

Equations and Graphing

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There are several ways to graph a straight line given its equation.

Let's quickly refresh our memories on equations of straight lines:

Slope Intercept Form	Point Slope Form	Horizontal Lines	Vertical Lines
$y = mx + b$ when stated in "y=" form, it quickly gives the slope, m , and where the line crosses the y-axis, b , called the y-intercept.	$y - y_1 = m(x - x_1)$ when graphing, put this equation into "y = " form to easily read graphing information.	$y = 3$ (or any number) horizontal lines have a slope of zero - they have "run", but no "rise" -- all of the y values are 3.	$x = -2$ (or any number) vertical lines have no slope (it does not exist) - they have "rise", but no "run" --all of the x values are -2.

Graphing Tidbits:

If a point lies on a line, its coordinates make the equation true.

(2,1) is on the line $y = 2x - 3$ because $1 = 2(2) - 3$

Before graphing a line, be sure that your equation starts with "y=".

To graph $6x + 2y = 8$ rewrite the equation:

$$2y = -6x + 8$$

$$y = -3x + 4$$

Now graph the line using either slope intercept method or chart method.

The x-coordinate may be called the **abscissa**.

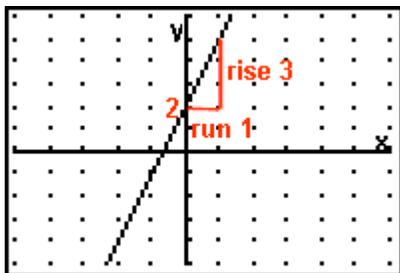
The y-coordinate may be called the **ordinate**.

Methods of Graphing a Line

Using $y = mx + b$ with rise/run

Graph $2y = 6x + 4$

1. Put your equation in "y=" form.
 $y = 3x + 2$
2. The number in front of x is the slope.
(If necessary, place this number over 1 to form a fraction for your rise/run.)
 $\text{slope} = 3/1$
3. The " b " value is where the line crosses the y -axis. Be sure to check the sign of this number. $b = 2$
4. Plot the b value on the y -axis.
see graph below
5. Standing at this point, use your rise and run values to plot your second point.
(If rise is positive, move up. If rise is negative, move down.)
(If run is positive, move right. If run is negative, move left.)
6. Connect the two points to form the line.



Using a Chart - Plotting Points

Graph $2y = 6x + 4$

X	Y
-3	
-2	
-1	
0	
1	
2	
3	

Create a chart to hold x and y values from your line. For lines, the x -values usually range from -3 to $+3$, but may be any values you wish.

While charts often contain more than 2 entries, only two entries are needed to determine a straight line. A third point should be used to "check" that an error was not made while computing the first two points.

X	Y
-3	-7
-2	-4
-1	-1
0	2
1	5
2	8
3	11

Substitute the x -values into the equation to determine the y -values. Putting the equation in "y=" form first will make the substitution easier.

$$y = 3x + 2$$

Now start substituting. For example, substitute $x = -3$:
 $y = 3(-3) + 2 = -9 + 2 = -7$

Plot the (x,y) coordinates to graph the line.

