Graphing Linear Equations Review

- we can graph linear functions (straight lines), using either of the methods given below:

a) **intercept method**

- finding the x and y-intercepts
  - an ***x-intercept*** is the x-coordinate of the point where a line crosses the x-axis **i.e.** $(x, 0)$
  - a ***y-intercept*** is the y-coordinate of the point where a line crosses the y-axis **i.e.** $(0, y)$

e.g. Graph the following.

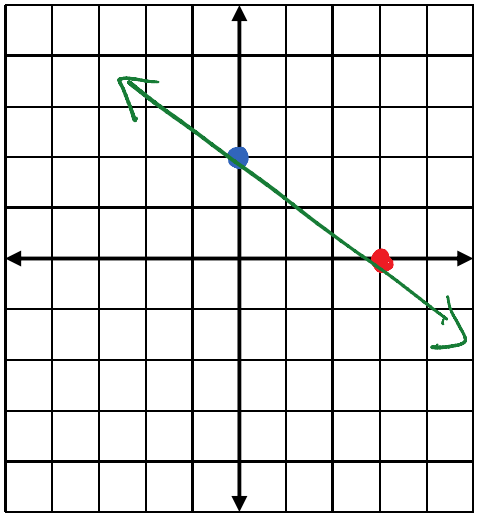
a) $2x + 3y = 6$

① $2(0)+3y=6$ ② $2x+3(0)=6$

$3y=6$ $2x=6$

$y=2$ $x=3$

y-intercept x-intercept



b) $4x - y = 4$

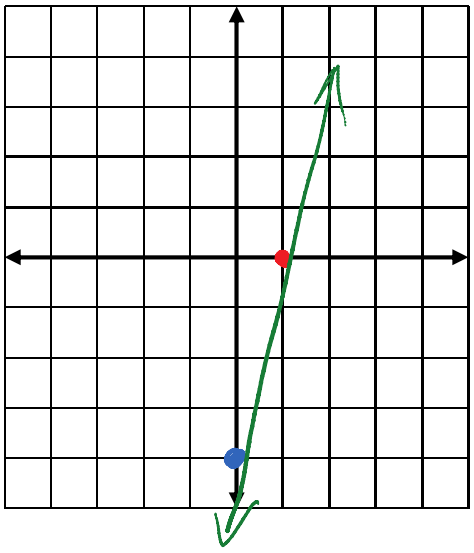
x	y
0	
	0

$4(0)-y=4$ $4x-0=4$

$-y=4$ $4x=4$

$y=-4$ $x=1$

$(0,-4)$ $(1,0)$



b) **slope-intercept method**

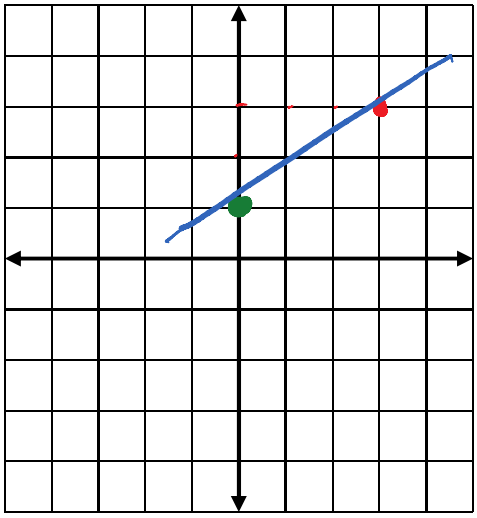
- rearrange your equation into $y = mx + b$ where m is the slope number and b is the y-intercept
- plot the y-intercept first
- use the slope number to determine a second point $\Rightarrow \frac{\text{rise}}{\text{run}}$
- connect the two points to form a line

e.g. Graph the following.

a) $3y - 2x = 3$

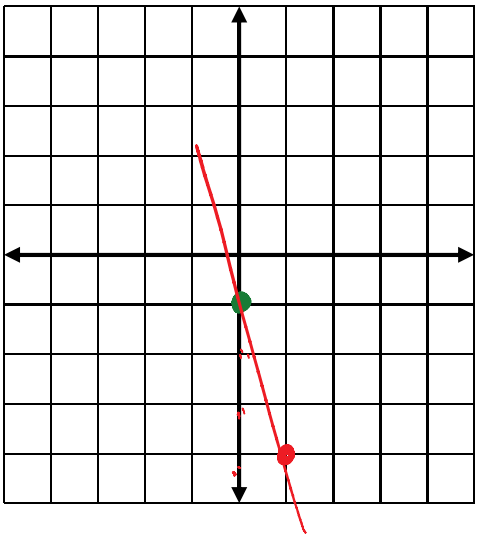
$\frac{3y}{3} = \frac{2x}{3} + \frac{3}{3}$

$y = \frac{2}{3}x + 1$ (rise 2, run 3; y-intercept)



b) $3x + y + 1 = 0$

$y = -3x - 1$ (rise −3, run 1; y-intercept)



Verifying Solutions to Equations

- Plug in the x and y values to determine if the left side = right side
- if the solution is not valid, you will end up with an untrue statement
- the following example shows how to verify that point (1, 3) is a solution to the system of linear equations $x + y = 4$ and $3x - y = 0$

Test (1, 3) for $x + y = 4$:

LS	RS
1 + 3 4	4

$4 = 4$ is true. ✓

Test (1, 3) for $3x - y = 0$:

LS	RS
3(1) – 3 0	0

$0 = 0$ is true. ✓

- therefore, (1, 3) is a solution to the system of linear equations $x + y = 4$ and $3x - y = 0$

e.g. Verify that point (4, 5) is a solution to each equation or system.

a) $3x + 5y = 20$

$3(4) + 5(5) = 20$

$12 + 25 = 20$

$37 \neq 20$

Not a solution

b) $4x = 21 - y$

$4(4) = 21 - 5$

$16 = 16$ ✓

yes a Solution

c) $6x - 2y = 14$ and $3x + y = 17$

$6(4) - 2(5) = 14$

$24 - 10 = 14$

$14 = 14$ ✓

$3(4) + 5 = 17$

$12 + 5 = 17$

$17 = 17$ ✓

Yes a solution.