Period_____   Date_____

The line at the right has seven integer points shown. Use the graph to answer the questions.

1. List the seven ordered pairs.

A (,   )

B (,   )

C (,   )

D (,   )

E (,   )

F (,   )
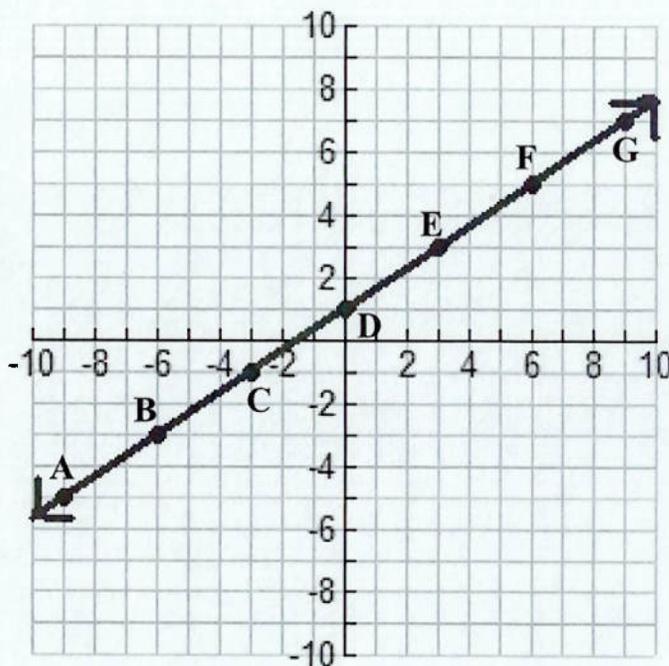
G(,   )

2. Find the slope of the line using different slope triangles as designated below. Write each slope in simplest form.

    a. D and E   **b.** B and D

    c. C and F   **d.** A and G

3. Does it matter which two ordered pairs you choose to use on a line when determining the slope of the line? Support your answer with evidence.

4. Similar triangles are triangles that have the same shape but not necessarily the same size. Similar triangles have side lengths that are proportional. Two quantities are proportional if they have the same ratio. Are the four slope triangles you drew in Exercise #2 similar triangles? Why or why not?

Lesson 2.8 ~ The Slope Formula

Name_____ Period_____ Date_____

Determine the slope of the line that passes through each pair of points. Write in simplest form.

1. (3, 8) and (1, 5)

2. (2, 8) and (1, 7)

3. (5, 0) and (4, 7)

4. (−1, 4) and (−3, 8)

5. (2, −1) and (5, 4)

6. (−2, 7) and (−2, −2)

7. (6, −3) and (−3, 9)

8. (3.5, 6) and (0.5, 0)

9. (5, 1) and (−2, 1)
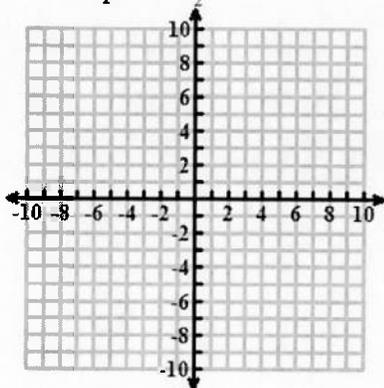
10. (−5, −1) and (−3, −3)

11. (1, −4) and (3, 1)

12. (−1, 0) and (0, −4)

Given the *y*-intercept and slope of a line, sketch the line. Name three ordered pairs that are on the line. Write the slope-intercept equation for the line.

13. *y*-intercept = 3
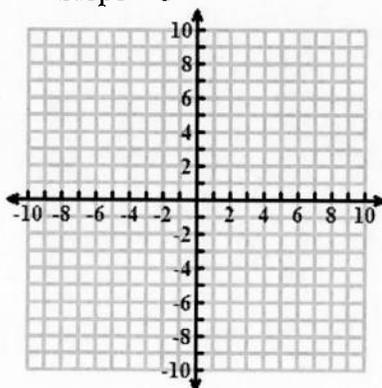   Slope = $-\frac{1}{2}$

Ordered Pairs:

_____

_____

_____

Equation:

_____

14. *y*-intercept = −5
     Slope = 3

Ordered Pairs:

_____

_____

_____

Equation:

_____

15. *y*-intercept = 1
     Slope = 0
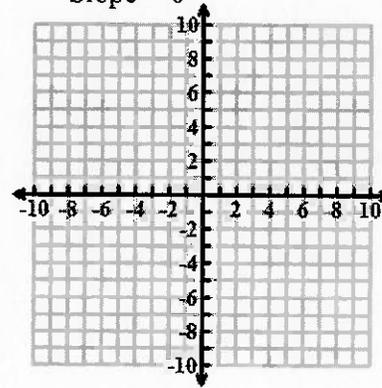
Ordered Pairs:

_____

_____

_____

Equation:

_____

Lesson 2.8C ~ The Slope Formula

Name_____ Period_____ Date_____

Determine the slope of the line that passes through each pair of points. Write in simplest form. Then use the slope to find three other points on the line formed by the given points.

Points on Line	Slope	Three Additional Points on the Line
1. (5, 4) and (1, 2)		
2. (−1, 6) and (3, −2)		
3. (0, 2) and (2, 5)		
4. (3, 6) and (6, 5)		
5. (−5, −1) and (−3, −4)		
6. (−3, 0) and (−3, −7)		
7. (6, −3) and (−3, 6)		
8. (2, 5) and (6, 5)		

9. Some lines are horizontal or vertical lines. You can determine this by finding the slope using the slope formula. You can also tell this by examining the ordered pairs on a line. How can you tell by looking at the ordered pairs for two points if…

   a. the line is a vertical line?

   b. the line is a horizontal line?

   c. Give an example of a set of ordered pairs for two points that form a vertical line.

7th Grade Advanced Math

Book 1: Linear Equations

Block 2: Sequences & Slope

Independent Practice

Worksheet Packet

Name: _____

Period: _____