Semester 1 Final Exam Review Name_____

These sections from the book will be covered on the final exam. Please review these sections to answer the questions in the review packet. Please use this chart as a checklist.

Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5
___Section 1.1 Variable and Expressions	___Section 2.1 Solving Equations using Addition and Subtraction	___Section 3.1 Graphing and Writing Inequalities	___Section 4.1 Graphing Relationships	___Section 5.1 Identifying Linear Functions
___Section 1.2 Adding and Subtracting Real Numbers	___Section 2.2 Solving Equations using Multiplying and Dividing	___Section 3.2 Solving Inequalities using Addition and Subtraction	___Section 4.2 Relations and Functions	___Section 5.2 Using Intercepts
___Section 1.3 Multiplying and Dividing Real Numbers	___Section 2.3 Solving two step and multi-step equations	___Section 3.3 Solving Inequalities using Multiplying and Dividing	___Section 4.3 Writing Functions	___Section 5.3 Rate of Change and Slope
___Section 1.4 Powers and Exponents	___Section 2.4 Solving equations with variables on both sides	___Section 3.4 Solving two step and multi-step inequalities	___Section 4.4 Graphing Functions using a table	___Section 5.4 Slope Formula
___Section 1.5 Square roots and real numbers	___Section 2.5 Solving for a variable	___Section 3.5 Solving inequalities with variables on both sides	___Section 4.5 Scatter Plots and Trend Lines	___Section 5.6 Slope-Intercept Form
___Section 1.6 Order of Operations	___Section 2.6 Rates, Ratios, and Proportions	___Section 3.6 Solving Compound Inequalities		___Section 5.7 Point-Slope Form
___Section 1.7 Simplifying Expressions	___Section 2.7 Applications of Proportions			___Section 5.8 Slopes of Parallel and Perpendicular Lines
	___ Extension Absolute Value Equations			___ Extension Scatter Plots and Trend Lines

Additonal Resources besides the review packet to use for studying for the final

- Notes
- Book
- Homework problems
- Online textbook (practice quizzes, tests) website: http://my.hrw.com/ Must have a username and password.

Chapter 1

Section 1.1 Variable and Expressions

- Write algebraic expressions using numbers, variable, and operations
- Define a variable and write an equation to model a situation.

Write an algebraic expression for each phrase.

1.) 4 more than p

2.) the quotient of 17 and k

3.) the product of c and 15

4.) 2 more than twice a number

5.) the sum of 15 and a number

Define a variable and write an equation to model each situation.

6.) The total cost is the number of cans times $0.70.

7.) What is the number of marbles left in a 48-marble bag after some have been given away?

Give two different ways to write each algebraic expression in words.

8.) x+3

9.) 2(x+3)

10.) $\frac{x}{3}$ +6

_____

_____

Write each expression into an algebraic expression.

11.) Six added to the product of x and 7

12.) Three times the quantity of two plus x

13.) The quotient of x and 2 added to 5

Write an expression and solve: An internet service provider charges $9.95 per month and $0.50 for each hour of internet usage. Write an expression representing the charges for *h* hours of use in one month. What is the charge for 35 hours?

Section 1.2 Adding and Subtracting Real Numbers

- *Same Signs* – (1) add the numbers, (2) take the sign of the bigger number
- *Different Signs* – (1) subtract the numbers, (2) take the sign of bigger number
- To subtract a number, add its opposite

1.) -7 + (-12) 2.) -8.7 + 10.3 3.) 9 + (-17) 4.) $\frac{1}{9}+\left(-\frac{5}{6}\right)$

5.) $1\frac{3}{4}+3\frac{1}{8}$ 6.) $\left|-0.1\right|+\left|-0.7\right|$ 7.) -4.3 + 1.2 + (-5.7)

8.) 3 – 8 9.) -7.4 – (-1.8) 10.) $\frac{2}{12}-\left(-\frac{3}{4}\right)$ 11.) $\left|-11-(-8)\right|$

Evaluate each expression for x = 3, y = -4, and z = 6.

12.) y – z 13.) –y – x 14.) x + y – 2z 15.) $|x|-|y|-|z|$

Section 1.3 Multiplying and Dividing Real Numbers

- *Same signs* – the answer is positive
- *Different signs* – the answer is negative

Simplify each expression.

1.) -5(3) 2.) -13(-6) 3.) $9\left(-\frac{5}{18}\right)$ 4.) $-(-2)^3$

5. $\frac{3-14}{-2}$ 6. -64 ÷ (-5) 7. $\frac{36}{-9}$ 8. -56 ÷ (4 + 3)

Section 1.4 Exponents

Simplify Know the difference.

1. $(-4)^2$ **2.** -6^2

Section 1.5 Square roots and real numbers

1.) Find the square root of:

a. $\sqrt{36}$ b. $\sqrt{27}$

- Classify and compare numbers
  - Irrational, Real, Rational, Integer, Whole, Natural

Name the set(s) of number to which each number belongs.

2.) -1 3.) -4.8 4.) 7 5.) 0 6.) $\frac{-2}{5}$

Use <, =, or > to compare.

7.) $\frac{2}{3}$ ____ $\frac{1}{6}$ 8.) $\frac{-3}{5}$ ____ $\frac{-2}{3}$ 9.) $\frac{4}{5}$ ____0.6

Section 1.6 Order of operations

- Simplify and evaluate expressions using the order of operations (PEMDAS)

Simplify each expression.

1.) $40-2\cdot 3^2$ 2.) $17-5^2\div(2^4+3^2)$ 3.) 6[13 – 2(4 + 1)]

Evaluate each expression for a = 5, b = 12, and c = 2.

4.) $2b\div c+3a$ 5.) $b^2 - 4a$ 6.) abc + ab

Section 1.7 Simplifying Expressions

- Distribute outside term to everything inside parentheses (multiply each time)
- Combine like terms- same variables with same exponents

Simplify each expression.

1.) 7(t – 4)

2.) -2(x + 3)

3.) –(x – 12)

4.) $\frac{1}{4}(8q+32)$

5.) 4t +11– 7t

6.) 13q – (-30q)+6

7.) w -9+ 23w

8.) $-18v^2 + 23v^2$

Write an expression for each phrase.

9.) 3 times the quantity m minus 7

10.) twice the quantity b plus 9

Properties check list:

Find in your textbook the Properties of Real Numbers. Write each of the properties in the table below. Also include an example for each property.

Property Name	**Property Description** **(For every real number *a*, *b*, and *c*)**	**Example**
Commutative Property of Addition		
Commutative Property of Multiplication		

Associative Property of Addition		
Associative Property of Multiplication		
Identity Property of Addition		
Identity Property of Multiplication		
Inverse Property of Addition		
Inverse Property of Multiplication		
Distributive Property		
Multiplication Property of Zero		
Multiplication Property of –1		

Chapter 2

Section 2.1 Solving Equations by adding or subtracting.

a. Use the opposite operation to get your variable by itself.

1. n + 5 = 8 2. n – 6 = 3 3. -8 +b =2 4. -5 =k-5 5. $\frac{1}{2}+x=\frac{3}{5}$

Are you ready for the final?

6.. What is the goal when solving equations?

_____

_____

8. What happens when you add or subtract the same amount on both sides of the equation?

_____

9. How do you know when to add and when to subtract?

_____

_____

Section 2.2 Solving Equations by multiplying or dividing.

a. Use the opposite operation to get your variable by itself.

1. $-4 = \frac{k}{-5}$ 2. 7x =56 3. $\frac{5}{9}v = 35$ 4. $\frac{4x}{7} = \frac{2}{3}$

5. -64 = 3x 6. 13 = -2w

Section 2.3 Solving two step and multi-step equations

First combine like terms and or distribute (if possible) then work with addition/subtraction and lastly multiplication/division.

1.) 3 + 4x = -1 2.) 7=2n-5 3.) $-3+\frac{m}{3}=12$

4.) 10=6-2x 5.) 2c + c + 6 = 21 6.) –2(b – 4) = 12

7.) 5y + 5 – 2y = 14 8.) 9=6- (x+2) 9. $7 = \frac{2}{3}x - \frac{1}{4}$

Are you ready for the final?

10.) Explain the steps you would follow to solve 2x +1 =7.

_____

_____

Section 2.4 Solving Equations with Variables on Both Sides.

a. After simplifying each side first (by distributing, or combining like terms) then if you have variables on both sides of the equation, get rid of the variable from one of the two sides.

1.) $5y - 3 = 2y + 12$ 2.) $-36 + 2w = -8w + w$ 3.) $6x = 4(x + 5)$

4.) $6(6g - 2) + 8(1 - 5g) = 2$

b. **No Solution and The Identity**. When you are solving an equation, if your variables disappear, and you're left with a true statement (such as 5 = 5) then it is the **Identity**. This means any number is a possible solution to the equation. If your variables disappear and you're left with a false statement (such as 4 = 7) then there is **No Solution**. This means there is no number you could possibly plug in for the variable in the problem that would make the equation true.

5.) $18x - 5 = 3(6x - 2)$ 6.) $3(x - 4) = 3x - 1$

Section 2.5 Solving for a Variable

You can rewrite an equation or formula to solve it for one of the variables. Just follow the same steps as you would for solving any equation. For instance, if you had to solve ab – d = c for b, your goal is to get the b by itself, which means getting rid of the a and the d. Just like any equation, you have to get rid of the "loosest" term first.

$ab - d = c$

$+d \quad +d$ Add "d" to both sides

$\frac{ab}{a} = \frac{c + d}{a}$ Divide both sides by a.

$$b = \frac{c+d}{a}$$

Solve each equation for y.

1.) $3y - 5x = 9$ 2.) $2x + 7y = 4$ 3.) $xy=z$ 4.) $\frac{y-b}{m} = x$

Section 2.6 Rates, Ratios and Proportions

- A **ratio** is a comparison of two numbers by division. It can be written as *a to b*, *a:b*, or $\frac{a}{b}$. When *a* and *b* are quantities with different units, then the ratio is called a **rate**. A **unit rate** is a rate with a denominator of 1, and it is found by dividing the numerator by the denominator.

1.) Find the unit rate of the given rate.

a) A 16 oz. bottle of juice costs $0.72. b) A bus travels 300 miles in 5 hours.

- A **proportion** is an equation that states that two ratios are equal. $\frac{a}{b} = \frac{c}{d}$. Proportions are solved by cross-multiplying so that *ad = bc*.

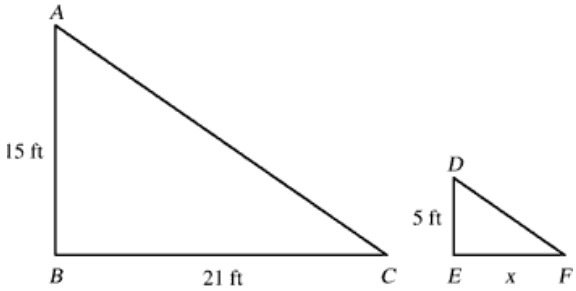
2.) Solve the proportion.

a) $\frac{n}{9} = \frac{4}{6}$ b) $-\frac{3}{4} = \frac{y}{2.5}$ c) $\frac{x+4}{5} = \frac{x-2}{7}$

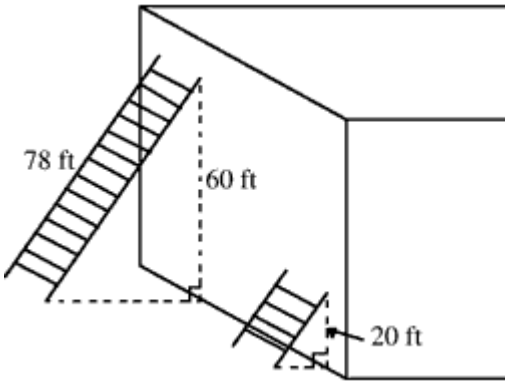
Section 2.7 Applications of Proportions

Similar figures are figures that have the same shape but not necessarily the same size. The symbol **~** means "is similar to". In similar figures, corresponding angles are congruent (equal in measure) and corresponding sides are in proportion (the same ratio). Proportions can be set up and solved to find the missing lengths of sides of similar figures.

1.) Find *x* in the diagram of similar figure.



2.) Two ladders are leaning against a wall at the same angle, as shown. How long is the shorter ladder?



Extension Absolute Value Equations

Get rid of the loosest term one step at a time. When you get to the absolute value bars, you must drop the bars and create two different equations. Then solve each equations independently, getting your two answers.

1.) $4|x+2|-8=20$ 2. $|2c|-30=18$ 3. $|3x+2|=11$

Chapter 3

Section 3.1 Graphing and Writing Inequalities

A solution for an inequality is any number that makes the inequality true.

For $x \geq 7$, 8 is a solution, but 3 is not

1.) Name 3 solutions for each of the following inequalities

a. $x<-5$ **b.** $x+2\geq 4$ **c.** $\frac{x}{2}\leq 6$

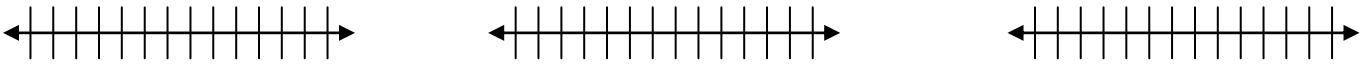
A graph can indicate all of the solutions of an inequality

- A **closed circle** is used for $\geq and \leq$

- An **open circle** is used for $> and <$

2.) Graph the following inequalities

a. $m \leq -5$ **b.** $10 \geq p$ **c.** $r > 2.5$



At least or more than are two ways to say that a value is the lowest and that all solutions will be bigger than this least value

At most or no more than are two ways to say that a value is the highest and that all solutions will be lower than this greatest value.

For the statement: At least 3 people said they would go to the show, the inequality is $p \geq 3$ where

p = the number of people

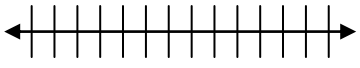
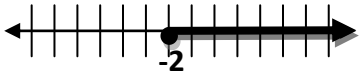
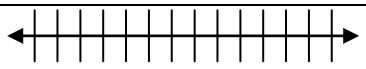
3.) Define a variable and write an inequality for each situation.

a. The bus can hold no more than 54 people _____

b. It will cost at least $25 to rent a car _____

Are you ready for the final?

Fill in the missing boxes in the table

Inequality	Graph
x>2	
	
-3≤x	

Section 3.2, 3.3, 3.4, 3.5 Solving Inequalities
To solve inequalities:

1. Simplify each side of the inequality (Get rid of fractions, distribute or combine like terms.)

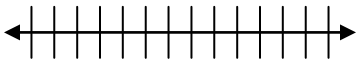
2. If there are variables on both sides of the equation, get rid of the variable from one of the two sides.

3. Solve for the variable by getting rid of the loosest term one step at a time.

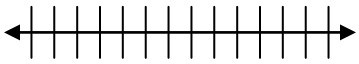
4. Remember if you multiply or divide by a negative number you must flip the inequality sign!

1.) Solve and graph

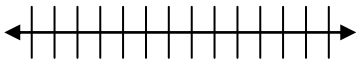
a. $h+3>2$



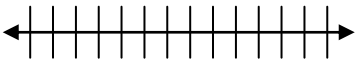
b. $-3n+5>-1$



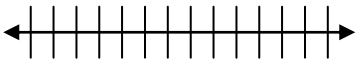
c. $6a+2(a-1)\geq 3a-7$



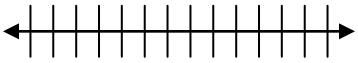
d. $y-8>-22$



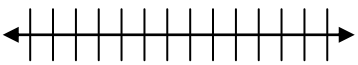
e. $-6w\leq 12$



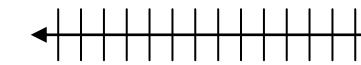
f. $3m>5m+12$



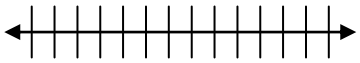
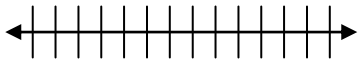
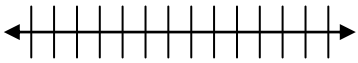
g. $t-4t<-9$



h. $2(m-8)\leq -8+3m$



i. $\frac{-2}{3}x < 6$ **j.** $\frac{4}{5}x + \frac{1}{2} > \frac{3}{5}$ **k.** -3(2x-7)≥3

Are you ready for the final?

2. What must be done to both sides of an inequality to make the inequality symbol change?

_____

_____

3. How can you tell whether the solution of an inequality is *all real numbers* or *no solutions*?

_____

_____

4. Explain the first step in solving x -3 <8

_____

_____

Section 3.6 Compound Inequalities

Inequalities joined by *and* or the word *or* are compound inequalities

If the inequalities are joined by *and,* the solutions make both inequalities true. The *and* graphs must intersect.

If the inequalities are joined by *or,* the solutions make either inequality true

a < x < b can be written as a < x and x < b

Example- 2 ways to solve

Split the problem into problems method

$4 \leq x + 2 \leq 8$

$4 \leq x + 2$ and $x + 2 \leq 8$

Workout the problem as is

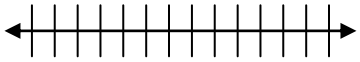
$4 \leq x + 2 \leq 8$

$-2 \quad -2 \quad -2$

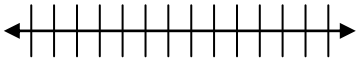
$2 \leq x \leq 6$

1.) Graph.

a. $x > -3$ and $x < 2$

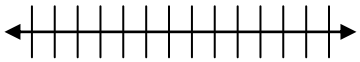


b. $m < -2$ or $m \geq 1$

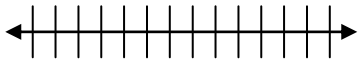


2.) Solve and graph.

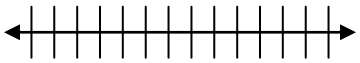
a. $-3 \leq z - 1 < 3$



b. $-2 \leq 3a - 8 < 4$



c. $2t \leq -4$ **or** $7t \geq 49$



Are you ready for the final?

3.) Describe a characteristic of the solutions graph of a compound inequality involving OR.

_____

_____

4.) Describe a characteristic of the solutions graph of a compound inequality involving AND.

_____

_____

5.) How do you know whether a graph represents a compound inequality involving AND or OR?

_____

_____

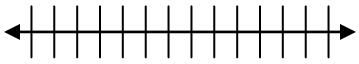
Extension Absolute Value Inequalities

Get rid of the loosest term one step at a time. When you get to the absolute value bars, you must drop the bars and create two different inequalities. Then solve each inequalities independently, getting your two answers.

$<$ and $\leq$ require the word ***and***,

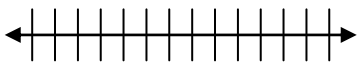
$>$ and $\geq$ require the word ***or***

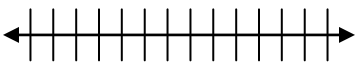
1.) $4+|r+2|>7$

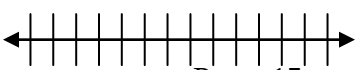


2.) Solve the following absolute value equation and inequalities

a. $|p+3|<9.5$ **b.** $|2x-7|-1\leq 0$ **c.** $\left|\frac{1}{2}m\right|\geq 4.8$







Are you ready for the final?

3.) How many answers to you get when you solve an absolute inequality?

_____

_____

4.) Write an absolute value inequality for all numbers less than units from 2 on the number line

_____

_____

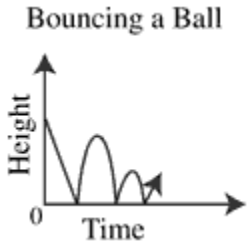
Chapter 4

Section 4.1: Graphing Relationships

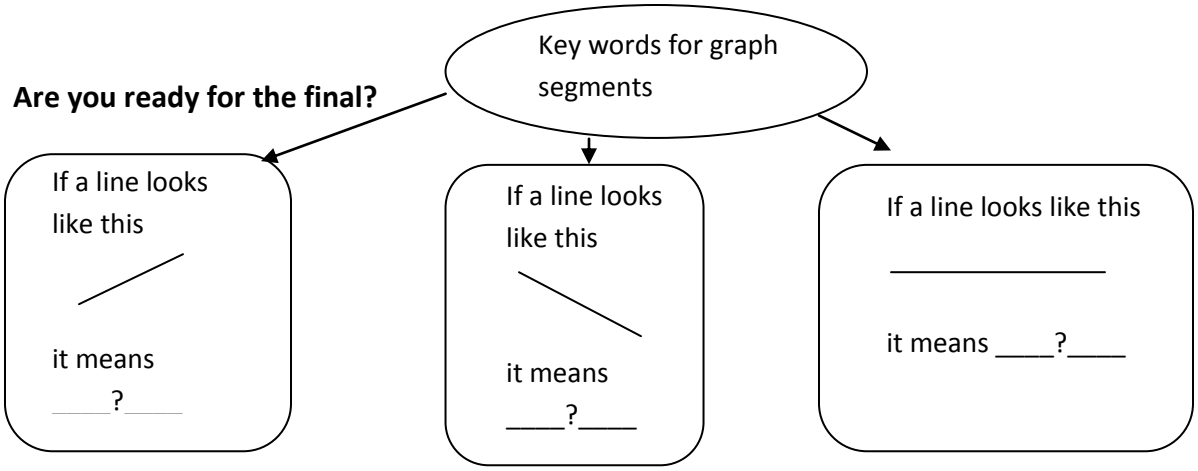
- Time is usually graphed on the x-axis (horizontal) because it never stops and does not rely on anything (independent).
- When interpreting graphs take in consideration the y-axis (vertical) and what the unit is such as speed or distance.
- A flat line means if speed-steady pace, distance- same distance or they are stopped
- A line going up means speed-going faster, distance- go farther away
- A line going down means speed- going slower, distance –getting closer

1.)What does the flat line mean in the graph? in the graph?

2.) What do the lines going upward mean



Are you ready for the final?



Section 4.2: Relations and Functions

- **Domain** are the **x** values. When asked for domain, just list the x values.
- **Range** are the **y**-values. When asked for range, just list the y values.
- There are five ways to show a relation: table, ordered pairs, mapping, graph or an equation.
- To determine if a relation is a function then one x goes to exactly one y.
- To determine if a graph is a function you must use the vertical line test which means to draw a vertical line and if the vertical line intersects (hits) the graphed line once then it is a function. If it hits more than once then it is not a function
- A function rule is when a value is put into x and the equation is then worked out. Example f(x)=3x -4, x =5 so 3·5 -4 = 11

Problems

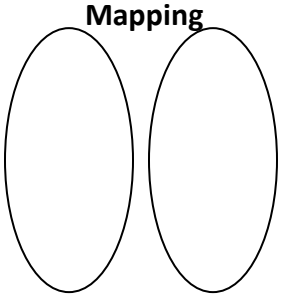
3.) Find the domain and range and then show the relation as a table, a mapping, and a graph.
Lastly determine if it is a function. (-3,5), (-2,8), (-1,5), (0,8), (1,-2)

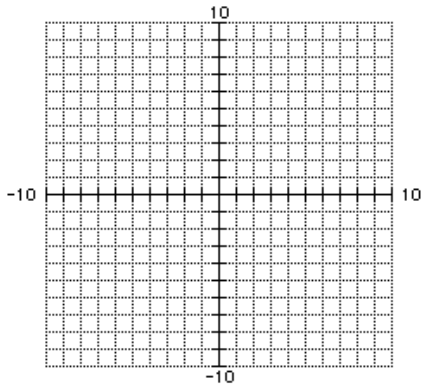
Domain = { } **Range** = { }

Graph

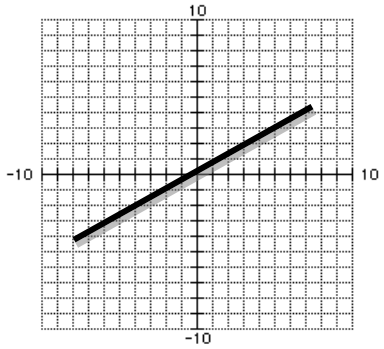
Table

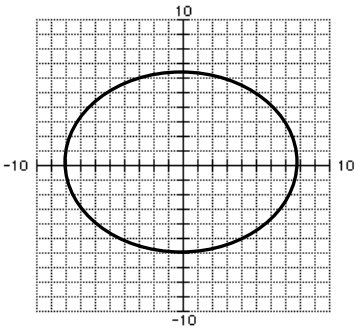
Mapping



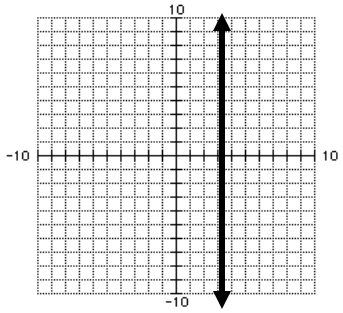


Vertical Line Test





Is it a function?_____ Is it a function?_____



Is it a function?_____

Are you ready for the final?

Relationships can also be represented by a set of _____ pairs called a _____.

The **domain** of a relation is the set of:

The **range** of a relation is the set of:

What is a **function**?

Section 4.3: Writing Functions

- Find a pattern in the table. Look at each row going across and determine what is being done to the input value (the x) in order to get each output value (the y). Then write this answer as a function rule.
- For example, in the table to the right, each input value is multiplied by 3 to get the output value. So the function rule would be **y = 3x**
- An equation looks like **f(x)=** $\frac{change\ of\ y}{change\ of\ x}$ **x** +what needs to be added
-

x	**y**
-2	-6
-1	-3
0	0
1	3

1.) Write a function rule for this table.

x	F(x)
-2	- 6
-1	-5
0	-4
1	-3

2.) Write a function rule for this table.

x	y
1	- 1
2	0
3	1
4	2

3.) Write a function rule for this table.

x	F(x)
1	4
2	7
3	10
4	13

Section 4.4: Graphing Functions

- In order to graph, a table must be created such as one below

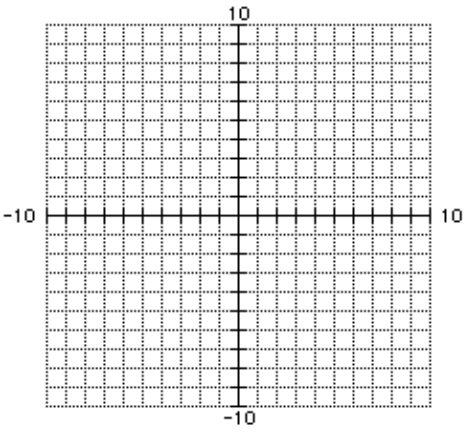
x	Function Rule (or work)	(x,y)

- The x are numbers you pick such as my favorite five (-2,-1,0,1,2)
- Plug the numbers into x in the equation and work it out to solve for y.
- Then graph the coordinates.

1.) Model the rule with a table of values and a graph.

f(x)=2x -3

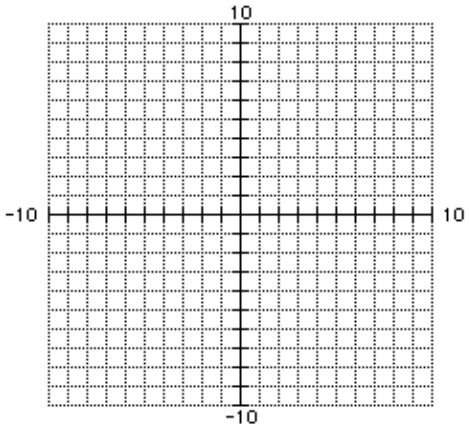
x	Function Rule (or work)	(x,y)



2.) Model the rule with a table of values and a graph.

f(x)= -x -3

x	Function Rule (or work)	(x,y)



Section 4.5 Scatter Plots

- **Please look in chapter 5, the extension, for more details**

Chapter 5

Section 5.1 Identifying Linear Functions

- A linear Function is_____
  How can you identify a linear function on a graph or on a table?

Complete the following sentence:

In a linear function, a constant change is *x* corresponds to_____

- Standard form Ax + By = C
  - No fractions or decimals
  - x and y are the both on the left side of = sign

Write each equation in standard form.

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

2. y =3x + 1

Section 5.2 Using Intercepts (Use when problem is in standard form)

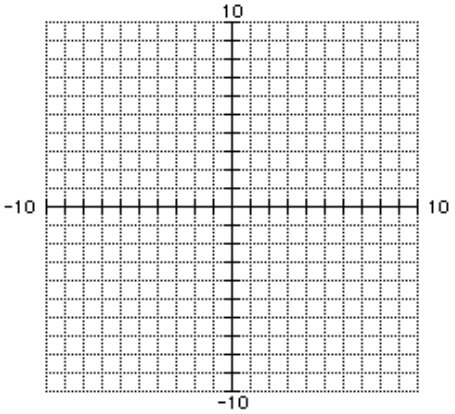
- When finding the y-intercept set the x equal to zero (cover-up method)
- When finding the x-intercept set the y equal to zero (cover-up method)
- Y= # (ex. y = 3) is a horizontal line
- X= # (ex. x = 3) is a vertical line

Problems

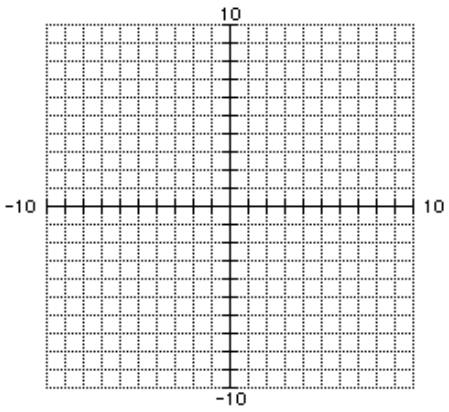
1.) Find the x- and y-intercept of 3x + 4y =8

2.) Find the x-and y-intercept of –5x + 3y =15

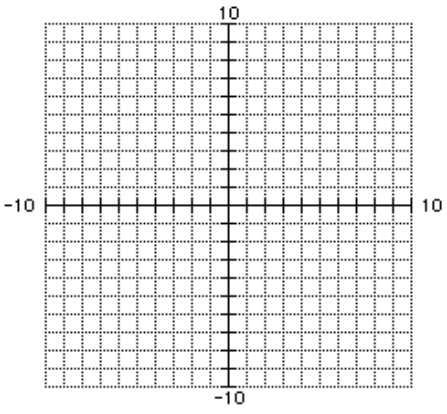
3.) Graph using intercepts. 2x + 3y = 12



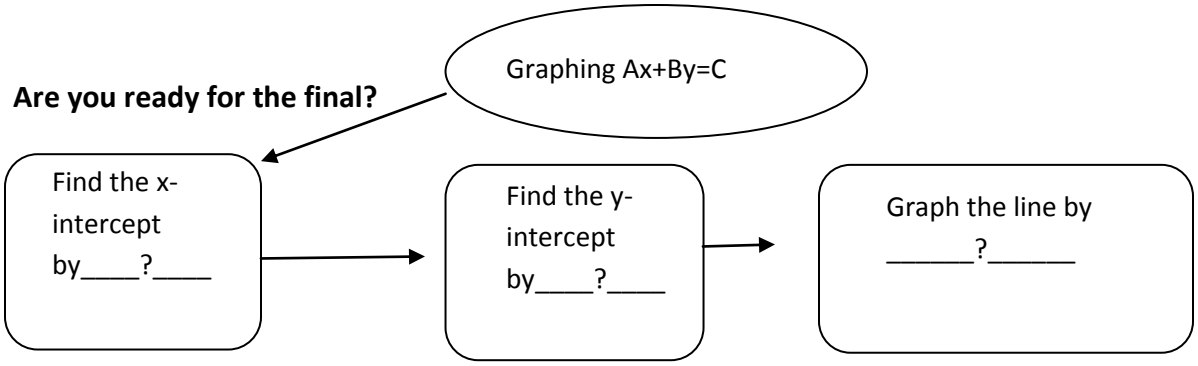
4.) Graph x= -3



5.) Graph y =2



Are you ready for the final?



6.) A function (line) has x-intercept of 4 and y-intercept of 2. Name two points on the graph of this function.

Point 1:_____ Point 2:_____

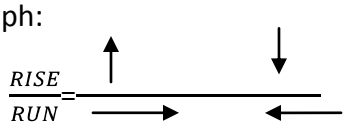
Sec: 5.3 Rate of Change and slope

The _____ is the _____ in the ___ values of two points on a line.

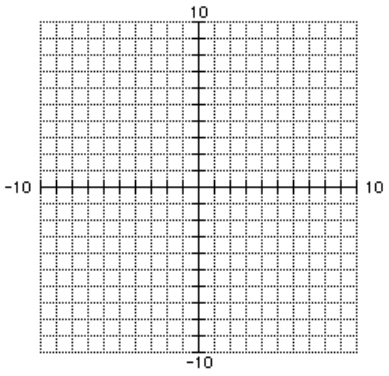
The _____ is the _____ in the ___ values of two points on a line.

The _____ of a line is the _____ of the _____ for any two points on the line.

Slope on a graph:



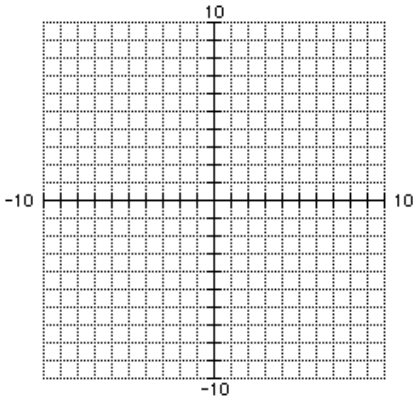
1. **Graph: (1 ,3), (2 , 5), (3, 7)**



Rise = _____ Run = _____

Slope = _____

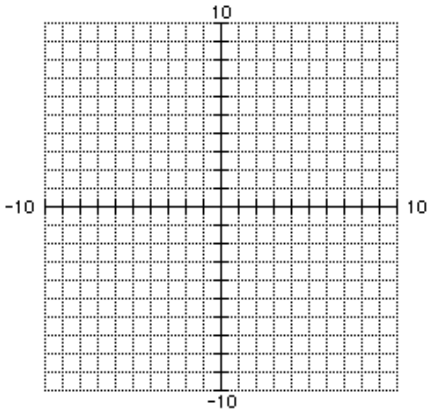
2. Graph: (-3, 1), (3, -1)



Rise = _____ Run = _____

Slope = _____

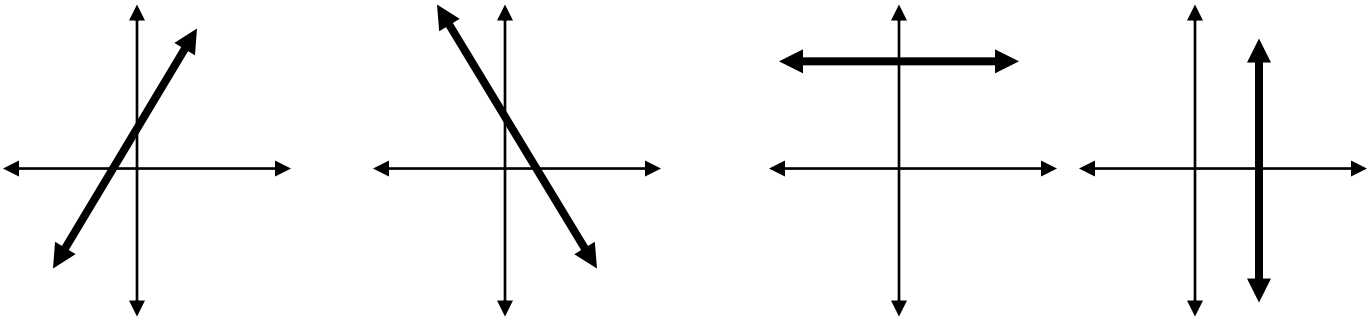
3. Graph: (3,0), (0, -6)



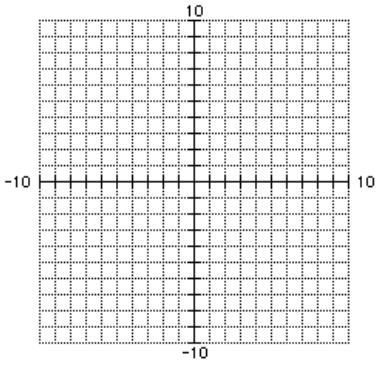
Rise = _____ Run = _____

Slope = _____

Positive slope **Negative slope** **Zero slope** **Undefined slope**



4. Draw a graph for the following situation: The rate of change of the profits of a company over one year is negative.



5. Would you rather run on a hill with a slope of 4 or a hill with a slope of $\frac{5}{2}$? Explain your answer

6. Would you run on a hill with a slope of $\frac{3}{2}$ or a hill with a slope of $\frac{-7}{2}$? Explain your answer

Section 5.4: Rate of change and slope

- Slope is $\frac{vertical\_change(rise)}{horizontal\_change(run)}$ or use the formula m = $\frac{y_2 - y_1}{x_2 - x_1}$
- Rise means go up if number is positive or go down if number is negative
- Run means go right if number is positive or go left if number is negative
- Horizontal lines have a 0 slope
- Vertical lines have an undefined slope.

Problems

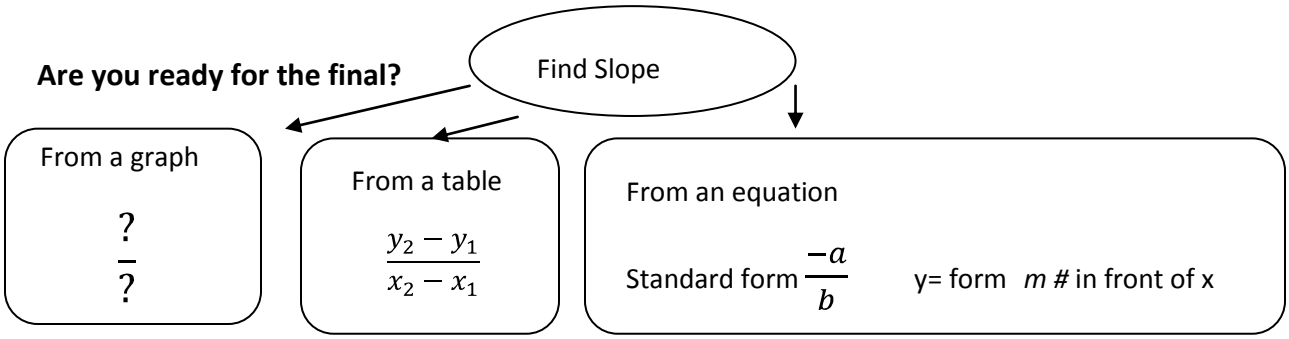
1.) Find the slope of (3,2) and (5,6)

2.) Find the slope of (-3,1) and (-4,-7)

3.) Find the slope of the line 8x +2y =96

4.) Find the slope of the line 5x-2y=90

Are you ready for the final?



5.) The slope of a line is the difference of the _____?_____ over the difference of the _____?_____ for any two points on the line.

6.) Two points lie on a line. When you substitute their coordinates into the slope formula, the value of the denominator is 0. Describe this line.

Section 5.6 Slope-Intercept form y = mx + b

- Slope intercept form equation is **y = mx + b**, where m is the slope and b is the y-intercept
- To graph you graph the y-intercept (*b means begin*) **first**
- Then graph the slope (*m means move*)

Problems

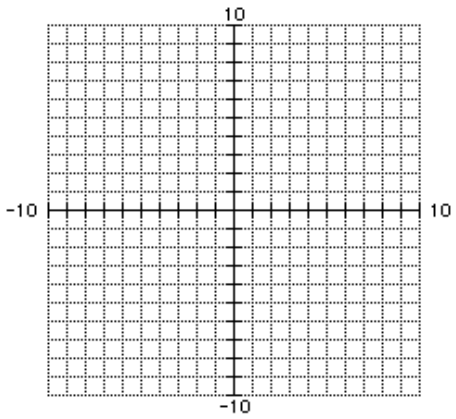
1.) Find the slope and y-intercept of $y = -2x + 3$

2.) Find the slope and y-intercept of $y = x - 4$

3.) Write an equation in slope and y-intercept form given the slope and y-intercept.

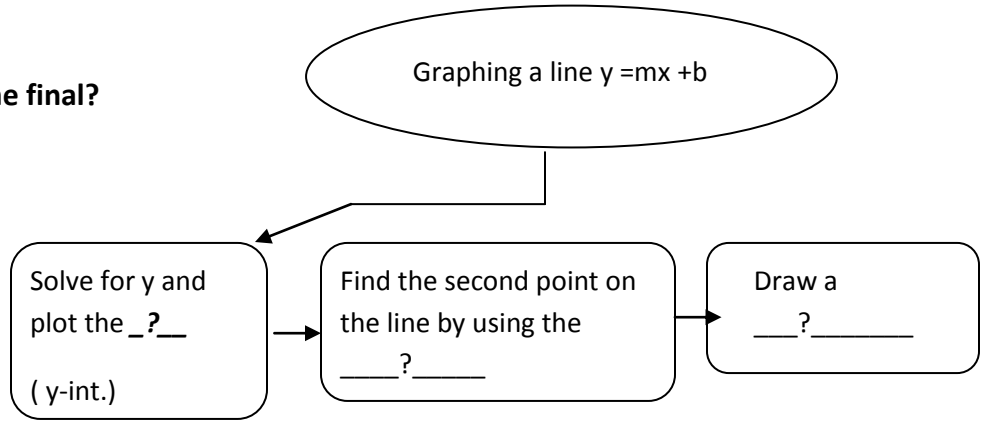
a. $m=\frac{2}{9}$ b= -5

b. slope is $\frac{4}{5}$ and y-intercept is $\frac{-2}{3}$



4.) Graph the equation of $y = \frac{-1}{3}x + 4$

Are you ready for the final?



5.) What information do you need to graph a line?_____

Hint: Can you graph a line if you are given:

a. slope/point b. x-intercept and y-intercept c. two points

d. (8,0) and (0,8) e. (7,0) and the x-intercept of 7

5.7: Point-Slope Form and Writing Linear Equations

The three forms of linear equations are **Slope-Intercept Form** y = mx = b, **Standard Form** Ax + By = C, and **Point-Slope Form** $y - y_1 = m(x - x_1)$. The information that is given determines which form you will be able to write. Each form can also be changed from one form to another using algebraic steps. If you are given two points instead of the slope, you must first use the **Slope Formula**, $m = \frac{y_2 - y_1}{x_2 - x_1}$, in order to find the slope. Then you can use one of the two given points to write the equation in the desired form.

Examples: Write an equation in slope intercept form that passes through the two given points. (The 1st one has been done for you.)

1. (-1, 0) and (1, 2)
2. (3, 5) (0, 0)
3. (6, -4) (-3, 5)

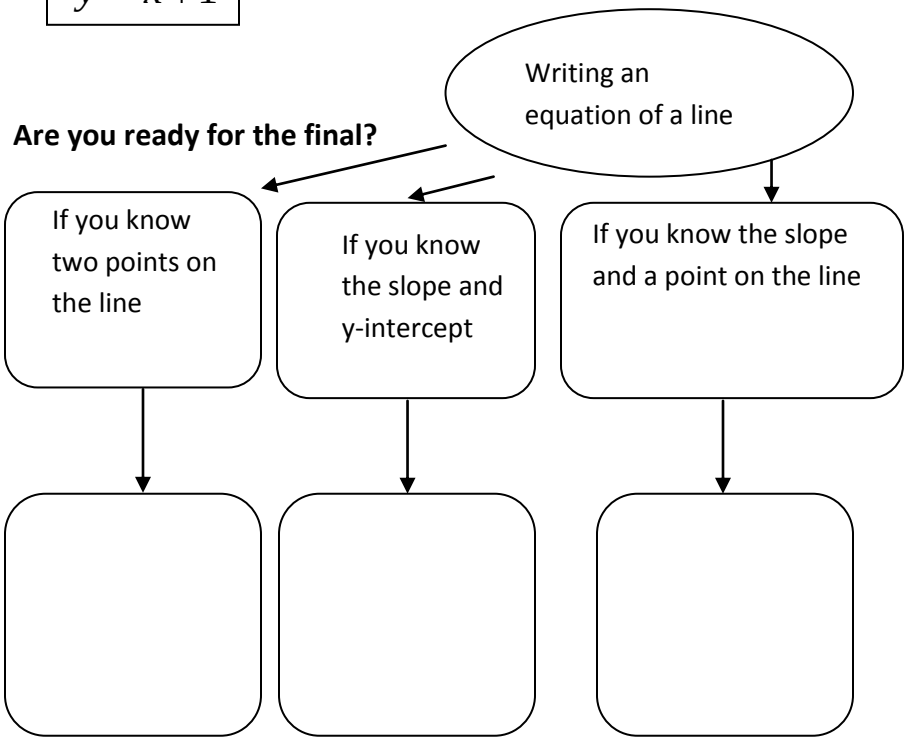
$$m = \frac{2-0}{1--1} = \frac{2}{2} = 1$$

$$y - y_1 = m(x - x_1)$$

$$y - 0 = 1(x + 1)$$

$$\boxed{y = x + 1}$$

Are you ready for the final?



4.)How are point-slope form and slope-intercept form alike? Different?

_____

_____

5.) When is point-slope form useful? When is slope-intercept form useful?

_____

_____

5.8: Parallel and Perpendicular Lines

Parallel lines are lines in the same plane that never intersect. Two lines are parallel if they have the same slope. For example, the lines y = -2x + 3 and y = -2x – 1 are parallel because the slope of each line is m = -2.

Perpendicular lines are lines that intersect to form right angles (90 degrees). Two lines are perpendicular if they have **opposite reciprocal** slopes. For example, the lines $y = \frac{2}{3}x + 1$ and $y = -\frac{3}{2}x + 4$ are perpendicular because the slopes have opposite signs and the fractions are reciprocals of one another. **Horizontal lines**, in the form y = a, are always perpendicular to **vertical lines**, in the form x = b. The slope of a horizontal line is zero while the slope of a vertical line is undefined.

Examples: Find the slope for a line that is parallel to the given equation. Then find the slope for a line that is perpendicular to the equation. The first one has been done for you.

1. $y = \frac{4}{7}x - 2$ 2. $y = -\frac{4}{3}x - 5$ 3. $2x + 3y = 9$ 4. -4x+5y=20

parallel slope = $\frac{4}{7}$

perpendicular slope = $-\frac{7}{4}$

Examples: Write an equation for a line that is ***parallel*** to the given equation and passes through the given point.

5. $y = 3x - 6$; (5, -4)

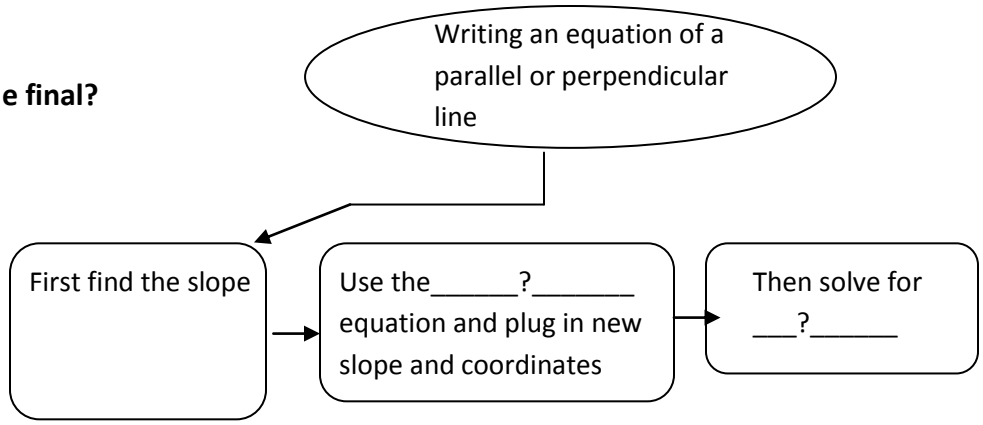
6. $-x + 2y = -10$; (-8, 4)

Examples: Write an equation for a line that is ***perpendicular*** to the given equation and passes through the given point.

7. $y = -\frac{1}{2}x + 9$; (2, -6)

8. $-4x + y = -7$; (-8, 0)

Are you ready for the final?



Complete the following sentence:

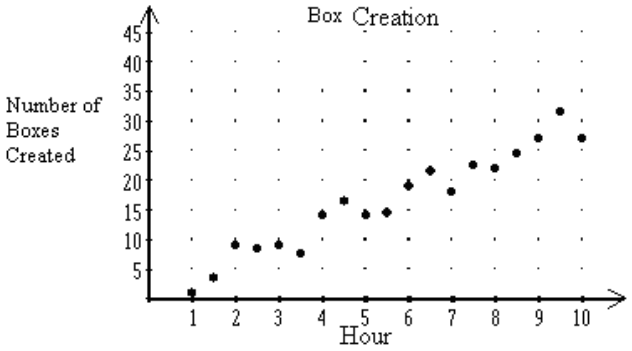
9. Two different nonvertical lines are parallel if and only if…

Extension Scatter Plots and Equations of Lines

The trend line that shows the relationship between two sets of data most accurately is called the **line of best fit**.

Examples:

1. Kathy started making craft boxes to store photos. The scatter plot shows how many boxes Kathy made each hour she worked. Find an equation of a reasonable trend line for the scatter plot. Predict the number of boxes Kathy can make in hour 12.



2. The table shows the time spent researching the stock market each week and the average weekly percent gain for an investor over one year.

Research (hours)	6	8	10	12	14	16	18
Gain (percent)	3.1	4.3	4.7	4.3	6.3	7.9	6.7

a. Graph the data.
b. Find an equation for the trend line of the data.
c. Using the trend line from part (b), predict the average weekly percent gain from researching the stock market for 20 hours per week.