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6.7 Linear Inequalities in Two Variables

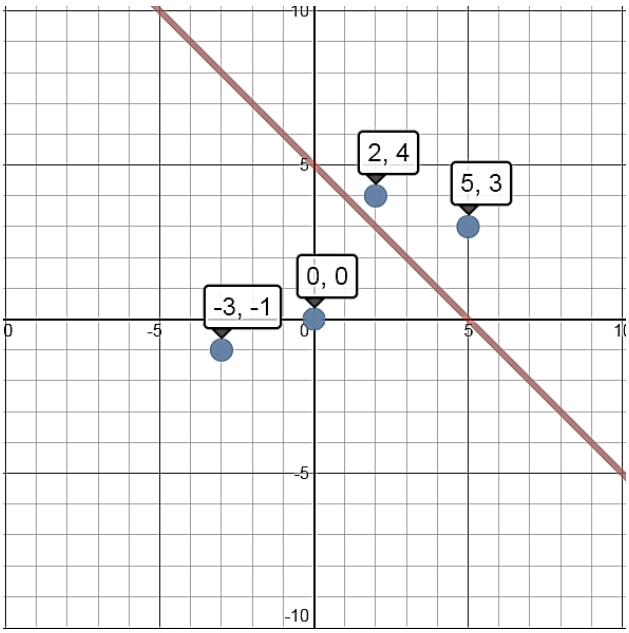
Topics to master:

☑ Graph Linear Inequalities in Two Variables

Graphing inequalities in two variables is just like graphing the equation of a line.

The graph produces a line that could either be _____ or _____.

Consider the graph of the line y = – x + 5.



The graph of the line divides the points into three sets:

1. Those points that lie on the line itself and satisfy the equation y = – x + 5 [like (0, 5), (2, 3), and (5, 0)]. This line, called the _____, divides the two regions in the plane that are graphed by the following two inequalities.

2. Those that lie in the half-plane above the line and satisfy the inequality y > – x + 5 [like (___ , ___) and (___ , ___)];

3. Those that lie in the half-plane below the line and satisfy the inequality y ___ – x + 5 [like (0, 0) and (___ , ___)]

Inequalities have many _____, values of x and y that will make the inequality true.

All of these solutions will be on one side of the boundary line. Because of that, one half of the graph contains all the _____.

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Example: Graph the inequality $y > 3x - 1$

Step 1: Graph the boundary line.

Use the _____ and the y-intercept to produce the boundary line.

Use a _____ line for _____ & _____

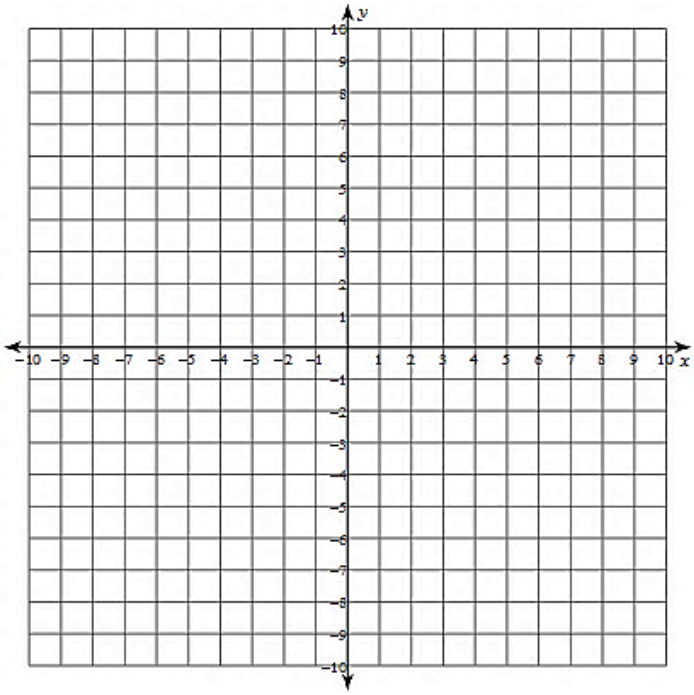
Use a _____ line for _____ & _____

Step 2: Choose a test point:
Choose any point not on the line, and substitute the coordinates of that point in the inequality.

Step 3: Shade the appropriate region.

Shade the region that includes the test point if the inequality ends up true.

Otherwise, shade the region on the other side of the boundary line.



** This method works only if the inequality is solved for y.**

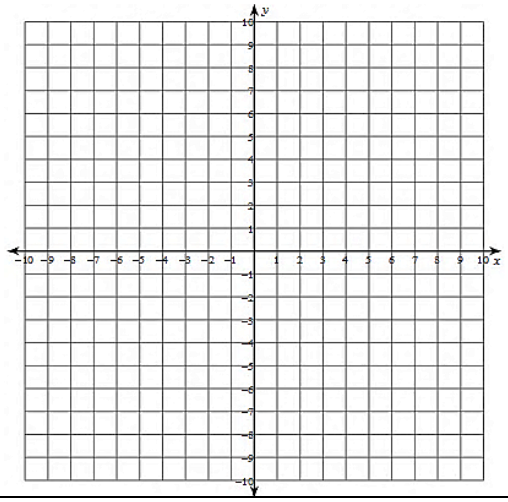
If the inequality is written in the form $y > mx + b$ or $y < mx + b$, then:

If $y > mx + b$, then shade _____ the boundary line;

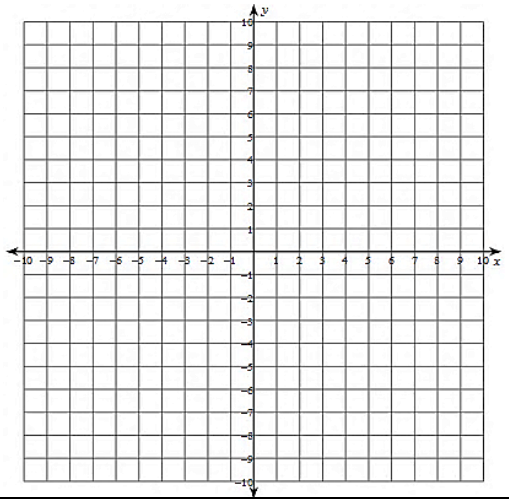
If y __ mx + b, then shade _____ the boundary line;

:

Graph $y < -\frac{1}{2}x + 6$



Graph $y \geq -\frac{3}{8}x - 2$



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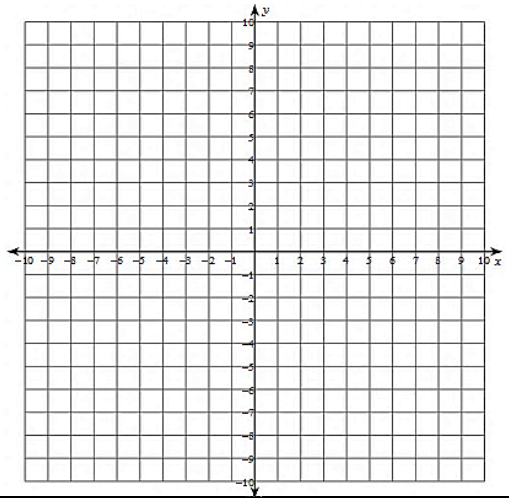
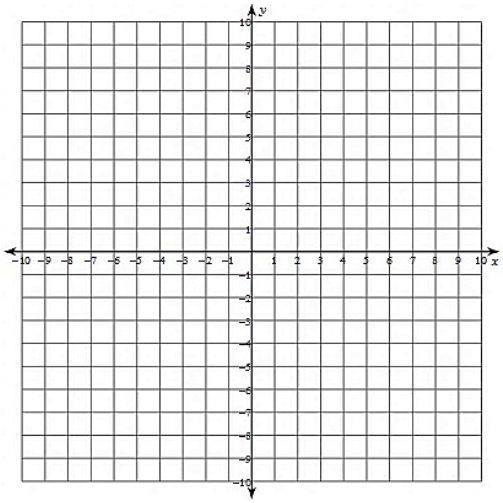
Now we look at inequalities where the x and y variables are on the same side

Graph $x + 2y \leq 0$	Inequality: _____
To make it easier to graph, isolate the variable y	

Graph $x + 3y \geq -1$	Inequality: _____
To make it easier to graph, isolate the variable y	

Graph $x + 2y \leq 0$	Inequality: _____
To make it easier to graph, isolate the variable y