Algebra 2 Chapter 3 Pre-Test

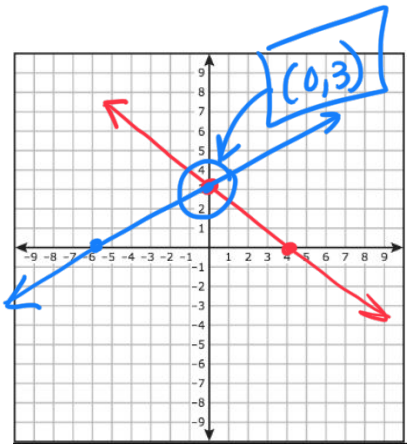
1.) (5 pts each, 10 pts total) Solve each of the following systems of equations by graphing.

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

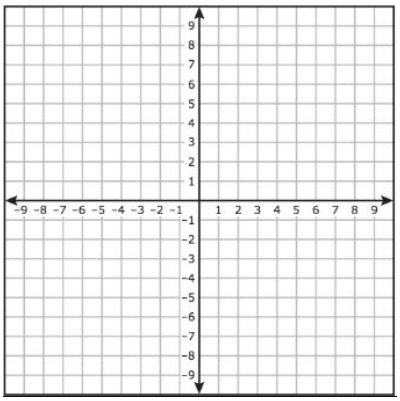
$3x+4y=12$ (0,3)
$x=0$ $y=3$

$3x+4y=12$ (4,0)
$x=4$ $y=0$

$-x+2y=6$ (-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.

a) $4x + 2y = 20$
$y = 2x - 2$

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

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

(3, 4)

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

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

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

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

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

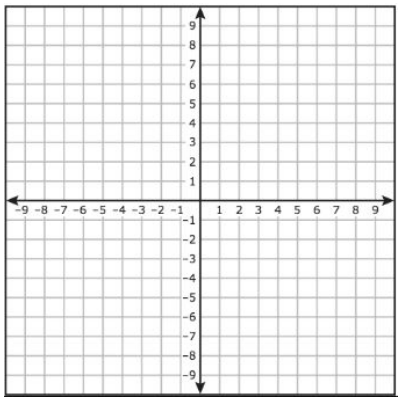
$2x + 7y = -8$
$+ \; -2x + 8y = -22$
$15y = -30$
$\frac{15y}{15} = \frac{-30}{15}$
$y = -2$

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

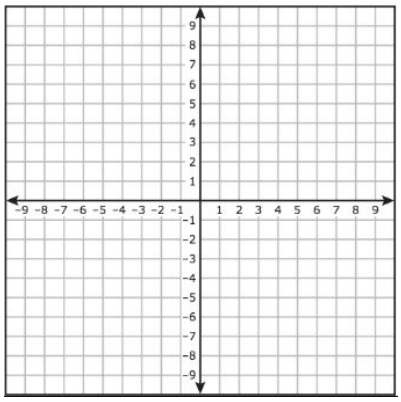
b) $4x - 5y = 31$
$2x + 3y = -1$

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

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

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

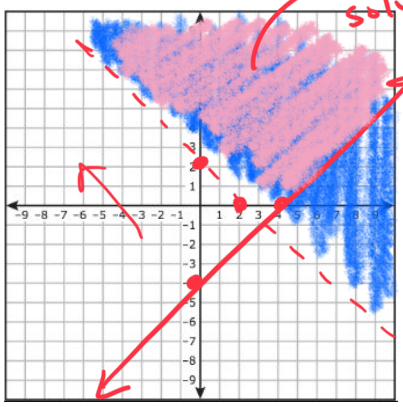
$x - y = 4$
$x=4 \quad y=0 \quad (4,0)$

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

(0,0)

$0+0 > 2$
$0 > 2$
false

overlap is solution

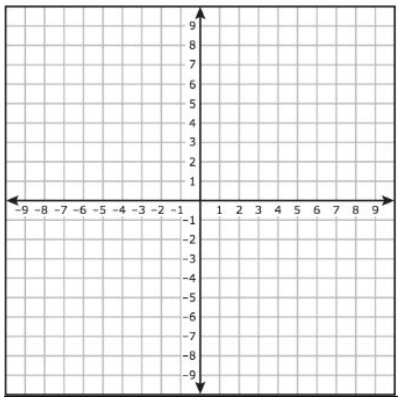


(0,0)

$0 - 0 \leq 4$
$0 \leq 4$
true

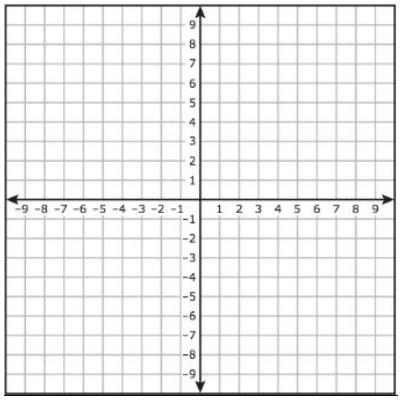
b) $2x + y > 2$

$x - y \geq 3$



c) $y > 3x + 2$

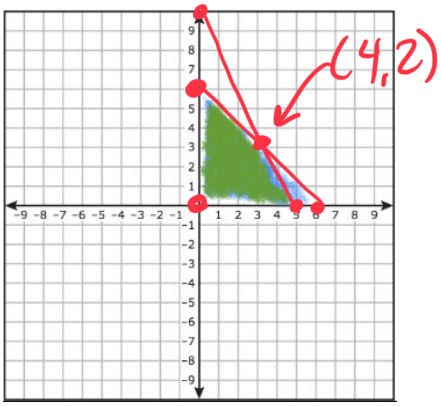
$y \leq -2x + 1$



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

(5,0) (0,10) } Quad I



Vertices:

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

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

$-(x + y = 6)$ → $-x - y = -6$
$2x + y = 10$ → $2x + y = 10$
$x = 4$

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

$4x + y$

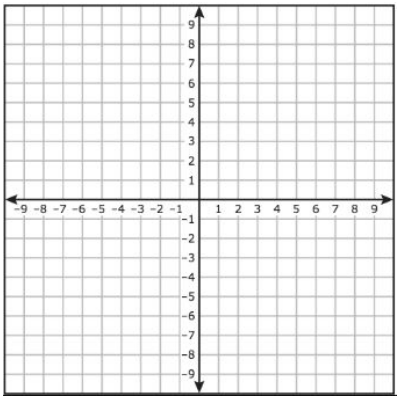
(0,0) $4(0) + 0 = 0$

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

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

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

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



Vertices:

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

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

a) (10 pts) Solve.

$$\begin{aligned} &(1)\quad 2x - 3y + z = -3\\ &(2)\quad x - 5y + 7z = -11\\ &(3)\quad -10x + 4y - 6z = 28 \end{aligned}$$

(1) $2x - 3y + z = -3$

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

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

(4) $7y - 13z = 19$

(2) $10(x - 5y + 7z = -11)$

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

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

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

$-46y + 64z = -82$

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

(5) $-23y + 32z = -41$

(4) $23(7y - 13z = 19)$

(5) $7(-23y + 32z = -41)$

$161y - 299z = 437$

$-161y + 224z = -287$

$-75z = 150$

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

$z = -2$

$x - 5y + 7z = -11$ $\quad 7y - 13z = 19$

$x - 5(-1) + 7(-2) = -11$ $\quad 7y - 13(-2) = 19$

$x + 5 - 14 = -11$ $\quad 7y + 26 = 19$

$-26 \quad -26$

$x - 9 = -11$ $\quad \frac{7y}{7} = \frac{-7}{7}$

$+9 \quad +9$ $\quad y = -1$

$x = -2$

$(-2, -1, -2)$

b) (2.5 pts) Graph the above solution.