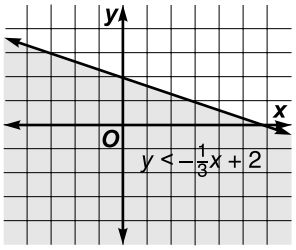
1-8

Study Guide

Graphing Linear Inequalities

The graph of $y = -\frac{1}{3}x + 2$ is a line that separates the coordinate plane into two regions, called **half planes**. The line described by $y = -\frac{1}{3}x + 2$ is called the **boundary** of each region. If the boundary is part of a graph, it is drawn as a solid line. A boundary that is not part of the graph is drawn as a dashed line.



The graph of $y > -\frac{1}{3}x + 2$ is the region above the line. The graph of $y < -\frac{1}{3}x + 2$ is the region below the line.

You can determine which half plane to shade by testing a point on either side of the boundary in the original inequality. If it is not on the boundary, (0, 0) is often an easy point to test. If the inequality is true for your test point, then shade the half plane that contains the test point. If the inequality is false for your test point, then shade the half plane that does not contain the test point.

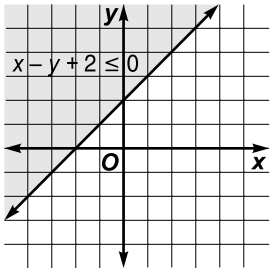
Example **Graph each inequality.**

a. $\boldsymbol{x - y + 2 \leq 0}$

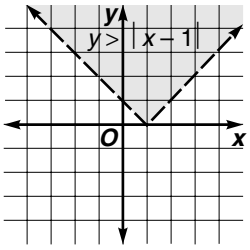
$$x - y + 2 \leq 0$$
$$-y \leq -x - 2$$
$$y \geq x + 2$$

Reverse the inequality when you divide or multiply by a negative.

The graph does include the boundary, so the line is solid. Testing (0, 0) in the inequality yields a false inequality, $0 \geq 2$. Shade the half plane that does not include (0, 0).



b. $\boldsymbol{y > |x - 1|}$



Graph the equation with a dashed boundary. Then test a point to determine which region is shaded. The test point (0, 0) yields the false inequality $0 > 1$, so shade the region that does not include (0, 0).