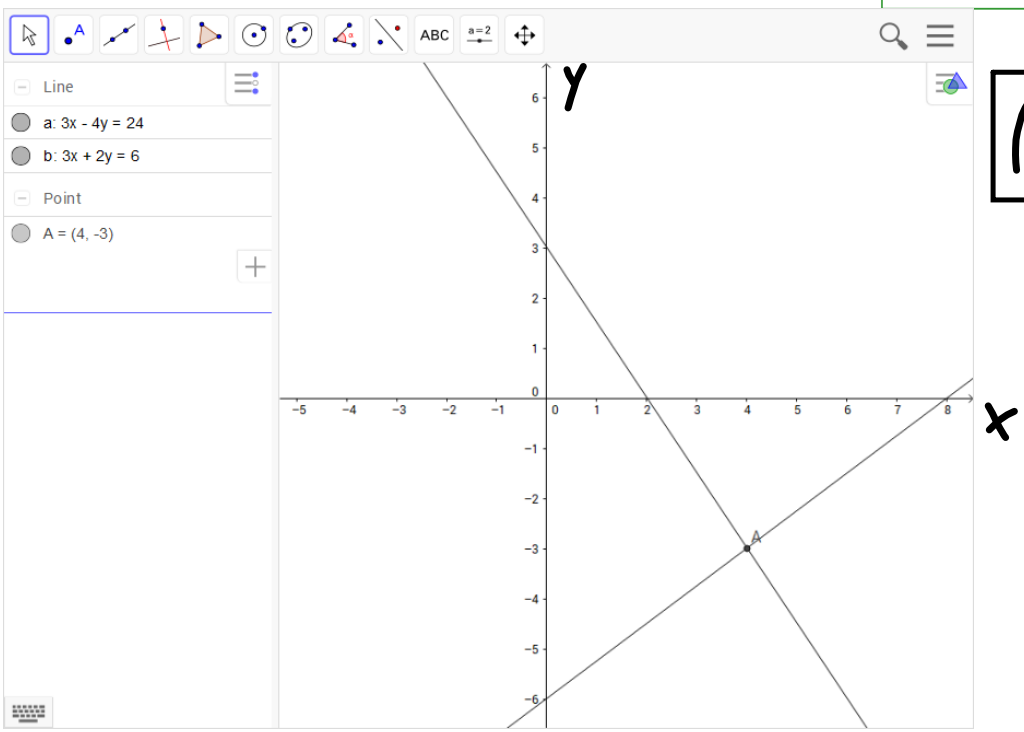
1) (6 points) Solve the following system of equations by using the **Graphing Method**.

$3x - 4y = 24$

$3x + 2y = 6$



(4, -3)

2) (6 points) Solve the following system of equations by using the **Method of Substitution**.

$$\begin{array}{|c|}\hline 6x - 8y = 6 \\ \hline -3x + 2y = -2 \\ \hline \end{array}$$

$-3x + 2y = -2$

$2y = 3x - 2$

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

$6x - 8y = 6$

$6x - 8\left(\frac{3}{2}x - 1\right) = 6$

$6x - 12x + 8 = 6$

$-6x = -2$

$x = \frac{1}{3}$

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

$y = \frac{3}{2}\left(\frac{1}{3}\right) - 1$

$y = \frac{1}{2} - 1$

$y = -\frac{1}{2}$

$\left(\frac{1}{3}, -\frac{1}{2}\right)$

3) (6 points) Solve the following system of equations by using the **Method of Elimination**.

$$\begin{array}{|c|}\hline 3x - 2y = 22 \\ \hline -5x + 6y = -13 \\ \hline \end{array}$$

$9x - 6y = 66$
$-5x + 6y = -13$

$4x = 53$

$x = \frac{53}{4}$

$15x - 10y = 110$
$-15x + 18y = -39$

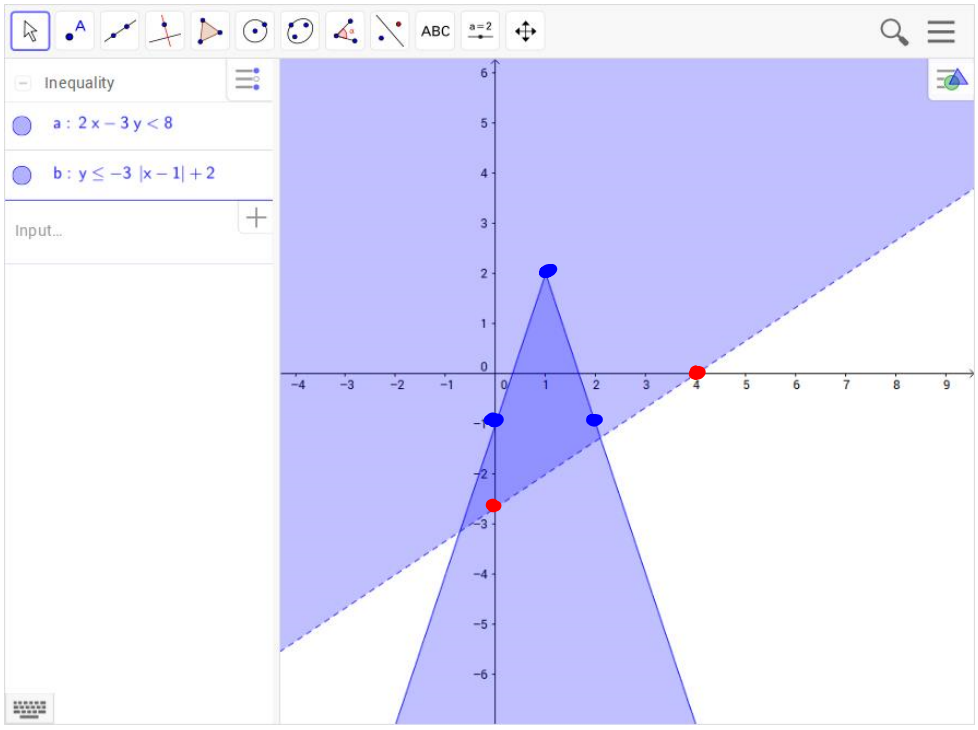
$8y = 71$

$y = \frac{71}{8}$

$\left(\frac{53}{4}, \frac{71}{8}\right)$

4) (6 points) Graph the given system of inequalities.

$$2x - 3y < 8$$
$$y \leq -3|x - 1| + 2$$



$2x - 3y < 8$

X_{INT}: 4

Y_{INT}: $-\frac{8}{3}$

DOTTED LINE

T.P. (0,0) TRUE

$y \leq -3|x-1| + 2$

VERTEX: (1, 2)

OPENS DOWN

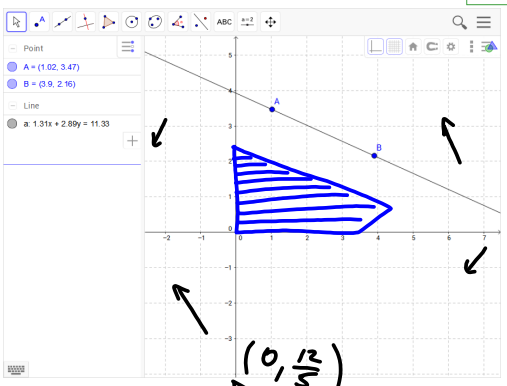
3 TIMES AS STEEP

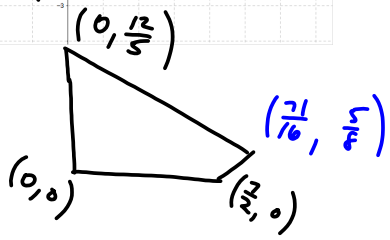
SOLID

SHADE BELOW

5) (8 points) Maximize the function $f(x,y) = 2x - \frac{5}{3}y$ subject to the following constraints.

$x \geq 0$
$y \geq 0$
$2x - 3y \leq 7$
$2x + 5y \leq 12$





$2x-3y=7$
$2x+5y=12$

$2x-3y=7$
$-2x-5y=-12$
$-8y=-5$
$y=\frac{5}{8}$

$10x-15y=35$
$6x+15y=36$
$16x=71$
$x=\frac{71}{16}$

$f(x,y) = 2x - \frac{5}{3}y$

$f(0,0) = 0$

$f(0,\frac{12}{5}) = -4$

$f(\frac{7}{2},0) = 7$

$f(\frac{71}{16},\frac{5}{8}) = 2(\frac{71}{16}) - \frac{5}{3}(\frac{5}{8})$

$= \frac{71}{8} - \frac{25}{24}$

$= \frac{213-25}{24} = \frac{188}{24}$

$= \frac{47}{6}$

MAX IS $\frac{47}{6}$ AND IT OCCURS AT $(\frac{71}{16}, \frac{5}{8})$.

6) (8 points) Solve the following system of equations.

$3x + 3y + 5z = 1$
$3x + 2y + 9z = 0$
$5x + 9y + 11z = -2$

$3x + 3y + 5z = 1$
$-3x - 2y - 9z = 0$
$y - 4z = 1$

$15x + 15y + 25z = 5$
$-15x - 27y - 33z = 6$
$-12y - 8z = 11$

$y - 4z = 1$
$-12y - 8z = 11$

$12y - 48z = 12$
$-12y - 8z = 11$
$-56z = 23$
$z = -\frac{23}{56}$

$-2y + 8z = -2$
$-12y - 8z = 11$
$-14y = 9$
$y = -\frac{9}{14}$

$3x + 3y + 5z = 1$
$3x + 3\left(-\frac{9}{14}\right) + 5\left(-\frac{23}{56}\right) = 1$
$3x - \frac{27}{14} - \frac{115}{56} = 1$
$3x = 1 + \frac{27}{14} + \frac{115}{56}$
$3x = \frac{56 + 108 + 115}{56}$
$3x = \frac{279}{56}$
$x = \frac{279}{56} \cdot \frac{1}{3} = \frac{93}{56}$

$\left(\frac{93}{56}, -\frac{9}{14}, -\frac{23}{56}\right)$