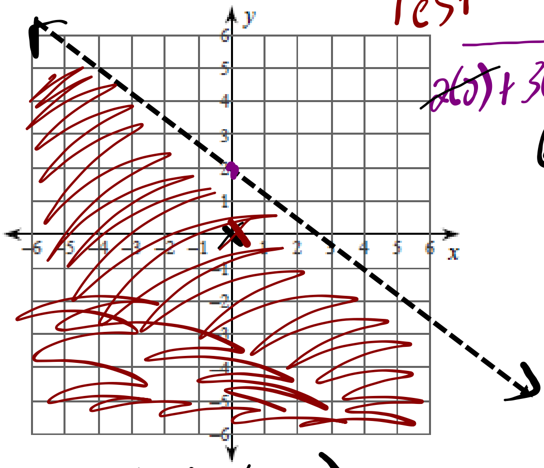
WARM-UP...GRAPH

$$2x+3y-6<0$$



$2x + 3y - 6 = 0$

Test (0,2)

LS	$<$ RS
$2(0)+3(2)-6$	0
$6-6$	
0	

$\frac{3y}{3} = \frac{-2x}{3} + \frac{6}{3}$

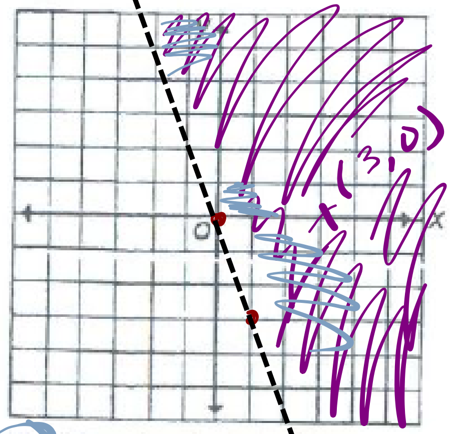
$y = -\frac{2}{3}x + 2$

$\frac{\text{Rise}}{\text{Run}}$ y-int

Test (0,0)

LS	$<$ RS
$2(0)+3(0)-6$	0 yes
-6	

9 $3x + y > 0$



Test

R Quadrants I, II, IV; excludes boundary line.

L ~~All four quadrants; includes boundary line.~~

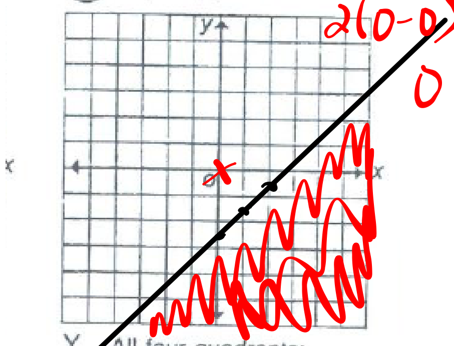
M Quadrants I, III, IV; excludes boundary line.

$3x + y = 0$

$y = -\frac{3x}{1}$

LS	> RS
$3(3) + 0$	0
9	yes

10. $2(x - y) \geq 5$



Y ~~All four quadrants; excludes boundary~~ line.

U Quadrants II, III, IV; includes boundary line.

A Quadrants I, III, IV; includes boundary line.

LS	$\geq$ RS
$2(0-0)$	5
0	
	No

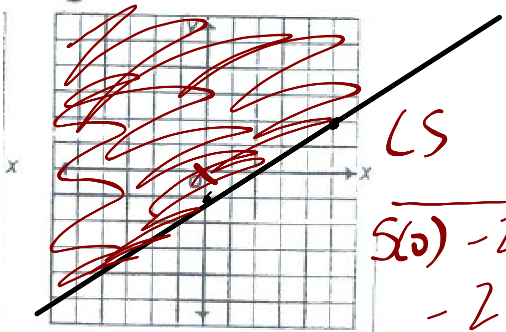
$$2(x - y) = 5$$

$$2x - 2y = 5$$

$$\frac{-2y}{-2} = \frac{-2x}{-2} + \frac{5}{-2}$$

$$y = \frac{1}{1}x - 2.5$$

(11) $5y - 2 \geq 3x - 7$



N ~~Quadrants I, III, IV; excludes boundary line.~~

B All four quadrants; includes boundary line.

D Quadrants I, II, IV; includes boundary line.

LS	$\geq$ RS
$5(0) - 2$	$3(0) - 7$
-2	-7
	Yes

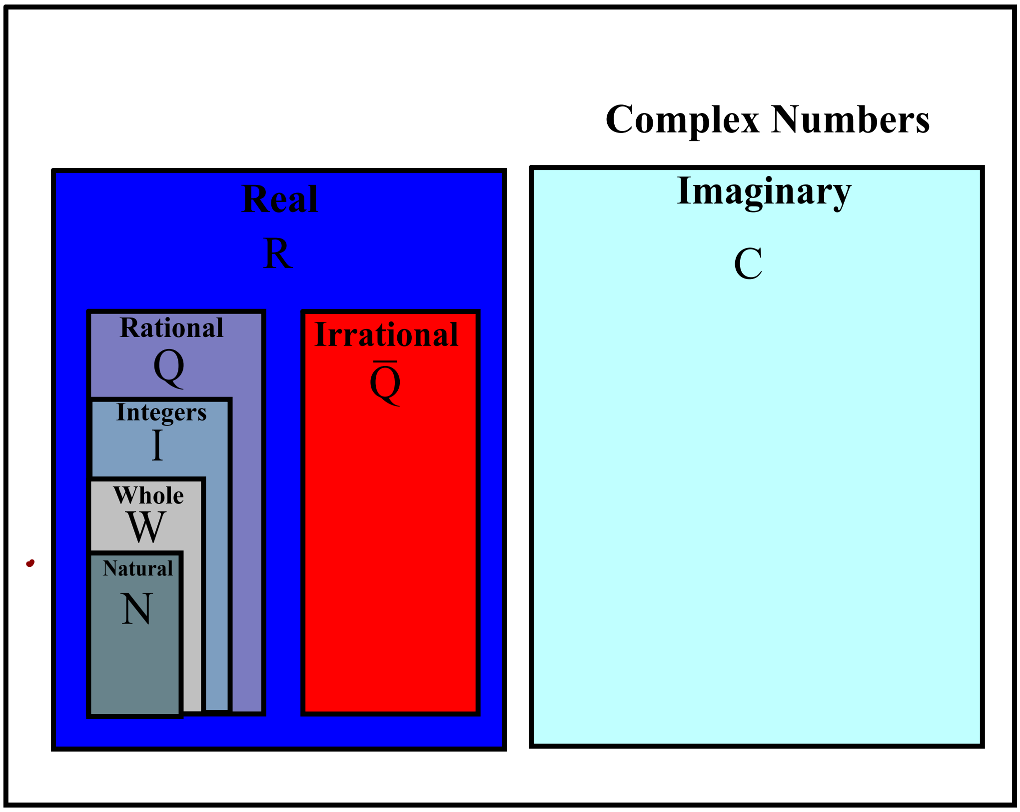
$$5y - 2 = 3x - 7$$

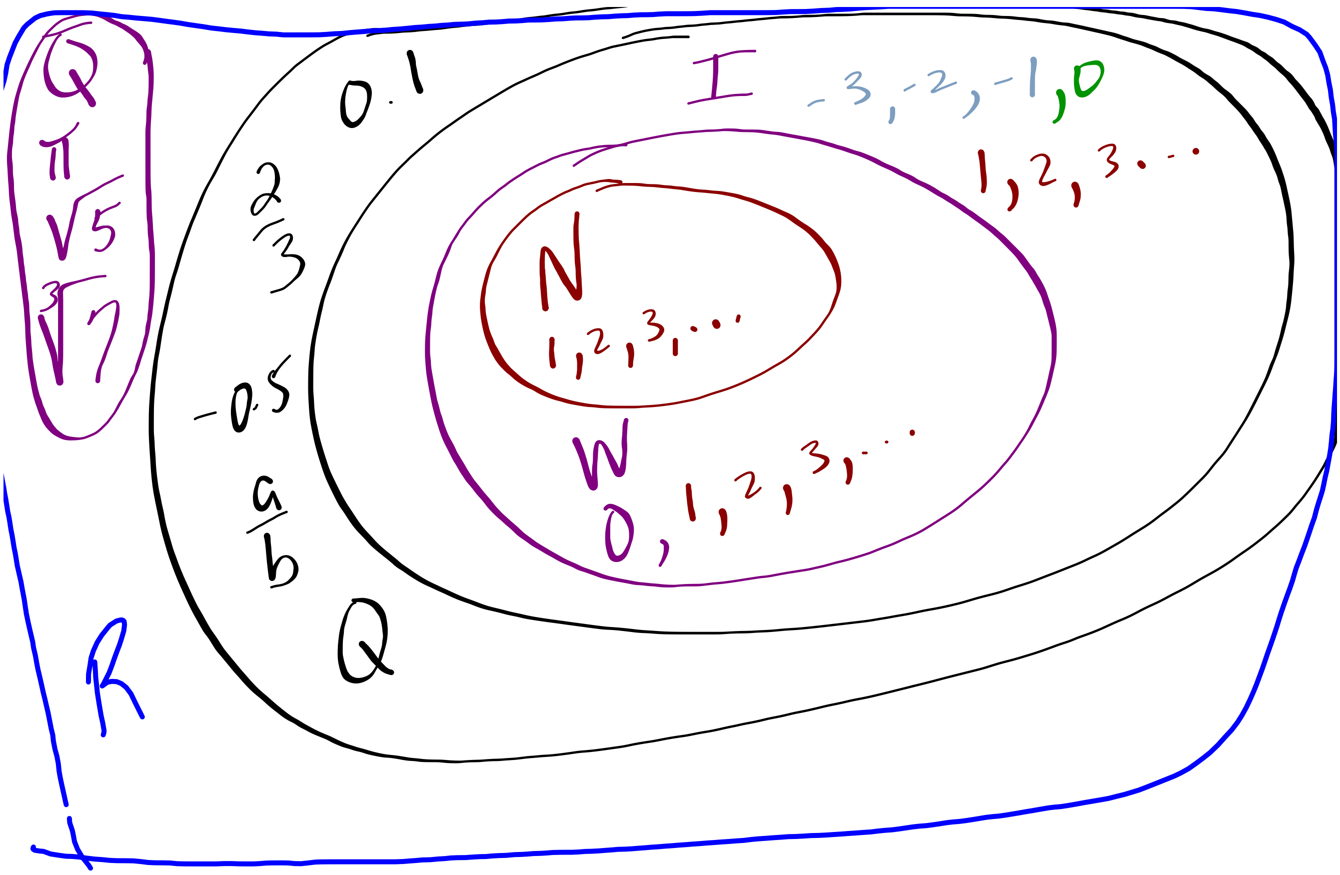
$$5y = 3x + 2 - 7$$

$$\frac{5y}{5} = \frac{3x}{5} - \frac{5}{5}$$

$$\boxed{y = \frac{3}{5}x - 1}$$

STORYTIME: "The Complete Number System"




Q
π
√5
∛7
0.1
2/3
-0.5
a/b
Q
I -3, -2, -1, 0
1, 2, 3...
N
1, 2, 3, ...
W
0, 1, 2, 3, ...
R

Pre-Calc

i

$\sqrt{-1}$

Imaginary
Non-Real
Complex

Graphs of Linear In-Equalities

Sometimes the domain and range are stated as being in the set of integers. This means that the solution set is **discrete** and consists of separate or distinct parts. Discrete variables represent things that can be counted, such as people in a room. This means that the solution region is not shaded but rather stippled with points.

So when interpreting the solution region for a linear inequality, consider the restriction on the domain and range of the variables.

> If the solution set is **continuous**, all the points in the solution region are in the solution set. (Shaded)
>
> If the solution set is **discrete**, only specific point in the solution region are in the solution set. This is represented graphically by stippling.

Some solution sets may be restricted to specific quadrants. For example, most linear inequalities representing real-world problem situations have graphs that are restricted to the first quadrant.

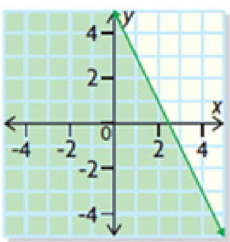
Here are some examples: Set → $\{(x, y) \mid y > -2x + 5, \; x \in R \;\; y \in R\}$

Such that

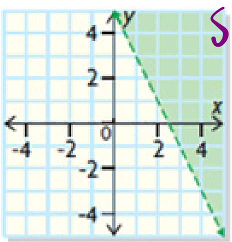
is an element

Real

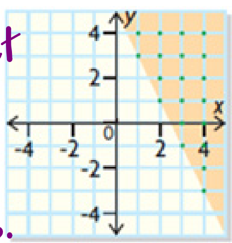
$\{(x, y) \mid y \leq -2x + 5,$
$x \in R, y \in R\}$



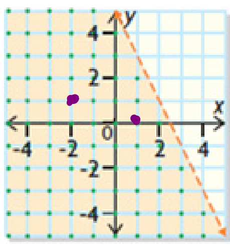
$\{(x, y) \mid y > -2x + 5,$
$x \in R, y \in R\}$



$\{(x, y) \mid y \geq -2x + 5,$
$x \in I, y \in I\}$



$\{(x, y) \mid y < -2x + 5,$
$x \in I, y \in I\}$



Let's do a couple more...

stipple Q1

1) $\{(x,y) \mid 2x+5y \le -20, x\varepsilon I, y\varepsilon I\}$

solid

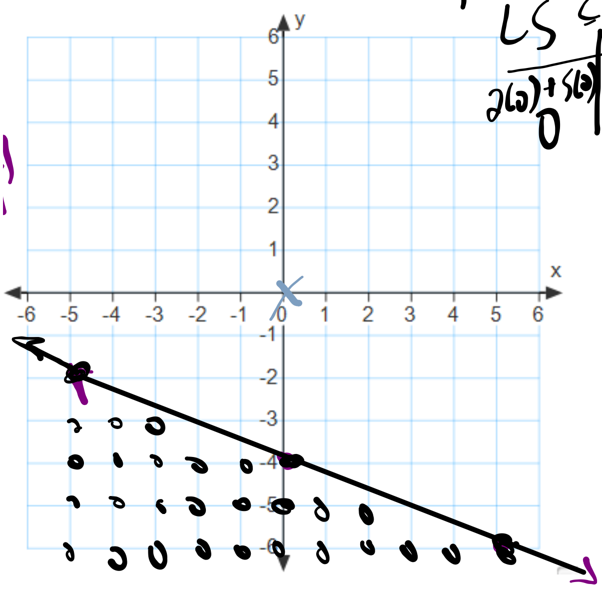
stipple (dots)

$$\frac{5y}{5} = \frac{-2x}{5} - \frac{20}{5}$$

$$y = -\frac{2}{5}x - 4$$

Test (0,0)

LS $\le$	RS
$2(0)+5(0)$	-20
0	NO



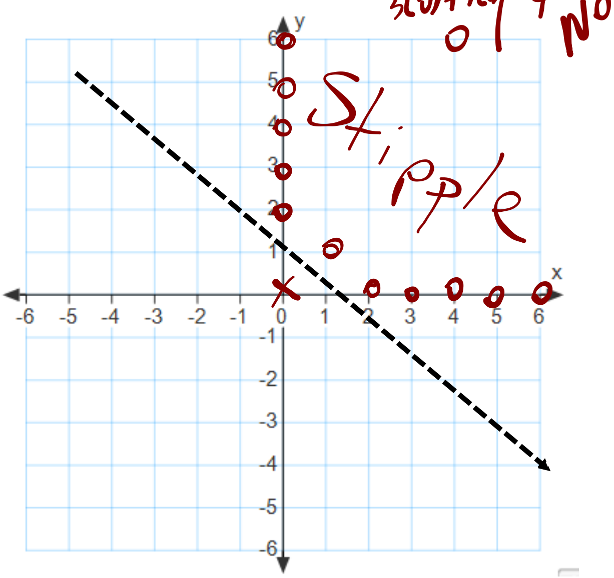
2) $\{(x,y) \mid 3x+4y > 4, x\varepsilon W, y\varepsilon W\}$

dashed

$$\frac{4y}{4} = -\frac{3x}{4} + \frac{4}{4}$$

$$y = -\frac{3}{4}x + 1$$

LS >	RS
$3(0)+4(0)$	4
0	NO



MORE PRACTICE...

Worksheet - Graphing Inequations with 2 variables.pdf

Worksheet Solutions

Attachments

Worksheet - Graphing Inequations with 2 variables.pdf

Worksheet - Graphing Linear Inequalities.pdf