Date _____

Foundations Math 11

6.1 Graphing Linear Inequalities in Two Variables

Linear Inequality relationship between two linear expressions involving an inequality ($<, >, \geq, \leq$)

Solution Set set of all possible solutions, often shaded on a grid.

Explore: For which inequalities is (3, 1) a possible solution? Justify.

a) $13 - 3x > 4y$

$13 - 3(3) > 4(1)$

$13 - 9 > 4$

$4 > 4$ ✗ (3, 1) is not a solution

b) $y + x < 10$

c) $2y - 5 \leq x$

$2(1) - 5 \leq (3)$

$2 - 5 \leq 3$

$-3 \leq 3$ ✓ is a solution

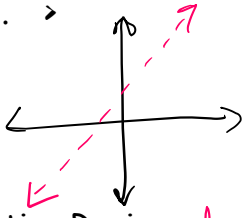
d) $y \geq 9$

Continuous connected set of numbers; includes #s between any two given values

Discrete separate or distinct parts. (things that can be counted)

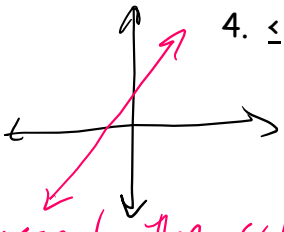
Graphing:

1. >



2. <

3. ≥



4. ≤

Solution Region part of the graph that represents the solution set

Half Plane region on one side of the linear relation

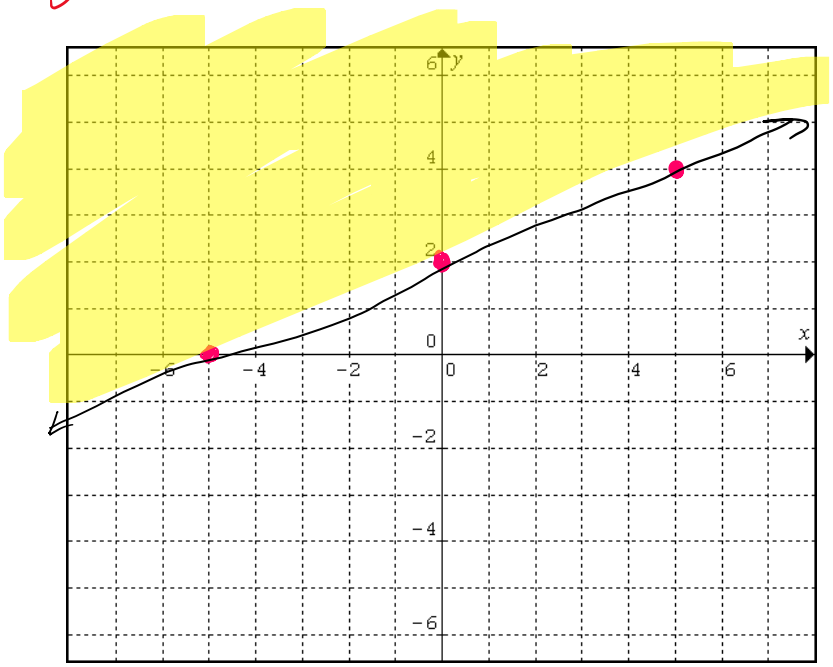
Example 1: Graph the solution set for each linear inequality

a) $-2x + 5y \geq 10.$

look like $y = mx + b$

$\frac{5y}{5} \geq \frac{2x + 10}{5}$

$y \geq \frac{2}{5}x + 2$



Test (0,0) "don't want it to work"

$-2(0) + 5(0) \geq 10$

$0 + 0 \geq 10$

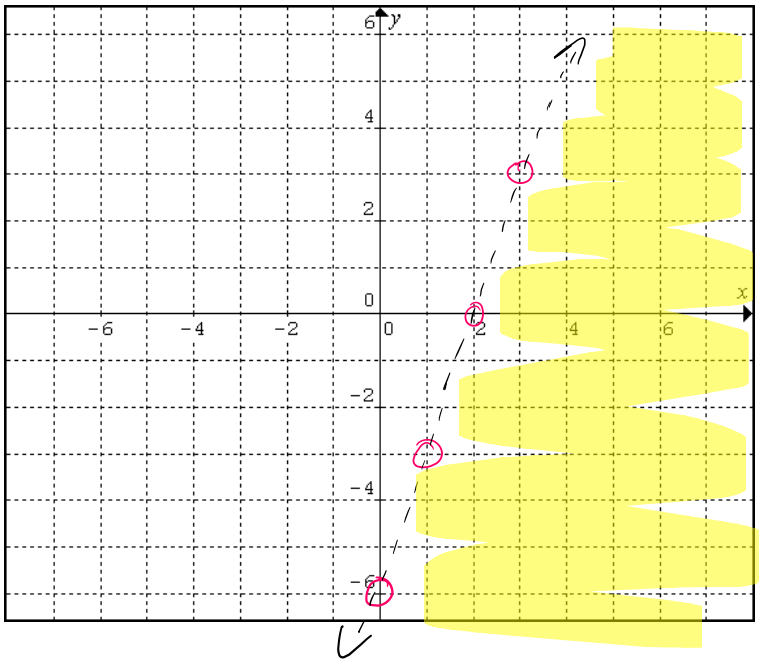
$0 \geq 10$

X that is what we wanted

b) $3x - y > 6$

$\frac{-y}{-1} > \frac{-3x + 6}{-1}$

$y < 3x - 6$



Test (0,0) "don't want it to work"

$3(0) - 0 > 6$

$0 > 6$

X

Example 2: Graph the solution set for each linear inequality on a Cartesian plane.

$x = 2$

a) $\{(x, y) | x - 2 > 0, x \in \mathcal{R}, y \in \mathcal{R}\}$

$x - 2 > 0$

$x > 2$

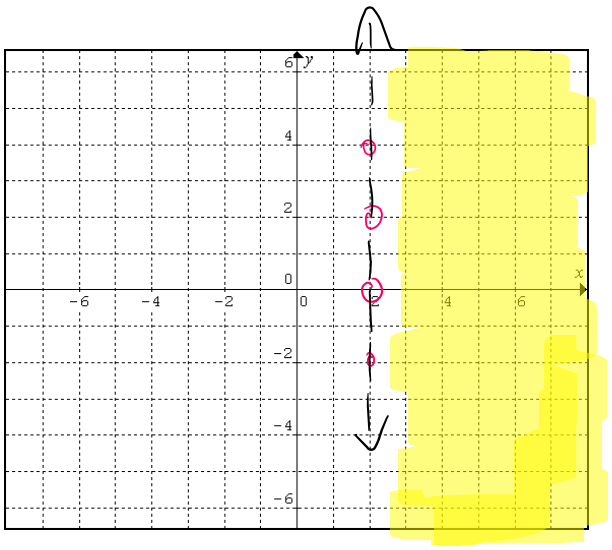
b) $\{(x, y) | -3y + 6 \geq -6, x \in I, y \in I\}$

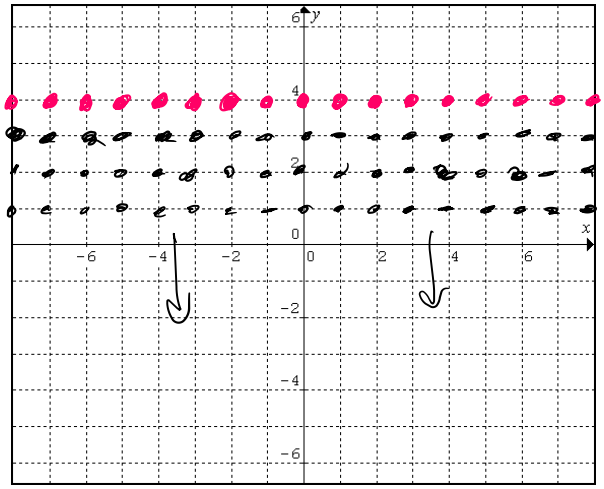
↳ only integers are allowed

$-3y + 6 \geq -6$

$\frac{-3y}{-3} \geq \frac{-12}{-3}$

$y \leq 4$



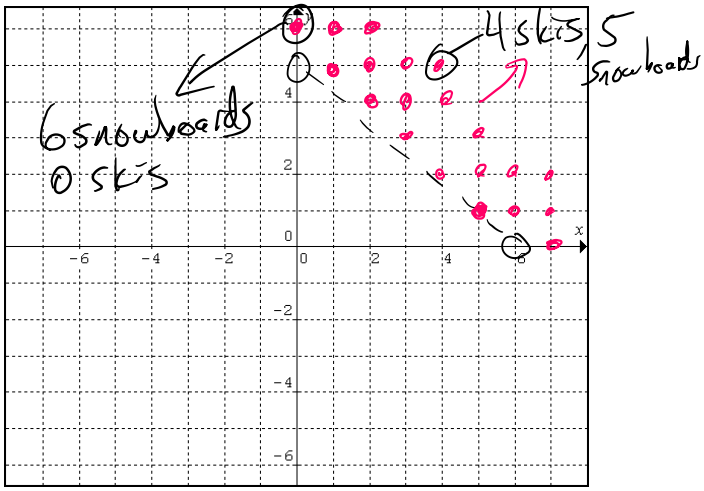


Example 3: A sports store has a net revenue of $100 on every pair of downhill skis sold and $120 on every snowboard sold. The manager's goal is to have a net revenue of more than $600 a day from the sales of these two items. What combinations of ski and snowboard sales will meet or exceed this daily sales goal? Choose two combinations that make sense, and explain your choices.

x: # of skis y: # of snowboards

$100x + 120y > 600$

$x, y \in W$ (whole numbers)



Find x-intercept

$100x + 120(0) > 600$

$100x > 600$

$x > 6$

Find y-intercept

$100(0) + 120y > 600$

$120y > 600$

$y > 5$

Need to Know:

A _____ set contains all of the points in the solution region

A _____ set contains some of the points (with whole number or integer coordinates)

When no domain, range, or context is given, is set of _____ _____

First graph the boundary …

< or >, draw a _____ line

≤ or ≥, with continuous solution set, draw a _____ line

≤ or ≥, with discrete solution set, draw a _____ line

To complete the graph …

_____ not on the boundary to see if it is in the solution region

if it is, shade the half plane _____ , if not, shade the _____ _____

if the solution set is discrete, _____ with whole – number or integer coordinates

Assignment: Page 303: 2-4, 6, 8-10, 12, 13

choose 2