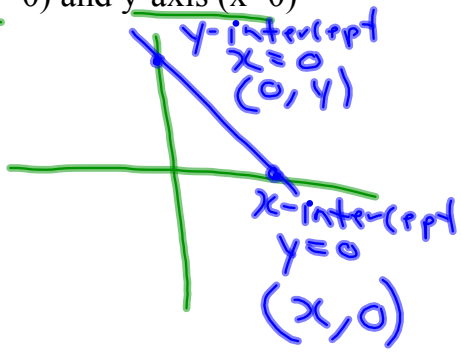
Section 5.7: Interpreting and Sketching Graphs

Rate of Change: = $\frac{\text{Change in independent (y)}}{\text{Change in dependent (x)}}$

Domain and Range:

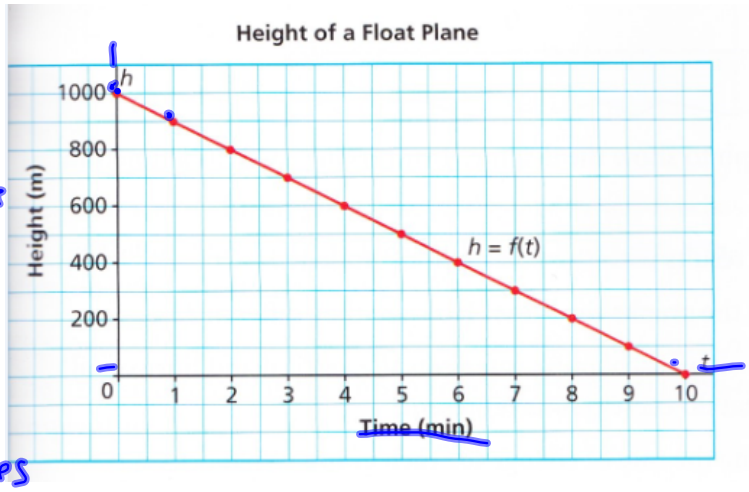
all the x values all of the y values

Intercepts: Where the line of the graph passes through the x-axis (y=0) and y-axis (x=0)



Example 1:

Float planes fly into remote lakes in Canada's Northern wilderness areas for ecotourism. This graph shows the height of a float plane above a lake as the plane descends to land.



a) Where does the graph intercept the vertical axis?

1000m (0,1000)

What does it mean?

Planes max height before it starts to descent.

b) Where does the graph intercept he horizontal axis?

10 min (10,0)

What does it mean?

The plane took 10 minutes to land.

c) What is the rate of change for this graph?

Points (0,1000) (1,900)

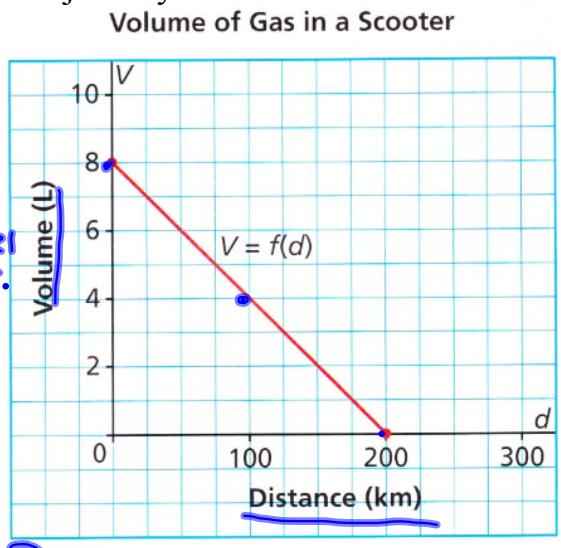
Rate of Change = $\frac{900-1000\text{ m}}{1-0\text{ min}} = \frac{-100\text{ m}}{1\text{ min}}$

What does it represent?

The plane is descending 100m per minute.

Example 2:

This graph shows the fuel consumption of a scooter with a full tank of gas at the beginning of a journey.



a) Determine the vertical and horizontal intercepts. What do they represent?

Vertical 8L (0,8) Amount of gas at the start

Horizontal 200km (200,0) How far they travel on a tank of gas.

b) Write the Domain and Range of the function.

Domain [0,200] Range. [0,8]

c) What is the Rate of change of the Function?

Points (0,8)(100,4)

Rate of Change $= \frac{4-8L}{100-0km} = \frac{-4L}{100km}$

The Scooter burns 4L of gas per 100km

Graphing Linear Functions from an equation:
You can use the intercepts to graph a linear function that is written as an equation or in function notation.

Example: $y = x - 3$

Steps:

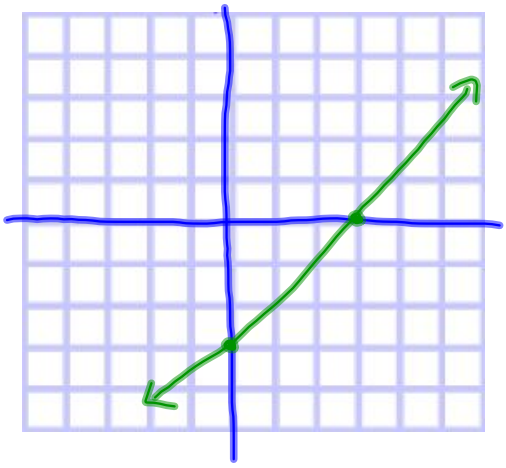
1. Find the y-intercept (vertical intercept) $x = 0$

$y = 0 - 3$
$= -3$ $(0, -3)$

2. Find the x-intercept (horizontal intercept) $y = 0$

$3 + 0 = x - 3 + 3$
$3 = x$ $(3, 0)$

3. Plot both intercepts, and draw a line through the two points.



Example:
Sketch a graph of the linear function f(x) = 4x - 3

① y-intercept $x = 0$

$f(0) = 4(0) - 3$

$= -3$

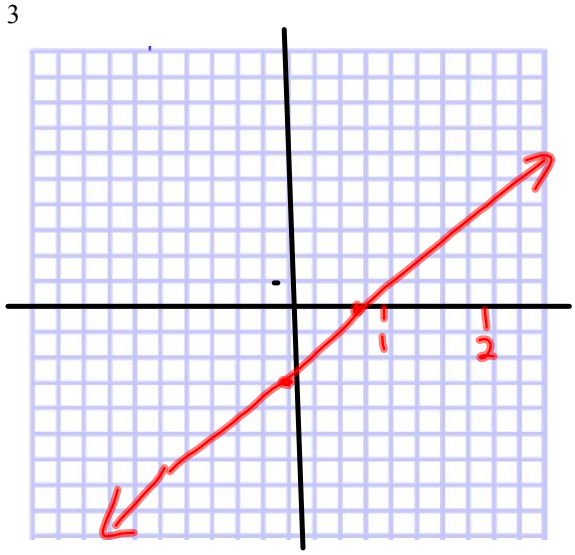
$(0, -3)$

② x-intercept $f(x) = 0$

$3 + 0 = 4x$ ~~$= -3 + 3$~~

$\frac{3}{4} = \frac{4x}{4}$

$x = \frac{3}{4}$ $\left(\frac{3}{4}, 0\right)$



Graphing Linear Equations from the y-intercept and the Rate of Change:

Steps:

1. Plot the y-intercept $x=0$ $(0,4)$

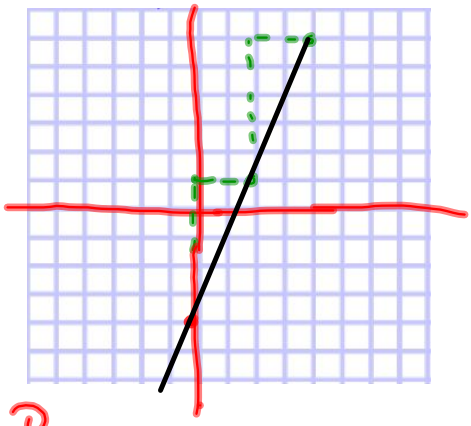
2. Use the rate of change to find other points.

$\frac{3}{4}$ up 3 right 4

$-\frac{3}{4}$ down 3 right 4

Examples: Draw graphs for each of the following situations

a) y-intercept: -4 (0,-4)
Rate of change: $\frac{5}{2}$



Rate of Change $\frac{5}{2}$
up 5
right 2

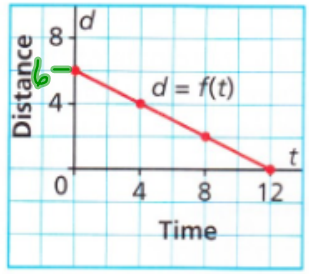
b) y-intercept: 6 (0,6)
Rate of change: $\frac{-1}{3}$

Rate of Change $\frac{-1}{3}$ down 1 right 3

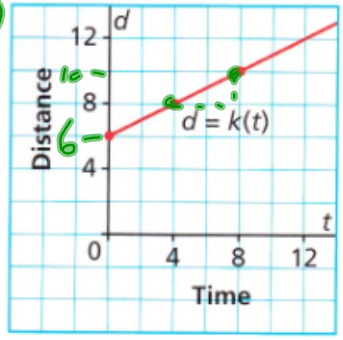
Matching Graphs with their y-intercepts and
Rate of change.

Which graph has a rate of change of $\frac{1}{2}$ and a vertical intercept of 6? Justify the answer.

a)



b)



Rate of Change (8,10)(4,8)

$= \frac{10-8}{8-4} = \frac{2}{4} = \frac{1}{2}$

Homework
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