Algebra 1 Name: Key

5.5 Notes – Solving Linear Inequalities

A linear inequality is similar to a linear equation, but the equal sign is replaced with an inequality symbol. A solution of a linear inequality is any ordered pair that makes the inequality true.

Example 1: Tell whether the ordered pair is a solution of the inequality.

a.) (3, 1); $y > x - 4$ (x, y)

$1 > 3 - 4$

$1 > -1$

True

(3,1) is a solution!

b.) (4, 5); $y < x + 1$ (x, y)

$5 < 4 + 1$

$5 < 5$

False

(4,5) is not a solution

To Graph Linear Inequalities:

1.) Solve the inequality for *y*. (slope-intercept form)

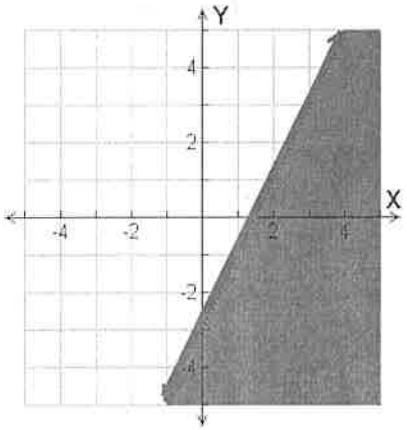
2.) Graph the boundary line. Use a solid line for ≤ or ≥. Use a dashed line for < or >.

3.) Shade the half-plane above the line for *y* > or ≥. Shade the half-plane below the line for *y* < or *y* ≤. Pick a test point to check your answer.

$y \leq 2x - 3$

$m = 2$

$b = -3$



Test point: (0,0)

$y \leq 2x - 3$

$0 \leq 2(0) - 3$

$0 \leq -3$

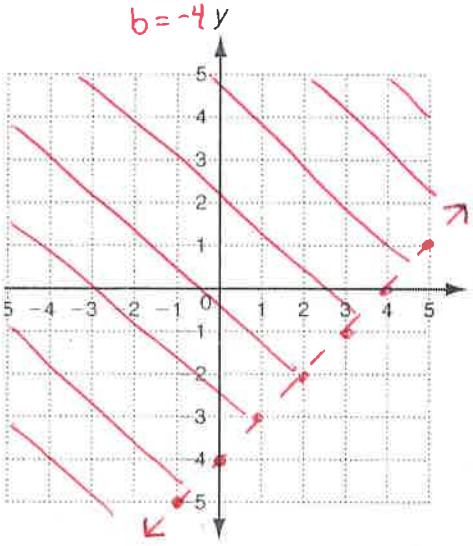
False → shade the region that does not include the point

Example 2: Graph the following inequalities.

a.) $y > x - 4$ dashed

$m = 1$

$b = -4$



TP: (0,0)

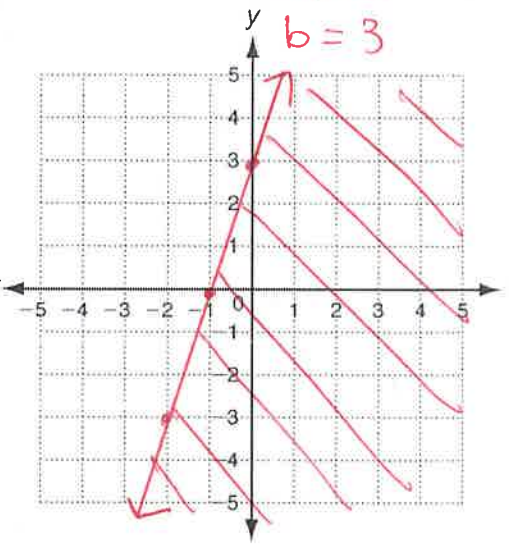
$0 > 0 - 4$

$0 > -4$ ✓ True

b.) $y \leq 3x + 3$ solid

$m = 3$

$b = 3$



TP: (0,0)

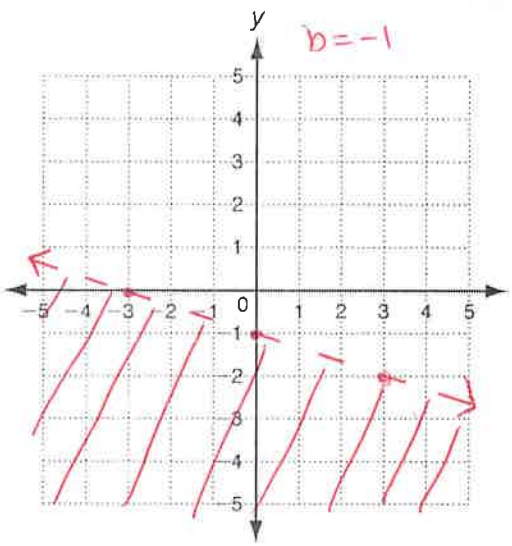
$0 \leq 3(0) + 3$

$0 \leq 3$ ✓ True

c.) $y < -\frac{1}{3}x - 1$

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

$b = -1$



TP: (0,0)

$0 < -\frac{1}{3}(0) - 1$

$0 < -1$ False

d.) $x + 2y < 6$

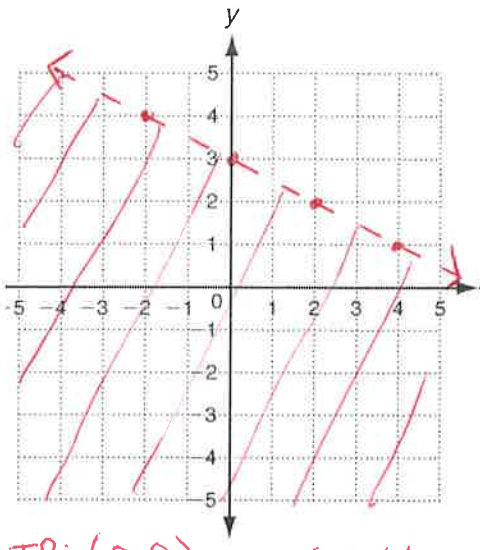
$-x \quad -x$

$\frac{2y}{2} < \frac{-x+6}{2} \quad \frac{2}{2}$

$y < -\frac{1}{2}x + 3$

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

$b = 3$



TP: (0,0) $0 + 2(0) < 6$

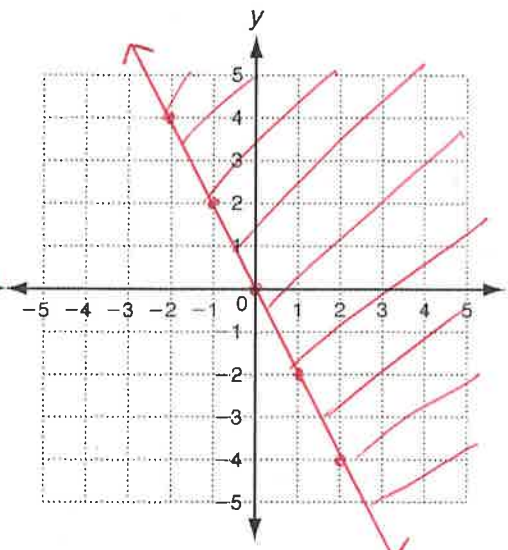
$0 < 6$ ✓

e.) $y \geq -2x$

$m = -2$

$b = 0$

*Cannot pick (0,0) as test point since (0,0) is on the line



TP: (1,1) $1 \geq -2(1)$

$1 \geq -2$ ✓

f.) $2x - y \leq 5$

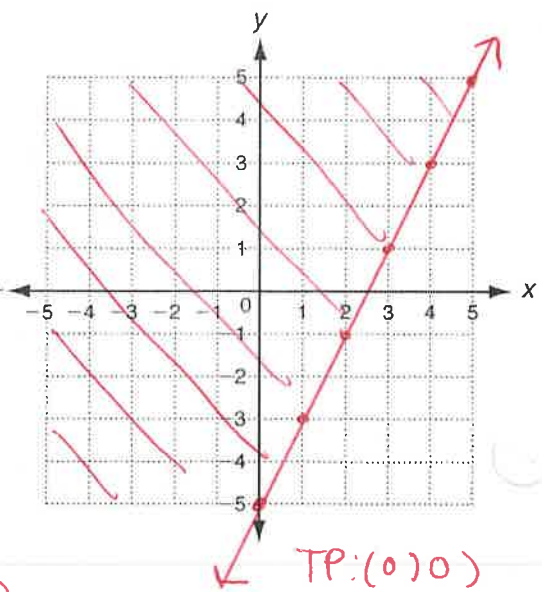
$-2x \quad -2x$

$\frac{-y}{-1} \leq \frac{-2x+5}{-1} \quad \frac{}{-1}$

$y \geq 2x - 5$

$m = 2$

$b = -5$



TP: (0,0) $2(0) - 0 \leq 5$

$0 \leq 5$ ✓