# 3.4 Linear Inequalities in Two Variables

Written by: Cindy Alder

## Objectives:

- Graph linear inequalities in two variables.
- Graph the intersection of two linear inequalities.
- Graph the union of two linear inequalities.

## Linear Inequality in Two Variables

An inequality that can be written as

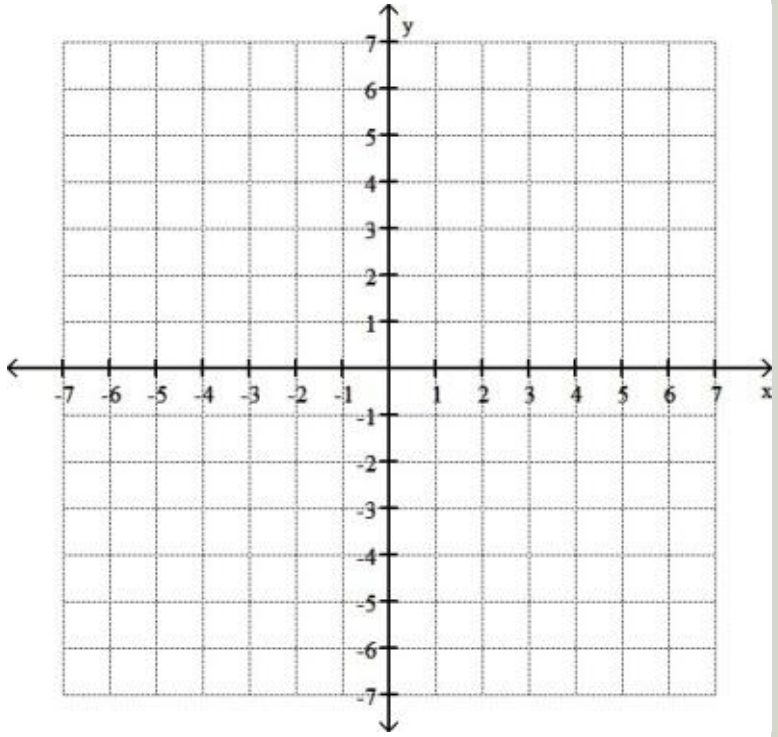
Where $A, B$, and $C$ are real numbers and $A$ and $B$ are not both 0, is a **linear inequality in two variables.**

- Graphs of linear inequalities in two variables are regions in the real number plane that may or may not include boundary lines.

# Graphing a Linear Inequality

- Step 1:
- Step 2:
- Step 3:

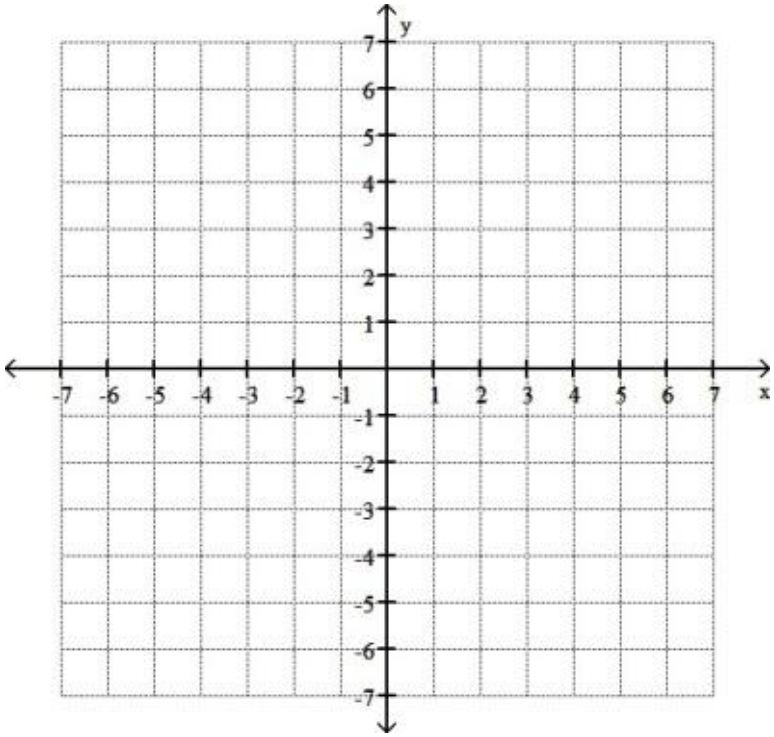
$$y \geq -x + 4$$



# EXAMPLE 1

- Graph the given inequality.

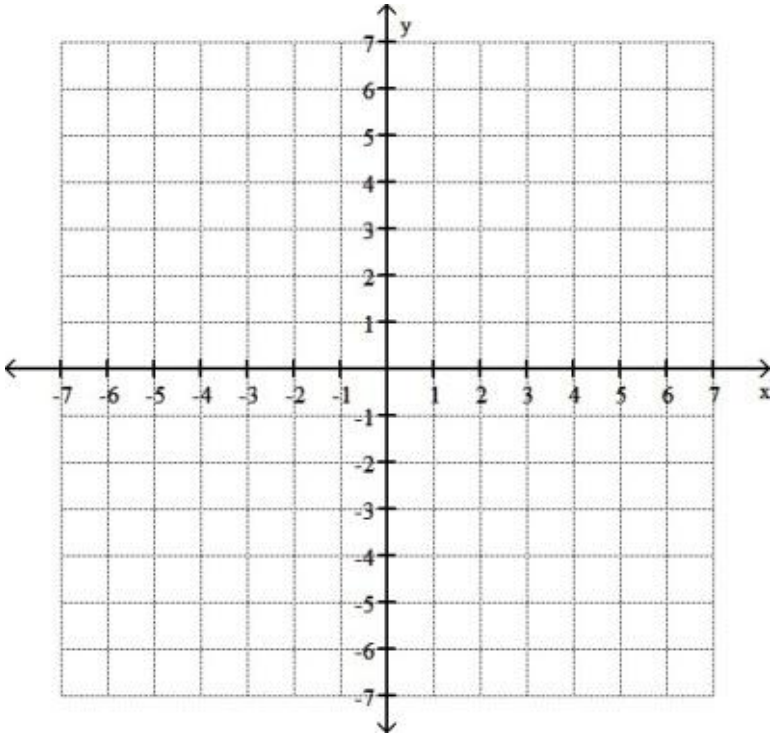
$$3x + 4y < 12$$



# EXAMPLE 2

- Graph the given inequality.

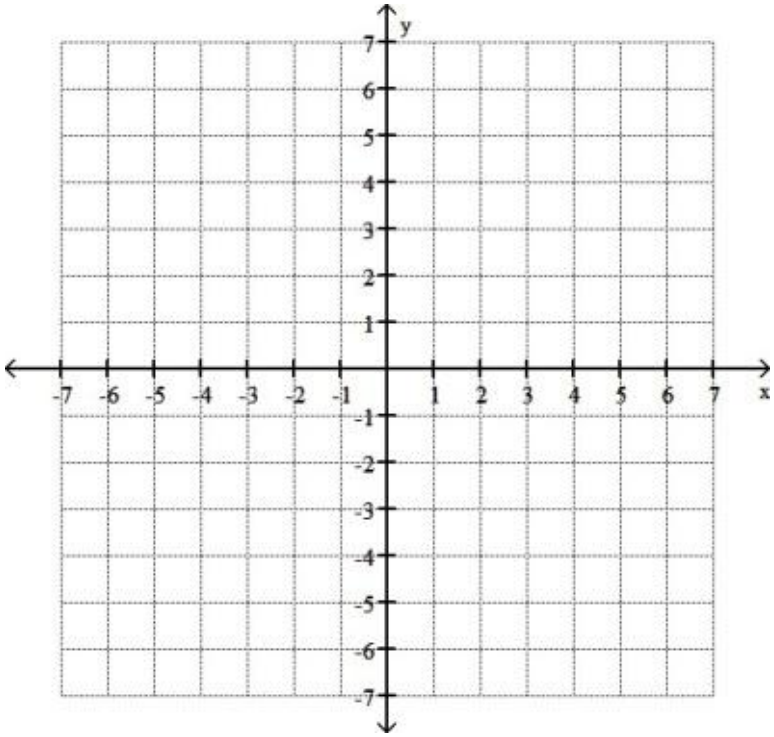
$$x - 5y > 10$$



# EXAMPLE 3

- Graph the given inequality.

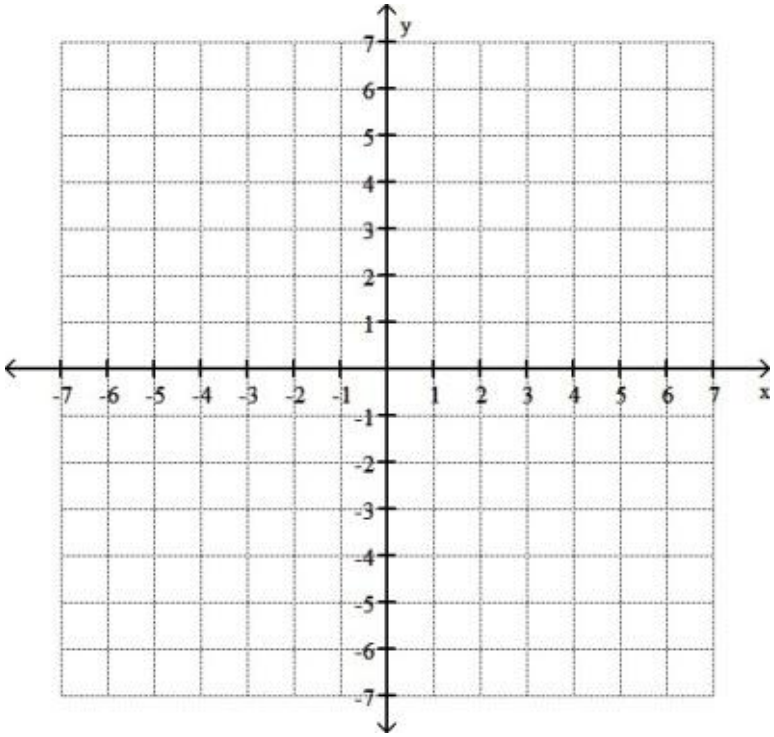
$$2x \leq 3y$$



# EXAMPLE 4

- Graph the given inequality.

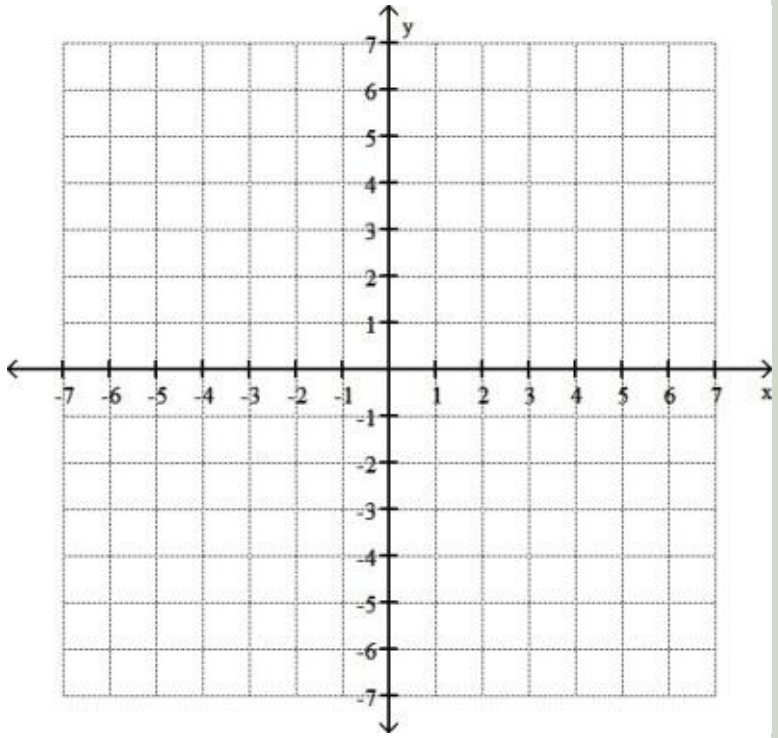
$$x > 4$$



# Graphing the Intersection of Two Linear Inequalities (and)

## Example 5

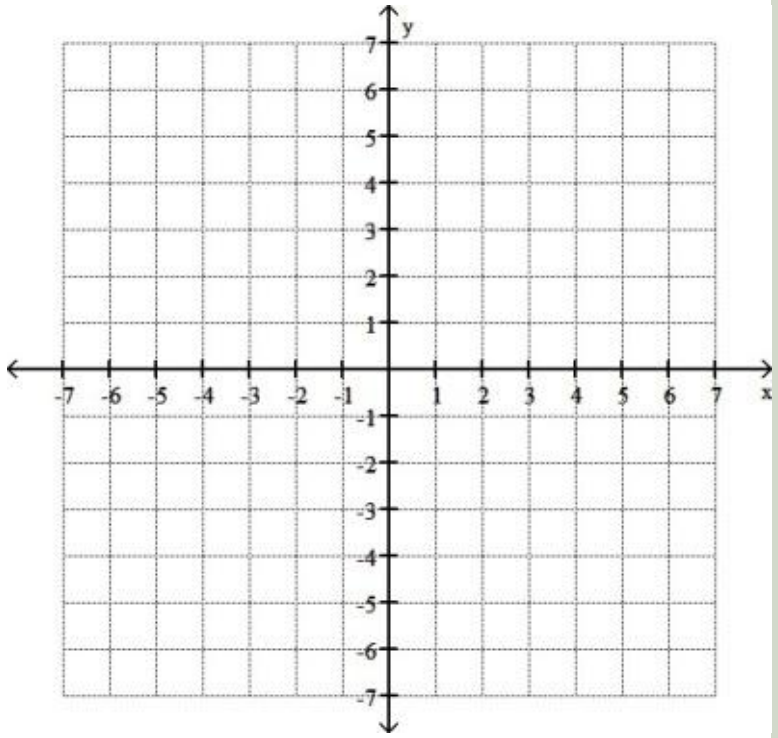
- Graph $2x + 4y \geq 5$ ***and*** $x \geq 1$.



# Graphing the Union of Two Linear Inequalities (or)

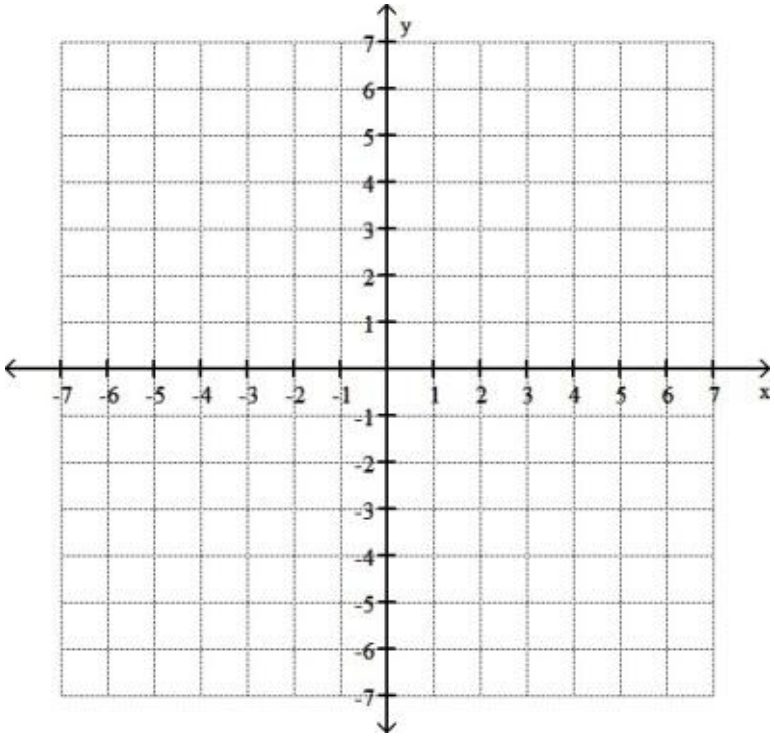
## Example 6

- Graph $3x - 5y < 15$ ***or*** $x \geq 4$.



# EXAMPLE 7

- Graph $x + 3y < 12$ ***and*** $2x - y < 3$.



# EXAMPLE 8

- Graph $|x + 2| < 5$.