Section 4.5 Graphing Linear Inequalities in Two Variables

Recall that a linear equation in two variables is an equation that can be written in the form where , , and are real numbers and and are not both .

A **linear inequality in two variables** is an inequality that can be written in one of the following forms:

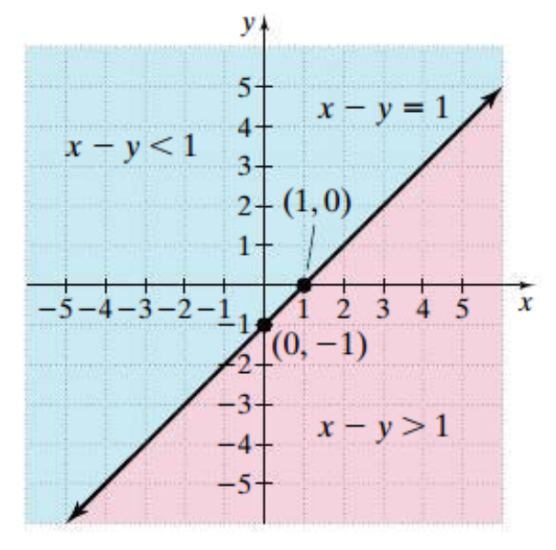
where , , and are real numbers and and are not both .

An ordered pair is a solution of an inequality in and if replacing the variables with the coordinates of the ordered pair results in a true statement.

# Objective 1: Graphing Linear Inequalities in Two Variables

Consider the linear equation which is graphed below. Recall that all points on the line defined by correspond to ordered pairs that are solutions to the equation.

Notice the line defined by divides the coordinate plane into two **half-planes**. All points on one side of the line are solutions to the inequality . All points on the other side of the line are solutions to the inequality . The line that separates these two regions, in this case the line defined by , is called the **boundary line**.



a. Show that the ordered pair is a solution to the inequality .

b. Show that the ordered pair is a solution to the inequality .

When graphing the solution set of a linear inequality in two variables, if the inequality sign is or , then the points on the boundary line are not part of the solution set, so the boundary line is dashed. If the inequality sign is or , the points on the boundary line are part of the solution set, so the boundary line is solid.

Graph the linear inequality.

|  |  |
| --- | --- |
| c.  Blank coordinate plane that spans from negative ten to positive ten on each axis with a scale of one unit. | d.  Blank coordinate plane that spans from negative ten to positive ten on each axis with a scale of one unit. |
| e.  Blank coordinate plane that spans from negative ten to positive ten on each axis with a scale of one unit. | f.  Blank coordinate plane that spans from negative ten to positive ten on each axis with a scale of one unit. |

|  |  |
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| g.  Blank coordinate plane that spans from negative ten to positive ten on each axis with a scale of one unit. | h.  Blank coordinate plane that spans from negative ten to positive ten on each axis with a scale of one unit. |