Notes 1.7: Functions

A **Function** is a special kind of **Relation** where each member of the *domain (x/inputs)* is matched with **exactly one** member of the *range (y/outputs)*:

- With a set of Ordered Pairs, each *x/input* must only match **one** *y/output*. If an ***x*** is repeated it must be matched with the same ***y***.

{ (2, 3), (3, 2), (4, 1), (5, -8) } *function* no x's repeat

{ (2, 3), (3, 2), (4, 1), (2, -8) } *non-function* x = 2 matches y = 3 & -8

{ (2, 3), (3, 3), (4, 3), (2, 3) } *function*

- With a Table, similarly, each *x/input* must only match **one** *y/output*. If an ***x*** is repeated it must be matched with the same ***y***.

x	y
2	3
3	2
4	1
50	9

Function

x	y
2	3
2	4
3	7
4	8

non-function

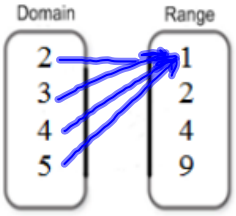
x	y
2	3
3	4
4	5
4	

?

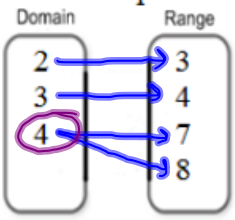
function if 5

nonfunction if ≠5

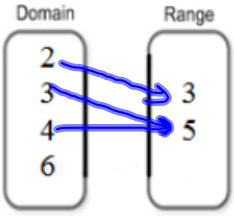
- In a Mapping, each *x/input* have exactly **one** arrow to a *y*/output. If an ***x*** has multiple arrows or no arrow to the range, it does not represent a function.



Function

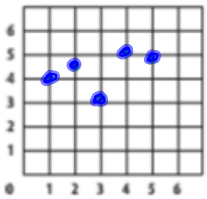


non-function

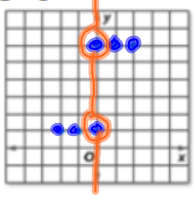


non-function

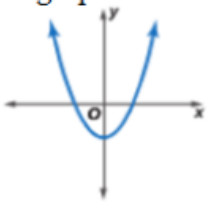
- To be a function a Graph, cannot have a point directly above or below another point. If a vertical line ever crosses a graph more than once, the graph isn't a function.



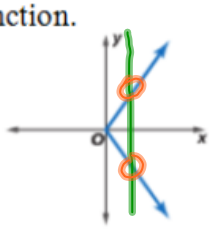
Function



non-function



function



non-function

fun each x has 1 y

no fun

Function Notation

When a function can be written as an equation, the symbol f(x) replaces y and is read as "the value of f at x" or simply "f of x."

This does NOT mean f times x.

Replacing y with f(x) is called writing a function in **function notation**.

$y = 3x + 7$

$f(x) = 3x + 7$

REMEMBER***

f(-3) means -3 is your input and you plug it in for x

1. If $f(x) = 2x - 5$ find the following values. Show your work.

a. $f(0)$ $= 2(0) - 5$

$f(0) = 0 - 5 = -5$

b. $f(-2) = 2(-2) - 5$

$-4 - 5 = -9$

c. $f(3)$

d. $f(5)$

2. If $g(x) = x^3 + 2$ find the following values. Show your work.

a. $g(0)$

b. $g(-2)$

c. $g(3)$

d. $g(5)$

3. If $h(x) = 3x^2 + 4$ find the following values. Show your work.

a. $h(0)$

b. $h(-2) = 3(-2)^2 + 4$

$3(4) + 4$

$12 + 4 = 16$

c. $h(3)$

d. $h(5)$

Equations

$y = 4x - 2$ Function

$F(x) = 3x^5 - 9$ Function

$x = 6$ non function