

**I. Solve each linear equation. MUST SHOW WORK ON NOTEBOOK PAPER!**

1)  $7w + 2 = 3w + 30$

$4w = 28$   
 $w = 7$

2)  $2 - 3(x + 4) = 8$   
 $2 - 3x - 12 = 8$   
 $-3x = 18$   
 $x = -6$

3)  $6x - 12 + 2x = 3 + 8x - 15$

4)  $\frac{3b-4}{4b+1} = \frac{2}{3}$

5)  $7(a + 1) - 3a = 5 + 4(2a - 1)$

6)  $4(w - 1) + 3 = 4w - (w + 1)$

**II. Solve for y. Then identify the slope and y intercept.**

7)  $2x + 5y = 10$

8)  $3x - y = 5$

9)  $5x - 3y = 15$

**III. Evaluate the following for the given values.**

10) Given  $f(x) = 4x - 7$ . Find

11) Given  $m(x) = 4x^2 - 5$

12. Given:  $p(x) = -3x^2 + 2x + 1$

- a.  $f(2)$
- b.  $f(-3)$

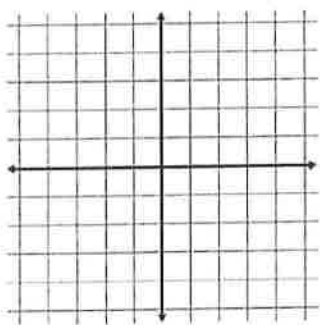
- a.  $m(3)$
- b.  $m(-1)$

- a.  $p(2)$
- b.  $p(-3)$

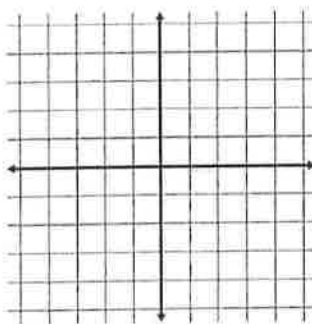
**IV. Graph the following lines.**

**IV. Graph each of the following equations.**

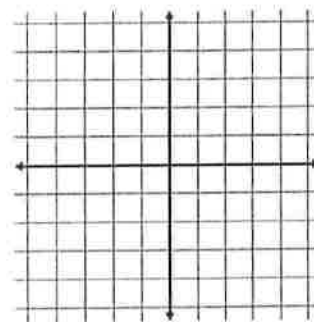
13)  $y = \frac{1}{2}x - 3$



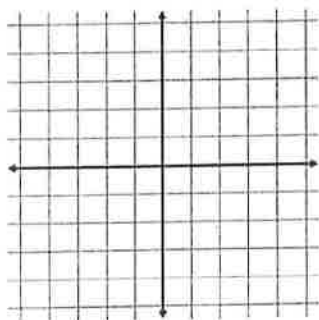
14)  $y = -\frac{2}{3}x + 1$



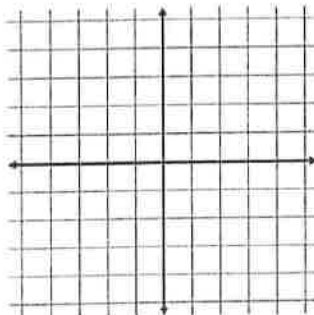
15)  $y = 3x - 1$



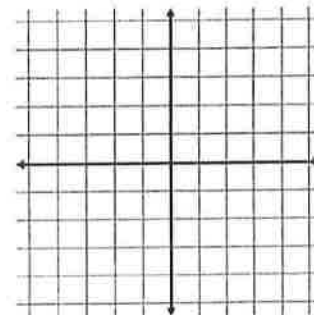
16)  $y = 4x$



17)  $2x + y = 4$



18)  $2x + 3y = 6$

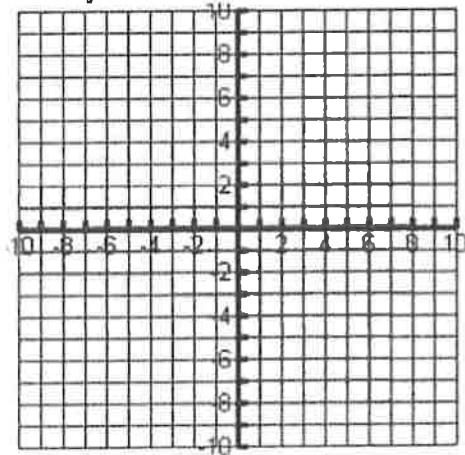


# 1-2 Homework

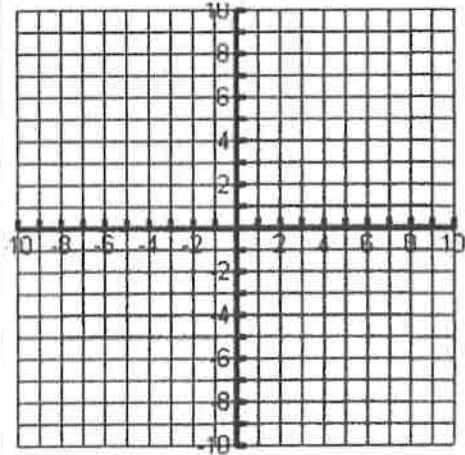
## Systems of Equations with Context

**Solve by Graphing.**

$$\begin{aligned} 3x - 6y &= 12 \\ 2x - 4y &= 8 \end{aligned}$$



$$\begin{aligned} x + y &= 2 \\ y &= -2x - 1 \end{aligned}$$



**Solve by Substitution.**

$$\begin{aligned} 2x - 3y &= -1 \\ y &= x - 1 \end{aligned}$$

$$\begin{aligned} y &= -3x + 5 \\ 5x - 4y &= -3 \end{aligned}$$

**Solve by Elimination.**

$$\begin{aligned} 5x + y &= 9 \\ 10x - 7y &= -18 \end{aligned}$$

$$\begin{aligned} -3x + 7y &= -16 \\ -9x + 5y &= 16 \end{aligned}$$

**For each question, define your variables, write a system of equations, and solve using any method. Please use a separate sheet of paper to show all work.**

1. The length of a rectangle is 3 cm more than twice the width. The perimeter of the rectangle is 42 cm. Find the dimensions of the rectangle.
2. Suppose you have \$200 in your account and you save \$10 dollars each week. Your friend has \$110 in their account and starts saving \$15 each week. When will your account balances be the same?
3. The difference of two numbers is 40. Their sum is 66. Find the numbers.
4. A youth group and their leaders visited Mammoth Cave. Two adults and 5 students in one van paid \$77. Two adults and 7 students in another van paid \$95. Find the adult price and student price of the tour.
5. A winter clothing store had a sale and Cory bought two pairs of gloves and four hats for \$43. Mark bought two pairs of gloves and two hats for \$30. How much did each pair of gloves and each hat cost?
6. At a recreation and sports facility, 3 members and 3 nonmembers pay a total of \$180 to take a yoga class. A group of 5 members and 3 nonmembers pay \$210 to take the same class. How much does it cost each member and nonmember to take the yoga class?
7. Joey has \$5.75 made up of all dimes and quarters. If Joey has 38 coins, how many of each coin does he have?

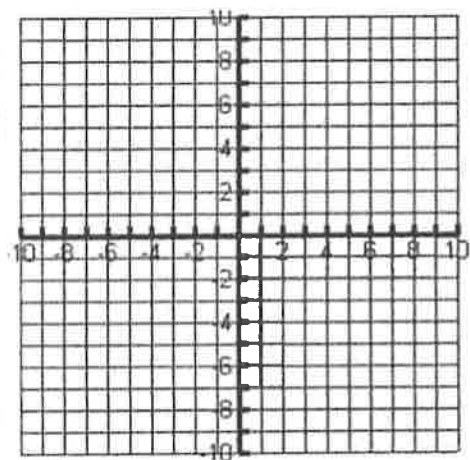
# 1-3 Homework

## Linear Inequalities with Context

Solve the system of inequalities.

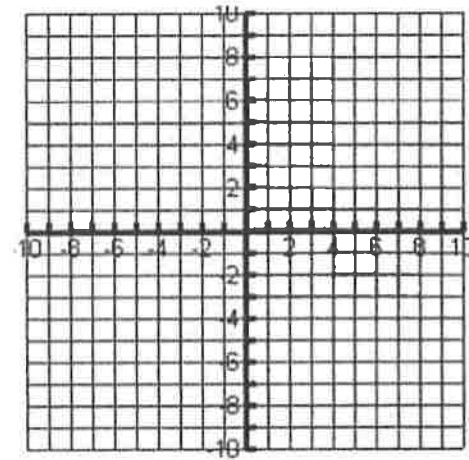
$$2x + 3y > -9$$

$$-x + y \leq 4$$



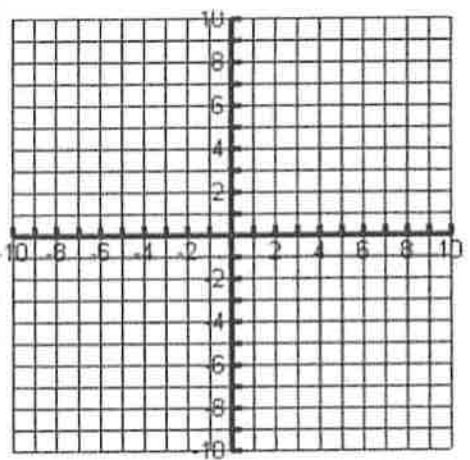
$$4x + 2y \leq -8$$

$$-x - 3y < 6$$



$$f(x) > 2x^2 - 6x - 7$$

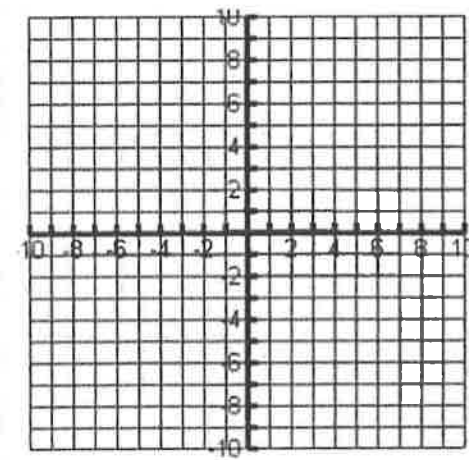
$$4x + f(x) \leq 10$$



$$-(x - 2)^2 + 7 \leq y$$

$$-2x + 2y < -6$$

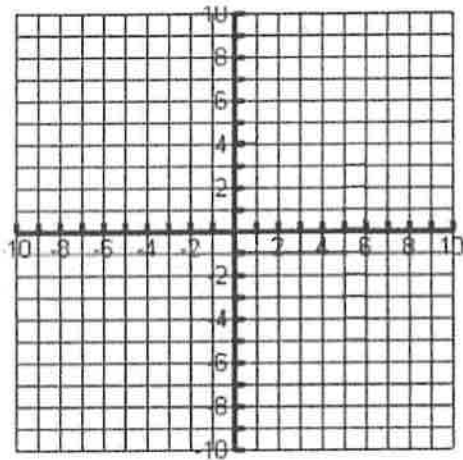
**\*\*Try to graph the quadratic function without a calculator.\*\***



$$y < -x + 4$$

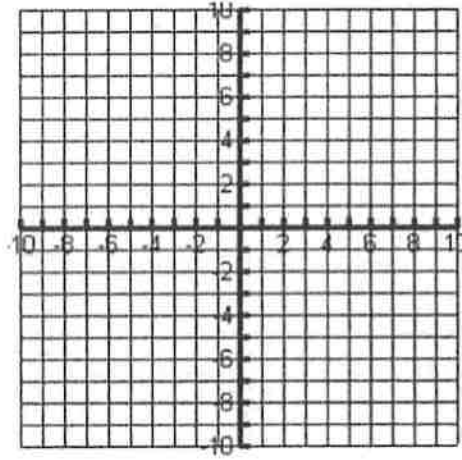
$$y < x - 6$$

$$y > -3x - 4$$

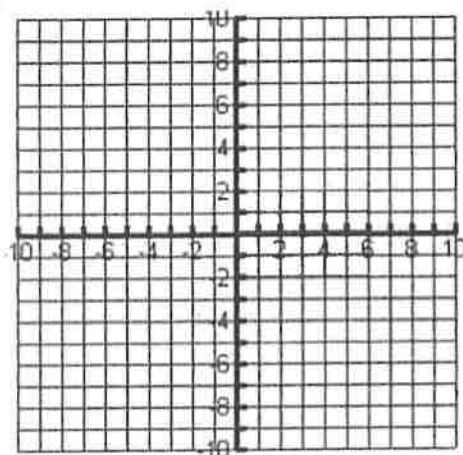


$$f(x) \leq -(x+3)^2 + 8$$

$$f(x) \geq 2(x+3)^2 - 6$$



A sundae requires 3 ice-cream scoops and 4 strawberries, and a milkshake requires 2 ice-cream scoops and 6 strawberries. Ramses wants to make sundaes and milkshakes with at most 25 ice-cream scoops and 37 strawberries. Let's form a system of inequalities to represent his conditions. Let  $x$  denote the number of sundaes he makes and  $y$  the number of milkshakes he makes. Graph your solution on the following graph.



For a person of height  $h$  (in inches), a healthy weight  $W$  (in pounds) is one that satisfies this system of inequalities:

$$w \geq \frac{19h^2}{703}$$

$$w \leq \frac{25h^2}{703}$$

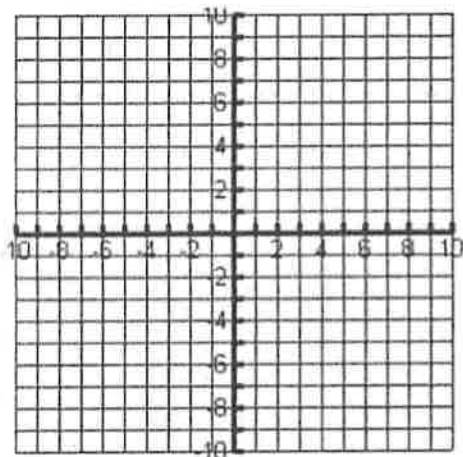
Graph the system for  $0 \leq h \leq 80$  using your graphing calculator. What is the range of healthy weights for a person 67 inches tall?

**1-4A Homework**

**Absolute Value Functions**

**Graph the following absolute value functions. Identify the vertex as well as the domain and range of each function.**

$y = |x - 3| + 2$

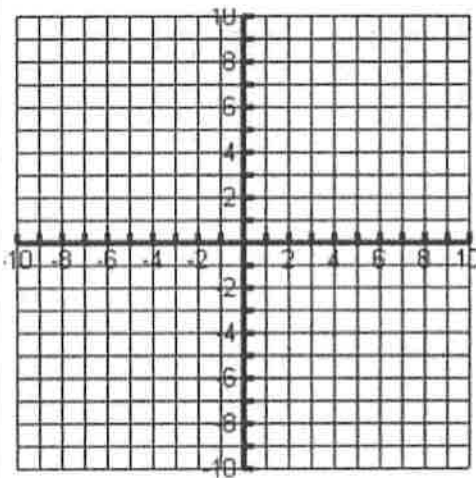


Vertex: \_\_\_\_\_

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

$y = |x + 5| - 4$

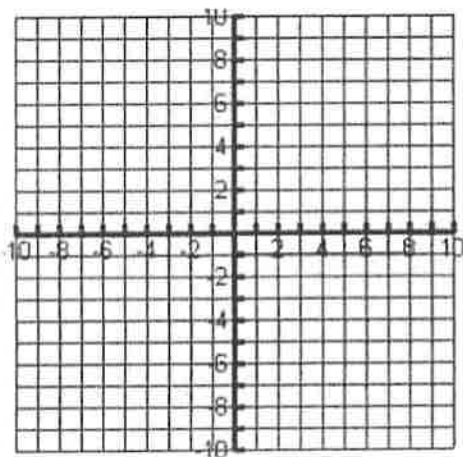


Vertex: \_\_\_\_\_

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

$y = -|x + 2| + 3$

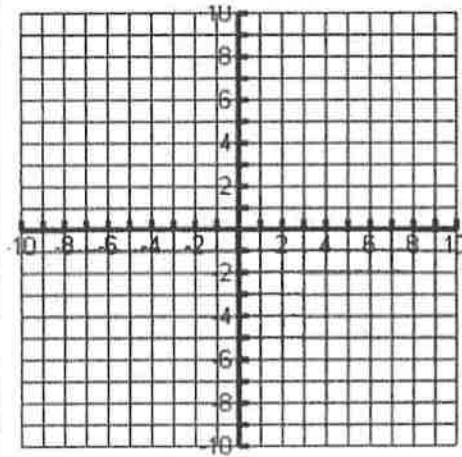


Vertex: \_\_\_\_\_

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

$y = 3|3x + 6| - 3$



Vertex: \_\_\_\_\_

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

**Given the following functions, state the transformations from the absolute value parent function.**

$y =  x-2  + 4$	
$y =  x+2  - 4$	
$y = - x  - 6$	
$y = 4 x+6  - 3$	
$y = \frac{1}{3} x-7  + 8$	
$y = -4 x+8  - 1$	

**Transformation Review: For each of the following functions, state the parent function following by the type of transformation that has occurred. Please record your responses in the indicated boxes.**

Function	Parent Function	Transformation
$y = x + 4$		
$y = -(x-2)^2 + 6$		
$y = \frac{1}{2}(x+2)^3 - 6$		
$y = 2\sqrt{x-4} + 6$		
$y = \sqrt[3]{x} + 7$		
$y = \frac{1}{x} - 8$		

HW 1-4 B

Directions: Solve each inequality on a separate piece of paper. Show all work.

1.  $|6b - 3| = 21$

2.  $|-2m + 7| = 1$

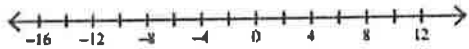
3.  $|b - 2| = 11$

4.  $5|9 - p| = 15$

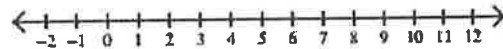
5.  $|10x + 10| - 2 = 78$

6.  $|6x - 6| + 5 = 59$

7.  $|4x + 8| > 40$



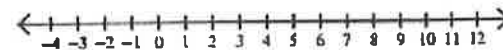
8.  $|-2x + 8| > 6$



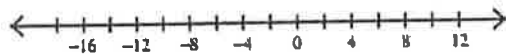
9.  $|-4n + 2| < 2$



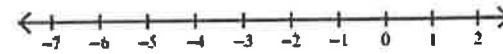
10.  $|4 - a| < 6$



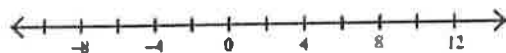
11.  $-2|-2p - 8| \geq -56$



12.  $9|9 + 3x| \leq 81$



13.  $|-3n + 6| - 9 > 15$





## Homework

### 1-6 Piecewise Functions

Evaluate the function for the given value of  $x$ .

$$f(x) = \begin{cases} 3, & \text{if } x \leq 0 \\ 2, & \text{if } x > 0 \end{cases}$$

$$g(x) = \begin{cases} x + 5, & \text{if } x \leq 3 \\ 2x - 1, & \text{if } x > 3 \end{cases}$$

$$h(x) = \begin{cases} \frac{1}{2}x - 4, & \text{if } x \leq -2 \\ 3 - 2x, & \text{if } x > -2 \end{cases}$$

1.  $f(2)$

2.  $f(-4)$

3.  $f(0)$

4.  $f\left(\frac{1}{2}\right)$

5.  $g(7)$

6.  $g(0)$

7.  $g(-1)$

8.  $g(3)$

9.  $h(-4)$

10.  $h(-2)$

11.  $h(-1)$

12.  $h(6)$

Match the piecewise function with its graph.

13.  $f(x) = \begin{cases} x - 4, & \text{if } x \leq 1 \\ 3x, & \text{if } x > 1 \end{cases}$

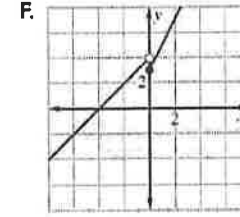
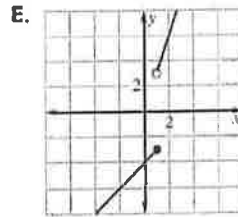
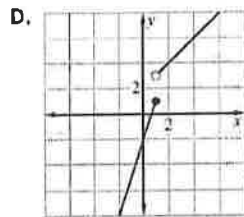
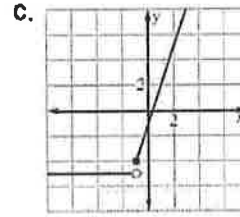
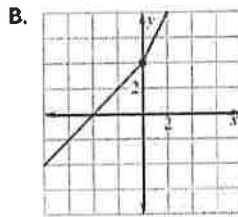
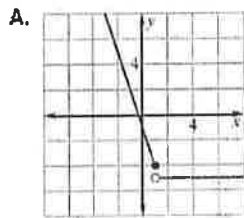
14.  $f(x) = \begin{cases} x + 4, & \text{if } x \leq 0 \\ 2x + 4, & \text{if } x > 0 \end{cases}$

15.  $f(x) = \begin{cases} 3x - 2, & \text{if } x \leq 1 \\ x + 2, & \text{if } x > 1 \end{cases}$

16.  $f(x) = \begin{cases} 2x + 3, & \text{if } x \geq 0 \\ x + 4, & \text{if } x < 0 \end{cases}$

17.  $f(x) = \begin{cases} 3x - 1, & \text{if } x \geq -1 \\ -5, & \text{if } x < -1 \end{cases}$

18.  $f(x) = \begin{cases} -3x - 1, & \text{if } x \leq 1 \\ -5, & \text{if } x > 1 \end{cases}$



Graph the function.

19.

$$f(x) = \begin{cases} x + 3, & \text{if } x \leq 0 \\ 2x, & \text{if } x > 0 \end{cases}$$

20.

$$f(x) = \begin{cases} x + 1, & \text{if } x < 0 \\ -x + 1, & \text{if } 0 \leq x \leq 2 \\ x - 1, & \text{if } x > 2 \end{cases}$$

21.

$$f(x) = \begin{cases} 2, & \text{if } x \leq -3 \\ -1, & \text{if } -3 < x < 3 \\ 3, & \text{if } x \geq 3 \end{cases}$$

22. The admission rates at an amusement park are as follows.

Children 5 years old and under: free

Children between 5 years and 12 years, inclusive: \$10.00

Children between 12 years and 18 years, inclusive: \$25.00

Adults: \$35.00

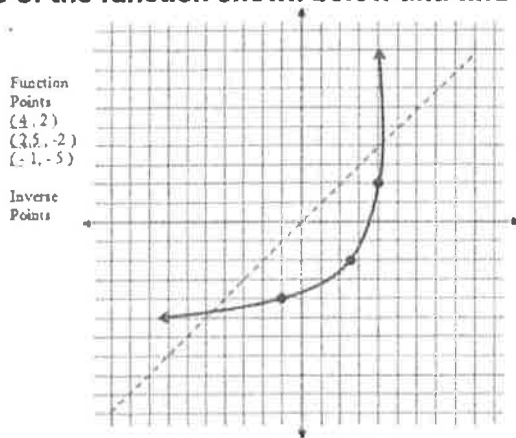
- Write a piecewise function that gives the admission price for a given age.
- Graph the function.

# 1-7

## Homework

### Introduction to Inverse Functions

1) Graph the inverse of the function shown below and find the inverse points.

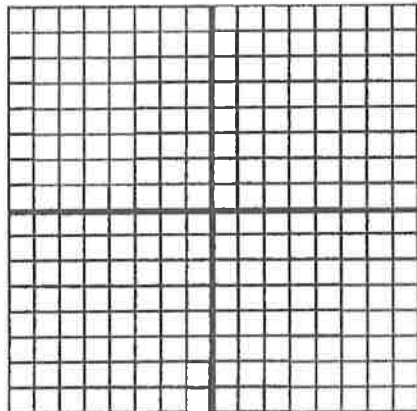


2) Find the algebraic inverse for each of the following:

a) $f(x) = 15x - 1$	
b) $y = \sqrt{x-3} + 2$	
c) $f(x) = (x-2)^2$	
d) $f(x) = \sqrt{x-4}$	
e) $f(x) = \frac{7x+5}{4}$	

3) Sketch the graphs of the following functions. Apply the Horizontal Line Test to determine if the function has an inverse function. Determine the inverse and graph it.

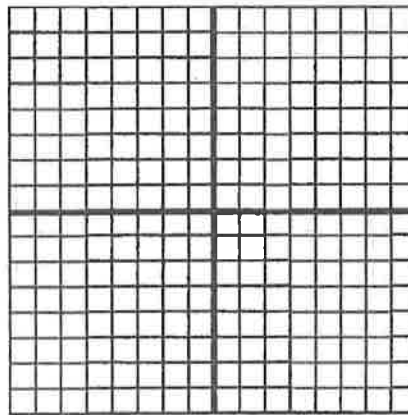
A.  $f(x) = \frac{1}{2}x - 5$



Horizontal Line Test:  
 Is the inverse of  $f(x)$  a function? \_\_\_\_\_

$f^{-1}(x) =$  \_\_\_\_\_

B.  $f(x) = 4x^2 - 1$



Horizontal Line Test:  
 Is the inverse of  $f(x)$  a function? \_\_\_\_\_

$f^{-1}(x) =$  \_\_\_\_\_

1-8

**Homework****Inverses in Context & Function Operations**

**#1 To make a long-distance call, your phone company charges \$1.50 to make the connection, and an additional \$0.10 for every minute that you are on the line once connected.**

**a. Write an equation for the price of a long-distance call,  $p$ , in terms of the length of the call in minutes,  $m$ :**

**b. When you get the phone bill, you see that your sister made a long-distance call that cost \$2.75. How long was she on the phone?**

**c. Think about how you solved part (b). Write an equation to determine  $m$  in terms of  $p$ . (That is, how do you calculate the length of a call based on its price?)**

**Operations on Functions**

<p>#2 <math>f(x) = x^2 - 6x + 2</math> Find <math>f(-2a)</math></p>	<p>#3 <math>f(x) = -2x^2 + 4x + 10</math> <math>g(x) = 3x^2 + 11x - 7</math> Find <math>f(x) - g(x)</math></p>
<p>#4 <math>f(x) = -2x^2 + 4x + 10</math> <math>g(x) = 3x^2 + 11x - 7</math> Find <math>f(x) + g(x)</math></p>	<p>#5 <math>f(x) = -2x^2 + 4x + 10</math> <math>g(x) = 3x^2 + 11x - 7</math> Find <math>f(x) \cdot g(x)</math></p>
<p>#6 <math>h(x) = 6x - 7</math> Find <math>h(a+b)</math></p>	<p>#7 <math>f(x) = x^2 - 6x + 2</math> <math>g(x) = 9x - 1</math> Find <math>2f(x) - 3g(x)</math></p>

<p>#8</p> <p><math>f(x) = x^2 - 6x + 2</math></p> <p><math>g(x) = 9x - 1</math></p> <p>Find <math>(f+g)(x)</math></p>	<p>#9</p> <p><math>f(x) = 3x^2 - 4</math></p> <p>Find <math>5[f(x+2)]</math></p>
<p>#10 Let <math>f(x) = x - 5</math> and <math>g(x) = x^2</math></p> <p>Find <math>(g \circ f)(-3x)</math></p>	<p>#11 Let <math>f(x) = x - 5</math> and <math>g(x) = x^2</math></p> <p>Find <math>(f \circ g)(-3x)</math></p>
<p>#11 Let <math>f(x) = x^2 + 4</math> and <math>g(x) = 2x</math></p> <p>Find <math>(g \circ f)(-2)</math></p>	<p>#12 Let <math>f(x) = x^2 + 4</math> and <math>g(x) = 2x</math></p> <p>Find <math>(f \circ g)(-2)</math></p>
<p>#13 Let <math>f(x) = x + 8</math> and <math>g(x) = 2x</math></p> <p>Find <math>(f \circ g)(4c)</math></p>	<p>#14 Let <math>f(x) = x + 8</math> and <math>g(x) = 2x</math></p> <p>Find <math>(g \circ f)(4c)</math></p>
<p>#15 Let <math>f(x) = x - 5</math> and <math>g(x) = x^2</math></p> <p>Find <math>(f \circ g)(3n)</math></p>	<p>#16 Let <math>f(x) = x - 5</math> and <math>g(x) = x^2</math></p> <p>Find <math>(g \circ f)(3n)</math></p>

**Math 3 ~ Unit 1: Functions & Their Inverses Test Review!**

**Section #1: Find the appropriate solution for the assigned function(s)**

$f(x) = 3x - 8$  and  $g(x) = -2x^2 + 5x - 7$

1.  $f(0)$
2.  $f(g(2))$
3.  $2[f(2) - g(1)]$
4.  $f(g(x))$
5.  $f(x) - g(x)$
6.  $f(2z) + g(z)$

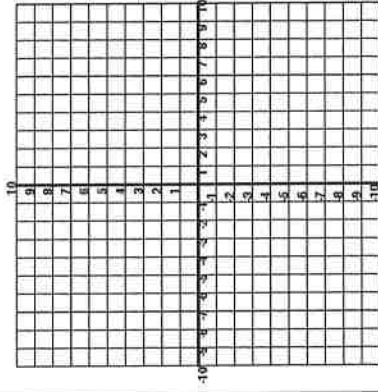
**Section #2: Find the solution(s) to the following system.**

7.  $y = -4x + 4$       **Solutions:** \_\_\_\_\_  
 $y = -x^2 - 2x + 4$

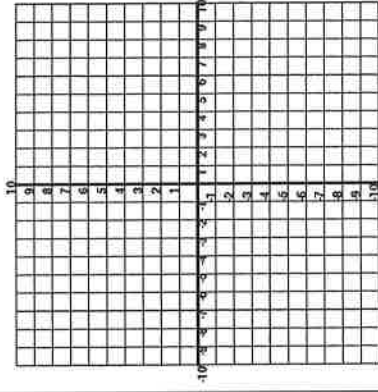
8.  $y = |x - 3|$       **Solutions:** \_\_\_\_\_  
 $y = \frac{-2}{5}x + \frac{27}{5}$

**Section #3 Sketch the solution for each inequality.**

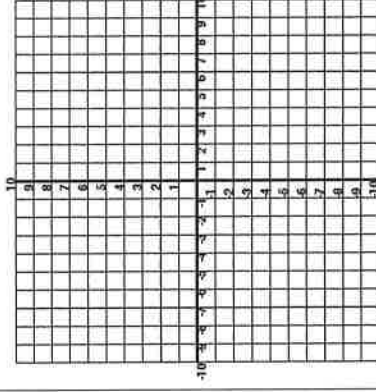
9.  $y > -x - 2$   
 $y < -5x + 2$



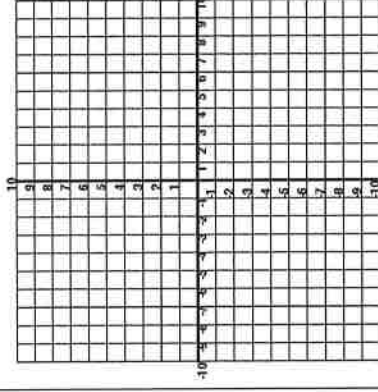
10.  $4x - 3y < 9$   
 $x + 3y > 6$



11.  $y \leq \frac{-5}{2}x - 2$   
 $y < \frac{-1}{2}x + 2$



12.  $3x + 2y \geq -2$   
 $x + 2y \leq 4$



**Please study your NOTES and Quizzes from this**

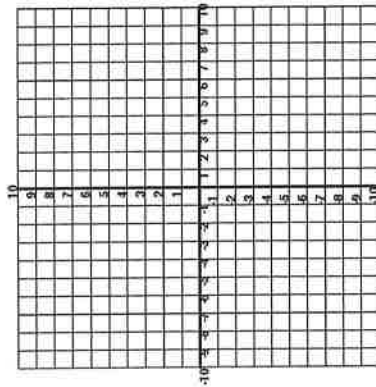
**Unit before tomorrow's test!!**

**Section #4: Solve the systems of linear equations through graphing, substitution, or elimination. Use method indicated if possible.**

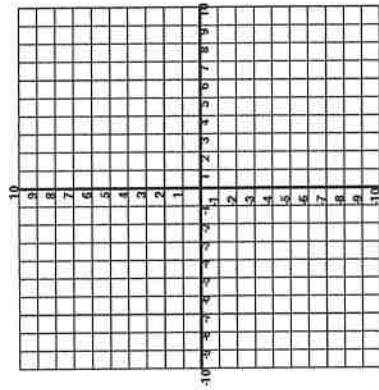
**13.** The equations  $8x + 4y = 28$  and  $-9x + 9y = 36$  represents the amount of money collected from the Stone Creek Movie Theater. If "y" represents the cost of an adult ticket to get into the movie and "x" represents the cost of a child ticket to get into a movie then what is the cost of each adult ticket? Use any method ☺

**METHOD 1: GRAPHING**

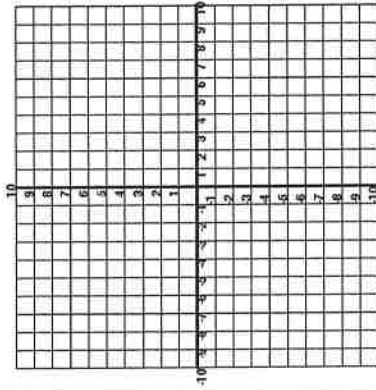
**14.**  $x + 4y = -8$   
 $3x + 2y = 6$



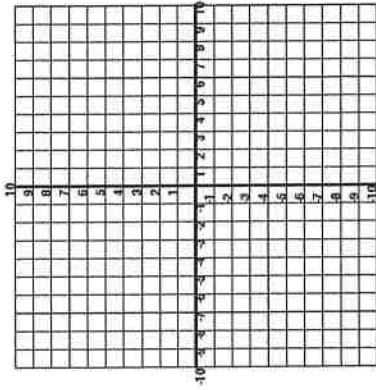
**15.**  $3x + 2y = 6$   
 $2x - 4y = -12$



**16.**  $x - y = 5$   
 $3x + y = 3$



**17.**  $7y = 2x + 35$   
 $3y = 2x + 15$



**METHOD 2: Elimination**

**18.**  $4x - 5y = 17$   
 $3x + 4y = 5$

**19.**  $5x - 2y = 10$   
 $3x + 2y = 6$

**20.**  $2y - 4x = -6$   
 $2y - 8x = -12$

**21.**  $\frac{1}{2}x + y = 3$   
 $-x + 2y = -6$

**Method 3: Substitution**

22.  $x - y = 1$   
 $x + 2y = 7$

23.  $-5m + 9n = 21$   
 $2m + 2n = 14$

**Section #5: Evaluate each piece-wise function for its given domain.**

24.  $f(x) = \begin{cases} 2x + 1 & x \geq 1 \\ x^2 + 3 & x < 1 \end{cases}$

25.  $f(x) = \begin{cases} x^2 - 1 & x \leq 0 \\ 2x - 1 & 0 < x \leq 5 \\ 3 & x > 5 \end{cases}$

$f(-10) =$   
 $f(-2) =$   
 $f(6) =$   
 $f(1) =$

$f(-2) =$   
 $f(0) =$   
 $f(5) =$   
 $f(7) =$

26. Looking at #24 find:  $2f(1) - 3(f(-3) + f(0))$

**Section #6: For each equation state the domain and range (using interval notation) then find the inverse and state the domain and range of the inverse. Also, determine if the inverse is a function.**

27.  $f(x) = 5x^3 - 7$   
 Domain: \_\_\_\_\_ Range: \_\_\_\_\_  
 $f^{-1}(x) =$  \_\_\_\_\_  
 Domain of  $f^{-1}(x)$ : \_\_\_\_\_  
 Range of  $f^{-1}(x)$ : \_\_\_\_\_

28.  $f(x) = -5x - 11$   
 Domain: \_\_\_\_\_ Range: \_\_\_\_\_  
 $f^{-1}(x) =$  \_\_\_\_\_  
 Domain of  $f^{-1}(x)$ : \_\_\_\_\_  
 Range of  $f^{-1}(x)$ : \_\_\_\_\_

29.  $f(x) = 3x^2 - 1$   
 Domain: \_\_\_\_\_ Range: \_\_\_\_\_  
 $f^{-1}(x) =$  \_\_\_\_\_  
 Domain of  $f^{-1}(x)$ : \_\_\_\_\_  
 Range of  $f^{-1}(x)$ : \_\_\_\_\_

30.  $f(x) = \sqrt{x - 4}$   
 Domain: \_\_\_\_\_ Range: \_\_\_\_\_  
 $f^{-1}(x) =$  \_\_\_\_\_  
 Domain of  $f^{-1}(x)$ : \_\_\_\_\_  
 Range of  $f^{-1}(x)$ : \_\_\_\_\_

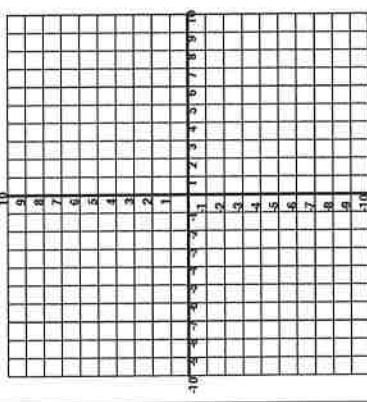
**Section #7 Absolute Value Equations & Functions**

31. Solve each of the following.

a.  $|x - 1| < 4$   
 b.  $3 + |x| \leq 5$   
 c.  $|x + 3| \geq 4$   
 d.  $|2m - 1| > 2$

32. Graph the following equation. Then describe the translate of  $g(x) = |x|$  to  $f(x)$ .

$f(x) = 3|x| - 2$



**33. Determine whether each of the following is a function. Justify your answer. Find the Domain and Range of each.**

- a.  $f(x) = \sqrt{x - 3}$   
 b.  $f(x) = -x^2 + 2x - 27$

34. You work forty hours a week at a furniture store. You receive a \$720 weekly salary, plus a 3% commission on sales over \$5000. Assume that you sell enough this week to get the commission. Given the functions  $f(x) = 0.03x$  and  $g(x) = x - 5000$ , which of  $(f \circ g)(x)$  and  $(g \circ f)(x)$  represents your commission? Also, how much will your salary be if your sales were \$14,000? How much will your salary be if your sales were \$4999?