An inequality in two dimensions has two very important characteristics:
- Boundary Line
- Shaded Region

Steps to Graph an Inequality in Two Dimensions on a Coordinate Plane
1. Write out the original problem.

2. You need to find the boundary line so write the following:
   "Write inequality as an equation to graph the boundary line"

3. Rewrite the inequality symbol with an $=$ sign to make an equation.

4. Graph the equation for a line with any method and if the original inequality had $\geq$ or $\leq$, make a solid line and if the original inequality had $>$ or $<$ make a dashed line. The slope intercept method or method of intercepts can be used.

5. Write on paper, "Find Shaded Region With a Test Point" and pick a point that is **not on the line**. Usually (0, 0) is a good test point.

6. Substitute in the test point into the original inequality and simplify both sides. If the simplified inequality is true, write, "Test point is TRUE so shade side of line with test point." If the simplified inequality is false, write, "Test point is FALSE so shade side of line away from test point."

7. Shade the appropriate side of the line.

8. Write "Check" on your paper, find a point in the shaded region, and check this point in the original inequality. It should simplify to be TRUE.

Example: Graph $3x - 5y < 15$.

"Write inequality as an equation to graph the boundary line"

$3x - 5y = 15$

Graph the boundary line with method of intercepts.

x intercept	y intercept	check point	(x,y)
$3x - 5y = 15$	$3x - 5y = 15$	$3x - 5y = 15$	
let y = 0	let x = 0	let x = -5	(5, 0)
$3x - 5(0) = 15$	$3(0) - 5y = 15$	$3(-5) - 5y = 15$	(0, -3)
$3x - 0 = 15$	$0 - 5y = 15$	$-15 - 5y = 15$	(-5, -6)
$3x = 15$	$-5y = 15$	$-15 + 15 - 5y = 15 + 15$	
$\dfrac{3x}{3} = \dfrac{15}{3}$	$\dfrac{-5y}{-5} = \dfrac{15}{-5}$	$-5y = 30$	
x = 5	y = -3	$\dfrac{-5y}{-5} = \dfrac{30}{-5}$	
		$y = -6$	

Note: Graph boundary line and make it dashed because original inequality had a < symbol.

To do shading take original inequality and test (0, 0) the test point. You can use any point to test as long as it is not on the line. The point (0, 0) is usually a good point to use.
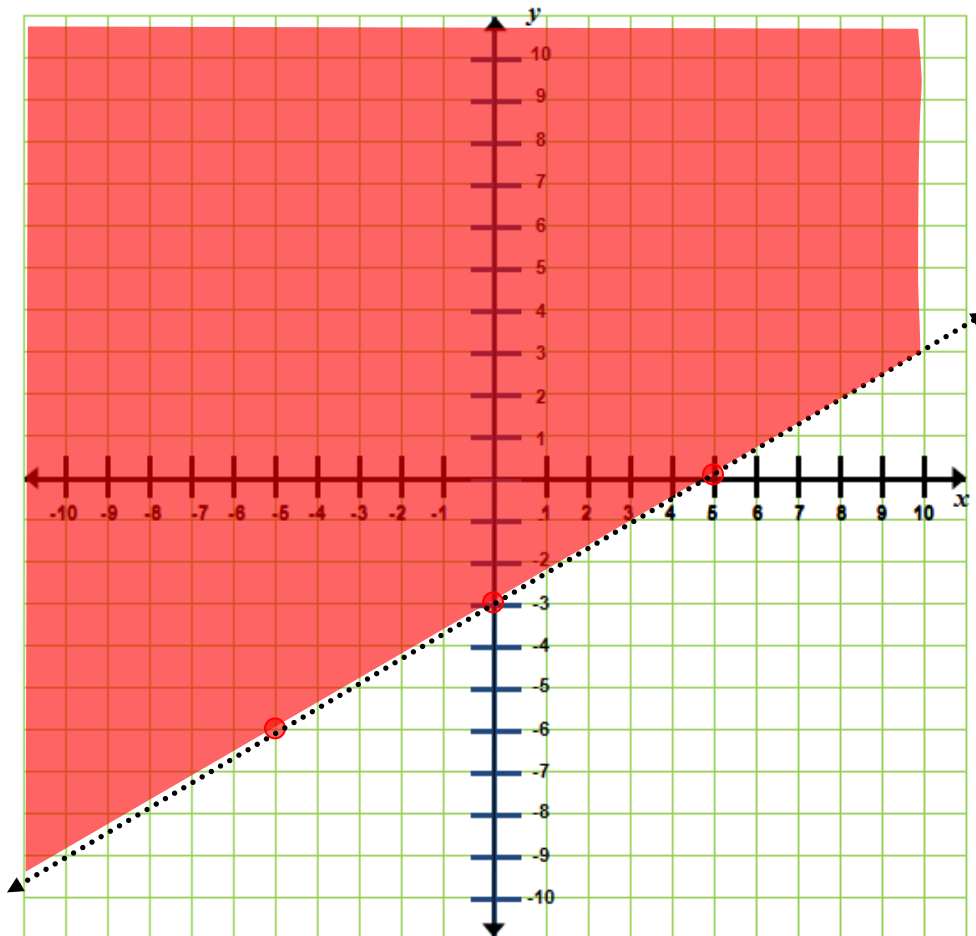
Test point: $(0, 0)$

$3x - 5y < 15;\ x = 0,\ y = 0$

$3(0) - 5(0) \overset{?}{<} 15$

$0 - 0 \overset{?}{<} 15$

$0 \overset{true}{<} 15$

Test point is TRUE so shade side of line with test point.

Check, $(-6, -2)$ in the shaded region.

$3x - 5y < 15;\ x = -6,\ y = -2$

$3(-6) - 5(-2) \overset{?}{<} 15$

$-18 + 10 \overset{?}{<} 15$

$-8 \overset{true}{<} 15$