2.8 Graph Linear Inequalities in Two Variables

Before	You solved linear inequalities in one variable.
Now	You will graph linear inequalities in two variables.
Why?	So you can model data encoding, as in Example 4.

Key Vocabulary
- **linear inequality in two variables**
- **solution of a linear inequality**
- **graph of a linear inequality**
- **half-plane**

A **linear inequality in two variables** can be written in one of these forms:

$$Ax + By < C \qquad Ax + By \le C \qquad Ax + By > C \qquad Ax + By \ge C$$

An ordered pair (x, y) is a **solution** of a linear inequality in two variables if the inequality is true when the values of x and y are substituted into the inequality.

EXAMPLE 1 TAKS PRACTICE: Multiple Choice

Which ordered pair is a solution of $2x + 5y > 9$?

A $(-4, -1)$ **B** $(-2, 3)$ **C** $(2, -4)$ **D** $(6, -1)$

Solution

Ordered Pair	Substitute	Conclusion
$(-4, -1)$	$2(-4) + 5(-1) = -13 \not> 9$	$(-4, -1)$ is not a solution.
$(-2, 3)$	$2(-2) + 5(3) = 11 > 9$	$(-2, 3)$ is a solution.
$(2, -4)$	$2(2) + 5(-4) = -16 \not> 9$	$(2, -4)$ is not a solution.
$(6, -1)$	$2(6) + 5(-1) = 7 \not> 9$	$(6, -1)$ is not a solution.

▶ The correct answer is B. **A B C D**

✓ GUIDED PRACTICE for Example 1

Tell whether the given ordered pair is a solution of $5x - 2y \le 6$.

1. $(0, -4)$ **2.** $(2, 2)$ **3.** $(-3, 8)$ **4.** $(-1, -7)$

GRAPHING INEQUALITIES The **graph** of a linear inequality in two variables is the set of all points in a coordinate plane that represent solutions of the inequality.

INTERPRET GRAPHS
A dashed boundary line means that points on the line are *not* solutions. A solid boundary line means that points on the line *are* solutions.

All solutions of $3x - 2y > 2$ lie on one side of the *boundary line* $3x - 2y = 2$.
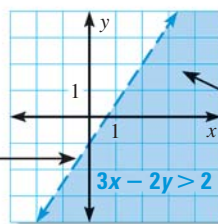
$3x - 2y > 2$

The boundary line divides the plane into two **half-planes.** The shaded half-plane is the graph of $3x - 2y > 2$.