Algebra 2 Chapter 3 Pre-Test

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

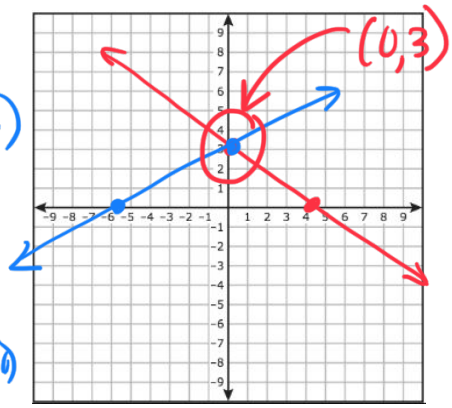
a) $3x + 4y = 12$
$\boxed{-x + 2y = 6}$

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

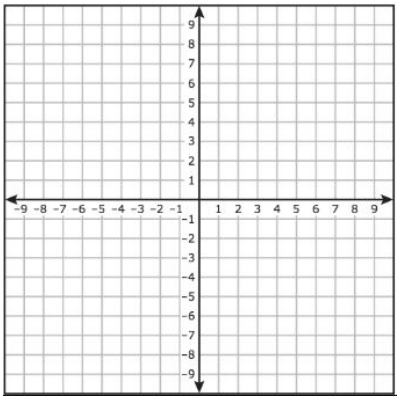
$3\cancel{x} + 4y = 12$
$x = 0 \quad y = 3$
$(0,3)$

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

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



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



2.) (5 pts each, 10 pts total) Solve each of the following systems of equations through substitution.

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

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

$y = 2x - 2$
$y = 2(3) - 2$
$y = 6 - 2$
$\boxed{y = 4}$

$(3,4)$

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

$6x + y = 13$
$-6x \quad -6x$
$y = -6x + 13$

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

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

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

$\cancel{2x} + 7y = -8$
$+ \; \cancel{-2x} + 8y = -22$

$\frac{15y}{15} = \frac{-30}{15}$

$\boxed{y = -2}$

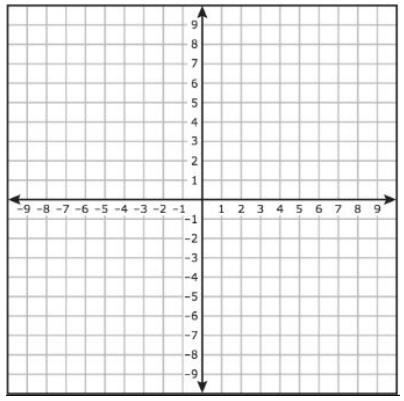
$(3, -2)$

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

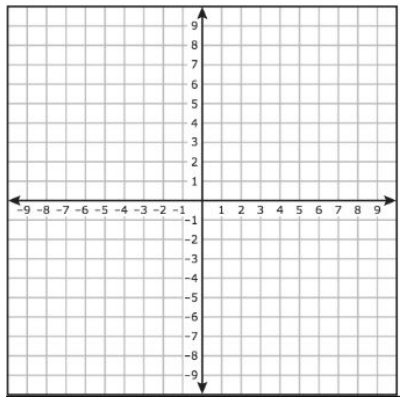
b) $4x - 5y = 31$
$2x + 3y = -1$

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) $8x + 4y = 16$
$y = -4x + 5$

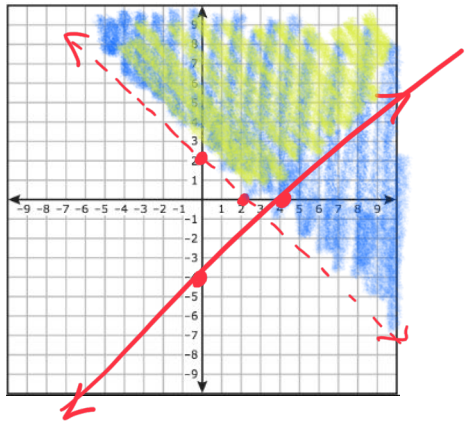


5.) (5 pts each, 15 pts total) Solve each of the following systems of inequalities by graphing.

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

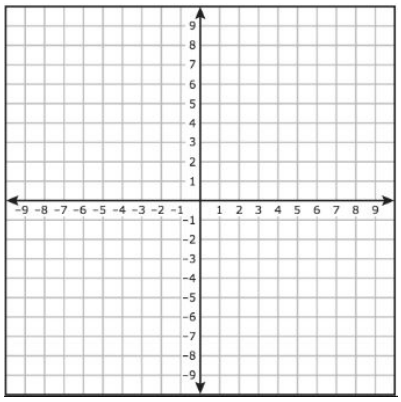
$\cancel{x} + y = 2$
$x = 0 \quad y = 2$
$(0,2)$
$x + \cancel{y} = 2$
$x = 2 \quad y = 0$
$(2,0)$
$\{(0,0)\}$
$x + y > 2$
$0 > 2$ false

$(0,-4)$
$\cancel{x} - y = 4$
$x = 0 \quad y = -4$
$x - \cancel{y} = 4$
$x = 4 \quad y = 0$
$(4,0)$
$\{(0,0)\}$
$x - y \leq 4$
$0 \leq 4$ true



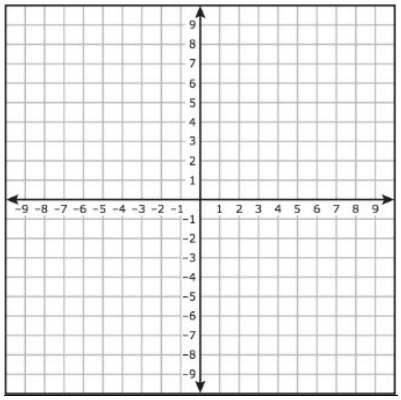
b) $2x + y > 2$

$x - y \geq 3$



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.

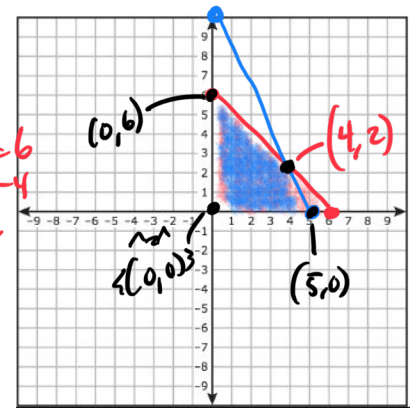
a) $x + y \leq 6$
$2x + y \leq 10$
$x \geq 0$
$y \geq 0$

Eliminate the floater

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

$-x - \cancel{y} = -6$
$2x + \cancel{y} = 10$
$x = 4$

$4 + y = 6$
$-4 \quad -4$
$y = 2$



Vertices:

(0,0), (0,6), (5,0)
(4,2)

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

$4x + y$

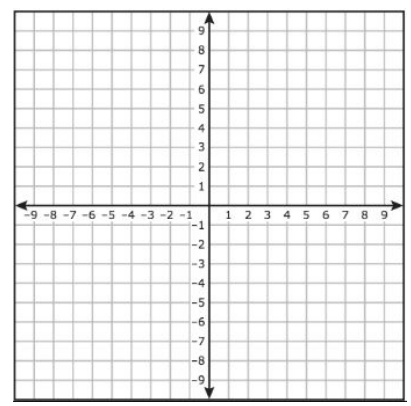
$(0,0) \rightarrow 4(0) + 0 = 0$

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

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

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

b) $4x + 2y \leq 4$
$2x + 4y \leq 4$
$x \geq 0$
$y \geq 0$



Vertices:

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

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

a) (10 pts) Solve.

① $2x - 3y + z = -3$

② $x - 5y + 7z = -11$

③ $-10x + 4y - 6z = 28$

① $2x - 3y + z = -3$

② $-2(x - 5y + 7z = -11)$

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

$-2x + 10y - 14z = 22$

$7y - 13z = 19$

② $10(x - 5y + 7z = -11)$

③ $-10x + 4y - 6z = 28$

$10x - 50y + 70z = -110$

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

$-46y + 64z = -82$

$\frac{-46y}{2} + \frac{64z}{2} = \frac{-82}{2}$

$-23y + 32z = -41$

$23(7y - 13z = 19)$

$7(-23y + 32z = -41)$

$161y - 299z = 437$

$-161y + 224z = -287$

$-75z = 150$

$\frac{-75z}{-75} = \frac{150}{-75}$

$\boxed{z = -2}$

$7y - 13z = 19$

$7y - 13(-2) = 19$

$7y + 26 = 19$

$-26 \quad -26$

$\frac{7y}{7} = \frac{-7}{7}$

$\boxed{y = -1}$

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

$x - 5(-1) + 7(-2) = -11$

$x + 5 - 14 = -11$

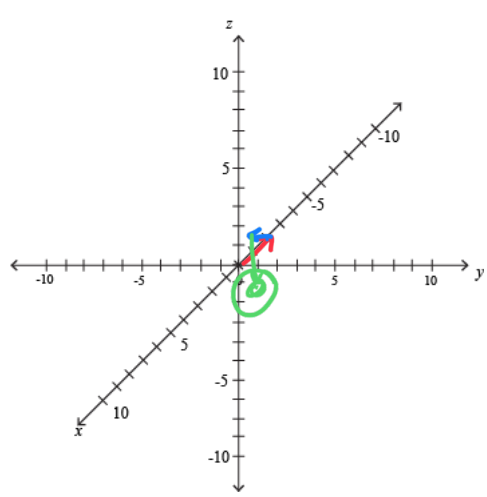
$x - 9 = -11$

$+9 \quad +9$

$\boxed{x = -2}$

$\boxed{\begin{array}{c} x \quad y \quad z \\ (-2, -1, -2) \end{array}}$

b) (2.5 pts) Graph the above solution.



c) (10 pts) Solve.

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

d) (2.5 pts) Graph the above solution.