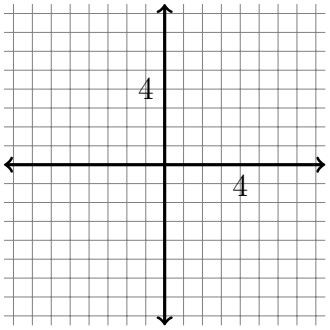
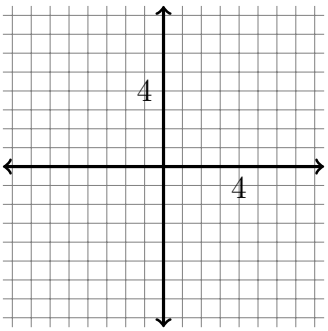
Show all work.

1. **(5 points)** Using the fact that $\begin{bmatrix} -5 & -2 & -2 \\ 2 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}^{-1} = \begin{bmatrix} 1 & 2 & 2 \\ -2 & -3 & -4 \\ -1 & -2 & -1 \end{bmatrix}$, find a solution to the matrix equation $\begin{bmatrix} -5 & -2 & -2 \\ 2 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 1 \\ -4 \\ 0 \end{bmatrix} = \begin{bmatrix} 4 \\ -5 \\ 2 \end{bmatrix}$.

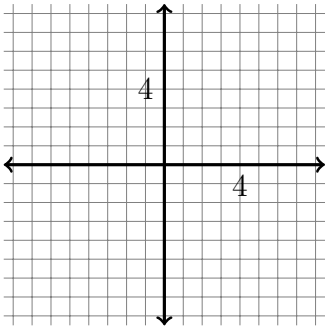
2. **(9 points)** Graph each of the following inequalities on the provided grid.




$4x - 3y \geq 24$




$3x \leq -9$




$x + 2y > 6$

3. **(6 points)** Graph the solution region of the following system of inequalities:

$$\begin{cases} 2x + y \leq 10 \\ x + y \leq 7 \\ x + 2y \leq 12 \\ x \geq 0 \\ y \geq 0 \end{cases}$$