

**Algebra 2 Review for Test#1: Systems of Linear Equations and Inequalities** A day (Nov 8) B day (Nov 9)  
 Review problems from the past. These types of problems will be on this test.

1) Solve. Remember to determine (+) case and (-) case

a)  $|q-3|=14$

(+) case  $q-3=14$   
 $q=17$

(-) case  $q-3=-14$   
 $q=-11$

$q=17, -11$

b)  $|2q+5|-15=-4$

$|2q+5|=11$

(+) case  $2q+5=11$   
 $2q=6$   
 $q=3$

(-) case  $2q+5=-11$   
 $2q=-16$   
 $q=-8$

$q=3, -8$

c)  $|3q+1|+10=7$

$|3q+1|=-3$

no solution

2) Evaluate each given expression.  $f(x)=7-3x$

$g(x)=-3x^2+1$

a) Find  $f(-2)=$   
 $=7-3(-2)$   
 $=7+6$   
 $=13$

b) Find  $g(2)=$   
 $=-3(2)^2+1$   
 $=-3 \cdot 4+1$   
 $=-12+1$   
 $=-11$

c) Find  $g(-1)=$   
 $=-3(-1)^2+1$   
 $=-3(1)+1$   
 $=-3+1$   
 $=-2$

d) Find  $5g(x)=$   
 $=5(-3x^2+x)$   
 $=-15x^2+5x$

e) Find  $f(g(x))=$   
 $=7-3(-3x^2+1)$   
 $=7+9x^2-3$   
 $=9x^2+4$

f) Find  $f(x)+g(x)=$   
 $7-3x+(-3x^2+1)$   
 $=-3x^2-3x+8$

3) Identify the following given the graph of the function.

$f(3)=5$

x-intercept(s):  $(2,0)$   $(-2,0)$

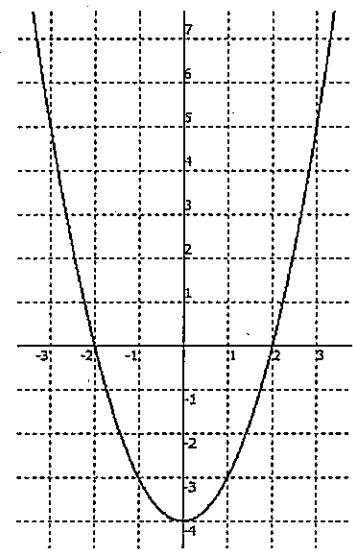
y-intercept:  $(0,-4)$

Write the equation of the function:  $f(x)=x^2-4$

Identify the domain:  $\mathbb{R}$

Identify the range:  $y \geq -4$

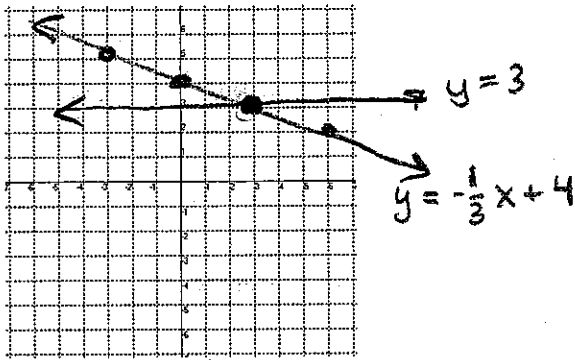
$f(x)=$



4) Solve by graphing.

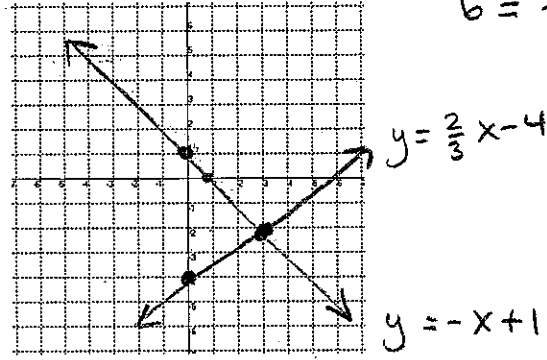
a) 
$$\begin{cases} y = -\frac{1}{3}x + 4 & m = -\frac{1}{3} \\ y = 3 & b = 4 \end{cases}$$

solution: (3, 3)



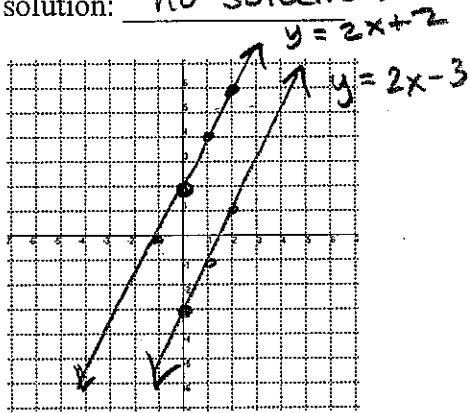
b) 
$$\begin{cases} x + y = 1 & \rightarrow y = -x + 1 & m = -1 \\ 2x - 3y = 12 & \rightarrow 2x - 3y = 12 & b = 1 \\ & -3y = -2x + 12 & \\ & y = \frac{2}{3}x - 4 & \end{cases}$$

solution: (3, 2)  
 $m = \frac{2}{3}$   
 $b = -4$



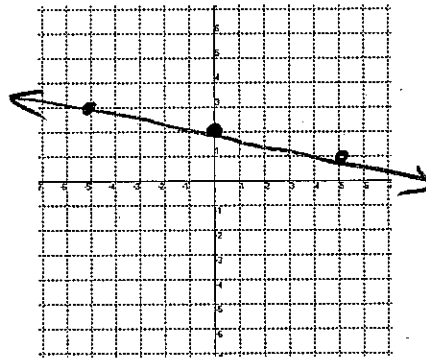
c) 
$$\begin{cases} y = 2x + 2 \\ y = 2x - 3 \end{cases}$$

solution: no solution



d) 
$$\begin{cases} x + 5y = 10 & \rightarrow y = -\frac{1}{5}x + 2 \\ -2x - 10y = -20 & \rightarrow y = -\frac{1}{5}x + 2 \end{cases}$$

solution: inf. many solutions



5) Solve using the substitution method.

a) 
$$\begin{cases} 2x - 3 = y \\ 4y + 3 = 5x \end{cases}$$

$$\begin{aligned} 4(2x - 3) + 3 &= 5x \\ 8x - 12 + 3 &= 5x \\ 8x - 9 &= 5x \\ 3x &= 9 \\ x &= 3 \end{aligned}$$

solution: (3, 3)

$$\begin{aligned} 2(3) - 3 &= y \\ 6 - 3 &= y \\ 3 &= y \end{aligned}$$

b) 
$$\begin{cases} 2x + 3y = 5 \\ x - 5y = 9 \rightarrow x = (5y + 9) \end{cases}$$

$$\begin{aligned} 2(5y + 9) + 3y &= 5 \\ 10y + 18 + 3y &= 5 \\ 13y &= -13 \\ y &= -1 \end{aligned}$$

solution: (4, -1)

$$\begin{aligned} 2x + 3(-1) &= 5 \\ 2x - 3 &= 5 \\ 2x &= 8 \\ x &= 4 \end{aligned}$$

6) Solve using the elimination method (linear combination method).

$$a) \begin{cases} 5x + 7y = 11 \\ -5x + 3y = 19 \end{cases}$$

$$\begin{aligned} 10y &= 30 \\ y &= 3 \end{aligned}$$

$$5x + 7(3) = 11$$

$$5x + 21 = 11$$

$$5x = -10$$

$$x = -2$$

solution:  $(-2, 3)$

$$b) \begin{cases} 2x - 5y = 10 \\ 4y = -15 + 3x \end{cases} \begin{matrix} \times 3 \\ \times 2 \end{matrix} \begin{cases} 2x - 5y = 10 \\ 3x + 4y = -15 \end{cases}$$

$$6x - 15y = 30$$

$$-6x + 8y = -30$$

$$-7y = 0$$

$$y = 0$$

$$2x - 5(0) = 10$$

$$2x = 10$$

$$x = 5$$

solution:  $(5, 0)$

7) Solve using the method of your choice.

$$a) \begin{cases} x - 2y = -6 \\ 2y = -10 + 5x \end{cases}$$

$$\begin{aligned} x - 2y &= -6 \\ x &= 2y - 6 \end{aligned}$$

$$2y = -10 + 5(2y - 6)$$

$$2y = -10 + 10y - 30$$

$$2y = 10y - 40$$

$$-8y = -40$$

$$y = 5$$

$$x = 2(5) - 6$$

$$x = 4$$

solution:  $(4, 5)$

$$b) \begin{cases} -2x + y = 6 \\ 4x - 2y = 5 \end{cases} \begin{matrix} \times 2 \\ \times 1 \end{matrix} \begin{cases} -2x + y = 6 \\ 4x - 2y = 5 \end{cases}$$

$$-4x + 2y = 12$$

$$4x - 2y = 5$$

$$0 = 17$$

solution: No solution

8) Solve each word problem. Your answers *must* be in the form of a sentence for full credit.

a. You are in charge of buying balloons for the upcoming prom. You want to use both latex and mylar balloons. The latex balloons cost \$0.10 each and the mylar balloons cost \$0.50 each. You need 125 balloons and you have \$32.50 to spend. How many of each kind of balloon can you purchase?

L: latex  
M: mylar

$$\begin{cases} 0.10L + 0.50M = 32.50 \\ L + M = 125 \end{cases}$$

$$M = 125 - L$$

using substitution

$$0.10L + 0.50(125 - L) = 32.50$$

$$0.10L + 62.50 - 0.50L = 32.50$$

$$-0.40L = -30$$

$$L = 75$$

$$M = 125 - 75$$

$$M = 50$$

solution: I should purchase 75 latex balloons and 50 mylar balloons.

x: first number  
y: second number

If you use substitution

b. The sum a number and another number is -42. The first number minus the second number is 52. Find the numbers. Remember: Your answer *must* be in the form of a sentence for full credit.

$$\begin{cases} x + y = -42 \\ x - y = 52 \end{cases}$$

$x = 52 + y$   
plug into 1st equation

$$\begin{aligned} (52 + y) + y &= -42 \\ 52 + 2y &= -42 \\ 2y &= -94 \\ y &= -47 \end{aligned}$$

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$$\begin{aligned} x &= 52 + (-47) \\ x &= 5 \end{aligned}$$

solution: One of the numbers is 5 and the other number is -47.

9) Graph the system of inequalities to determine the solution area.

a.  $\begin{cases} y \geq -2x + 1 \\ x < 3 \end{cases}$   $m = -2$   
 $b = 1$

b.  $\begin{cases} x + 2y \geq -6 \\ -x + 2y < 2 \end{cases}$   
 $\begin{cases} y \geq -\frac{1}{2}x - 3 \\ y < \frac{1}{2}x + 1 \end{cases}$

c.  $-2 < y \leq 3$

