6-5 Reteaching

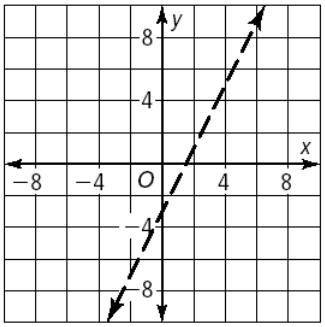
Linear Inequalities

To graph an inequality, graph the line and find the solution region by substituting a test point. The point (0, 0) is a good one unless the line goes through the origin.

Problem

What is the graph of $y > 2x - 3$?

Begin by graphing the line $y = 2x - 3$. Take random values for x, find the corresponding y values, and create a table.



x	$y = 2x - 3$
−2	−7
−1	−5
0	−3
1	−1
2	1

The ordered pairs are (–2, –7), (–1, –5), (0, –3), (1, –1), and (2, 1). You can graph the line using these points. The line should be dashed because the inequality symbol is >.

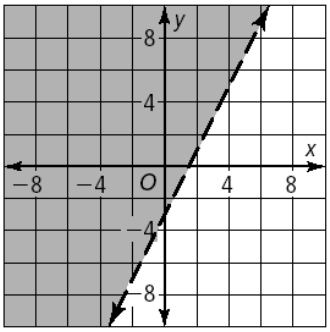
To determine which region to shade, substitute (0, 0) into the inequality to see if it is a solution.

$y > 2x - 3$

$0 \stackrel{?}{>} 2(0) - 3$

$0 > -3$ ✔

The point (0, 0) satisfies the inequality and is above the line. Therefore, shade the region above the line, which is the solution region.



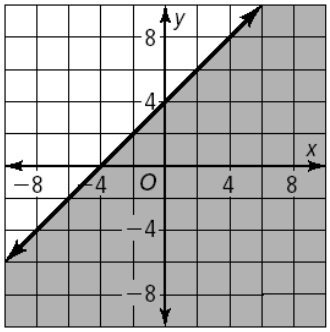
Exercises

Graph each linear inequality.

1. $y < x + 2$ **2.** $y > 3x - 4$ **3.** $x + y < -3$ **4.** $x - 2y > -1$

Problem

What is the inequality for the graph shown?



First look for the *y*-intercept for the boundary line. The *y*-intercept is the point (0, 4).

Next determine the slope of the boundary line by finding a second point on the line, (–4, 0). Use the slope formula to determine the slope: $\frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 0}{0 - (-4)} = \frac{4}{4} = 1.$

Now you know that the slope is 1 and the *y*-intercept is 4 and can write an equation for the boundary line $y = x + 4$.

To find the inequality sign, notice that the line is solid. Then note that the shading is below the line, indicating "less than." The inequality is $y \leq x + 4$.

Exercises

Determine the inequality for each graph shown.

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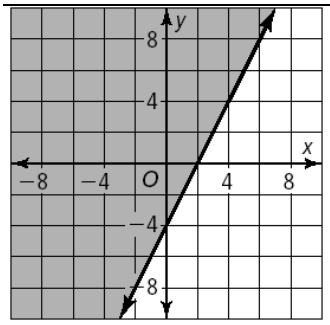

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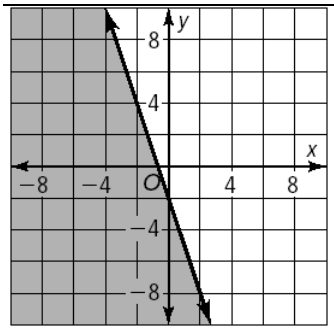

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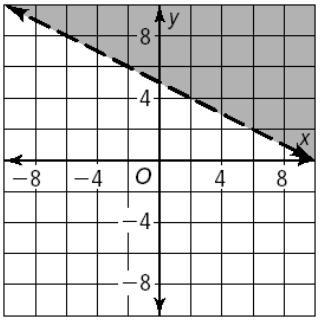

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