

Graphing Linear inequalities in 2 variables

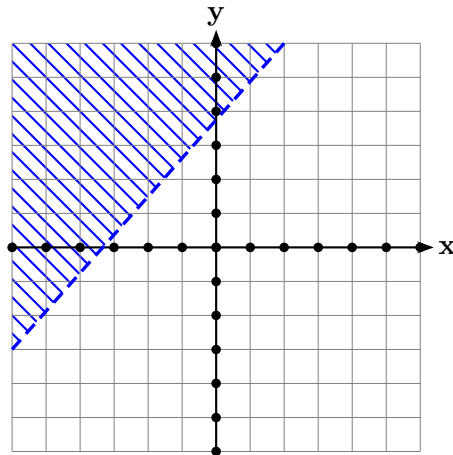
For the following five questions you have to fill in the blanks.

- For the first two blank spaces, use the word *increases* or *decreases*,
- For the third blank, use the word *left* or *right* and,
- For the last blank, use the word *above* or *below*.

Needless to say the completed sentence has to make sense and to be true. Here is an example:

Example. The linear expression $2x + 4y$ *increases* with x and *increases* with y . It follows that the graph of the inequality $2x + 4y > -1$ is to the *right* and *above* the graph of the line with equation $2x + 4y = -1$.

1. The linear expression $3x - 4y$ _____ with x and _____ with y . It follows that the graph of the inequality $3x - 4y > 5$ is to the _____ and _____ the graph of the line with equation $3x - 4y = 5$.
2. The linear expression $x + y$ _____ with x and _____ with y . It follows that the graph of the inequality $x + y \leq 3$ is to the _____ and _____ the graph of the line with equation $x + y = 3$.
3. The linear expression $-3x - 2y$ _____ with x and _____ with y . It follows that the graph of the inequality $-3x - 2y < 0$ is to the _____ and _____ the graph of the line with equation $-3x - 2y = 0$.
4. The linear expression $-3x + 5y$ _____ with x and _____ with y . It follows that the graph of the inequality $-3x + 5y \geq -7$ is to the _____ and _____ the graph of the line with equation $-3x + 5y = -7$.
5. The linear expression $6x - 4y$ _____ with x and _____ with y . It follows that the graph of the inequality $6x - 4y \leq 1$ is to the _____ and _____ the graph of the line with equation $6x - 4y = 1$.
6. If the equation of the line in the following graph is $-9x + 8y = 30$, write an inequality that describes the shaded region in the graph below:

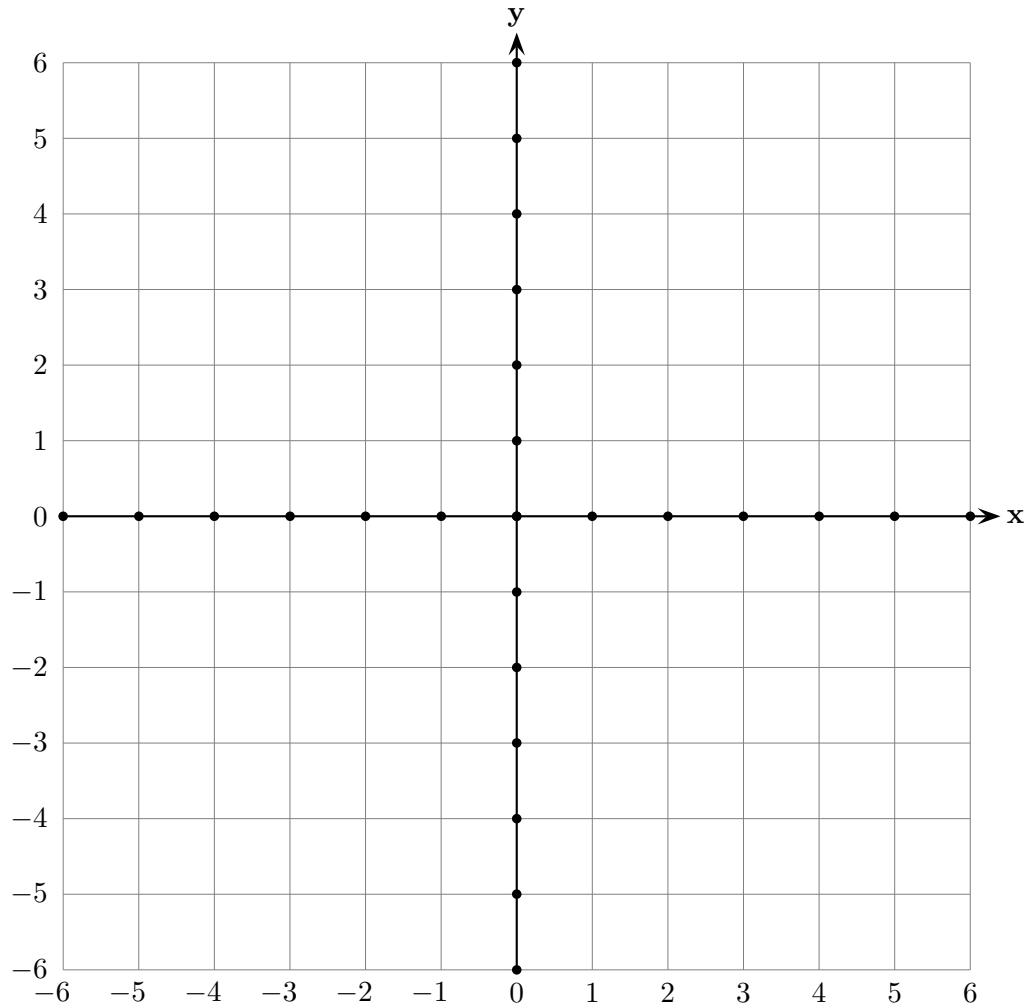


7. Graph each of the following lines:

(a) $2x - 3y = 6$

(b) $x + y = 2$

(c) $y - 2x = 3$



8. In the grid above, graph the solution set of each of the following inequalities:

(a) $2x - 3y \leq 6$

(b) $x + y > 2$

(c) $y - 2x > 3$

9. (a) After graphing the three lines in Question 1 into how many regions is the plane divided?
 (b) For each of the regions in part (a) write a system of inequalities whose solution set is the given region.
 (c) Into how many regions is the plane divided if we include the two coordinate axes?
 (d) For each of the regions in part (c) write a system of inequalities whose solution set is the given region.

