Name:_____ Date:_____

Notes
Algebra Section 6.7
Pages 405-412

Goal: "You will graph linear inequalities in two variables"

Vocabulary: Linear inequality in two variables: The result of replacing the = sign in a linear equation with a $>, <, \geq, or \leq$.

Solution of an inequality in two variables: x and y are an ordered pair (x , y) that produces a true statement when the values of x and y are substituted into the inequality.

Determine if an ordered pair is a solution:

1) Plug in for x and y and solve.
2) Does it produce a true statement?

Ex: Which of the following are solutions to $x - 3y \leq 6$?

a. (0, 0) b. (6, –1) c. (10, 3) d. (–1, 2)

a, c and d are all solutions because when you plug them into the inequality they work.

Ex: Tell whether the given ordered pair is a solution to: $-x + 2y < 8$

a. (0, 0) b. (0, 4) c. (3, 5) d. (–2, 3)

a and c are solutions

Graphing a linear inequality in two variables:

1) Graph the inequality the same way you would graph a line.

   Either use slope-intercept or x and y intercepts.

   *If the sign is > or <, draw a dotted line. This means that the points on the line are Not part of the solution.

   *If the sign is $\leq$ or $\geq$ draw a solid line. This means that the points on the line are included in the solution.

2) Choose a coordinate pair. (typically the origin if possible) that is located on one side of the line. Plug your ordered pair into the inequality to see if it works.

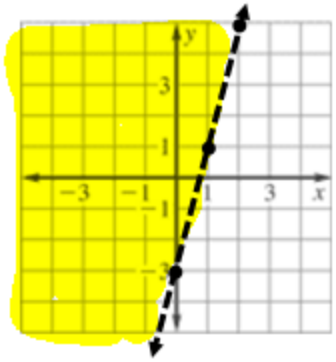
   If it does, then the test point is part of the solution. Shade the side containing the test point.

   If it does not work, then the test point is not part of the solution. Shade the other side.

Graph the following linear inequalities:

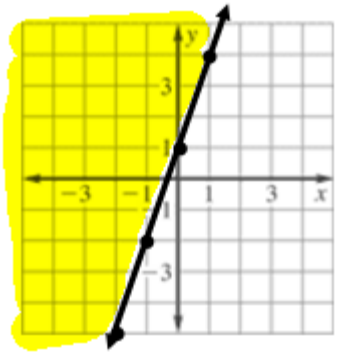
Ex: $y > 4x - 3$

Graph using $y = mx + b$ $m = 4$, $b = -3$
Test (0, 0), which works, so shade with the origin

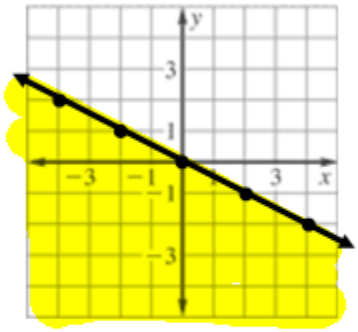


Ex: $y \geq 3x + 1$

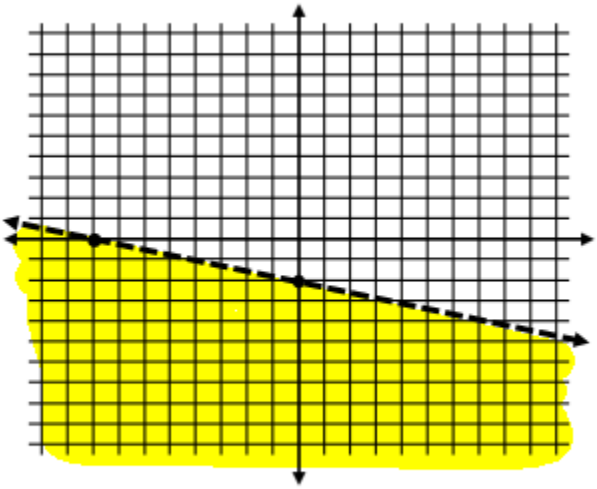
Graph using $y = mx + b$ $m = 3$, $b = 1$
Test (0, 0), doesn't work (shade other side)



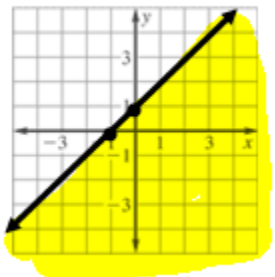
Ex: $x + 2y \leq 0$



Ex: $x + 4y < -8$



Ex: $x - y \geq -1$



Ex: You have 2 summer jobs at a youth center. You earn \$8 per hour giving basketball lessons and \$10 giving swimming lessons. Let x represent the number of hours you spend coaching basketball and y represent the amount of time you spent giving swimming lessons. Your goal is to earn at least \$200 per week.

a. Write an inequality to represent the situation

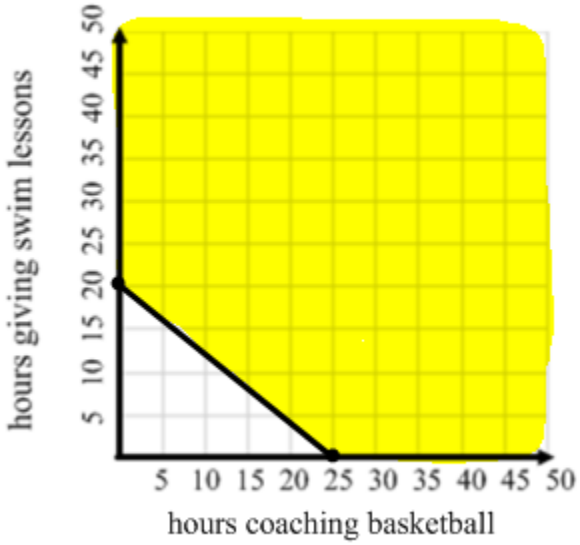
$8x + 10y \geq 200$

b. Graph the inequality.

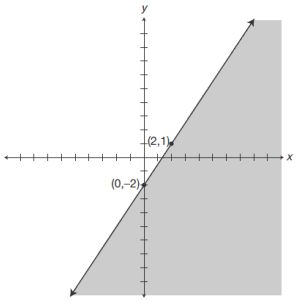
Graph using x and y intercepts, be sure to connect with a solid line. Origin doesn't work. Shade without.

c. Give two possible solutions so you would make the amount you want.

Can choose anything on the line or in the shaded region.



Write the inequality of each graph shown.

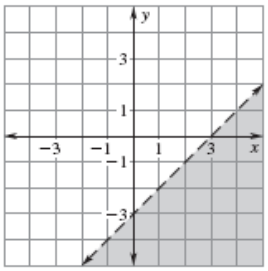


Find equation of the line by finding m and b

$m = \frac{3}{2}$, $b = -2$ so $y = \frac{3}{2}x - 2$

Inequality sign is $\leq$ or $\geq$ since line is solid. Origin does not work. Plug in (0, 0) and choose inequality sign that makes it false.

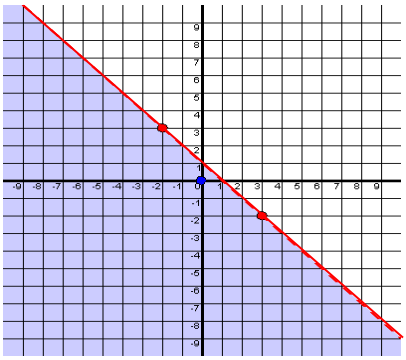
$y \leq \frac{3}{2}x - 2$



Find equation of the line by finding m and b
$m = 1$, $b = -3$ so $y = x - 3$

Inequality sign is > or < since line is dotted.
Origin does not work. Plug in (0, 0) and choose inequality sign that makes it false.

$$y < x - 3$$



Find equation of the line by finding m and b
$m = -1$, $b = 1$ so $y = -x + 1$

Inequality sign is $\leq$ or $\geq$ since line is solid.
Origin does work. Plug in (0, 0) and choose inequality sign that makes it true.

$$y \leq -x + 1$$