

7.6 Solve Linear Systems of Linear Inequalities

Goal • Solve systems of linear inequalities in two variables.

VOCABULARY:

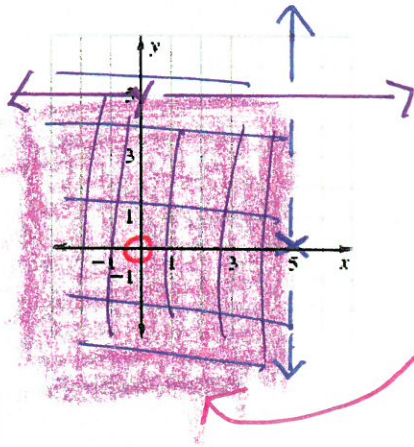
Example:

GRAPH $x < 5$

$T(0,0) \ 0 < 5 \ T$

GRAPH $y \leq 5$

$T(0,0) \ 0 \leq 5 \ T$



System of linear inequalities

Consists of 2 LINEAR INEQUALITIES WITH 2 VARIABLES.

EXAMPLE :

$x < 5$ - DASHED - V LINE - $m = \text{UNDEFINED}$

$y \leq 5$ - SOLID - H LINE - $m = 0$

Solution of a system of linear inequalities

SOLUTION REGION: are all the points in the region where their graphs intersect

GRAPHING A SYSTEM OF LINEAR INEQUALITIES

Step 1 Graph the 1ST inequality.

Step 2 Graph the 2ND inequality.

Step 3 Find the INTERSECTION of the graphs.

Step 4 The "SOLUTION Region" is where the graphs INTERSECT.

Use an ARROW to IDENTIFY the solution region.

Algebra 1 Notes...

Example 1 Graph the system of inequalities.

Inequality 1: $x + 3y > 6$

Inequality 2: $2x - 3y \geq 3$

Step 1 Graph the 1st inequality.

$x + 3y > 6$ (use intercepts)

$x: 6$ $y: 2$ DOTTED LINE

$T(0,0)$ $0 > 6$ F

Step 2 Graph the 2nd inequality.

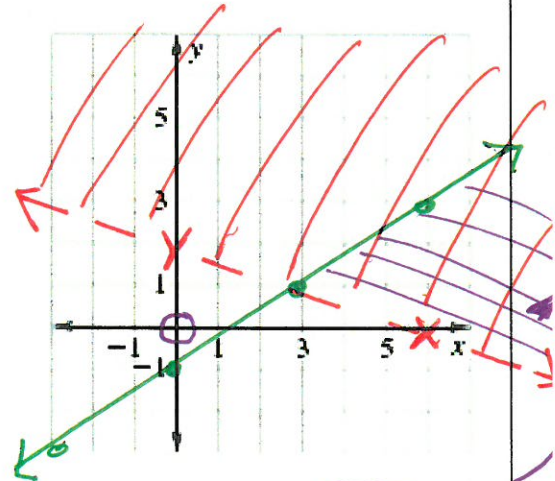
$2x - 3y \geq 3$ (PUT IN $y = mx + b$)
 $-2x$ $-2x$ SOLID LINE

$$\frac{-3y}{-3} \geq \frac{-2x + 3}{-3}$$

$$y \leq \frac{2}{3}x - 1$$

$m = \frac{2}{3}$ $b = -1$

*remember: when you mult or divide the variable by a negative number reverse the inequality!



Solution region

Step 3 Find the intersection of the graphs.

$T(0,0)$ $0 > 3$ F $0 \leq -1$ F

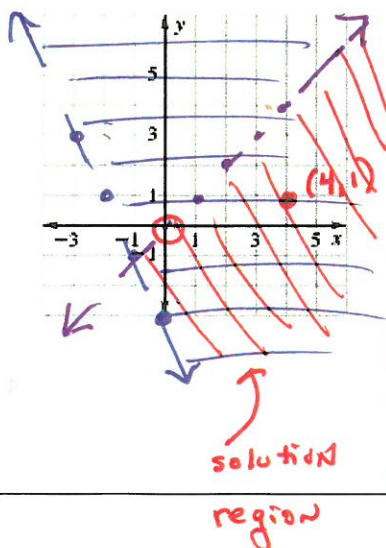
Step 4 Mark the Solution Region with an arrow.

Check Point – Graph the system of linear inequalities.

2) both Dotted Line

$y > -2x - 3$
 $m = -2, b = -3$
 $T(0,0)$ $0 > -3$ T

$y < x$ TRICKY!
 $m = 1, b = 0$
 Pick a point to test (4,1)
 $1 < 4$ T



3) BOTH SOLID LINES

$x + y \leq 4$
 $x: 4$
 $y: 4$
 $T(0,0)$ $0 \leq 4$ T

$-y \leq -x + 6$
 $T(0,0)$ $0 \leq 6$ T

$T(0,0)$ $0 \leq 6$ T $0 > -6$ T

