

Graphing Linear Inequalities

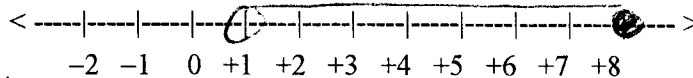
Quality - Accuracy - Transfer - 100%

Section 1. More algebraic inequalities on the number line provided. Learn by doing. For each exercise, perform the "POINT TEST" as your check.

****Special Case**** Betweenness

1. $-2 < x - 2 \leq 5$
 $+3 \quad +2 \quad +3$
 $+1 < x \leq 8$

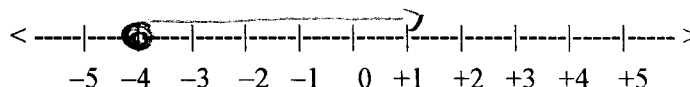
$(1, 8]$



2. $18 \geq -3x + 6$

$-3x + 6 \leq 18$
 $-6 \quad -6$
 $-3x \leq 12$
 $\frac{-3x}{-3} \leq \frac{12}{-3}$
 $x \geq -4$

$[-4, \infty)$



Remembering:

The Good News: Y on left

Y is Positive

The Bad News: Y is Negative

Y is Negative

Section 2. Graphing Linear Inequalities on the Cartesian Planes.

1. Re-Arrange and Simplify the Following Linear Inequalities.

a. $2x + y > 5$

Re-Write $y > -2x + 5$ Simplify: _____ $m = -\frac{2}{1}$ $b = (0, 5)$

b. $y - 4x \leq 7$

Re-Write $y \leq +4x + 7$ Simplify: _____ $m = \frac{4}{1}$ $b = (0, 7)$

c. $2y + 4x - 6 > 0$

Re-Write $\frac{2y}{2} > \frac{-4x + 6}{2}$ Simplify: $y > -2x + 3$ $m = \frac{-2}{1}$ $b = (0, 3)$

d. $3x - y > 5$

Re-Write $-y > -3x + 5$ Simplify: $y < +3x - 5$ $m = \frac{3}{1}$ $b = (0, -5)$

e. $9 \leq 2x - 3y$

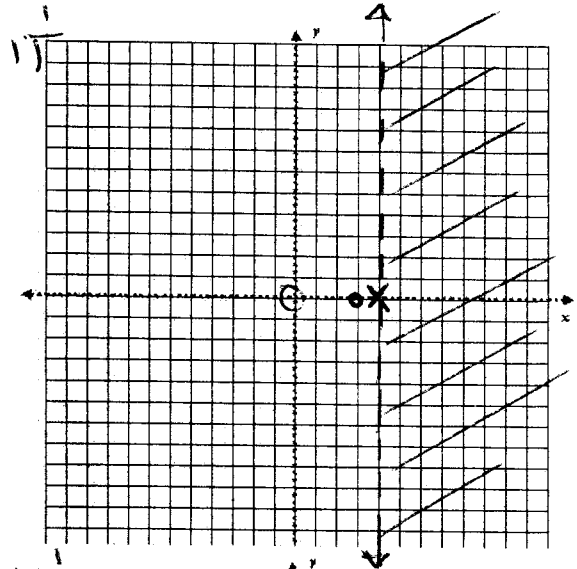
$2x - 3y \geq 9$

Re-Write $\frac{2x}{-3} \geq \frac{-9}{-3}$ Simplify: $y \leq \frac{2}{3}x - 3$ $m = \frac{2}{3}$ $b = (0, -3)$

Section 3. Graphing Linear Inequalities on the Cartesian Plane - In Two Variables $x=4$

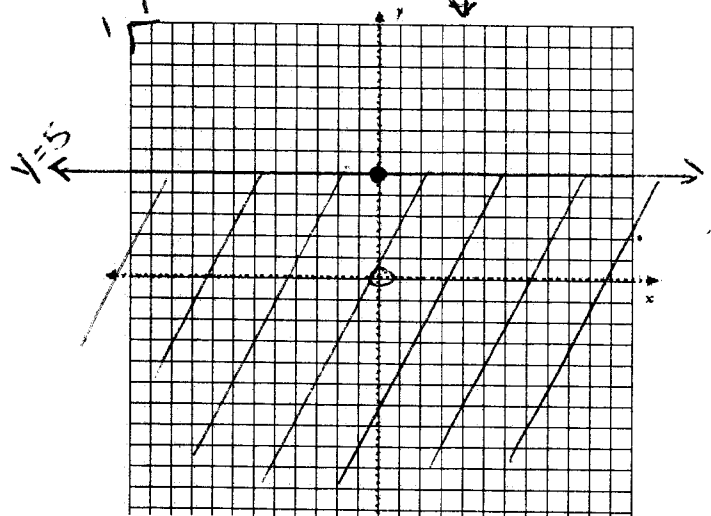
1. $x > 4$

$x=4$
 No y term
 // to y axis



2. $y \leq 5$

$y=5$
 No x term
 // to x axis



3. $y \leq 2x$

$m = \frac{2}{1} = \frac{\Delta y}{\Delta x}$

$b = (0,0)$

Solid

@ (5,5)

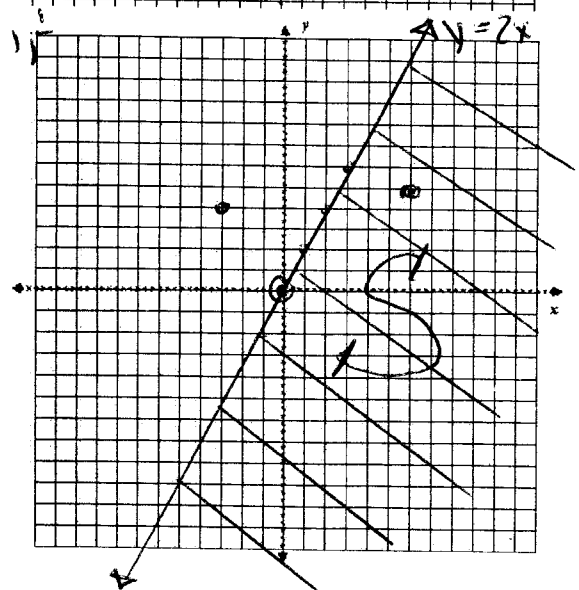
$5 \leq 2(5)$

$5 \leq 10$ Yes

@ (-3,4)

$4 \leq 2(-3)$

$4 \leq -6$ No



****Special Case: Betweenness****

4. $x + y < 4$

$y < -x + 4$

$m = -\frac{1}{1} = \frac{\Delta y}{\Delta x}$

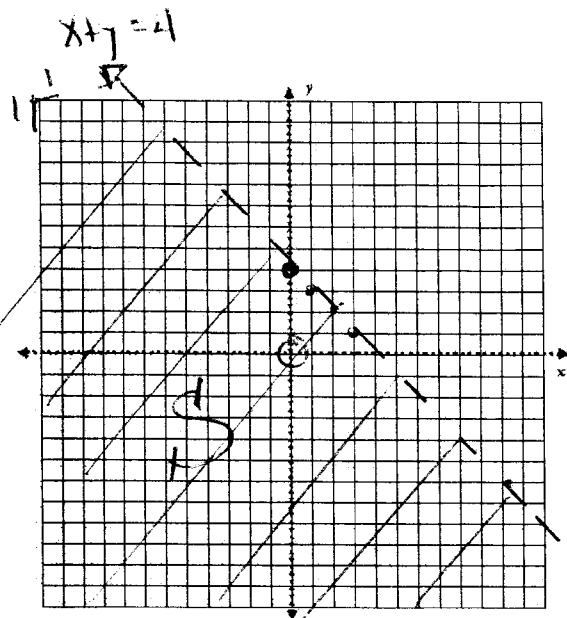
$b(0, 4)$

dotted

$(0, 0)$

$0 + 0 < 4$

$0 < 4$ Yes



5. $y - x \geq 5$

$y \geq x + 5$

$m = \frac{1}{1} = \frac{\Delta y}{\Delta x}$

$b(0, 5)$

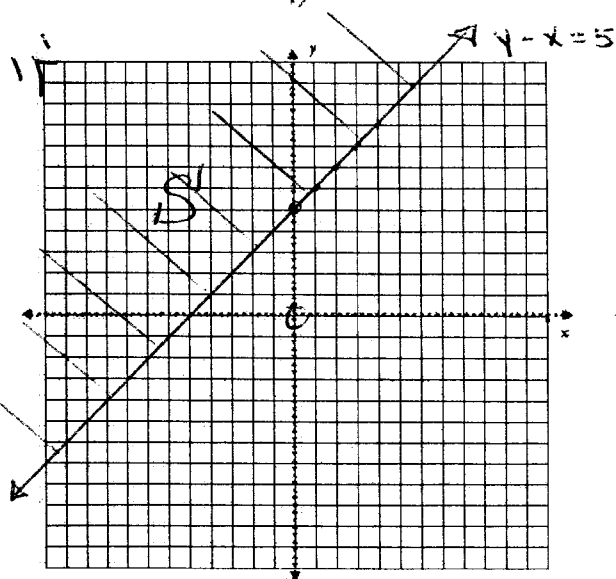
Solid

$(-10, 10)$

$10 - (-10) \geq 5$

$10 + 10 \geq 5$

$20 \geq 5$ Yes



6. $y - 3x > 3$

$y > +3x + 3$

$m = \frac{+3}{1} = \frac{\Delta y}{\Delta x}$

$b(0, 3)$

dotted

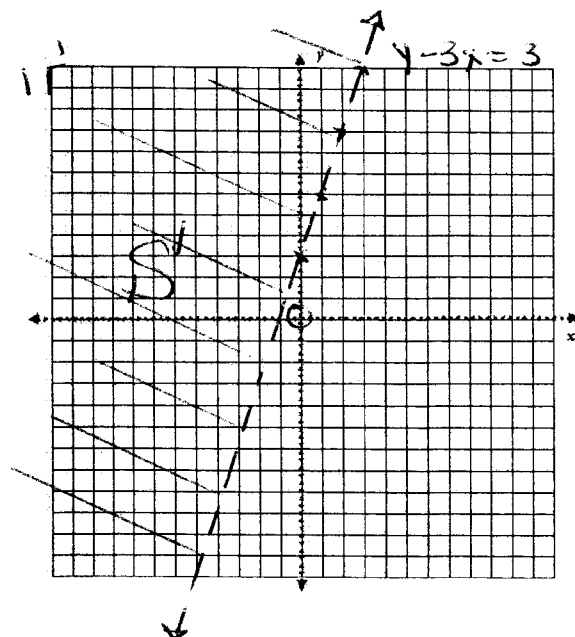
$(-10, 10)$

$10 - 3(-10) > 3$

$10 + 30 > 3$

$40 > 3$

Yes



7. $x - 2y \leq 4$

$$-2y \leq -x + 4$$
$$-1 \quad -2 \quad -2$$

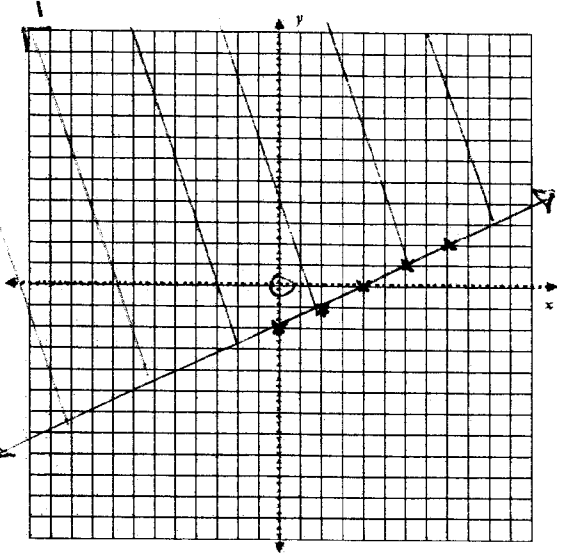
$$y \geq +\frac{1}{2}x - 2$$

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

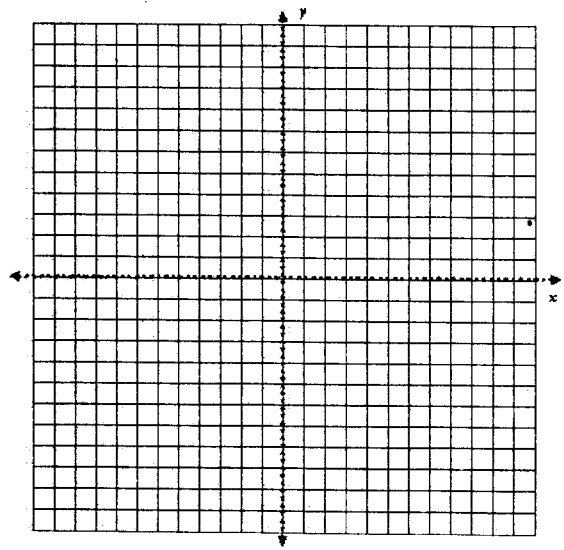
$$b(0, -2)$$

@(0,0)
 $0 - 2(0) \leq 4$
 $0 \leq 4$
Yes

$x - 2y = 4$



8. $6 \leq 2x - 3y$



Section 4. Systems of Linear Inequalities (1) Draw your boundary lines, and plan your shading, (2) Shade your 1/2 plane Solutions.

1. $y \geq -\frac{2}{3}x + 1$
 $y > -4$

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

$m = -\frac{2}{3} = \frac{\Delta y}{\Delta x}$

$b = (0, 1)$

Solid

$y > -4$

No X-Value

|| to X-Axis

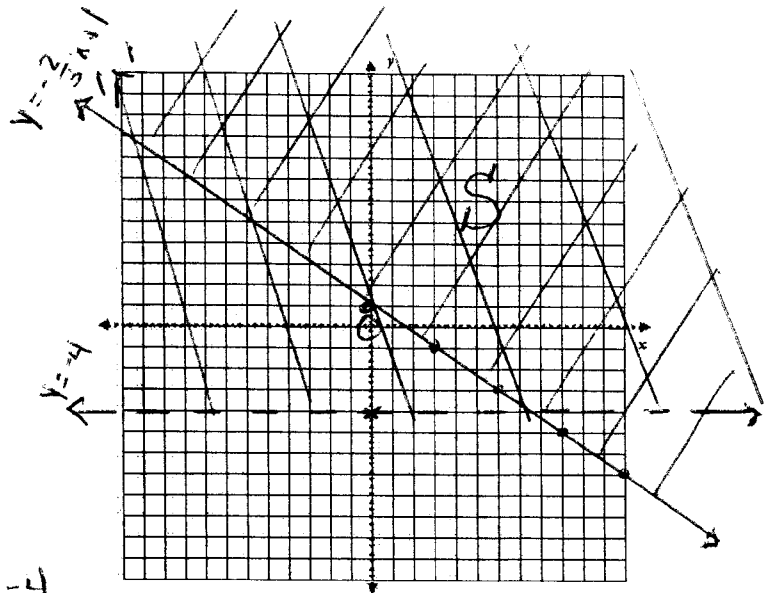
@ (0, 1)

$1 \geq -\frac{2}{3}(0) + 1$

$1 > -4$ yes

$1 > -4 + 1$

$1 > -3$ yes



2. $3x + 2y > 8$
 $x - 5y < 5$

$3x + 2y > 8$

$\frac{2y}{2} > \frac{-3x + 8}{2}$

$y > -\frac{3}{2}x + 4$

$m = -\frac{3}{2} = \frac{\Delta y}{\Delta x}$

$b = (0, 4)$

dotted

$x - 5y < 5$

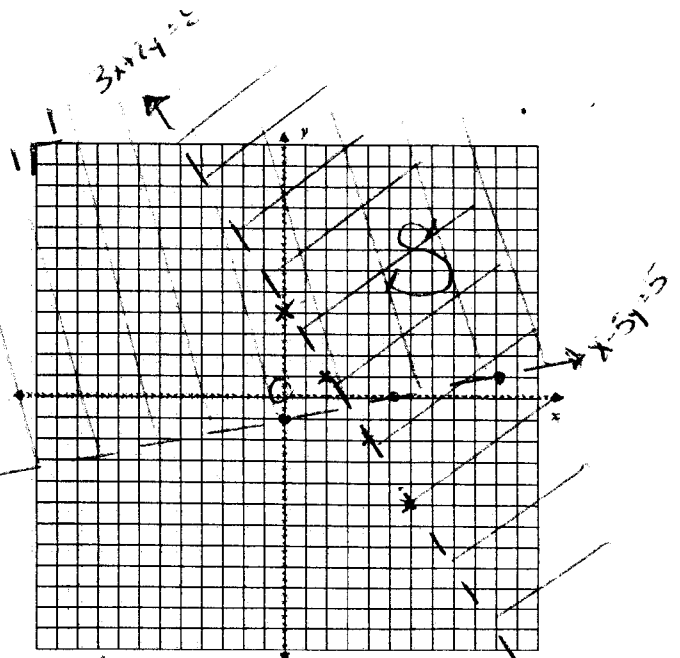
$-\frac{5y}{5} < \frac{-x + 5}{5}$

$y > +\frac{1}{5}x - 1$

$m = \frac{1}{5} = \frac{\Delta y}{\Delta x}$

$b = (0, -1)$

dotted



@ (10, 10)

$10 - 5(10) < 5$

$3(10) + 2(10) > 8$

$10 - 50 < 5$

$30 + 20 > 8$

$-40 < 5$

$50 > 8$

Homework Section

Section	Page(s)	Problems(s)
10.3	660	7 → 27 Odd, 29 → 45 E.O.O.

Handwritten symbols at the bottom of the page: $>$, $<$, \leq , \geq .

Systems of Linear Equations – in 2 Variables

Quality – Accuracy – Transfer – 100%

1. Six boxes of oranges and five boxes of grapefruits cost \$61. At the same time and place, 3 boxes of oranges and 2 boxes of grapefruits cost \$28. Find the cost of one box of each.

$x = \text{Oranges}$
 $y = \text{Grapefruits}$

$$\begin{aligned} 6x + 5y &= 61 \\ 3x + 2y &= 28 \end{aligned}$$

$$-2 \left[\begin{aligned} 3x + 2y &= 28 \\ -6x - 4y &= -56 \end{aligned} \right]$$

$$\begin{aligned} \cancel{6x} + 5y &= 61 \\ -\cancel{6x} - 4y &= -56 \\ \hline y &= 5 \end{aligned}$$

$$\begin{aligned} 6x + 5(5) &= 61 \\ 6x + 25 &= 61 \\ -25 \quad -25 & \\ \hline 6x &= 36 \\ \boxed{x = 6} \end{aligned}$$

$$\begin{aligned} 3(6) + 2(5) &= 28 \\ 18 + 10 &= 28 \\ 28 &= 28 \checkmark \end{aligned}$$

2. The Perimeter of a rectangle is 28 feet. Three times the length increased by 4 times the width is 48 feet. Find the dimensions of the rectangle.

$x = \text{length}$
 $y = \text{width}$

$$\begin{aligned} 2x + 2y &= 28 \\ 3x + 4y &= 48 \end{aligned}$$

$$-2 \left[\begin{aligned} 2x + 2y &= 28 \\ -4x - 4y &= -56 \end{aligned} \right]$$

$$\begin{aligned} 3x + 4y &= 48 \\ -4x - 4y &= -56 \\ \hline -x &= -8 \\ \boxed{x = 8} \end{aligned}$$

$$\begin{aligned} 2(8) + 2y &= 28 \\ 16 + 2y &= 28 \\ -16 \quad -16 & \\ \hline 2y &= 12 \\ \boxed{y = 6} \end{aligned}$$

$$\begin{aligned} 3(8) + 4(6) &= 48 \\ 24 + 24 &= 48 \\ 48 &= 48 \checkmark \end{aligned}$$

3. Bianca has \$5.70 in quarters and dimes. The number of quarters is 6 more than the number of dimes. How many coins of each type does she have?

$x = \text{dimes}$
 $y = \text{quarters}$

$$\begin{aligned} 10x + 25y &= 570 \\ y &= x + 6 \end{aligned}$$

$$\begin{aligned} 10x + 25(x + 6) &= 570 \\ 10x + 25x + 150 &= 570 \\ 35x + 150 &= 570 \\ -150 \quad -150 & \\ \hline 35x &= 420 \\ \boxed{x = 12} \end{aligned}$$

$$\begin{aligned} y &= 12 + 6 \\ \boxed{y = 18} \end{aligned}$$

$$\begin{aligned} -10(12) + 25(18) &= 570 \\ 1.20 + 4.50 &= 5.70 \\ 5.70 &= 5.70 \end{aligned}$$