

Pre-Algebra Summer Packet:
Answer keys are in the back of this packet!

#1: Solving Multi-Step Equations Worksheet

1.) $-28 = 2(x + 3) - 5(x - 1)$

2.) $6y - (3y - 6) - 8y + 4 = 24$

1.) _____

2.) _____

3.) $3(2x - 4) + 5(x + 1) = 37$

4.) $4h + 3(h - 2) - 2h = 6$

3.) _____

4.) _____



5.) $8 - 6(n - 4) = 56$

6.) $-x - 12 - (x - 5) + x - 4 = 9$

5.) _____

6.) _____

7.) $-5(x - 6) - (2x - 4) - x = 12$

8.) $7x - 2(4 - 3x) = 18$

7.) _____

8.) _____

#2: Equations with Fractions Worksheet

1.) $-\frac{7}{10}x + 14 = -21$

2.) $\frac{2}{3}(m - 6) = 3$

1.) _____

2.) _____

3.) $\frac{2}{5}x + 2 = \frac{3}{4}$

4.) $\frac{2}{7}n - \frac{1}{14}n = -3$

3.) _____

4.) _____

5.) $\frac{1}{8}(5 + 2x) + \frac{3}{4} = \frac{3}{5}$

6.) $\frac{2}{3}(x - \frac{1}{5}) + 5 = \frac{1}{2}$

5.) _____

6.) _____



$$7.) -\frac{1}{3}(4x + 15) - \frac{1}{2} = 45$$

7.) _____

$$8.) \frac{5}{6} \left(\frac{2}{5} - 3x \right) + 2x = \frac{3}{4}$$

8.) _____

9.) For question number 8, what is the first step that you would do? Why do you need to do this step first?

#3: Solving Equations with Variables on Both Sides Worksheet

1.) $9(x + 8) + 12 = 8(x + 8) + 10$

2.) $5(y - 11) = 3y - (4 - 3y)$

3.) $4(9y - 5) = 10(3y + 17) - 40$

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

5.) $18 - 7(2x - 3) = 3(4x - 11) - 6$

6.) $26 - (4x - 11) = -5(x + 7) + 4 - 3x$



$$7.) \frac{1}{3}(9x + 27) - 4 = \frac{1}{2}(2x + 54)$$

$$8.) 5(5x - 7) + 9 - 4x = 4(8x + 6) - 3x$$

9.) Describe how you would check a problem that has variables on both sides.

#4 Rewriting Equations and Formulas Worksheet

Solve for y .

1.) $-2(x + 3y) = 18$

2.) $4x - 6 + 2y = 2x - y$

3.) $5y + 8 = 2y - 3x + 5$

4.) $-2x - y = -3$

5.) $x + 5y - 10 = 2x$

6.) $8x - 4y = -4$

7.) $9x + 3y = 10 - 4x + y$

8.) $5(x + y) = 20 + 3x$

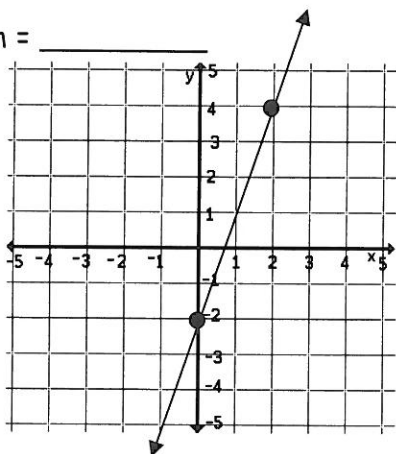
9.) $3(y - 7) = 12x$

#5 Slope of a Line Worksheet

Find the slope between the given points:

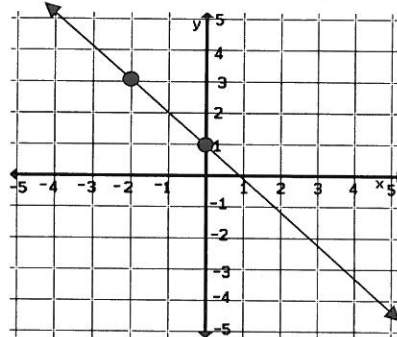
1.)

$m =$ _____



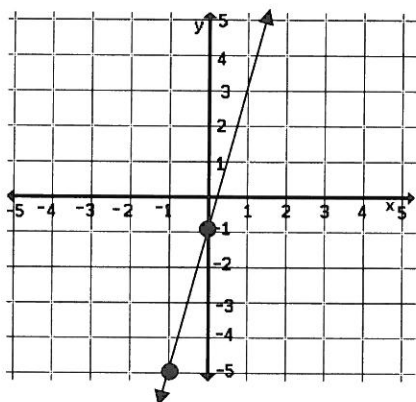
2.)

$m =$ _____



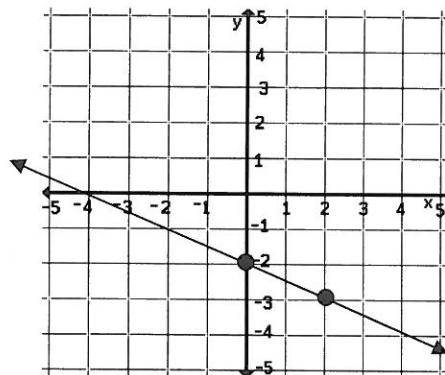
3.)

$m =$ _____



4.)

$m =$ _____



5.) $(19, -2)$ and $(-11, 10)$

6.) $(8, -4)$ and $(4, 2)$

7.) $(6, -12)$ and $(15, -3)$

8.) $(1, -19)$ and $(-2, -7)$

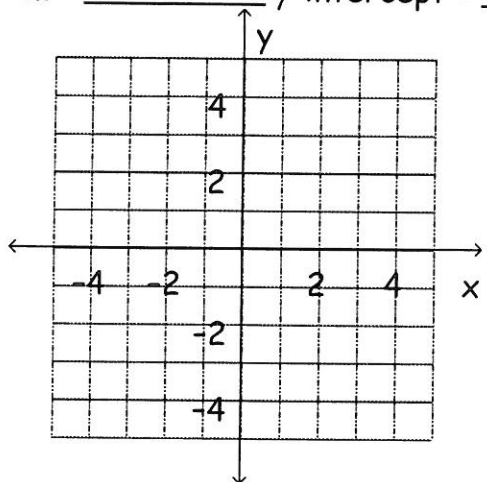
9.) $(12, -18)$ and $(-15, -18)$

10.) $(17, -13)$ and $(17, 8)$

#6: Graphing Linear Equations Worksheet

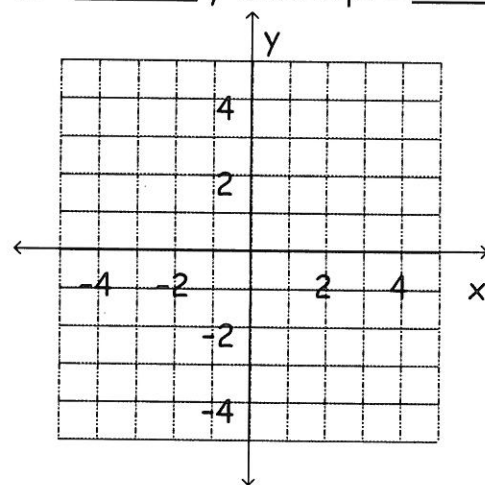
1.) $y = \frac{1}{2}x - 4$

m = _____ y-intercept = _____



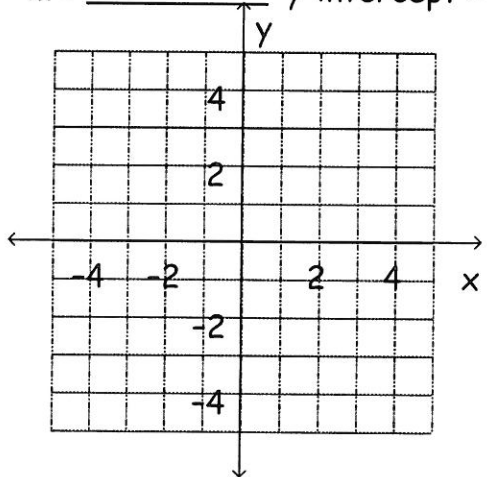
2.) $y = 2x - 2$

m = _____ y-intercept = _____



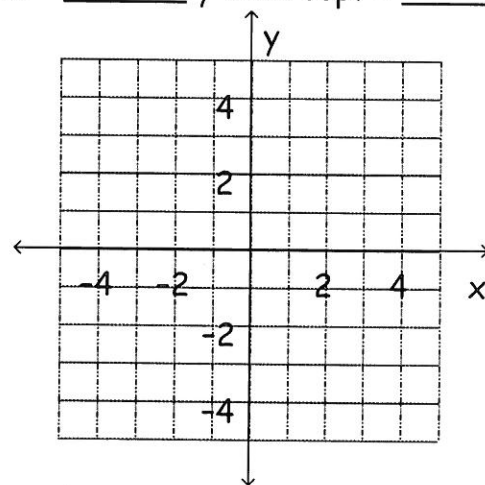
3.) $y = x$

m = _____ y-intercept = _____



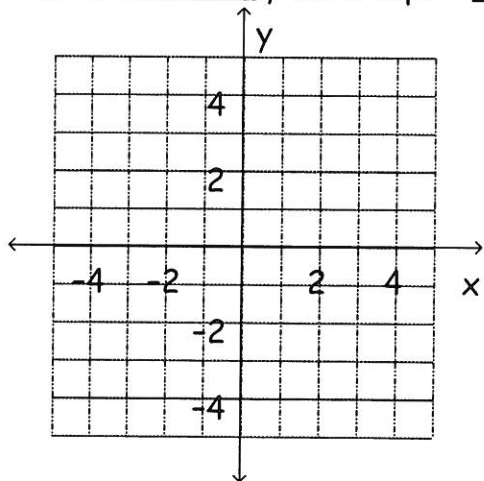
4.) $y = -4$

m = _____ y-intercept = _____



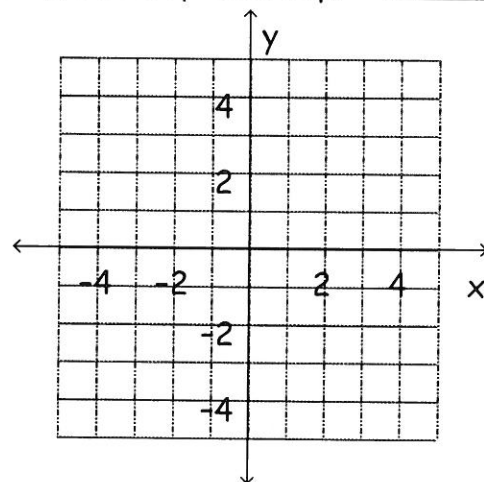
5.) $x = 3$

m = _____ y-intercept = _____



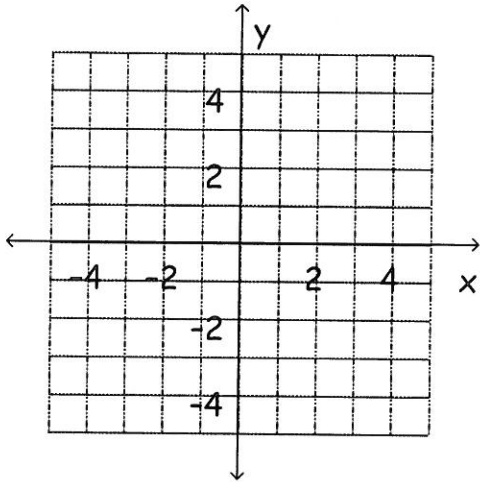
6.) $y = -\frac{1}{3}x + 1$

m = _____ y-intercept = _____



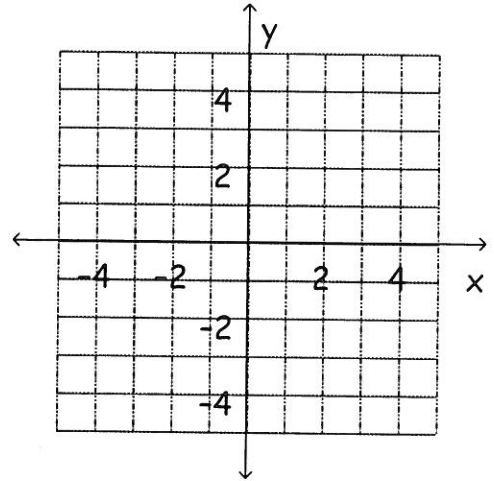
7.) $y = -x + 4$

$m =$ _____ y -intercept = _____



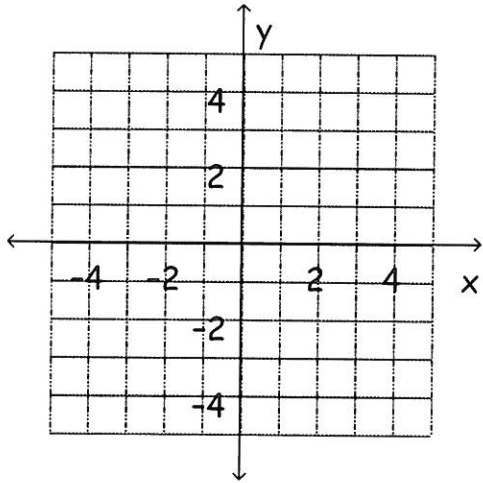
8.) $y = 3x$

$m =$ _____ y -intercept = _____



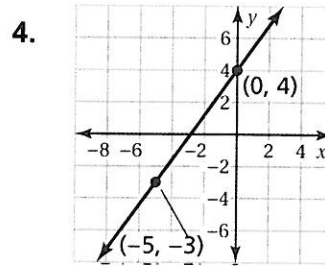
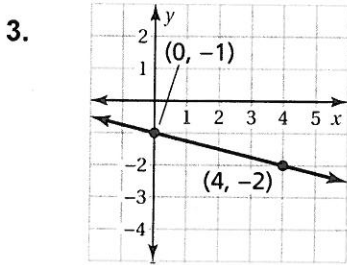
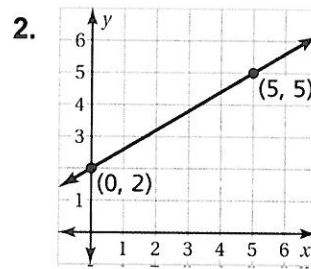
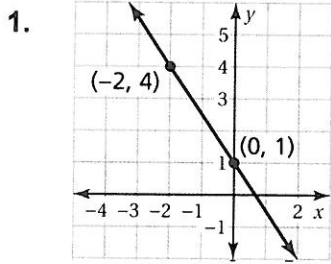
9.) $y = \frac{3}{2}x - 2$

$m =$ _____ y -intercept = _____



#7 Writing Equations in Slope-Intercept Form Worksheet

Write an equation of the line in slope-intercept form.



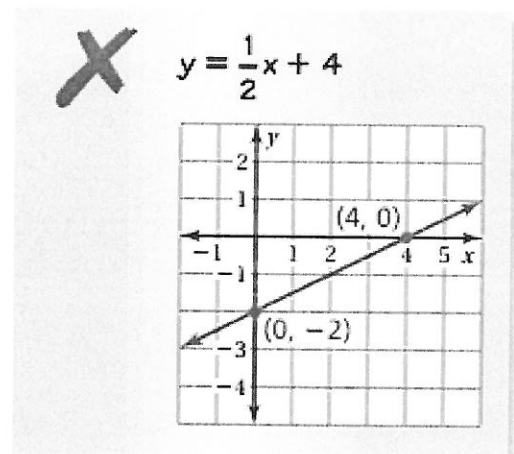
5. A plant is 3 inches tall when you purchase it and grows 2 inches per month. Write an equation that represents the height y (in inches) of a plant that you purchased x months ago.

6. Your hair is 6 inches long and grows at a rate of 0.25 inches per year.

6a. Write an equation that represents the length y (in inches) of your hair after x years.

6b. How long is your hair after 8 years?

7. Describe and correct the error in writing an equation of the line.



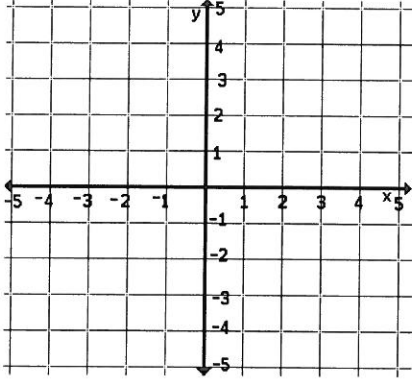
#8 Graphing Equations in Standard Form Worksheet

Find the x-intercept and y-intercept of each equation, then graph.

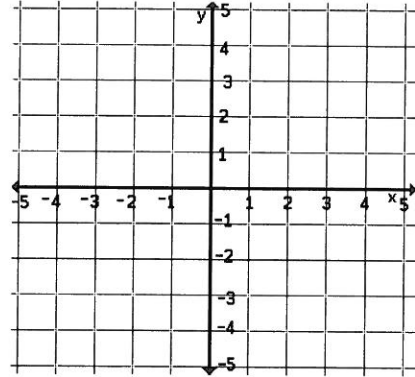
1.) $5x - 2y = 10$

2.) $-8x + 4y = 16$

x-intercept: _____ y-intercept: _____



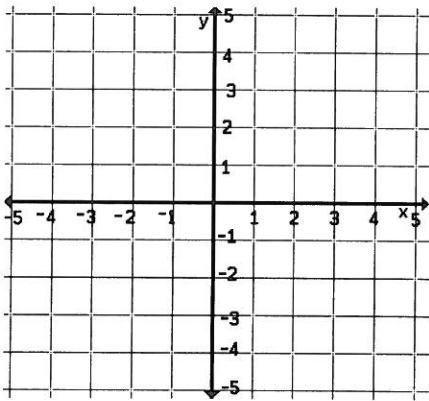
x-intercept: _____ y-intercept: _____



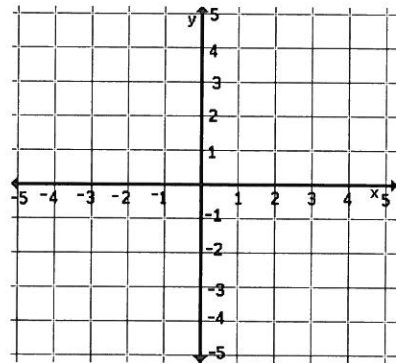
3.) $x + 2y = 4$

4.) $-9x - 8y = 36$

x-intercept: _____ y-intercept: _____



x-intercept: _____ y-intercept: _____



Write an equation in standard form for the word problem.

5.) You want to buy some CDs and DVDs. CDs cost \$14 each and DVDs cost \$18 each. You spent a total of \$126. Write an equation in standard form for how much you spent.

#9 Writing Rules for Linear Functions Worksheet

Write a rule for each linear function.

1.)

x	f(x)
-3	-1
0	1
3	3
6	5

Slope:

y-intercept:

Rule:

2.)

x	f(x)
0	9
2	5
4	1
6	-3

Slope:

y-intercept:

Rule:

3.)

x	f(x)
-1	-7
0	0
1	7
2	14

Slope:

y-intercept:

Rule:

4.)

x	f(x)
-12	7
-9	8
-6	9
-3	10

Slope:

y-intercept:

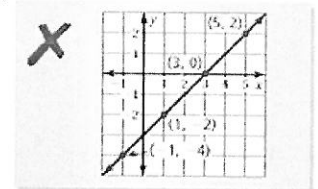
Rule:

5a.) A dolphin eats 30 pounds of fish per day. Write a function that relates the number of pounds p of fish that a dolphin eats in d days.

b.) How many pounds of fish does a dolphin eat in 30 days?

6.) Error analysis: Describe and correct the error in graphing the function represented by the input-output table.

Input, x	-1	-2	0	2
Output, y	-1	1	3	5



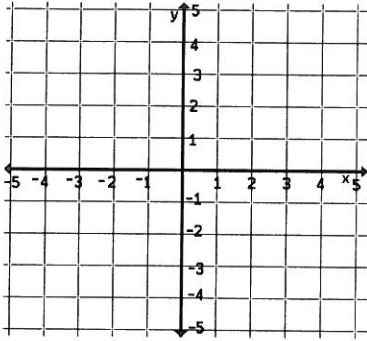
7.) a. Describe the advantages you see in using a rule for a function rather than listing function values in a table. Are there any disadvantages?

b. Create a function rule for a real life example.

#10 Solving Systems of Linear Equations by Graphing Worksheet

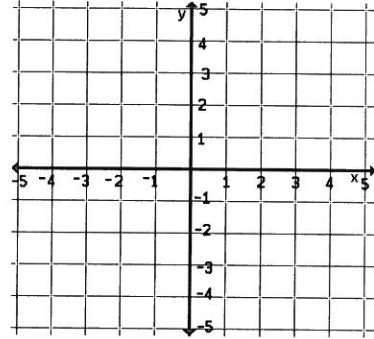
Solve the system of linear equations by graphing.

1.) $y = 3x + 2$ and $y = -x - 2$



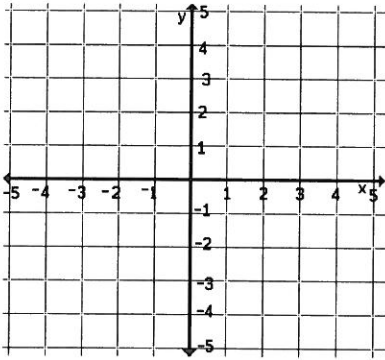
Solution: _____

2.) $y = -4x + 1$ and $y = 2x - 4$



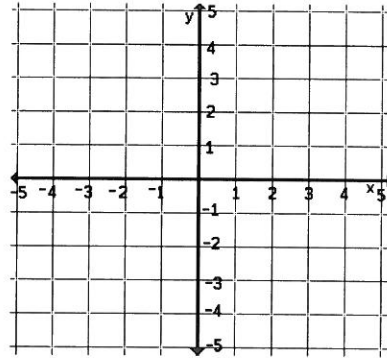
Solution: _____

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



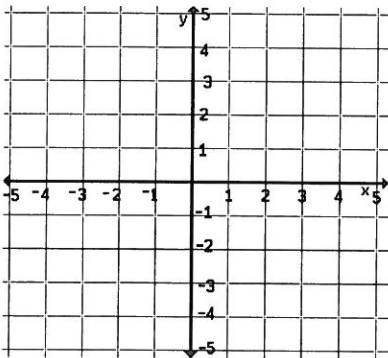
Solution: _____

4.) $y = x - 5$ and $x + y = 3$ (Solve for y)



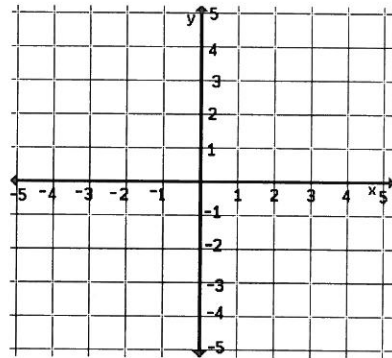
Solution: _____

5.) $y = x$ and $y = -x$



Solution: _____

6.) $y = x + 2$ and $2x - 2y = -4$ (Solve for y)



Solution: _____

#11 Solving Systems of Linear Equations by Substitution Worksheet

Directions: Show ALL OF YOUR WORK!! Make sure to find x and y!

1.) $2x - 3y = -1$
 $y = x - 1$

Answer: _____

2.) $y = -3x + 5$
 $5x - 4y = -3$

Answer: _____

3.) $y = 5x - 7$
 $-3x - 2y = -12$

Answer: _____

4.) $5x + 4y = -14$
 $x = -2y + 2$

Answer: _____

5.) $3y - 3x = 4$
 $y = x + 3$

Answer: _____

6.) $x = -3y + 1$
 $-3x - 3y = -15$

Answer: _____

#12 Solving Systems Using Elimination Worksheet

Solve using **ELIMINATION!!** Show **ALL OF YOUR WORK!!** Make sure to find x and y !

1.) $-4x - 2y = -12$
 $4x + 8y = -24$

Answer: _____

2.) $5x + y = 9$
 $10x - 7y = -18$

Answer: _____

3.) $-3x + 7y = -16$
 $-9x + 5y = 16$

Answer: _____

4.) $x - y = 11$
 $2x + y = 19$

Answer: _____

5.) $-7x + y = -19$
 $-2x + 3y = -19$

Answer: _____

6.) $8x + 14y = 4$
 $-6x - 7y = -10$

Answer: _____

#13 Systems of Equations Word Problems Worksheet

Solve using either method.

1.) A school sells 292 tickets for a basketball game. An adult ticket costs \$3. A student ticket costs \$1. They collect \$470 in ticket sales. Find how many adult and student tickets were sold.

2.) A school is planning to bring 193 people to a competition. There are 8 vehicles available between school buses and minivans. The school buses seat 51 people each and the minivans seat 8 people each. How many buses and minivans will be needed?

3.) On the first day of ticket sales, a school sold 3 senior citizen tickets and 1 child ticket for a total of \$38. The school took in \$52 on the second day by selling 3 senior citizen tickets and 2 child tickets. Find the price of a senior citizen ticket and the price of a child ticket.

4.) You buy a total of 50 burgers and hotdogs for \$90. You pay \$2 per burger and \$1.50 per hotdog. How many burgers and hotdogs did you buy?

5.) A company rents bicycles for \$25 per day and skates for \$20 per day. The business has 20 rentals today and makes \$450. How many bicycles and skates did the company rent out today?

6.) The length of a rectangle is 3 inches more than twice the width. The perimeter of the rectangle is 36 inches. What are the dimensions of the rectangle?

#14 Product of Powers Property Worksheet

Simplify each expression

1.) $-7x^6 \cdot 5x^8$

2.) $3y^2 \cdot 2y^3$

3.) $x^2 \cdot x \cdot x^3$

4.) $x^3 \cdot y^5 \cdot y^2 \cdot x^4$

5.) $2x^3 \cdot 3x^2$

6.) $(-2b)^4$

7.) $6x^7 \cdot 4x^{12}$

8.) $(3^2)^4 \cdot 3^5$

9.) $(3x^4)^2 \cdot 2x^7$

10.) $(3mn)^2$

11.) $y^7 \cdot (xy)^2$

12.) $2x^3 \cdot (3x)^2$

#15 Quotient of Powers Property Worksheet

Simplify the expression. Write your answer as a power.

1. $\frac{12^{20}}{12^9}$

2. $\frac{7.6^{13}}{7.6^3}$

3. $\frac{(-9)^{15}}{(-9)^3}$

4. $\frac{(-8.5)^{11}}{(-8.5)^{10}}$

5. $\frac{(-1000)^{13}}{(-1000)^8}$

6. $\frac{t^{21}}{t^{19}}$

Simplify the expression. Write your answer as a power.

7. $\frac{11^7 \cdot 11^{10}}{11^4 \cdot 11^2}$

8. $\frac{2.5^8 \cdot 2.5^3}{2.5 \cdot 2.5^4}$

9. $\frac{(-7.9)^{15} \cdot (-7.9)^9}{(-7.9)^{12} \cdot (-7.9)^7}$

10. $\frac{b^{35}}{b^{20}} \cdot \frac{b^{15}}{b^{10}}$

Simplify the expression.

11. $\frac{4^8 \cdot m^7 \cdot n^4}{4^5 \cdot m^2}$

12. $\frac{r^{12} \cdot s^7 \cdot t^9}{r^9 \cdot s^3}$

13. $\frac{p^{18}q^{11}}{p^{10}q^8}$

14. $\frac{3^5a^{17}b^{21}}{3^4a^{15}b^{12}}$

#16 Negative Exponents Worksheet

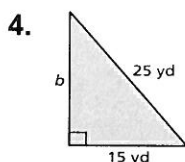
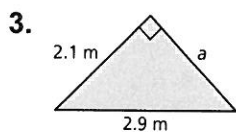
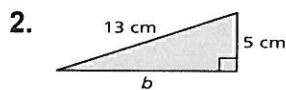
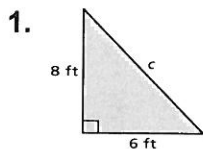
Simplify each fraction. Get rid of any negative exponents!!

1.) $\frac{a^3b}{ab^4}$	2.) $\frac{m^5n^6}{mn}$	3.) $\frac{w^2z^9}{w^4z^3}$
4.) $\frac{a^6b^4}{a^3b^{-2}}$	5.) $\frac{c^{-2}d^{11}}{c^8d^{-5}}$	6.) $\frac{m^{-3}n^{-4}}{m^2n^{-9}}$
7.) $\frac{ab^{-6}}{a^{-3}b}$	8.) $\frac{p^{-2}s^{-9}}{p^6s^{-11}}$	9.) $\frac{c^2d^{-3}}{c^3d^{-1}}$
10.) $\frac{a^3b^2c^{-4}}{a^{-2}b^5c^{-9}}$	11.) $hj^{-4}k^3$	12.) $x^{-4}yz^{-7}$

#17 The Pythagorean Theorem

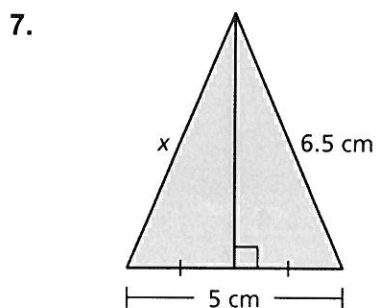
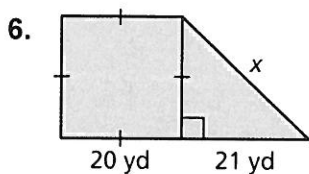
missing length of the triangle.

Find the



5. A small shelf sits on two braces that are in the shape of a right triangle. The leg (brace) attached to the wall is 4.5 inches and the hypotenuse is 7.5 inches. The leg holding the shelf is the same length as the width of the shelf. What is the width of the shelf?

Find the missing length of the figure.



#18 Pre-Algebra Final Review

Solve each equation showing all algebraic steps.

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

2.) $\frac{1}{3}(3w - \frac{3}{4}) - 5 = -\frac{1}{2}$ (Clear Fractions!!)

3.) $4m - 9 + 3(m - 4) = 7$

4.) $-1 - 2(h + 2) = -2(6 - 3h) - 1$

Solve using elimination.

5.) $3x - 4y = -26$
 $5x - 6y = -40$

Solve using substitution.

6.) $4x + 2y = -40$
 $3x + y = -27$

Write systems of equations for the situations. Then solve algebraically.

7.) The admission fee at the Glen Ellyn fair is \$1.50 for children and \$4.00 for adults. Jack went on Saturday and there were a total of 2,200 people. The fairgrounds collected \$5,050. How many children and how many adults attended the fair?

8.) A farmhouse shelters 16 animals. Some of them are chickens and the others are cows. Altogether these animals have 60 legs. How many chickens and how many cows are in the farmhouse?

Simplify. Final answers should not contain negative exponents.

9.) $\frac{g^{-6}h^{-4}}{g^2h^{-9}}$

10.) $\frac{x^2y^9}{x^5y^3}$

11.) $\frac{a^3b^2c^{-2}}{a^{-2}b^5c^{-6}}$

Simplify.

12.) $x^3 \cdot y^5 \cdot y^2 \cdot x^4$

13.) $(-2y)^4$

14.) $(3g^3)^2 \cdot 2g^6$

Solve for y.

15.) $12x - 4y = -4$

16.) $x + 5y - 15 = 3x$

Find the slope.

17.) $(8, -1)$ and $(0, -7)$

18.) $(-4, 3)$ and $(-10, 9)$

Write a rule for the linear function.

19.)

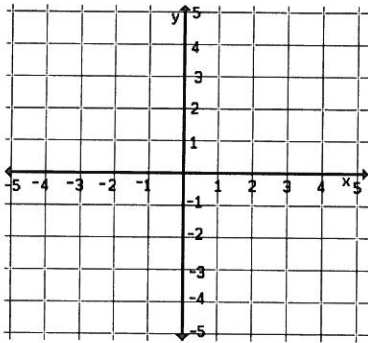
x	f(x)
-3	-1
0	1
3	3
6	5

Graph the following equations and identify the slopes and y-intercepts. Solve for y first.

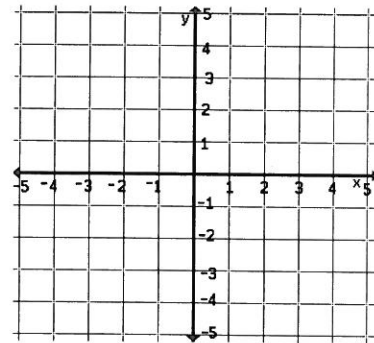
20.) $y = x - 4$

21.) $y = -3x + 1$

m = _____ b = _____



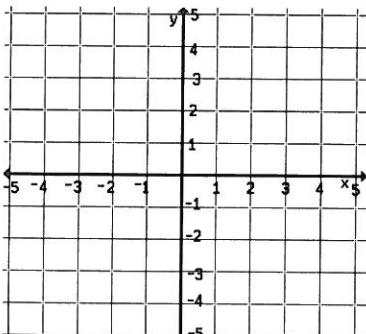
m = _____ b = _____



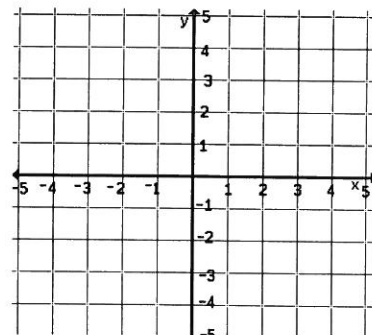
22.) $y = x$

23.) $y = 4$

m = _____ b = _____



m = _____ b = _____



Homework Answer Key:

#1 Solving Multi-Step Equations

1.) $x = 13$	2.) $x = -2.8$	3.) $x = 4$	4.) $h = 2.4$	5.) $n = -4$	6.) $x = -20$	7.) $x = 2.75$	8.) $x = 2$
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#2 Solving Equations with Fractions

1.) $x = 50$	2.) $m = 10.5$	3.) $x = -3.125$	4.) $n = -14$	5.) $x = -3.1$	6.) $x = -6.55$	7.) $x = -37.875$
8.) $x = -0.83$	9.) Distribute; It always comes first!					

#3 Solving Equations with Variables on Both Sides

1.) $x = -10$	2.) $y = -51$	3.) $y = 25$	4.) $x = 3$	5.) $x = 3$	6.) $x = -17$	7.) $x = 11$	8.) $x = -6.25$
9.) You need to plug in your answer to the left side of the equation and get an answer. Then you plug in the answer again to the right side of the equation and you should get the same answer. If both sides are the same, then the problem is correct!							

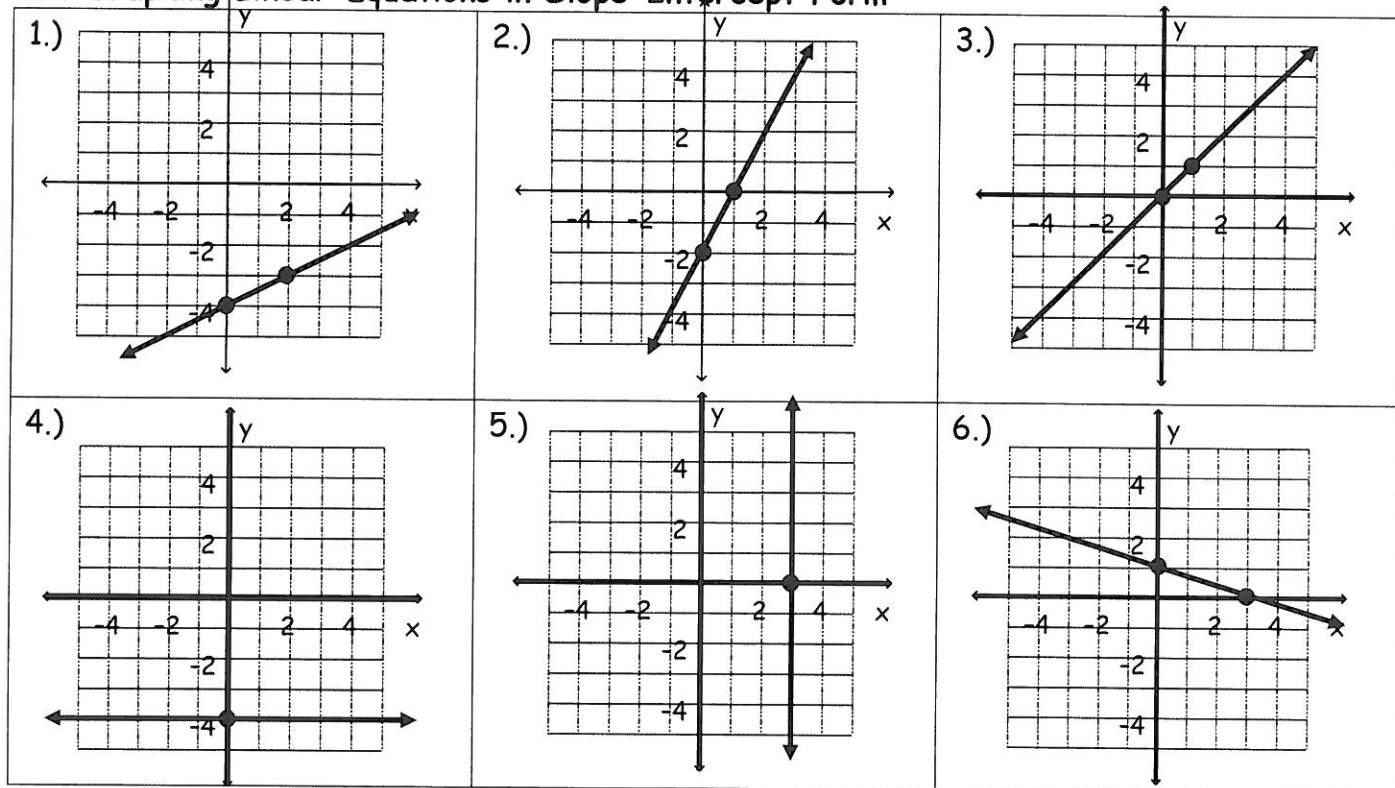
#4 Rewriting Equations and Formulas

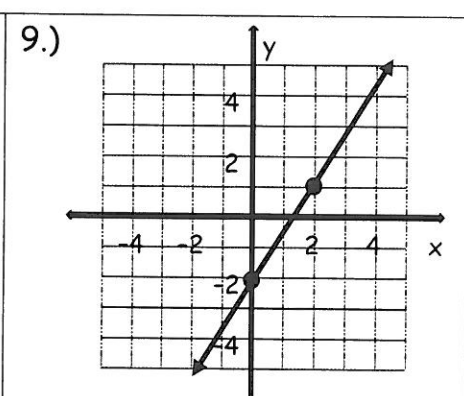
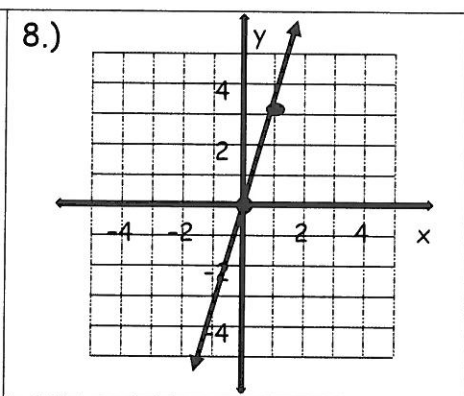
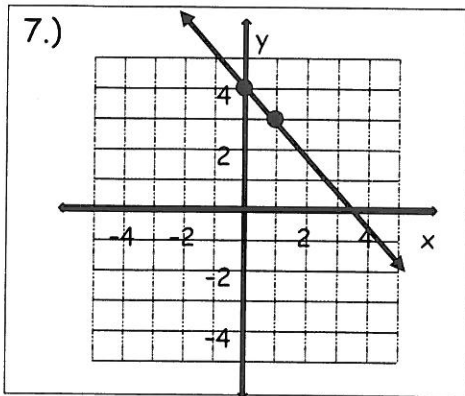
1.) $y = -\frac{1}{3}x - 3$	2.) $y = -\frac{2}{3}x + 2$	3.) $y = -x - 1$	4.) $y = -2x + 3$	5.) $y = \frac{1}{5}x + 2$	6.) $y = 2x + 1$
7.) $y = -\frac{13}{2}x + 5$	8.) $y = -\frac{2}{5}x + 4$	9.) $y = 4x + 7$			

#5 Slope of a Line

1.) 3	2.) -1	3.) 4	4.) $-\frac{1}{2}$	5.) $-\frac{2}{5}$	6.) $-\frac{3}{2}$	7.) 1	8.) -4	9.) 0	10.) undefined
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#6 Graphing Linear Equations in Slope-Intercept Form





#7 Writing Equations in Slope-Intercept Form

1.) $y = -\frac{3}{2}x + 1$	2.) $y = \frac{3}{5}x + 2$	3.) $y = -\frac{1}{4}x - 1$	4.) $y = \frac{7}{5}x + 4$	5.) $y = 2x + 3$	6a.) $y = \frac{1}{4}x + 6$
6b.) 8 inches	7.) They wrote the x-intercept instead of the y-intercept. Should be: $y = \frac{1}{2}x - 2$				

#8 Graphing Equations in Standard Form

1.) $x = (2, 0); y = (0, -5)$ 	2.) $x = (-2, 0); y = (0, 4)$ 	3.) $x = (4, 0); y = (0, 2)$ 	4.) $x = (-4, 0); y = (0, -4.5)$
5.) $14x + 18y = 126; x = \# \text{ of CDs and } y = \# \text{ of DVDs}$			

#9 Writing Rules for Linear Functions

1.) $f(x) = \frac{2}{3}x + 1$	2.) $f(x) = -2x + 9$	3.) $f(x) = 7x$	4.) $f(x) = \frac{1}{3}x + 11$	5a.) $p = 30d$	5b.) 900 lbs
6.) The order of x and y coordinates is reversed in the order pair			7a.) It is quicker and easier, but not all answers are visible.		

#10 Solving Systems of Linear Equations by Graphing

1.) (-1, -1)	2.) (1, -3)	3.) (3, 4)	4.) (4, -1)	5.) (0, 0)	6.) No Solution
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#11 Solving Systems of Linear Equations by Substitution

1.) (4, 3)	2.) (1, 2)	3.) (2, 3)	4.) (-6, 4)	5.) No Solution	6.) (7, -2)
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#12 Solving Systems of Linear Equations by Elimination

1.) (6, -6)	2.) (1, 4)	3.) (-4, -4)	4.) (10, -1)	5.) (2, -5)	6.) (4, -2)
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#13 Solving Systems of Equations Word Problems

1.) 89 A; 203 S	2.) 3 B; 5 V	3.) \$8 S; \$14 C	4.) 20 HD; 30 HAM	5.) 10 B; 10 S	6.) W = 5; L = 13
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#14 Product of Powers Property

1.) $-35x^{14}$	2.) $6y^5$	3.) x^6	4.) x^7y^7	5.) $6x^5$	6.) $16b^4$	7.) $24x^{19}$	8.) 3^{13}	9.) $18x^{15}$
10.) $9m^2n^2$	11.) x^2y^9	12.) $18x^5$						

#15 Quotient of Powers Property

1.) 12^{11}	2.) 7.6^{10}	3.) $(-9)^{12}$	4.) -8.5	5.) $(-1000)^5$	6.) t^2	7.) 11^{11}	8.) 2.5^6	9.) $(-7.9)^5$
10.) b^{20}	11.) $64m^5n^4$	12.) $r^3s^4t^9$	13.) p^8q^3	14.) $3a^2b^9$				

#16 Negative Exponents

1.) $\frac{a^2}{b^3}$	2.) $\frac{m^4n^5}{1}$	3.) $\frac{z^6}{w^2}$	4.) a^3b^6	5.) $\frac{d^{16}}{c^{10}}$	6.) $\frac{n^5}{m^5}$	7.) $\frac{a^4}{b^7}$	8.) $\frac{s^2}{p^8}$
9.) $\frac{1}{cd^2}$	10.) $\frac{a^5c^5}{b^3}$	11.) $\frac{hk^3}{j^4}$	12.) $\frac{y}{x^4z^7}$				

#17 The Pythagorean Theorem

1.) $c = 10$ ft	2.) $b = 12$ cm	3.) $a = 2$ m	4.) $b = 20$ yd	5.) 6 in	6.) $x = 29$ yd	7.) $x = 6.5$ cm
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#18 Review Homework

1.) $x = -9$	2.) $w = 4\frac{3}{4}$	3.) $m = 4$	4.) $h = 1$	5.) $(-2, 5)$	6.) $(-7, -6)$		
7.) 1500 children, 700 adults $c + a = 2,200$, $1.5c + 4a = 5,050$		8.) 14 cows, 2 chickens $x + y = 16$, $2x + 4y = 60$		9.) $\frac{h^5}{g^8}$	10.) $\frac{y^6}{x^3}$	11.) $\frac{a^5c^4}{b^3}$	
12.) x^7y^7	13.) $16y^4$	14.) $18g^{12}$	15.) $y = 3x + 1$	16.) $y = \frac{2}{5}x + 3$	17.) $\frac{3}{4}$	18.) -1	19.) $f(x) = \frac{2}{3}x + 1$
20.) $m = 1$ $b = -4$		21.) $m = -3$ $b = 1$		22.) $m = 1$ $b = 0$		23.) $m = 0$ $b = 4$	