

Introduction to Functions

What is a function?

It is a rule that will give **one and only one possible answer (y)** for any x value that is input into the rule.

Function Notation:

Instead of y we use $f(x)$ or $g(x)$ or $h(x)$ etc

This is pronounce *f of x* or *g of x* or *h of x*....

Let's look at an example of a linear function: a rule that will make a straight line

$$f(x) = 2x + 8 \quad \text{this could also be written } y = 2x + 8$$

Function notation allows us to ask a question using as few words as possible

Example: $f(3)=?$

(The question is asking us to plug 3 in for x and then solve for y...)

$$f(x) = 2x + 8$$

$$f(3) = 2(3) + 8$$

$$= 6 + 8$$

$$= 14$$

$$f(5) = \underline{2(5)} + 8 = 18$$

$$f(10) = \underline{2(10)} + 8 = 28$$

$$f(0) = \underline{2(0)} + 8 = 8$$

$$f(-2) = \underline{2(-2)} + 8$$
$$= -4 + 8 = 4$$

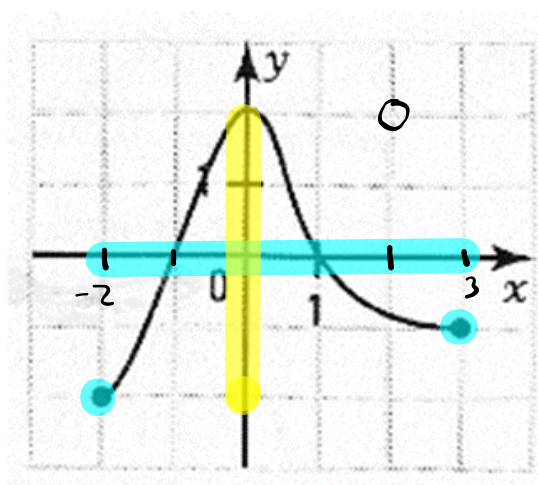
Properties of Functions

 \mathbb{R}

Domain: All possible **x-values** of the function

Range: All possible **y-values** of the function

Ex 1. Find the Domain and Range of the function:



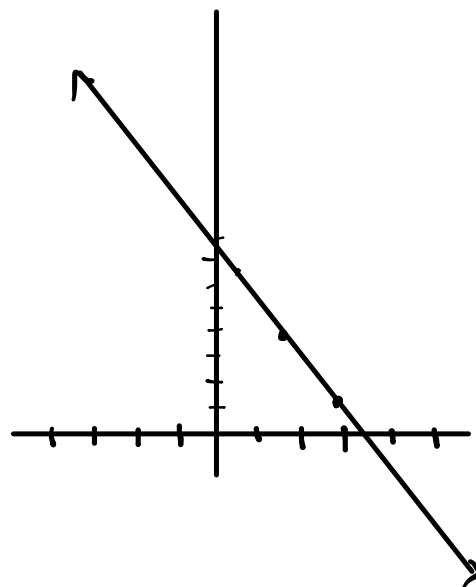
$$\text{dom } f: [-2, 3]$$

$$\text{ran } f: [-2, 2]$$

Think of the **rule** as a **program**: x is the **input** and y is the **output**

Example 2: $g(x) = -3x + 10$

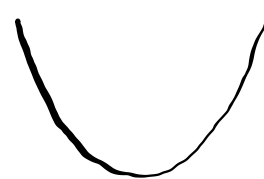
	Input x	Rule $g(x)$ $= -3x + 10$	Output y
$g(3)$	3	$-3(3) + 10$	1
$g(2)$	2	$-3(2) + 10$	4
$g(1)$	1	$-3(1) + 10$	7
$g(0)$	0	$-3(0) + 10$	10
$g(-1)$	-1	$-3(-1) + 10$	13
$g(-2)$	-2	$-3(-2) + 10$	16
$g(-3)$	-3	$-3(-3) + 10$	19



Example 3

	Input x	Rule $h(x) = 4x^2$	Output y
$h(3)$	3	$4(3)^2$	36
$h(2)$	2	$4(2)^2$	16
$h(1)$	1	$4(1)^2$	4
$h(0)$	0	$4(0)^2$	0
$h(-1)$	-1	$4(-1)^2$	4
$h(-2)$	-2	$4(-2)^2$	16
$h(-3)$	-3	$4(-3)^2$	36

$$-1^2 = -1 \cdot 1^2 = -1$$
$$(-1)^2 = -1 \cdot -1 = 1$$



1) $f(x) = 3x - 7$

Input x	Rule $3x - 7$	Output y
$f(0)$	$3(0) - 7$	-7
1	$3(1) - 7$	-4
3	$3(3) - 7$	2
-1	$3(-1) - 7$	-10

