

Graphing Inequalities Steps

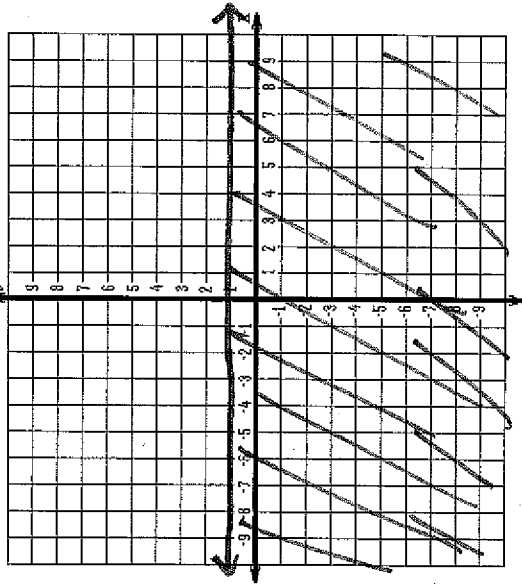
1. Decide which form
 - a) Standard Form $Ax + By > C$
* solve for y
 - b) Slope Intercept Form $y > mx + b$
2. Graph line
 - plot y intercept (0, b)
 - move the slope value rise
 - decide if solid or dotted run
line is needed
Solid \geq or \leq dotted $>$ or $<$

3. Shading

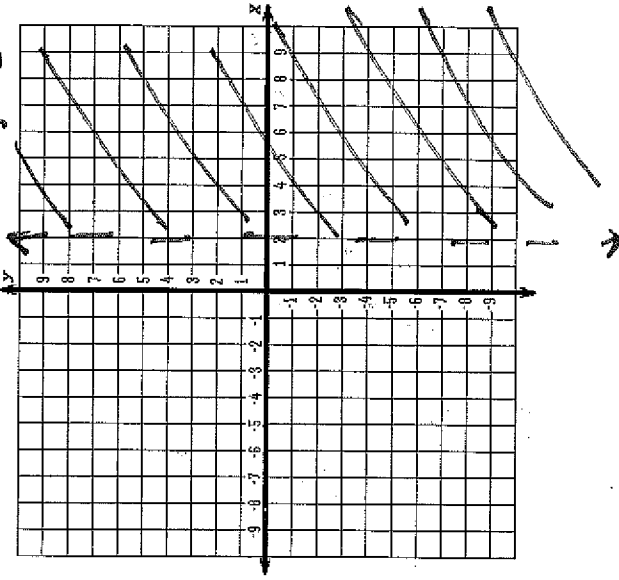
- If $>$ or \geq shade above the line
- If $<$ or \leq shade below the line

Graphing Linear Inequalities

$y \leq 1$
solid, below



$x > 2$
dotted, above [right]



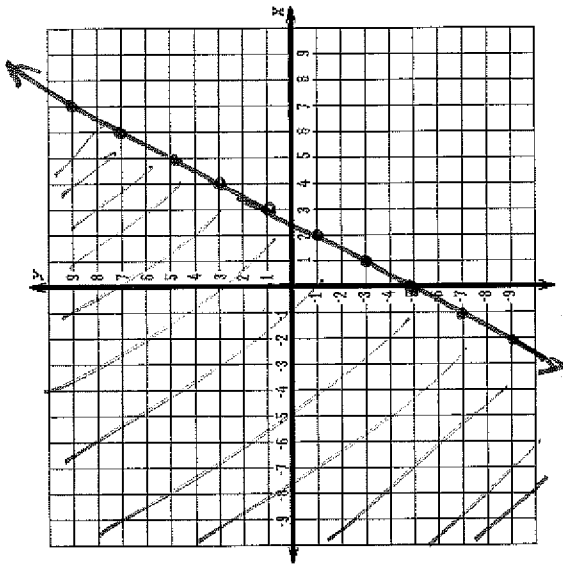
$$y \geq 2x - 5$$

↑ y intercept

slope

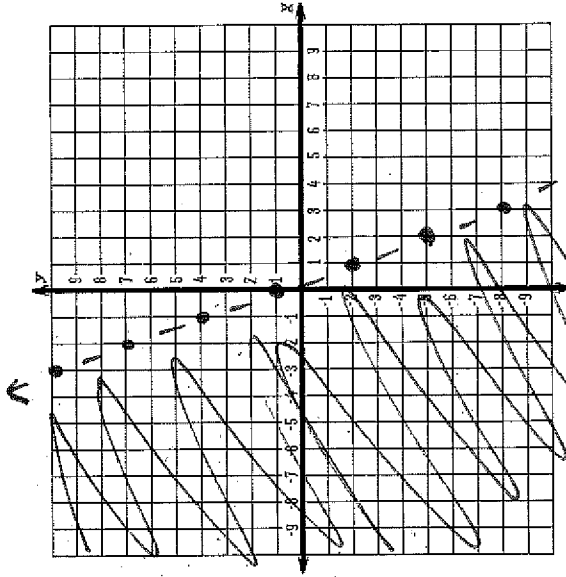
$$2 = \frac{\text{rise}}{\text{run}}$$

Solid, above



OYO

$$y < -3x + 1$$



$$5x + 10y < 20$$

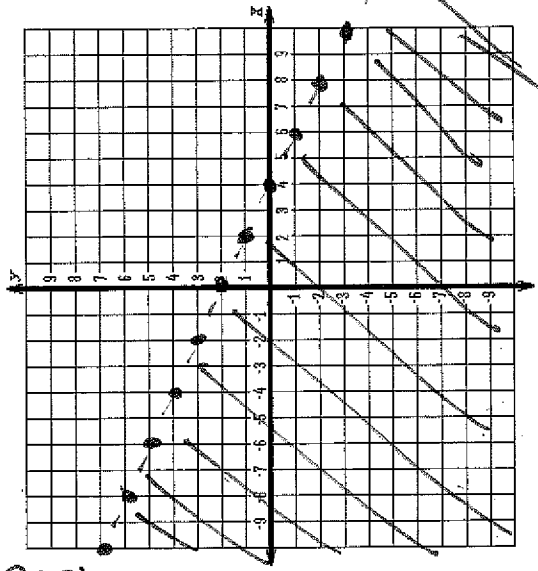
-5x

-5x

$$\frac{10y}{10} < \frac{-5x + 20}{10}$$

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

dotted, below



OYO

$$3x - 5y \geq 15$$

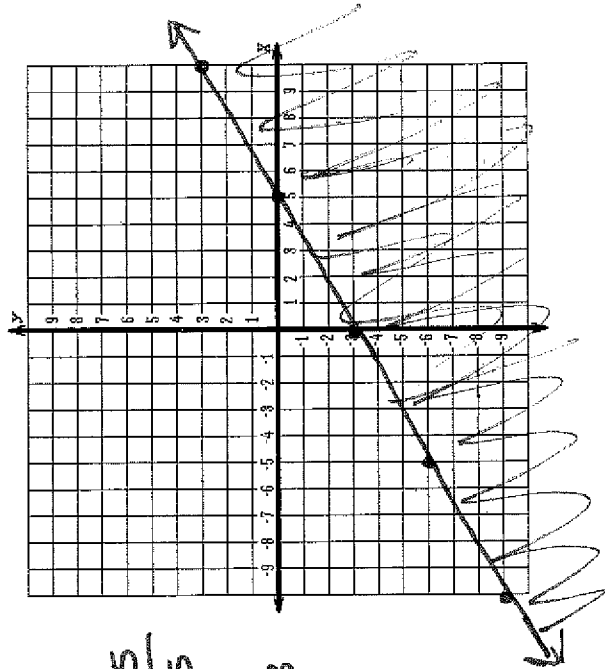
-3x

-3x

$$\frac{-5y}{-5} \geq \frac{-3x + 15}{-5}$$

*divided by a negative

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



NOTES 3-2

ALGEBRA II UNIT 3 SYSTEMS of LINEAR INEQUALITIES

1. Solve each inequality for y.
2. Graph each inequality including shading all possible solutions (remember **dotted** or **solid** lines)
3. Find the intersection of the half planes (shaded areas). The solutions are found in this intersection.
4. List one ordered pair that IS a solution and one ordered pair that IS NOT a solution.

Dotted > <

Solid ≥ ≤

Shade Above > ≥

Shade Below < ≤

$y > -x - 2$
 $y < -3x + 2$

Solution:
 (-4, 6)

Not solution:
 (3, 2)

$-6 - 2y < -x$
 $\frac{1}{2}y < x + 1$

$-6 - 2y < -x$
 $+6$
 $-2y < -x + 6$
 $\frac{-2y}{-2} < \frac{-x + 6}{-2}$
 $y > \frac{1}{2}x - 3$

$\frac{1}{2}y < x + 1$
 $y < 2(x + 1)$
 $y < 2x + 2$

Solution:
 (5, 2)

Not Solution:
 (1, 4)

OYO
 $y \leq .5x + 2$
 $y < -2x - 3$

Solution:
 (-4, -4)

Not Solution:
 (2, 1)

OYO
 $3x + 2y \geq -2$
 $x + 2y \leq 2$

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

Solution:
 (6, -5)

Not Solution:
 (4, 1)

$$y \geq x$$

$$y \leq -x$$

$$x < -3$$

OYO

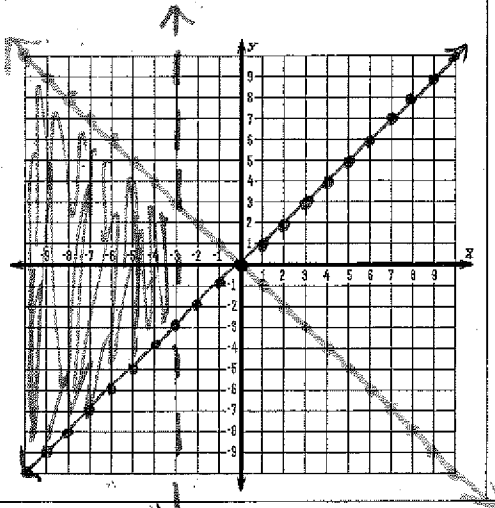
$$y < 3x - 1$$

$$y \leq -\frac{1}{2}x + 4$$

$$y > 2$$

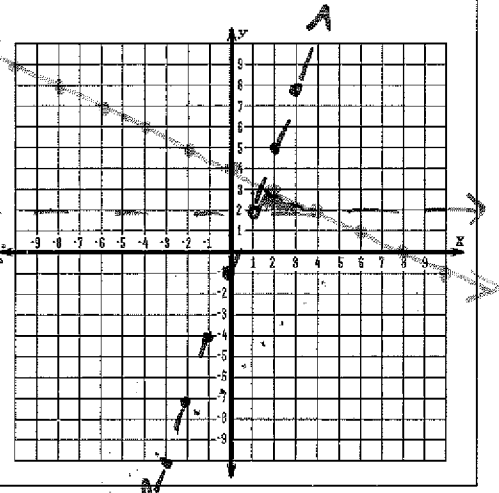
Solution:
 $(-6, 0)$

Not Solution:
 $(-3, 0)$



Solution:
 $(2, 3)$

Not Solution:
 $(2, 2)$



NOTES 3-3

ALGEBRA II UNIT 3 SYSTEMS OF LINEAR INEQUALITIES

Key Words: At least \geq No more than \leq At most \leq No fewer than \geq
 Maximum \leq Minimum \geq Limited to \leq

- The Wheel Cycle Co. manufactures motorcycles & bicycles.
 To stay in business it must produce at least 10 motorcycles each month.
 The company does not have the facilities to produce more than 60 motorcycles.
 It also does not have the facilities to produce more than 120 bicycles.
 The total production cannot exceed 115 motorcycles and bicycles combined.

Write the system of inequalities

$m \geq 10$ (Min # of motorcycles)

$m \leq 60$ (Max # of motorcycles)

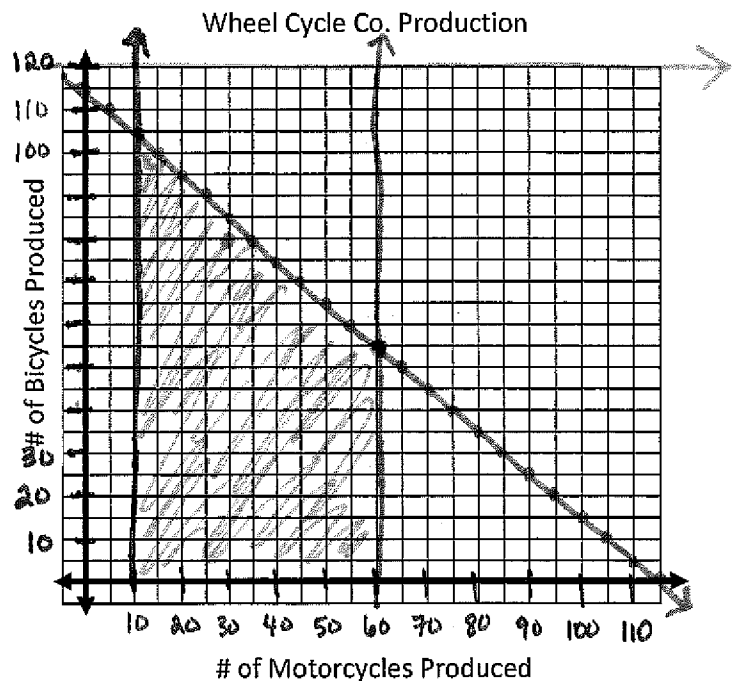
$b \leq 120$ (Max # of bicycles)

$m + b \leq 115$ (Total production)

Graph the system of inequalities
 (solve for b if needed)

$b \leq -m + 115$

Identify the commonly shaded region



Identify three possible solutions and the amount of profit each would create if the company makes \$134 per motorcycle and \$20 per bicycle.

30 motorcycles 80 bikes Profit \$ 5,620

$30(134) + 80(20)$

60 motorcycles 55 bikes Profit \$ 9,140

$60(134) + 55(20)$

10 motorcycles 105 bikes Profit \$ 3,440

$10(134) + 105(20)$

2. A carpenter makes bookcases in two sizes, large & small. It takes about 6 hours to make a large bookcase & 2 hours to make a small one. The carpenter can only spend 24 hours a week making bookcases and must make at least 2 of each size.

Write the system of inequalities

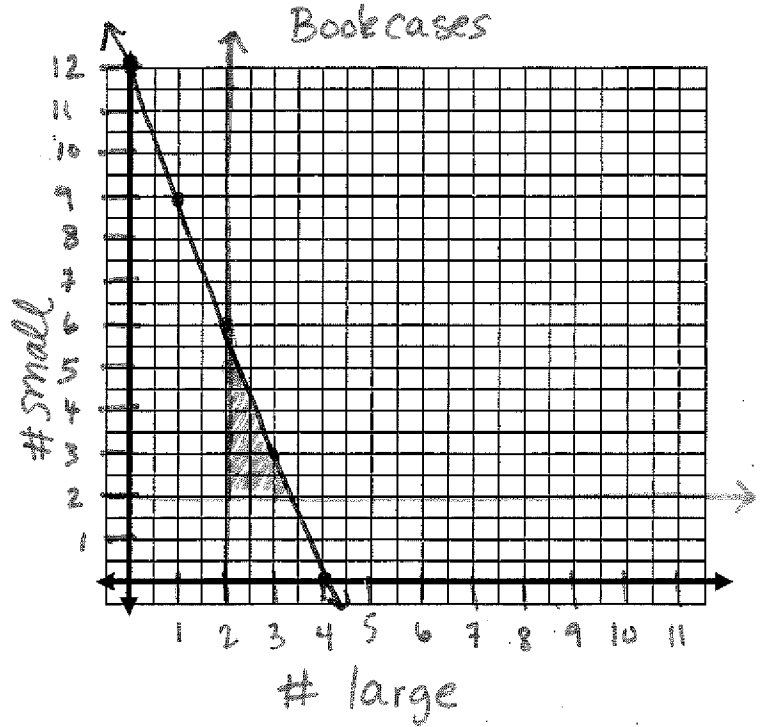
$$\underline{6L + 2S \leq 24}$$

$$\underline{L \geq 2}$$

$$\underline{S \geq 2}$$

$$\frac{2S}{2} \leq \frac{-6L + 24}{2}$$

$$S \leq -3L + 12$$



Graph the system of inequalities

Include in your graph:

- Title
- Labels on axes
- scale on x and y axis
- lines
- shading
- commonly shaded region

Identify three possible solutions and the profit earned if the profit on a large bookcase is \$50 and the profit on a small one is \$20.

2 Large 5 Small Profit \$ 200

$$2(50) + 5(20)$$

3 Large 2 Small Profit \$ 190

$$3(50) + 2(20)$$

2 Large 6 Small Profit \$ 220

$$2(50) + 6(20)$$