Algebra 2 Chapter 3 Pre-Test

1.) (5 pts each, 10 pts total) Solve each of the following systems of equations by graphing.

a) $3x + 4y = 12$
   $-x + 2y = 6$

$\cancel{3x} + 4y = 12$
$x = 0 \quad y = 3 \quad (0,3)$

$3x + \cancel{4y} = 12$
$x = 4 \quad y = 0 \quad (4,0)$

$\cancel{-x} + 2y = 6$
$x = 0 \quad y = 3 \quad (0,3)$

$-x + \cancel{2y} = 6$
$x = -6 \quad y = 0 \quad (-6,0)$

(0,3)
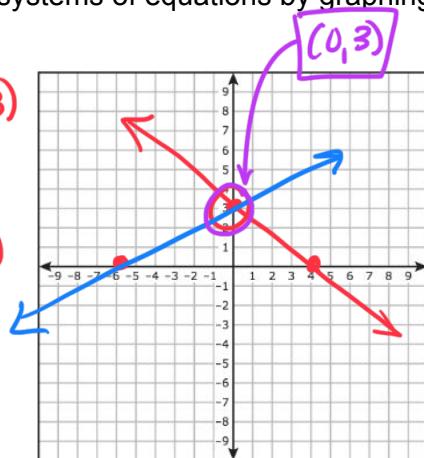
b) $2x + 5y = 10$
   $y = 2x - 2$
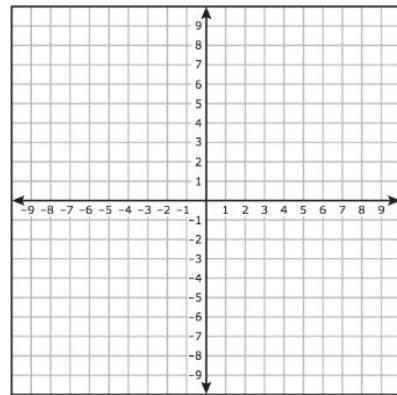
2.) (5 pts each, 10 pts total) Solve each of the following systems of equations through substitution.

$4x + 2y$

a) $4x + 2y = 20$
   $y = \boxed{2x - 2}$

$y = \boxed{2x + 3}$

$4x + 2(2x - 2) = 20$
$4x + 4x - 4 = 20$
$8x - 4 = 20$
$+4 \quad +4$
$\dfrac{8x}{8} = \dfrac{24}{8}$
$\boxed{x = 3}$
$\boxed{3,4}$

$4x + 2(2x + 3)$
$4x + 4x + 6$

$y = 2x - 2$
$y = 2(3) - 2$
$6 - 2$
$y = 4$

1

b) $5x - 3y = 7$
$6x + y = 13$

3.) (5 pts each, 10 pts total) Solve each of the following systems of equations through elimination.

a) $2x + 7y = -8$
$-2(x - 4y = 11)$

$2x + 7y = -8$
$-2x + 8y = -22$
_____
$\dfrac{15y}{15} = \dfrac{-30}{15}$
$y = -2$

$x - 4y = 11$
$x - 4(-2) = 11$
$x + 8 = 11$
$-8 \quad -8$
$x = 3$

$(3, -2)$

b) $4x - 5y = 31$
$2x + 3y = -1$

2

4.) (5 pts each, 10 pts total) Solve each of the following systems of equations through any method.

a) $3x + 4y = -21$
$-4x - 4y = 16$
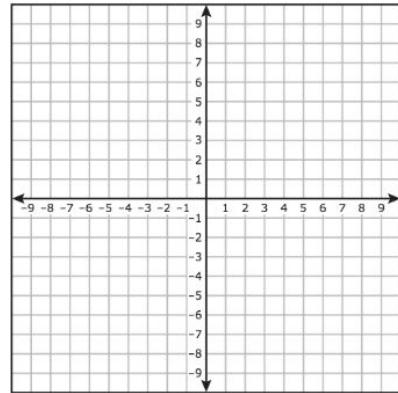
b) $8x + 4y = 16$
$y = -4x + 5$
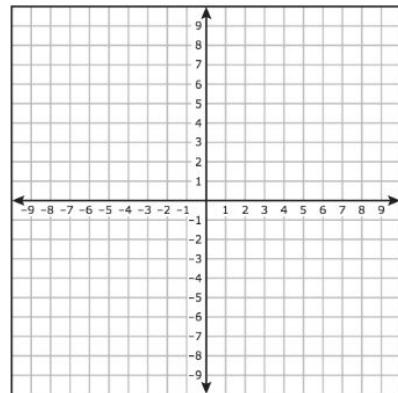
5.) (5 pts each, 15 pts total) Solve each of the following systems of inequalities by graphing.

a) $x + y > 2$
$x - y \leq 4$

$x + y = 2$
$x = 0 \quad y = 2 \quad (0, 2)$

$x - y = 4$
$x = 0 \quad y = -4 \quad (0, -4)$

$x + y = 2$
$x = 2 \quad y = 0 \quad (2, 0)$

$x - y = 4$
$x = 4 \quad y = 0 \quad (4, 0)$

$0 + 0 > 2$
$0 > 2 \text{ False}$

$0 - 0 \leq 4$
$0 \leq 4 \text{ true}!$

3
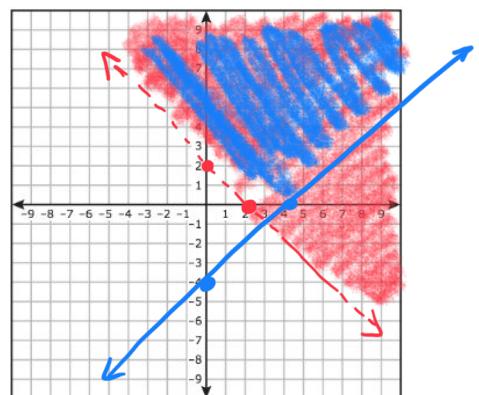
b) $2x + y > 2$
   $x - y \geq 3$
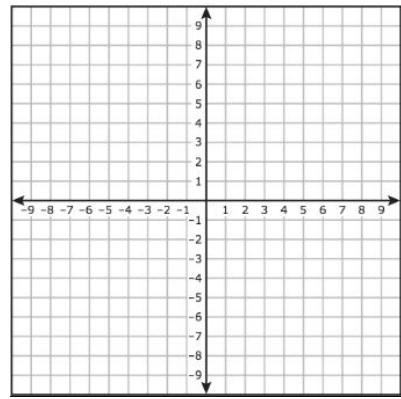
c) $y > 3x + 2$
   $y \leq -2x + 1$
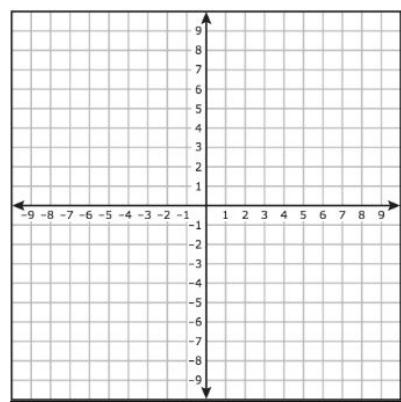
6.) (10 pts each, 20 pts total) Graph each system of constraints. Name all vertices. Then find the values of x and y that maximize or minimize the objective function.

a) $x + y \leq 6$

$2x + y \leq 10$

Quad I $\begin{cases} x \geq 0 \\ y \geq 0 \end{cases}$

$2x + \cancel{y} = 10$

$X = 5 \quad y = 0$

$\cancel{2x} + y = 10$

$X = 0 \quad y = 10$

Vertices:

Find the maximum for $P = 4x + y$

$(4,2)$ actual

$(0,6)$

$6(0,0)$

$(5,0)$

$X + y = 6$

$4 + y = 6$

$-4 \quad -4$

$y = 2$

$-X \cancel{+y} = -6$

$2x \cancel{+y} = 10$

$X = 4$
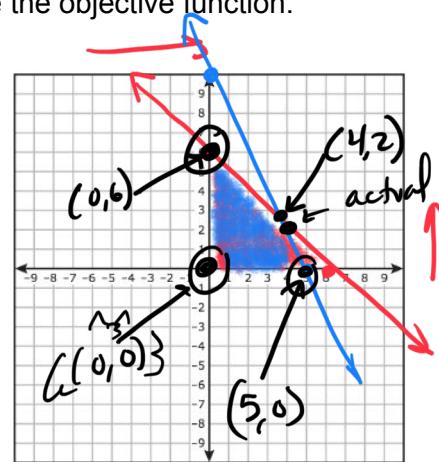
$4x + y$

$(0,6) \quad 4(0) + 6 = 6$

$(0,0) \quad 4(0) + (0) = 0$

$(5,0) \quad 4(5) + 0 = 20$

$(4,2) \quad 4(4) + 2 = 18$

b) $4x + 2y \leq 4$

$2x + 4y \leq 4$

$x \geq 0$

$y \geq 0$

Vertices:

Find the minimum for $P = 3x + y$

5
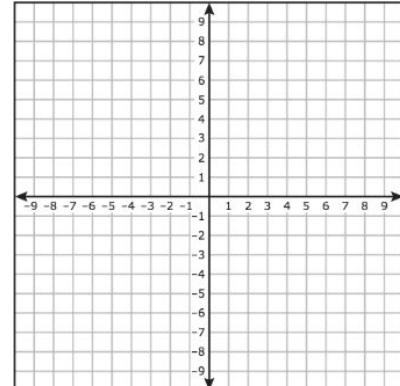
7.) (various pts each, 25 pts total) Solve each system using elimination.

a) (10 pts) Solve.

$2x - 3y + z = -3$
$x - 5y + 7z = -11$
$-10x + 4y - 6z = 28$

$-7(2x - 3y + z = -3)$
$x - 5y + 7z = -11$

$6(2x - 3y + z = -3)$
$-10x + 4y - 6z = 28$

$-14x + 21y - 7z = 21$
$x - 5y + 7z = -11$

$12x - 18y + 6z = -18$
$-10x + 4y - 6z = 28$

"5" $2x - 14y = 10$

$-13x + 16y = 10$ "4"

$2(-13x + 16y = 10)$
$13(2x - 14y = 10)$

$-26x + 32y = 20$
$26x - 182y = 130$
_____

$-13x + 16y = 10$

$-13x + 16(-1) = 10$
$-13x - 16 = 10$
$ +16 +16$
$\dfrac{-13x}{-13} = \dfrac{26}{-13}$
$\boxed{x = -2}$

$2x - 3y + z = -3$
$2(-2) - 3(-1) + z = -3$
$-4 + 3 + z = -3$
$-1 + z = -3$
$ +1 +1$
$\boxed{z = -2}$

$\dfrac{-150y}{-150} = \dfrac{150}{-150}$
$\boxed{y = -1}$

b) (2.5 pts) Graph the above solution.

$\left(-2, -1, -2\right)$
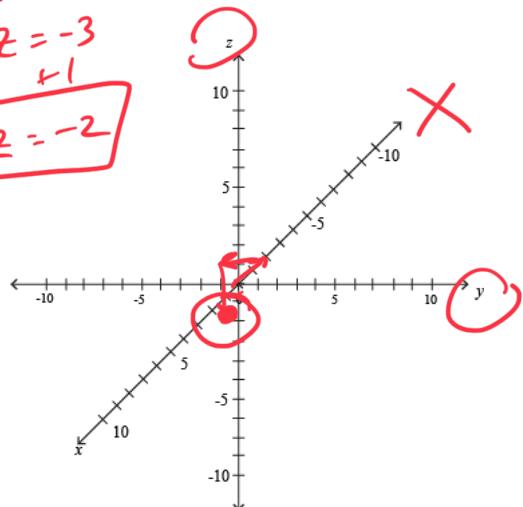
c) (10 pts) Solve.

$$14x - 3y + 5z = -15$$
$$3x + 2y - 6z = 10$$
$$7x - y + 4z = -5$$

d) (2.5 pts) Graph the above solution.