

# **Graphs of Inequalities in Two Variables**

Section 2.8  
Algebra 2  
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# Linear Inequalities

- A linear inequality in two variables can be written in any one of these forms:
  - $Ax + By < C$
  - $Ax + By > C$
  - $Ax + By \leq C$
  - $Ax + By \geq C$
- An ordered pair  $(x, y)$  is a **solution** of the linear inequality if the inequality is true when  $x$  and  $y$  are substituted into the inequality.

# Example 1

- Which ordered pair is a solution of  $5x - 2y \leq 6$ ?
  - A. (0, -3)
  - B. (5, 5)
  - C. (1, -2)
  - D. (3, 3)

# Graphing Linear Inequalities

- The *graph* of a linear inequality is the set of all points in a coordinate plane that represent solutions of the inequality.
  - We represent the *boundary line* of the inequality by drawing the function represented in the inequality.

# Graphing Linear Inequalities

- The ***boundary line*** will be a:
  - **Solid** line when  $\leq$  and  $\geq$  are used.
  - **Dashed** line when  $<$  and  $>$  are used.
- Our graph will be **shaded** on one side of the boundary line to show where the solutions of the inequality are located.

# Steps to Graphing Linear Inequalities

Here are some steps to help graph linear inequalities:

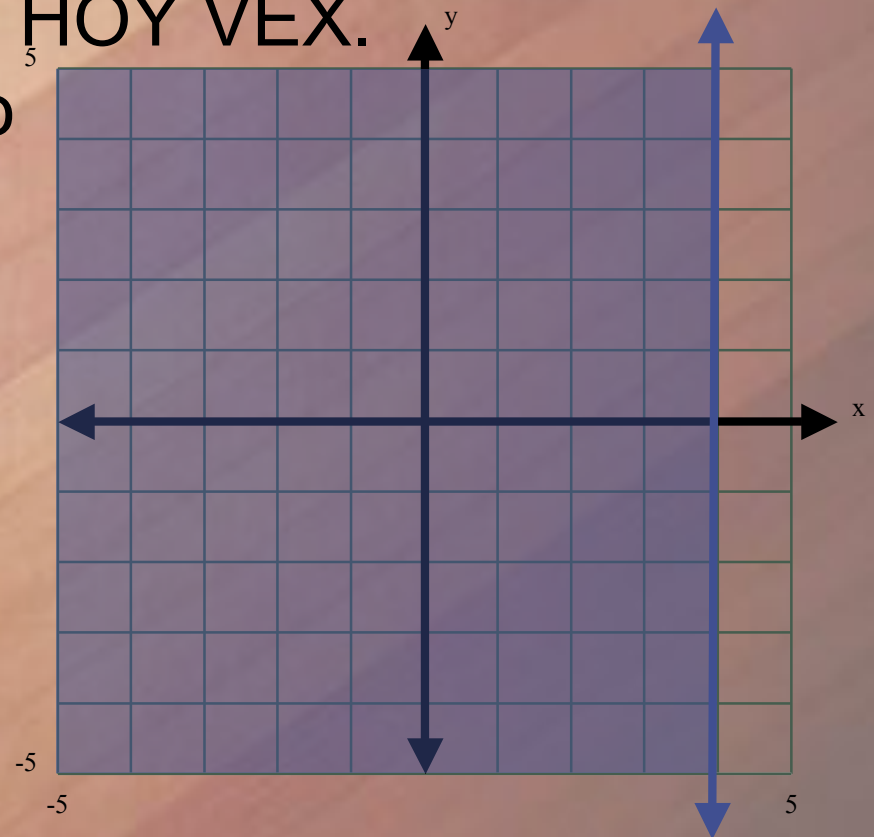
1. Graph the boundary line for the inequality. Remember:
  - $\leq$  and  $\geq$  will use a **solid curve**.
  - $<$  and  $>$  will use a **dashed curve**.

# Steps to Graphing Linear Inequalities

2. Test a point **NOT** on the boundary line to determine which side of the line includes the solutions. (The origin is always an easy point to test, but make sure your line does not pass through the origin)
  - If your test point is a solution, shade THAT side of the boundary line.
  - If your test point is NOT a solution, shade the opposite side of the boundary line.

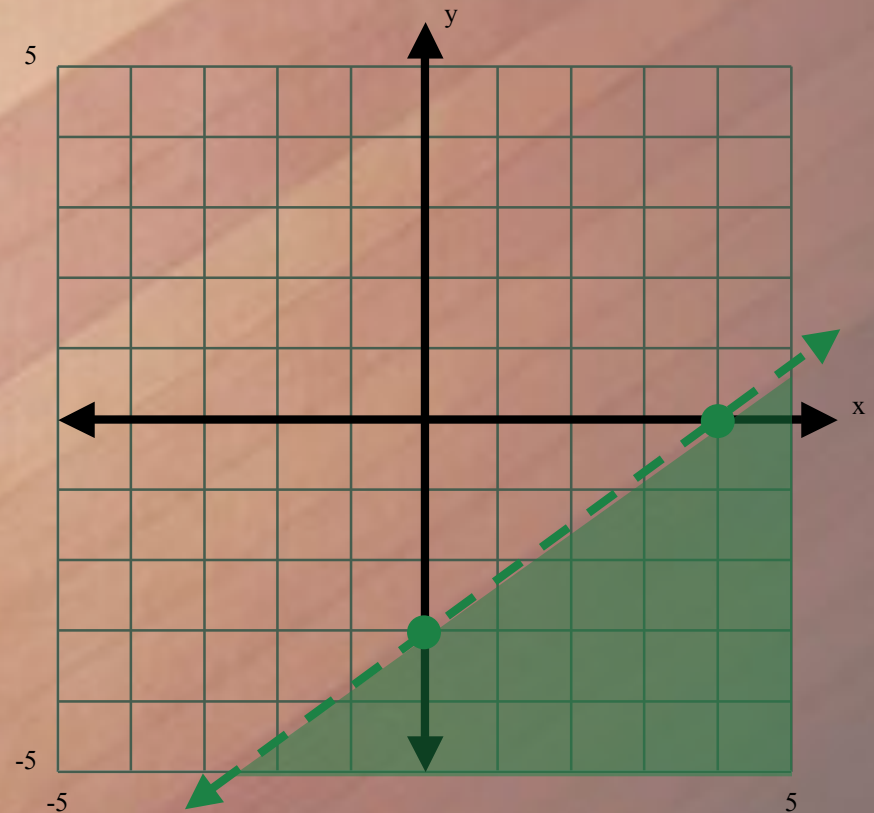
# Example 2

- Graph the inequality  $x \leq 4$  in a coordinate plane.
- HINT: Remember HOY VEX.
- Decide whether to use a solid or dashed line.
- Use  $(0, 0)$  as a test point.
- Shade where the solutions will be.



# Example 3

- Graph  $3x - 4y > 12$  in a coordinate plane.
- Sketch the boundary line of the graph.
  - Find the x- and y-intercepts and plot them.
- Solid or dashed line?
- Use  $(0, 0)$  as a test point.
- Shade where the solutions are.

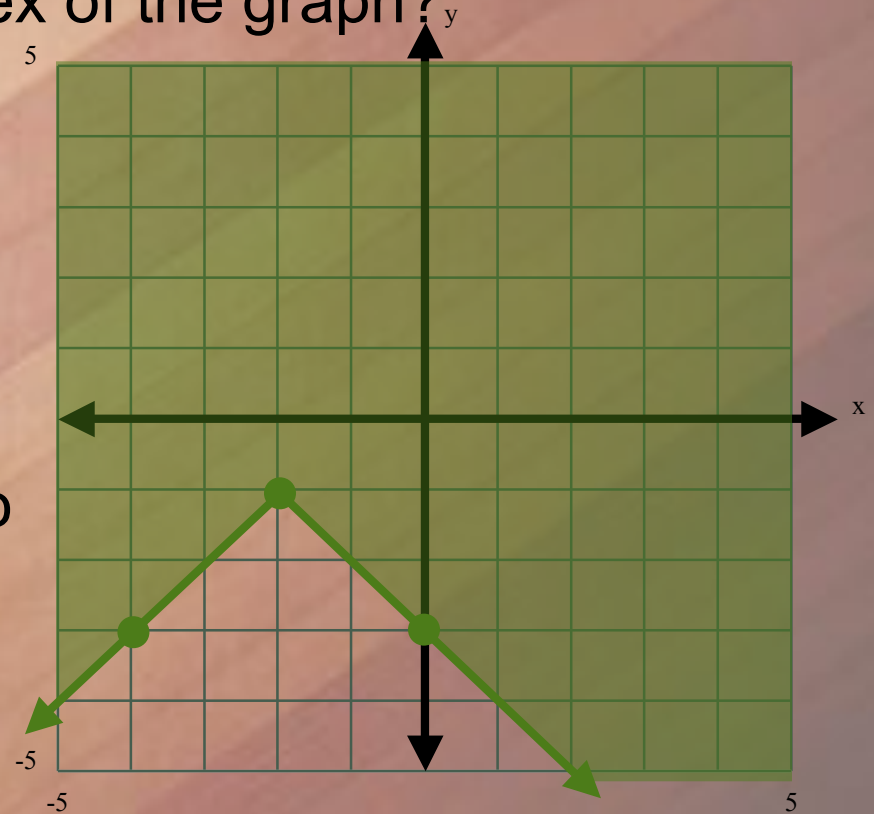


# Absolute Value Inequalities

- Graphing an absolute value inequality is just the same as we would graph a linear inequality.
  - Our boundary line is described by the graph of an absolute value *function*.
- We use the same ideas about solid and dashed lines and shading as we would with linear equations.
- Remember what causes our graph to reflect vertically (appear upside-down).

# Example 5

- Graph  $y \geq -|x + 2| - 1$  in a coordinate plane.
  - Where is the vertex of the graph?
  - Plot a point on each side of the vertex.
  - Solid or dashed line?
  - Use a test point to decide where to shade.



# Assessment

Worksheet 2.8B

