Graphing a Linear Inequality

To graph a linear inequality in two variables, follow these steps:

STEP 1 **Graph** the boundary line for the inequality. Use a dashed line for < or > and a solid line for ≤ or ≥.

STEP 2 **Test** a point *not* on the boundary line to determine whether it is a solution of the inequality. If it is a solution, shade the half-plane containing the point. If it is not a solution, shade the other half-plane.

EXAMPLE 2 **Graph linear inequalities with one variable**

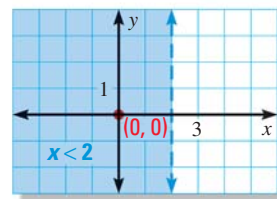Graph (a) $y \leq -3$ and (b) $x < 2$ in a coordinate plane.

a. **Graph** the boundary line $y = -3$. Use a solid line because the inequality symbol is ≤.

Test the point (0, 0). Because (0, 0) is *not* a solution of the inequality, shade the half-plane that does not contain (0, 0).
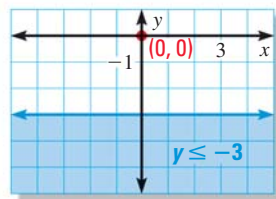
b. **Graph** the boundary line $x = 2$. Use a dashed line because the inequality symbol is <.
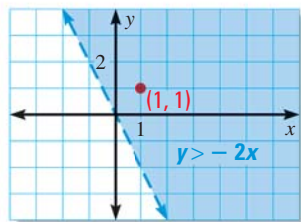
Test the point (0, 0). Because (0, 0) *is* a solution of the inequality, shade the half-plane that contains (0, 0).

EXAMPLE 3 **Graph linear inequalities with two variables**

Graph (a) $y > -2x$ and (b) $5x - 2y \leq -4$ in a coordinate plane.

AVOID ERRORS
It is often convenient to use (0, 0) as a test point. However, if (0, 0) lies on the boundary line, you must choose a different test point.
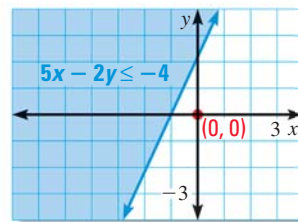
a. **Graph** the boundary line $y = -2x$. Use a dashed line because the inequality symbol is >.

Test the point (1, 1). Because (1, 1) *is* a solution of the inequality, shade the half-plane that contains (1, 1).

b. **Graph** the boundary line $5x - 2y = -4$. Use a solid line because the inequality symbol is ≤.

Test the point (0, 0). Because (0, 0) is *not* a solution of the inequality, shade the half-plane that does not contain (0, 0).

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