Solve this system of equations.

$5(6x + 8y = 30)$
$2(15x + 20y = 75)$

$30x + 40y = 150$
$-\ 30x + 40y = 150$
$0 = 0$

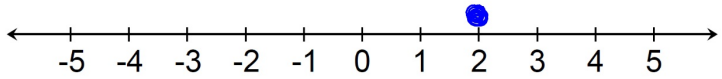
These are the same line.

This is a true statement and will always be true.

many sol's

Graph this on a number line:

$x = 2$

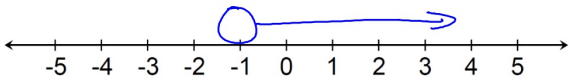


Number line graph of the solution to an equation:

Just a point on the number line.

Graph each inequality on a number line.

1. $-1 < Q$



Number line graph of an inequality:

Starting point and a direction.

Is number included?

Yes: shaded circle

No: open circle

An arrow going left or right from the starting point to show ALL the solutions.

You are going to buy some CD's and/or DVD's at the store. CD's cost $8 each and DVD's cost $12 each. You can spend up to $72.

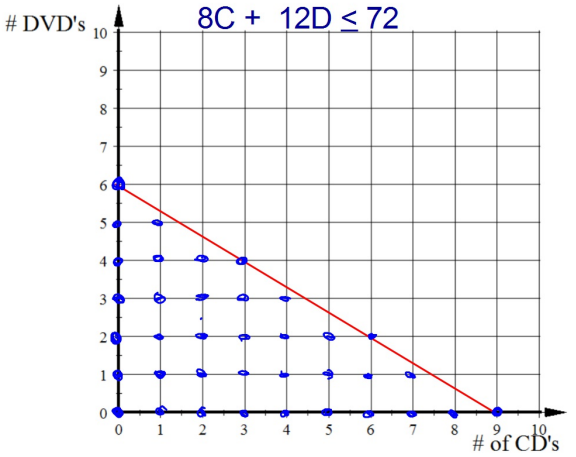
1. Model this situation with an inequality.

$8C + 12D \leq 72$

2. How many ways can you spend up to $72.

You could try to use a table to find all the ways to spend up to $72 but it would be easy to leave something out and may take a long time. There must be another way.....

C	D	$
0	0	0
1	0	8
1	1	20
2	0	16
⋮	⋮	⋮

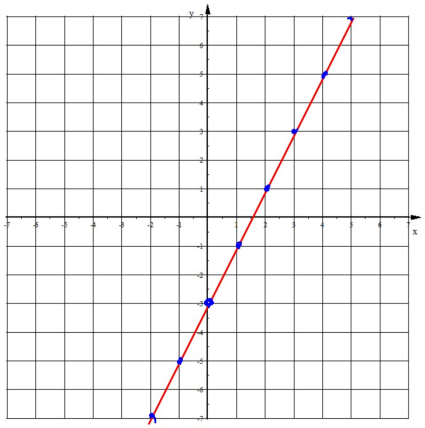


Each point on the line represents speding exactly $72. Each point below the line represents spending less than $72.

There are 37 ways to spend up to $72.

Get a sheet of graph paper and a ruler. Graph this line.

$y = 2x - 3$



Graph of a linear EQUATION on the x-y plane:

Just a line on the x-y plane.

Actually it's an infinite number of points all lying in the same line, so close together it appears to be one continuous line.

Graph of a linear EQUATION on the x-y plane:

Just a line on the x-y plane.

Remember:
The graph of an INEQUALITY on a number line is
a Starting Point (open or shaded)

and a Direction (an arrow indicating ALL rest of the solutions).

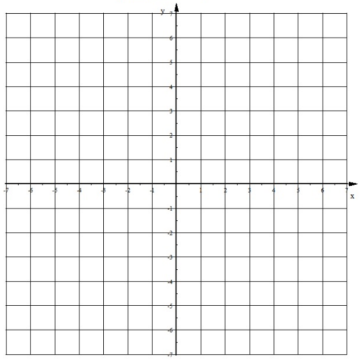
Sec 7-5: Linear Inequalities.

What would the graph of this linear INEQUALITY look like?

$$y \geq 2x - 3$$

Graphing Linear Inequalities on the x-y plane:

$y \geq 2x - 3$



A "Starting Line" and a direction.

Dashed Line
or
Solid Line

Also known as
the Boundary Line

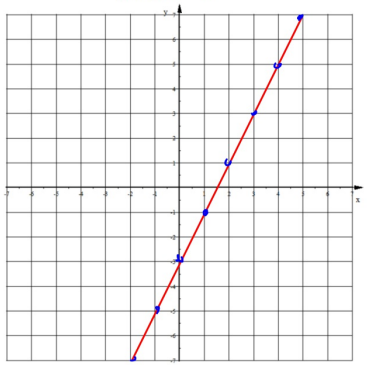
Shade the area on
one side of the line
or on the other side.

Also known as
the Solution Region

Graph of a linear INEQUALITY on the x-y plane:

A line on the graph that is either SOLID or DASHED
then the area on one side of the line is shaded to show
ALL the rest of the solutions.

$y \geq 2x - 3$



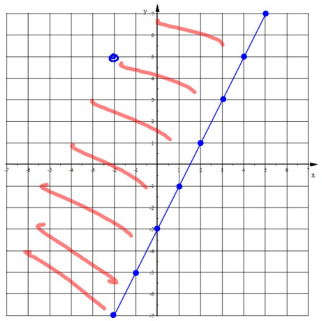
Graphing the Boundary Line

- Put points on the graph to represent the location of the line.
- Connect the points with either a

Solide Line (≤ or ≥) or Dashed Line (< or >)

This line is solid because the inequality has the "or equal to" part.

$y \geq 2x - 3$



Which side of the line do you shade?

Method 1: Pick any point NOT on the line and see it makes the inequality true.

- If Point makes inequality true: Shade that side.
- If Point makes inequality false: Shade other side.

If you Test $(0,0)$ $0 \geq 2(0) - 3$. $0 \geq -3$ IT IS TRUE

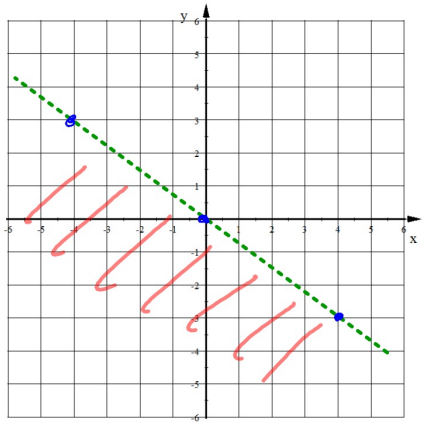
Method 2: Works only if inequality is in Slope-Intercept Form

- If you say "y is greater..." shade ABOVE the line.
- If you say "y is less..." shade BELOW the line.

$y \geq$ → y is greater....

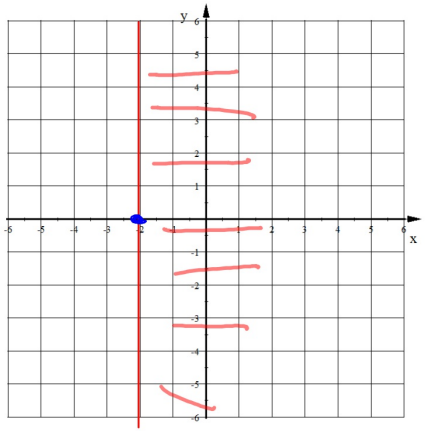
1. $y < -\frac{3}{4}x$

dashed line & below



2. $x \geq -2$

- VERTICAL Line
- solid line
- to the right



Graphing linear inequalities that are in

STANDARD FORM

Graph each inequality.

5. $12x - 30y \leq 60$

Method 1:

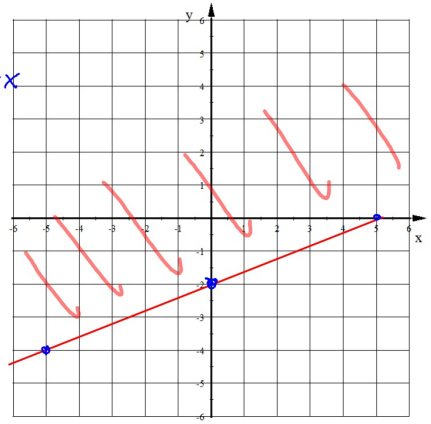
$y \geq -2 + \frac{2}{5}x$

Step 1: Rewrite equation into Slope-Intercept Form

$y \geq \frac{60 - 12x}{-30}$

Step 2: Plot points and connect with the correct kind of line

Step 3: Shade the correct side



5. $12x - 30y \leq 60$

Method 2:

Step 1: Find the x & y-intercepts & plot them on the axes.

x-int $= \frac{60}{12} = 5$; y-int $= \frac{60}{-30} = -2$

Step 2: Connect with the correct kind of line. SOLID LINE

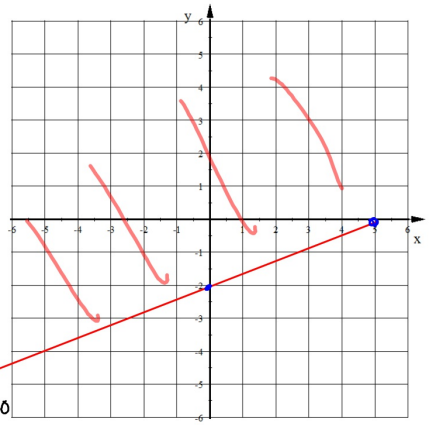
Step 3: Test the origin.

If the origin "works" shade THAT side.

If the origin doesn't "work" shade the other side of the line.

$(0,0) \rightarrow$ $12(0) - 30(0) \leq 60$

$0 \leq 60$



This is true, therefore, Shade the side that has the origin