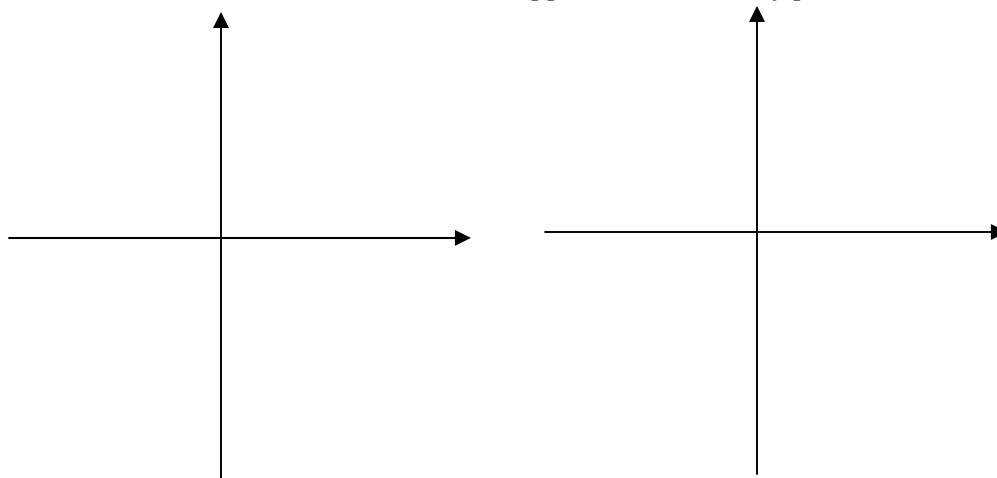


5.1: Linear Inequalities in Two Variables

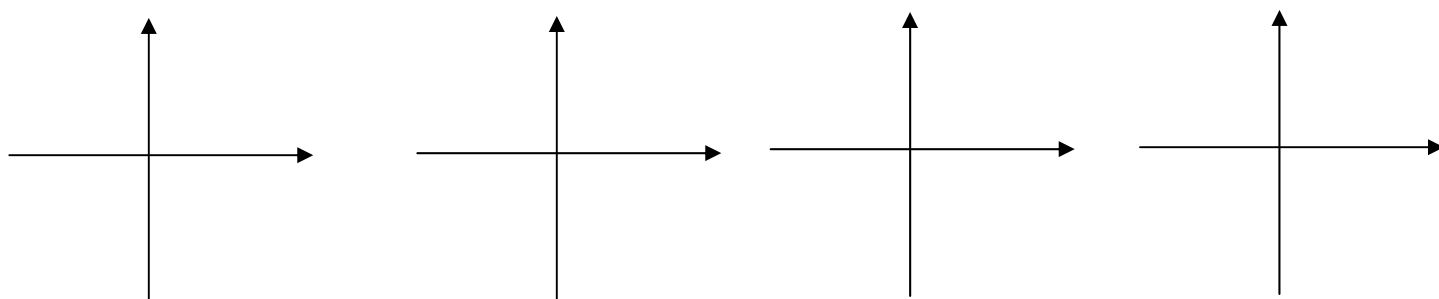
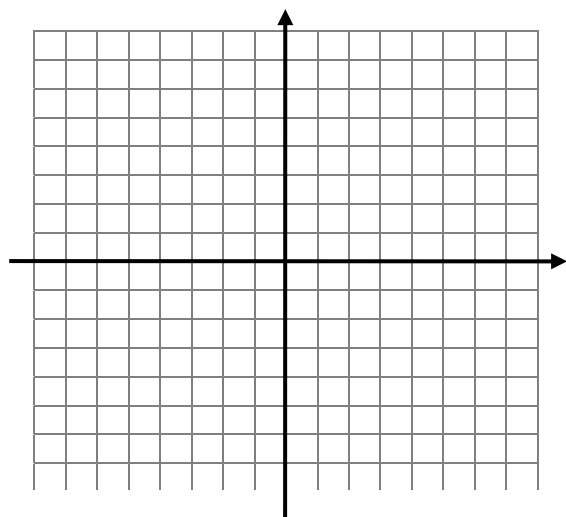
Half-planes:

A line divides the plane into two *half-planes*. A vertical line divides it into *left* and *right half-planes*; a non-vertical line divides it into *upper* and *lower half-planes*.



Graphing linear inequalities:

Example 1: There are four linear inequalities related to the line $y = 2x + 1$.



Steps for Graphing a Linear Inequality:

Step 1: First graph the line $Ax + By = C$. Use a solid line if equality is included (\leq or \geq) and a dashed line if equality is not included ($<$ or $>$).

Step 2: Choose a test point not on the line and substitute the coordinates into the inequality. Determine whether this gives a true or a false statement.

Note: The origin $(0,0)$ is usually a good choice, as long as it is not on the line.

Step 3:

- If your test point makes the inequality *true*, shade the half-plane containing the test point.
- If your test point makes the inequality *false*, shade the half-plane not containing the test point.

Example 2: Graph the inequality $2x > 3y$.

