Graphing a Linear Inequality in Two Variables

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

STEP 2 **Test** a point not on the boundary line by checking whether the ordered pair is a solution of the inequality.

STEP 3 **Shade** the half-plane containing the point if the ordered pair is a solution of the inequality. Shade the other half-plane if the ordered pair is *not* a solution.

EXAMPLE 2   Graph a linear inequality in two variables
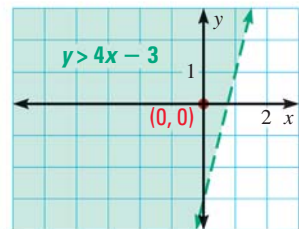
Graph the inequality $y > 4x - 3$.

Solution

STEP 1 **Graph** the equation $y = 4x - 3$. The inequality is >, so use a dashed line.

STEP 2 **Test** $(0, 0)$ in $y > 4x - 3$.

$$0 \overset{?}{>} 4(0) - 3$$

$$0 > -3 \checkmark$$

STEP 3 **Shade** the half-plane that contains $(0, 0)$, because $(0, 0)$ is a solution of the inequality.

EXAMPLE 3   Graph a linear inequality in two variables
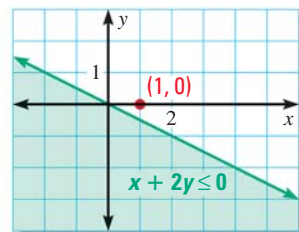
Graph the inequality $x + 2y \leq 0$.

Solution

STEP 1 **Graph** the equation $x + 2y = 0$. The inequality is ≤, so use a solid line.

AVOID ERRORS
Be sure to test a point that is not on the boundary line. In Example 3, you can't test $(0, 0)$ because it lies on the boundary line $x + 2y = 0$.

STEP 2 **Test** $(1, 0)$ in $x + 2y \leq 0$.

$$1 + 2(0) \overset{?}{\leq} 0$$

$$1 \leq 0 \; ✗$$

STEP 3 **Shade** the half-plane that does not contain $(1, 0)$, because $(1, 0)$ is *not* a solution of the inequality.

✓ **GUIDED PRACTICE**   for Examples 2 and 3

   4. Graph the inequality $x + 3y \geq -1$.