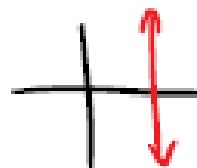


# 5) Introduction to linear relations

- **Linear** relations are straight lines relationships
- Linear relations are always functions!
  - One exception:



vertical line is NOT a function.

## Part 1: Algebra Review

Example #1: Solve the following equations for  $y$ .

a)  $4x + 6y = 24$

$$\begin{aligned} \cancel{-4x} \quad \quad \quad \cancel{-4x} \\ \frac{6y}{6} &= \frac{24 - 4x}{6} \quad \div 6 \\ y &= 4 - \frac{2}{3}x \end{aligned}$$

$\uparrow$  Y-INT       $\uparrow$  SLOPE

b)  $\left(\frac{x}{2} + \frac{y}{3} = 1\right) \times 6$  ← lcm of 2 and 3

$$\begin{aligned} \frac{6 \cdot x}{1 \cdot 2} + \frac{6 \cdot y}{1 \cdot 3} &= 6 \cdot 1 \\ \frac{6x}{2} + \frac{6y}{3} &= 6 \\ \cancel{-3x} \quad \quad \quad \cancel{-3x} \\ 3x + 2y &= 6 \end{aligned}$$

$$\begin{aligned} \frac{6y}{6} &= \frac{6 - 3x}{2} \\ y &= 3 - \frac{3}{2}x \end{aligned}$$

$\uparrow$  Y-INT       $\uparrow$  SLOPE

## Part 2: Graphing Using Slope and Y-Intercept

We know two ways of graphing equations:

1. Table of values  
Best used when: equations are solved for one variable ( $y = 3x + 10$ )
2. Using X and Y intercepts  
Best used when:  $2x + 6y = 10$

A new third way! Graphing from the equation  $y = mx + b$

$m =$  Slope

$b =$  Y-intercept

### STEPS

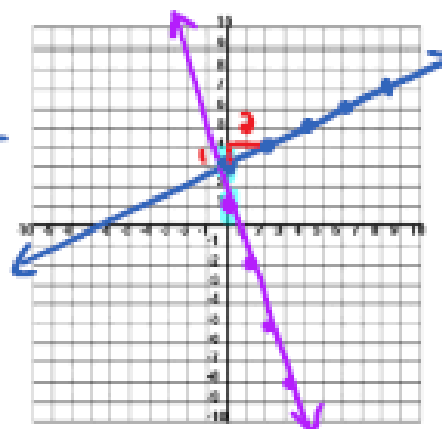
1. Solve for  $y$  (if necessary)
2. Plot the  $y$ -intercept
3. Use the slope  $\left(\frac{\text{rise}}{\text{run}}\right)$  to plot 2<sup>nd</sup> point
4. Keep plotting more points using the same slope until you have at least 4 points

Example #2:  $y = \frac{1}{2}x + 3$

$\swarrow$  rise  
 $\searrow$  run       $\uparrow$  Y-int

$y = -\frac{3}{1}x + 1$

$\swarrow$  rise  
 $\searrow$  run



assignment # 5  
pages #3-10 questions #1-25