

Intermediate Algebra 2: Unit 5 Cover Sheet: Number Sense/Coordinate grid/Slope

Objectives:

- The student will...
 - ❖ To learn about prime factorizing large numbers
 - ❖ To learn how to estimate square roots that are not perfect squares
 - ❖ To understand scientific notation and standard form of a number.
 - ❖ Students will be able to graph points on a coordinate plane
 - ❖ Students will be able to locate points on a coordinate plane
 - ❖ To learn how to make a table of values using an equation
 - ❖ Students will learn how to graph a line using a table of values
 - ❖ To learn about slope, finding slope and y-intercept from an equation
 - ❖ To learn about graphing an equation using slope and y-intercept

TARGET LEARNING GOAL (Lesson and Description)	0	50	60	70	77	85	93	100	Need to Retake	Retake Complete	HW Complete
5.1 Assessment Prime Factorization											
5.2 Assessment Estimating Square Roots											
5.3 Assessment Scientific Notation (2 PARTS)											
5.4 Assessment Graphing and Locating Points on Coordinate Grid											
5.5 Assessment Tables of Values and Distance											
5.6 Assessment Graphing Lines with a Table of Values											
5.7 Assessment Find Slope from a graph and two points											
5.8 Assessment Slope-Intercept Form (2 PARTS)											

UNIT 3 RETAKE DEADLINES:

Retake Procedures:

- > Get a retake form
- > Finish all your homework and get a parent signature
- > Turn in retake form for teacher approval at least 2 days prior to retaking the assessment with the following stapled to it:
 - Test corrections (if chosen)
- > Turn in and schedule a time for retake

Name: _____
Date: _____

5.1 Prime Factorization

Prime Number: _____

Factor: _____

Prime Factorization: _____

Factor Tree Example (for prime factorization): 42

Examples:

- Write the prime factors of the given number.
- a. 12
 - b. 11
 - c. 32
 - d. 72

Period: _____

Prime Factorization

Skill: Prime Factorization

Name: _____

Find the prime factorization of the following numbers.

Total Problems	40
Problems Correct	___
Percent Correct	___

- | | |
|------------|-------------|
| 1. 325 | 2. 420 |
| 3. 200 | 4. 564 |
| 5. 616 | 6. 240 |
| 7. 286 | 8. 270 |
| 9. 150 | 10. 476 |
| 11. 1,323 | 12. 264 |
| 13. 320 | 14. 500 |
| 15. 432 | 16. 104 |
| 17. 352 | 18. 1,539 |
| 19. 1,000 | 20. 1,372 |
| 21. 224 | 22. 792 |
| 23. 858 | 24. 1,020 |
| 25. 1,125 | 26. 8,624 |
| 27. 30,030 | 28. 3,036 |
| 29. 900 | 30. 3,971 |
| 31. 3,375 | 32. 6,732 |
| 33. 296 | 34. 1,435 |
| 35. 5,824 | 36. 10,404 |
| 37. 5,929 | 38. 16,170 |
| 39. 18,711 | 40. 120,050 |

5.2 Perfect Squares and Estimating Square Roots

Perfect Square: Rational numbers with square roots that are rational numbers.

Perfect Squares	
4	$= 2 \times 2$
9	$= 3 \times 3$
16	$= 4 \times 4$
25	$= 5 \times 5$
36	$= 6 \times 6$
49	$= 7 \times 7$
64	$= 8 \times 8$
81	$= 9 \times 9$
100	$= 10 \times 10$

But how do you find a square root that IS NOT a perfect square?

When estimating a square root:

- Find out which perfect squares the number is in between.
- Then pick which number it is closest too.
- When you estimate square roots, always use the \approx symbol.

Examples: Estimate to the nearest whole number!!

- $\sqrt{28}$
- $\sqrt{105}$
- $\sqrt{54}$
- $\sqrt{16}$

Higher level question: How do you think you would round to the nearest tenths place?? $\sqrt{24}$

Finding Square Roots

Estimate to find the square root to the nearest *whole number*.

- $\sqrt{89}$ _____
- $\sqrt{123}$ _____
- $\sqrt{20}$ _____
- $-\sqrt{61}$ _____

Find the square root to the nearest *whole number*.

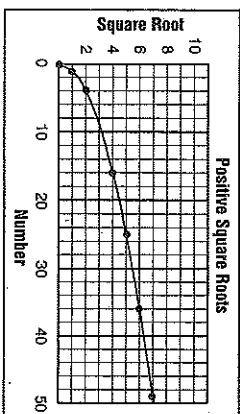
- $\sqrt{3}$ _____
- $\sqrt{17}$ _____
- $-\sqrt{34}$ _____
- $\sqrt{87}$ _____
- $\sqrt{124}$ _____
- $\sqrt{111}$ _____
- $\sqrt{0.04}$ _____
- $-\sqrt{0.21}$ _____

Find the square root to the nearest *tenth* when $a^2 = 7$ and $b^2 = 2$.

$$14. \sqrt{a^2 + b^2} \quad 15. \sqrt{b^2 + a^2}$$

Mixed Applications

The graph shows the positive square roots of the numbers from 1 to 50. Use the graph for Exercises 16–18.



- What is the approximate square root of 50?
- What is the approximate square root of 30?
- Can you approximate the square root of 0.07? Explain.

WRITER'S CORNER

- Give one advantage and one disadvantage of using a graph to find square roots.

5.3 Scientific Notation (Part 1)

Powers of 10:

$$\begin{array}{ll} 10^0 = & 10^{-1} \\ 10^1 = & 10^{-2} \\ 10^2 = & 10^{-3} \\ 10^3 = & 10^{-4} \\ 10^6 = & 10^{-7} \end{array}$$

**When you multiply by 10 to a positive number, the decimal moves to the right.

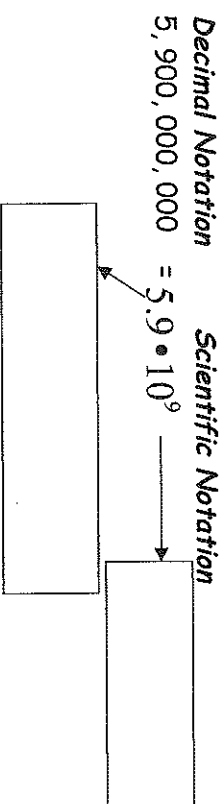
The value of the number _____.

**When you multiply by 10 to a negative number, the decimal moves to the left.

The value of the number _____.

Scientific Notation:

Decimal Notation or Standard Form:



Examples: Is the number in scientific notation? If no, explain why.

- a. $11.8 \cdot 10^7$ b. $6.9 \cdot 10^5$ c. $0.7 \cdot 10^{18}$ d. $1.2 \cdot 5^3$

To change a number from decimal notation to scientific notation:

1. Place the decimal in a location that creates a number that is greater than zero but less than ten. (want 1-9)
2. Count the number of decimal places you moved AND notice which direction you moved. If the original number is greater than 1, the exponent is positive. If the original number is less than 1, the exponent is negative.
3. Multiply your new number by 10 to a power (as determined in step 2).

Examples: Write the following numbers in scientific notation.

EX. A Express 7,900,000. in scientific notation.

Step 1: 7.9

Step 2: I moved the decimal 6 places, and the original number was greater than one.

Step 3: 7.9×10^6

EX. B Express 0.0045 in scientific notation.

Step 1: 4.5

Step 2: I moved the decimal 3 places and the original number is less than one.

Step 3: 4.5×10^{-3}

C. 2390.

D. 0.0000563209

Scientific Notation (Part 2)

To change a number from scientific notation to decimal notation:

1. Write the number with no decimal.
2. Determine the direction you need to move your decimal using the power of 10.
3. Place your pencil in the same decimal place as in the original problem.
4. Move your decimal the number of times determined by step 2.

EX. 4 Express 2.76×10^7 in standard notation.

My exponent is positive, so I will move the decimal to the right 7 places.

27,600,000

EX. 5 Express 1.8×10^{-4} in standard notation.

My exponent is negative, so I will move the decimal to the left 4 places.

0.00018

Examples: Write the following numbers in decimal notation.

a. 9.3×10^4

b. 4.354×10^5

c. 3.8×10^{-4}

d. 2.34×10^{-3}

5.4 Graphing Vocabulary

Coordinates-

Coordinate plane:

Y-Axis:

X-Axis:

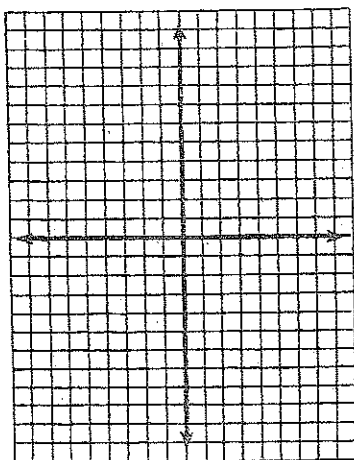
Quadrants:

Origin:

Ordered Pair:

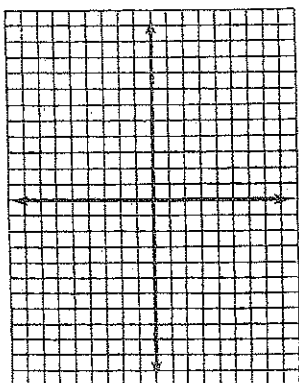
Graph Each Point:

- a. A(4, -2)
- b. B(2, -4)
- c. C(-4, -3)
- d. D(0, -2)

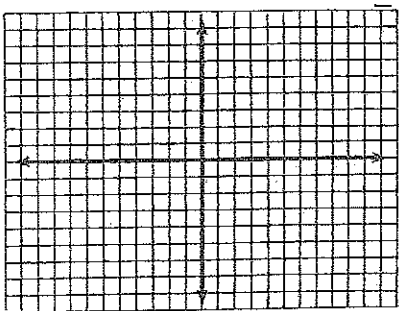


List the location of the 4 points on the graph to the right.
(TEACHER WILL DRAW THEM IN DURING NOTES)

- 1. POINT A
- 2. POINT B
- 3. POINT C
- 4. POINT D



*****What do the X and Y-coordinates tell you?? If you had the ordered pair (-2,5) Which number tells you how far to move right or left and which number tells you how far to move up and down?*****



Use Mental Math. In which quadrants would you find the points with these quadrants?

- a. (-11, -7)
- b. (18, -9)
- c. (5, 8)
- d. (-2, 7)

The Coordinate System—Plotting Points

EXAMPLE

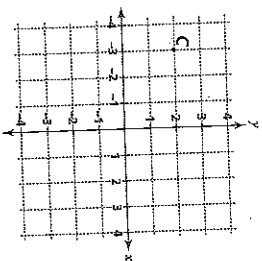
Plot a point at $(-3, 2)$. Label the point C.

Step 1 Construct a coordinate system large enough to include the ordered pair $(-3, 2)$.

Step 2 To plot $(-3, 2)$, begin at the origin $(0, 0)$. Move 3 units left on the x-axis.

Step 3 Move 2 units up.

Step 4 Make a shaded circle at $(-3, 2)$.



Directions On a sheet of graph paper, draw a coordinate system. Then use it to plot and label each point shown in problems 1–20.

- | | | |
|-----------------------|------------------------|------------------------|
| 1. Point X $(5, 6)$ | 8. Point D $(3, -4)$ | 15. Point B $(-1, 5)$ |
| 2. Point Q $(2, -5)$ | 9. Point C $(-5, -4)$ | 16. Point Y $(-7, -8)$ |
| 3. Point A $(-5, 0)$ | 10. Point V $(0, 6)$ | 17. Point H $(-6, -7)$ |
| 4. Point W $(-1, -3)$ | 11. Point F $(-6, -3)$ | 18. Point N $(7, -6)$ |
| 5. Point S $(-2, 5)$ | 12. Point R $(-7, 5)$ | 19. Point J $(4, 4)$ |
| 6. Point Z $(1, 3)$ | 13. Point T $(5, -5)$ | 20. Point M $(2, -6)$ |
| 7. Point E $(-4, 6)$ | 14. Point G $(4, 6)$ | |

Directions Using the above points, identify the quadrant in which each point is located.

- | |
|-------------------|
| 21. Point F _____ |
| 22. Point N _____ |
| 23. Point G _____ |
| 24. Point B _____ |
| 25. Point Q _____ |

The Coordinate System—Locating Points

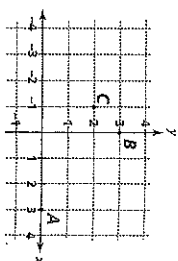
EXAMPLE

Locate points A, B, and C. Remember to always read the x-axis first, then the y-axis.

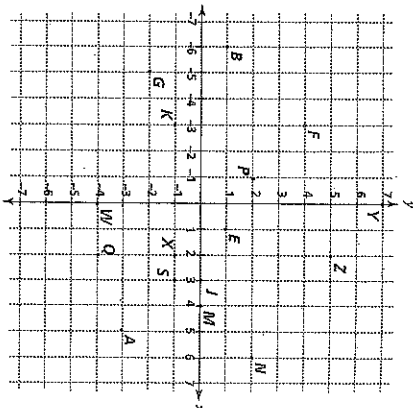
The ordered pair for Point A is $(3, 0)$.

The ordered pair for Point B is $(0, 3)$.

The ordered pair for Point C is $(-1, 2)$.



Directions Write the ordered pair that describes the location of each point.



- | | | |
|------------------|-------------------|-------------------|
| 1. Point E _____ | 6. Point Q _____ | 11. Point M _____ |
| 2. Point J _____ | 7. Point Y _____ | 12. Point X _____ |
| 3. Point K _____ | 8. Point B _____ | 13. Point A _____ |
| 4. Point N _____ | 9. Point F _____ | 14. Point G _____ |
| 5. Point P _____ | 10. Point W _____ | 15. Point Z _____ |

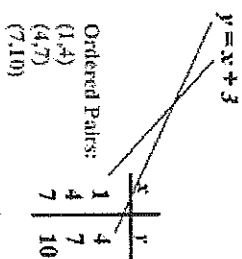
Directions Identify the quadrant in which each of these points is located.

- | | | |
|-------------------|-------------------|-------------------|
| 16. Point N _____ | 18. Point B _____ | 20. Point Z _____ |
| 17. Point A _____ | 19. Point G _____ | |

5.5 Table of Values

Table of Values:

Table of Values



Example: ----->

To set up a table of values:

- 1.
- 2.
- 3.

Set up a table and solve for the given x values.

Example 1: Find a table of values for $y = -2x - 1$. Use the provided values for x.

x	$y = -2x + 1$	y	(x, y)
-2			
0			
1			
3			

Example 2. Solve $y = x - 6$ if the x-values are $\{-2, -1, 0, 2, 4\}$

x	y	(x, y)

Tables of Values and Coordinate Systems

Directions Make a table of values for each linear equation.

- 1.
- 2.
- 3.

1. $y = x + 1$

x	y

2. $y = x - 5$

x	y

3. $y = x - 7$

x	y

4. $y = x - 1$

x	y

5. $y = x + 2$

x	y

6. $y = x + 4$

x	y

Directions On a sheet of graph paper, draw a coordinate system with x values from -7 to 7 and y values from -7 to 7. Suppose that the system stands for a grid to map a lake. Use it to answer these questions.

7. How far away is the sandbar (2, 0) from the boat (2, 6)?
8. Willie drives the boat (2, 6) to the sandbar (2, 0) and then to the deepest part of the lake (-4, 0). How far does he drive the boat?
9. Sarah swims from the end of the sandbar (-1, 0) to the boat dock (-1, -7). How far does she swim?
10. Zach walks along the sandbar (2, 0) to the end of the sandbar (-1, 0) and back again. How far does he walk?

5.6 Graphing Linear Equations

Linear Equation:

To graph an equation with a table:

Step 1:

Step 2:

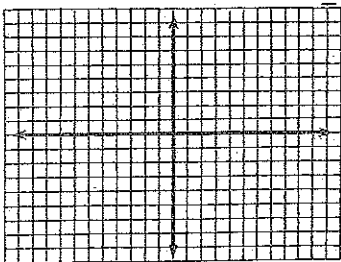
Step 3:

Step 4:

Examples: Graph the following functions.

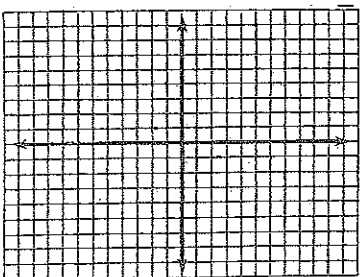
1. $y = -2x$

X	Y	(x, y)



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

X	Y	(x, y)



Name

Date

Period

Graphing Lines

Workbook Activity

Chapter 10, Lesson 8

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EXAMPLE

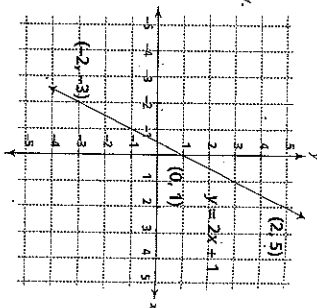
Graph the linear equation $y = 2x + 1$.

Step 1 Make a table of values.

Step 2 Choose three different values for x and solve for y .

Step 3 Draw a coordinate system and plot the points from the table of values. Connect the points, draw arrows at the ends of the line, and label the line $y = 2x + 1$.

x	$y = 2x + 1$	y
0	1	1
1	3	3
2	5	5



Directions Complete each table of values. Graph the first linear equation here and the others on graph paper.

1.

x	$y = x + 3$	y



2.

x	$y = 2x + 4$	y

3.

x	$y = x - 1$	y

4.

x	$y = 3x$	y

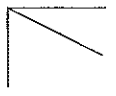
5.

x	$y = -x$	y

5.7 Understanding Slope!

Which one is steeper? Why?

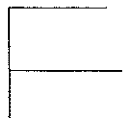
1. a.



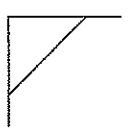
b.



2. a.



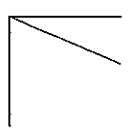
b.



3. a.



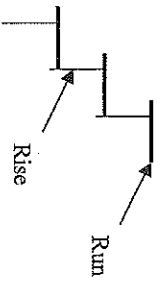
b.



Slope:

Hint:

We write it as:



- 1.
- 2.
- 3.
- 4.

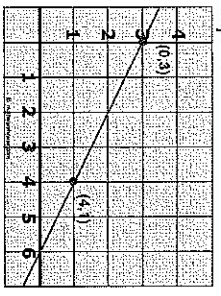
Four Types of Slope

1. Zero Slope: (1, 2) and (-1, 2)
2. Undefined Slope: (1, -2) and (1, 3)
3. (50, 35) (10, 15)
4. (3, -5) (-6, 4)

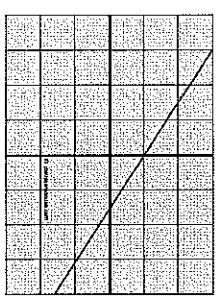
Finding Slope Using a graph:

Examples.

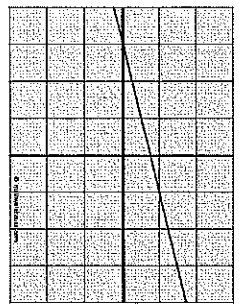
1.



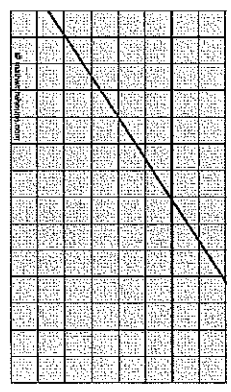
3.



2.



4.



Finding Slope using two points.

Finding Slope Using two points (x₁, y₁) and (x₂, y₂):

Three steps:

- 1.
- 2.
- 3.

1. (3, 4) (2, 2)
2. (0, -1) (7, 15)

Formula:

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

Finding Slope From a Graph

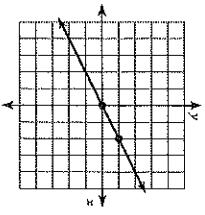
Find the slope of each line.

Name _____

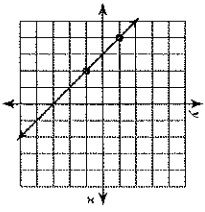
Date _____

Period _____

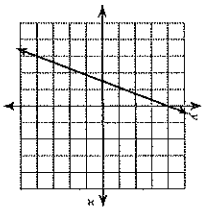
1)



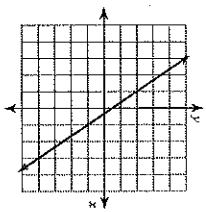
2)



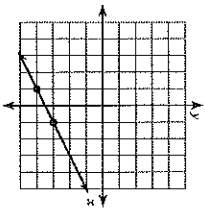
9)



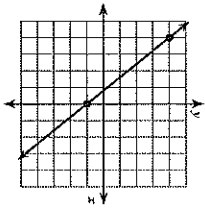
10)



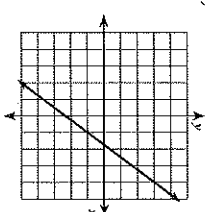
3)



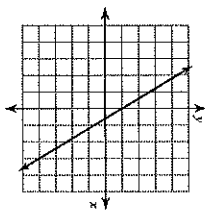
4)



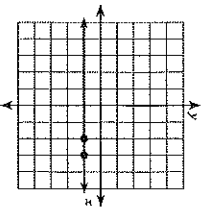
11)



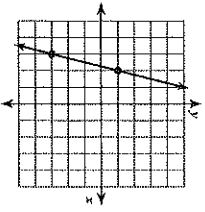
12)



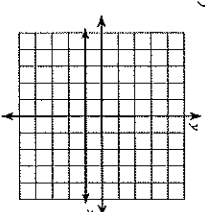
5)



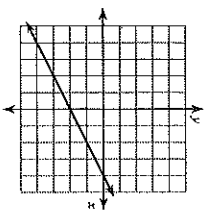
6)



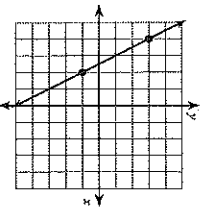
13)



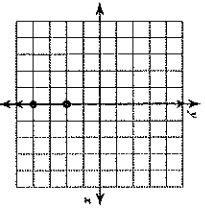
14)



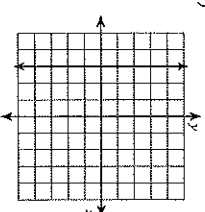
7)



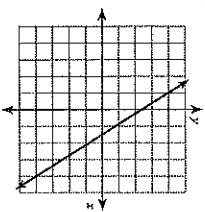
8)



15)



16)



Finding Slope From Two Points

Find the slope of the line through each pair of points.

1) $(19, -16), (-7, -15)$

2) $(1, -19), (-2, -7)$

9) $(6, -10), (-15, 15)$

10) $(12, -18), (-15, -18)$

11) $(3, -20), (5, 8)$

12) $(15, 8), (-17, 9)$

3) $(-4, 7), (-6, -4)$

4) $(20, 8), (9, 16)$

5) $(17, -13), (17, 8)$

6) $(19, 3), (20, 3)$

13) $(-19, 12), (-9, 1)$

14) $(12, 2), (-7, 5)$

7) $(3, 0), (-11, -15)$

8) $(19, -2), (-11, 10)$

15) $(6, -12), (15, -3)$

16) $(9, 3), (19, -17)$

5.8 Slope Intercept Form: $y = mx + b$

$m =$ SLOPE

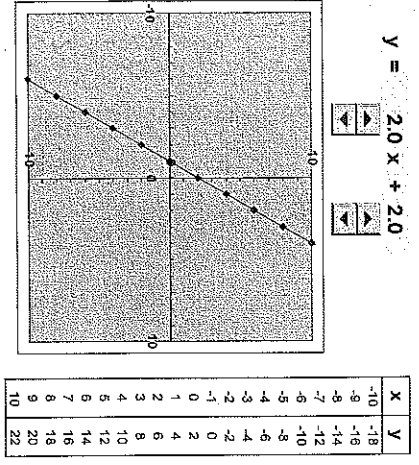
$b =$ y-intercept

Let's look at a graph of a linear equation in this form.

$$y = \frac{3}{4}x - 2$$

- What does the slope tell you about a line? Rise/run
- How does changing the slope affect your graph?

- What is the y-intercept?
- What does it tell you about the line?
- How does changing the y-intercept affect your graph?



Examples:

Identify the slope of the line and the y-intercept for each equation.

1. $y = 3x + 2$

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

3. $y = x - 9$

4. $y = -2 + 12x$

5. $y = -17$

6. $y = -x + 6$

7. $y = 4 - \frac{1}{5}x$

8. $y = -0.2x + 7$

Finding Slope From an Equation

Date _____ Period _____

Find the slope of each line. Find y-intercept of each line.

1) $y = -\frac{5}{2}x - 5$

2) $y = \frac{4}{3}x - 1$

11) ~~$3x + 2y = 6$~~

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

12) ~~$4x + 5y = 0$~~

~~$-2y = 4x$~~

$y = \frac{4}{5}x$

14) ~~$x + 5y = 15$~~

$y = -\frac{1}{5}x - 3$

3) $y = -x + 3$

4) $y = -4x - 1$

15) ~~$2y - 10 = 2x = 0$~~

16) ~~$x + 5 + y = 0$~~

$y = -x - 5$

5) ~~$2x - y = 4$~~

6) ~~$x + 2y = 8$~~

17) ~~$3x + 20 = 4y$~~

18) ~~$-15 - x = 5y$~~

~~$8x - 3y = 10$~~

~~$8x - 3y = 10$~~

19) ~~$1 = 2x + y$~~

20) ~~$x + y = 1$~~

9) ~~$y = 2$~~

10) ~~$4x - 3y = 9$~~

~~$-3x = -4x + 9$~~

21) ~~$0 = 5y$~~

22) ~~$-50 + 10y = 2x$~~

Algebra 1
5.8 Part 2: Graphing Linear Equations

NOTES

$$y = mx + b$$

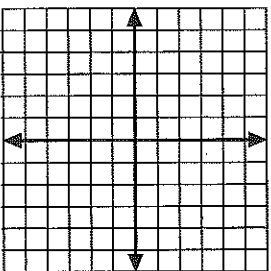
slope y-intercept

Steps to graph a line in slope-intercept form ($y = mx + b$)

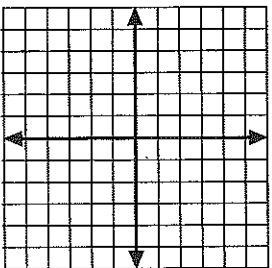
1. Graph the y-intercept on the y-axis (1st point)
2. If the slope (m) is not a fraction, make it a fraction by putting a 1 in the denominator (bottom of the fraction). Ex: $2 \rightarrow \frac{2}{1}$
3. From the point on the y-intercept, go up the number in the numerator (rise), and go left or right the number in the denominator (run).
 - *If the slope is positive, go right. (after connecting the points, the line should go up)
 - *If the slope is negative, go left. (after connecting the points, the line should go down)
4. Connect the two points. Make sure your line has arrows!

Graph each equation using its slope and y-intercept.

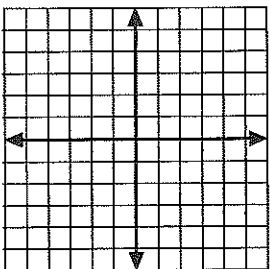
1. $y = 2x - 1$



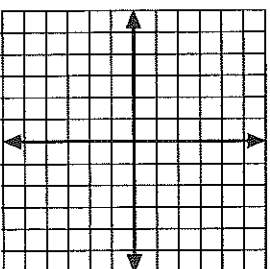
2. $y = -2x$



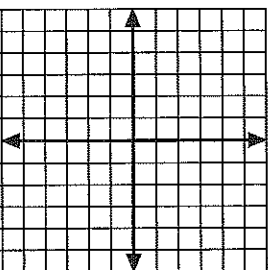
3. $y = \frac{1}{2}x + 3$



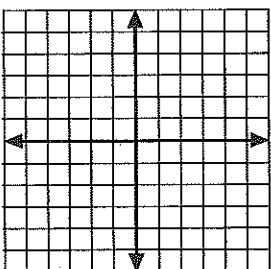
4. $y = -\frac{1}{2}x - 2$



5. $y = \frac{2}{3}x + 5$



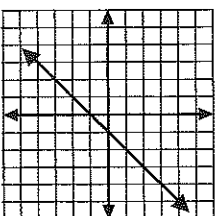
6. $y = 0x + 1$



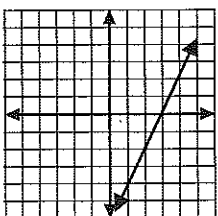
Write an equation for the given line.

- Steps: 1) Identify the slope (m) and y-intercept (b)
 2) Plug the numbers for "m" and "b" into $y = mx + b$
 3) You're done!

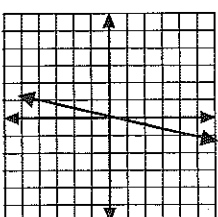
7.



8.



9.

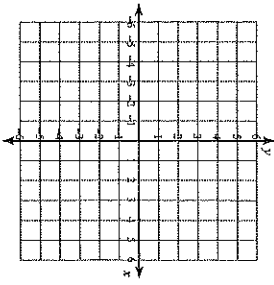


Graphing Lines

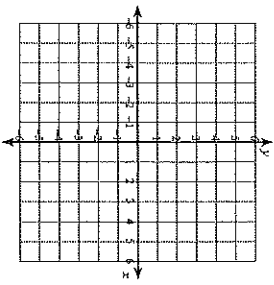
Sketch the graph of each line.

Name _____ Date _____ Period _____

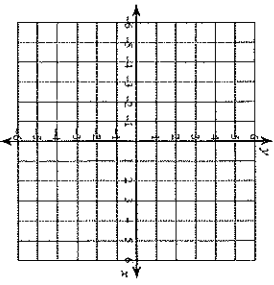
1) $y = \frac{7}{2}x - 2$



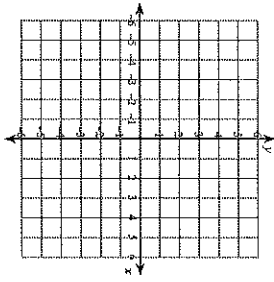
3) $y = -5$



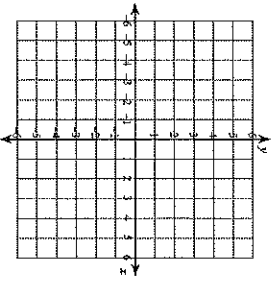
5) $y = \frac{1}{4}x + 2$



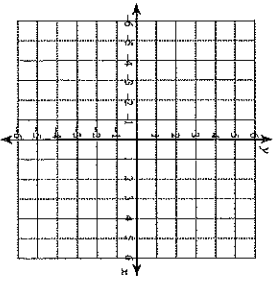
2) $y = -6x + 3$



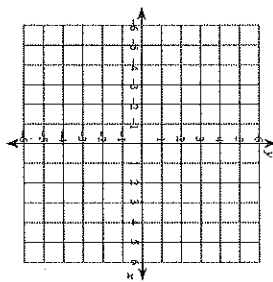
4) $y = \frac{6}{5}x + 1$



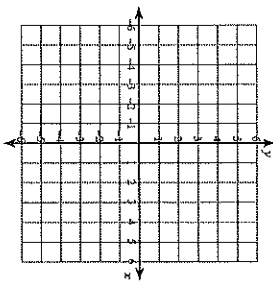
6) $x = 5$



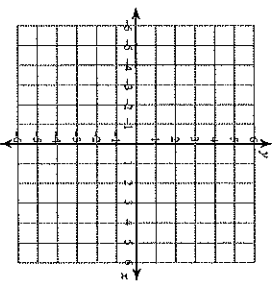
7) $y = \frac{5}{3}x$



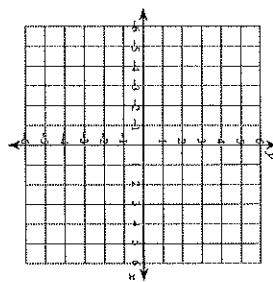
9) $y = -\frac{1}{3}x + 3$



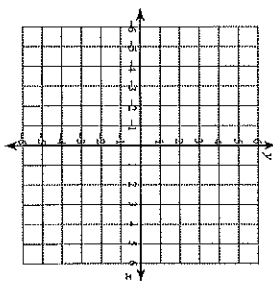
11) $y = \frac{1}{2}x - 2$



8) $x = 0$



10) $y = \frac{1}{5}x - 4$



12) $y = 2x + 5$

