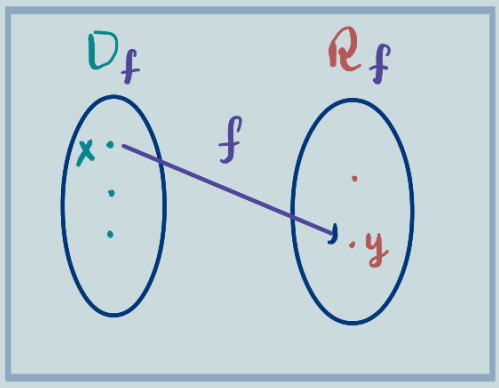
Algebra

#2, Linear Functions.

Function: f



1. Input one number x
2. Output one number $f(x) = y$

We write: $f(x) = y$.

D_f = { all possible input } ; R_f = { all possible output }

"the set of" "the set of"

D_f → Domain

R_f → Range

Linear Function:

$y(x) = mx + c$, m, c constants

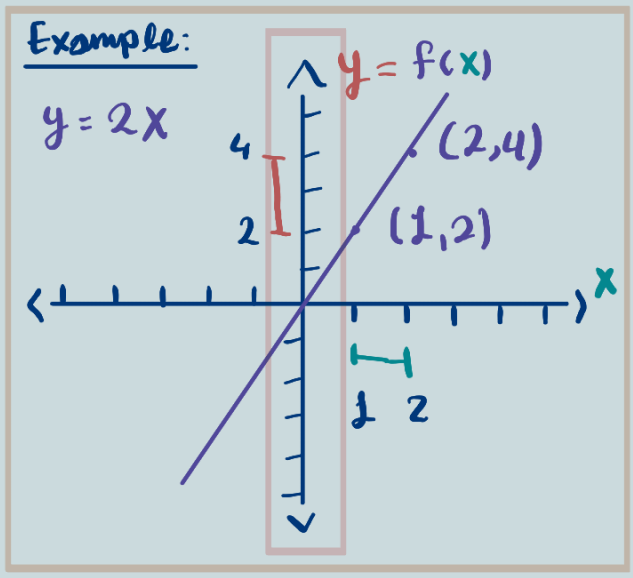
Why linear? Looks like a line!

→ A linear function is determined by

$\begin{cases} (2,4) = (x_1, y_1) \\ (1,2) = (x_2, y_2) \end{cases}$

Example:

$y = 2x$



1. m, slope

→ $m = \frac{\text{change in } y}{\text{change in } x} = \frac{2}{1} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{y_1 - y_2}{x_1 - x_2}$

2. c, → $c = f(0)$

$y(0) = m \cdot 0 + c = c$

Key: For most word problems,

→ c is the initial value, height, cost, ...

→ m is the rate of change, growth, decay, ...