

C2 - Graphing Lines

Graphing Lines - Strategies

Three main strategies for graphing lines are:

Table of Values

x & y intercepts

Slope Intercept Form

Graphing Lines - Table of Values

Making a table of values is a very powerful graphing strategy that may be used to graph any type of relation.

We have already used this strategy in: C1 Linear or Non-Linear Investigation



Graphing Lines - x & y intercepts

How many points do we need to know in order to graph a line?

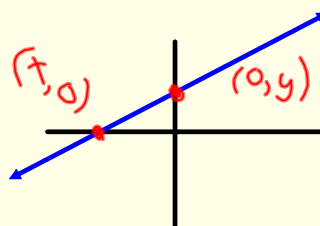
Two Points

Let's use the x and y intercepts as the two points that we need.

X	Y
0	
	0

Remember: y-intercept is when $x = 0$

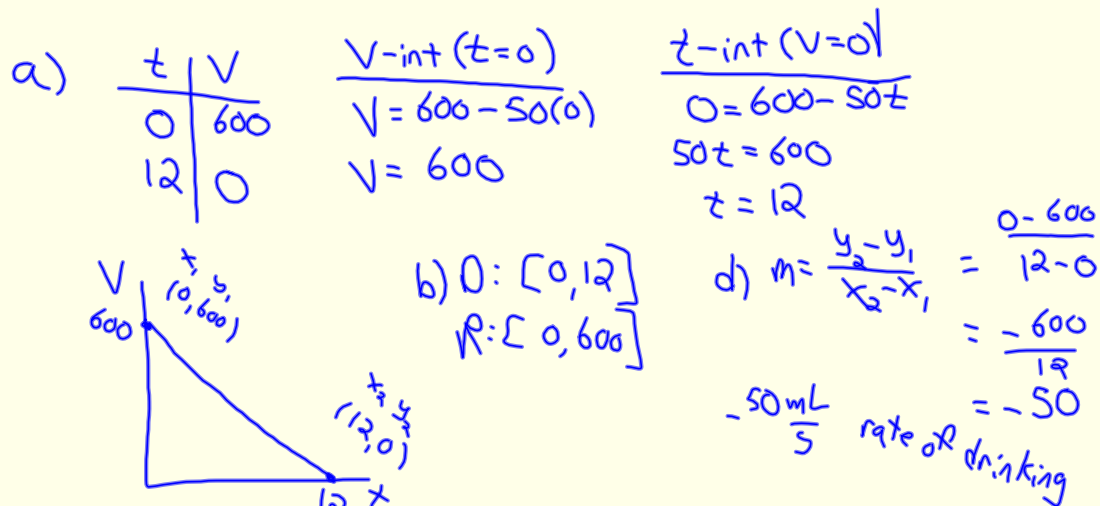
x-intercept is when $y = 0$



Graphing Lines - x and y intercepts

Example: The volume of water in a glass in mL, V , after a certain amount of time in seconds, t , may be given by $V = 600 - 50t$.

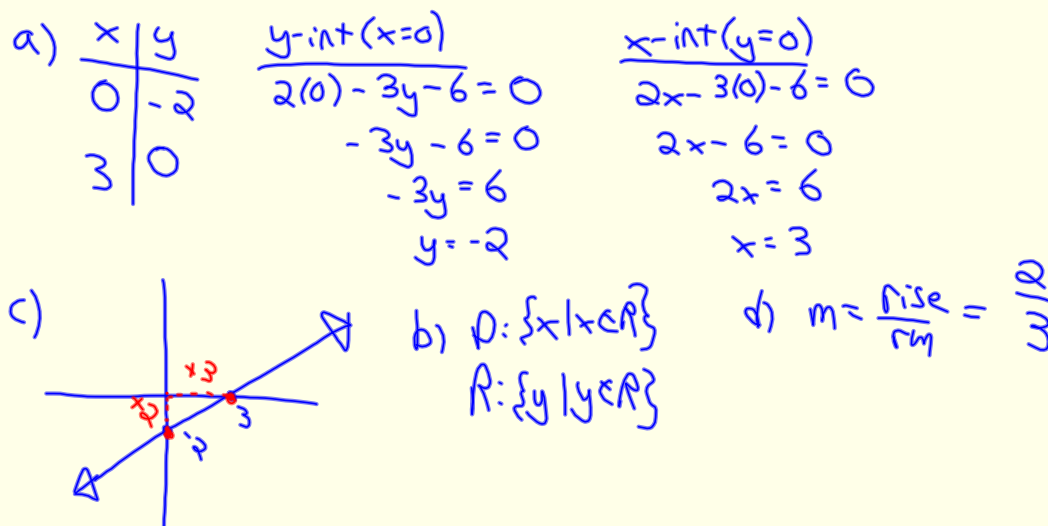
- Calculate the t -intercept and V -intercept.
- Sketch a graph and state the domain and range
- Calculate the slope and explain what it means.



Graphing Lines - x and y intercepts

Example: A linear relation is given by $2x - 3y - 6 = 0$. Domain is all real numbers.

- Calculate the x -intercept and y -intercept.
- Sketch a graph and state the domain and range
- Calculate the slope and explain what it means.



Practice

C2 - Graphing Lines Assignment

CP - 150, 151

Graphing Lines - Slope Intercept Form

Complete the handout: Investigating Lines

Debrief: Investigating Lines KEY

Slope-Intercept Form

The equation of a line may be written in slope intercept form:

$$y = mx + b$$

where:

- m is the slope of the line
- b is the y-intercept of the line
- x and y represent points on the line (x,y).

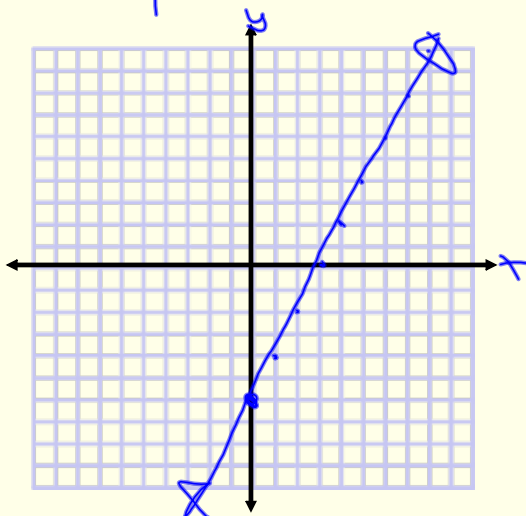
Examples: For each scenario, determine the slope and y-intercept and explain what they mean in the context of the problem.

- a) An interior decorator's fee is given by: $F = 60h + 100$ $y = mx + b$
 $m = 60$ Charges \$60/hr F = Fee (\$)
 $b = 100$ Fixed charge (consultation fee) h = hours worked
- b) The temperature of water is given by: $T = 16t + 20$
 $m = 16$ Temp increases $16^\circ\text{C}/\text{min}$ T = Temperature (Celsius)
 $b = 20$ starting temp. t = time (min)

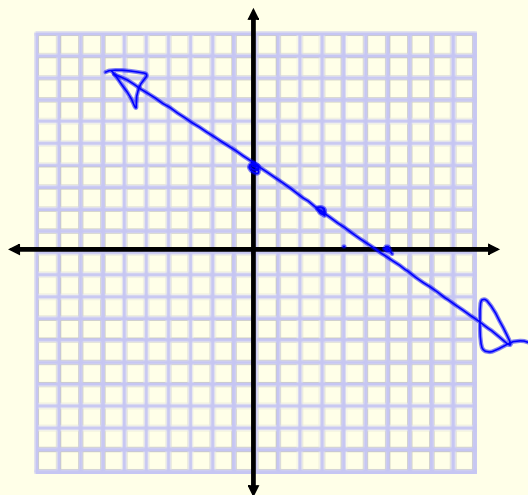
Graphing Lines - Slope Intercept Form

Sketch a graph of the following linear relations.

e.g. $y = 2x - 6$
 $y = mx + b$
 $m = \frac{2}{1}$ $b = -6$



e.g. $y = -\frac{2}{3}x + 4$
 $m = -\frac{2}{3}$ $b = 4$



Practice: CP pg. 155

Equations of a Line - Different Forms

Slope Intercept Form

$$y = mx + b$$

where:

- m is the slope of the line
- b is the y-intercept of the line
- x and y represent points on the line (x,y).

e.g. $y = \frac{2}{3}x - 4$

A useful form of the line where slope and y-intercept are easily identified.

General Form

$$Ax + By + C = 0$$

where:

- A,B,C are Integers and A is positive.
- x and y represent points on the line (x,y).

e.g. $2x - 3y - 12 = 0$

A form of the line that is used by convention. Answers are often expressed in General Form.

General Form to Slope Intercept Form

If you wish to identify the slope and y-intercept of a line when it is in general form you must first re-arrange the equation into slope-intercept form ($y = mx + b$).

Examples:

a) $8x + y + 2 = 0$

$$y = -8x - 2$$

$$m = -8 \quad b = -2$$

b) $3x + 4y - 12 = 0$

$$\frac{4y}{4} = -\frac{3x}{4} + \frac{12}{4} \quad m = -\frac{3}{4}$$

$$y = -\frac{3}{4}x + 3 \quad b = 3$$

c) $x - 5y + 10 = 0$

$$\frac{-5y}{-5} = \frac{-x}{-5} - \frac{10}{-5}$$

$$y = \frac{1}{5}x + 2$$

$$m = \frac{1}{5} \quad b = 2$$

d) $3x + 6y - 14 = 0$

$$\frac{6y}{6} = \frac{-3x}{6} + \frac{14}{6} \quad m = -\frac{1}{2}$$

$$y = -\frac{1}{2}x + \frac{7}{3} \quad b = \frac{7}{3}$$

Practice: CP pg. 157