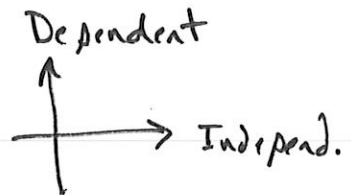
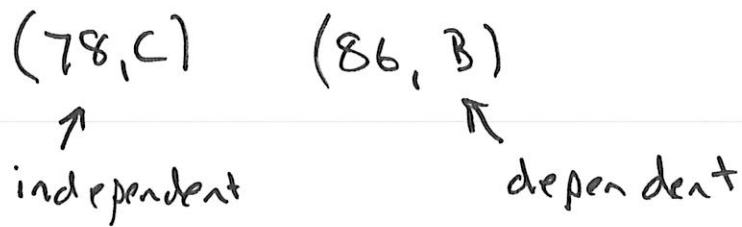


Relation → when one quantity can be described in terms of another.

Letter grade you receive on this test depends on the numerical score.



Example of relation:  $\{(3, 10), (8, 28), (10, 35)\}$

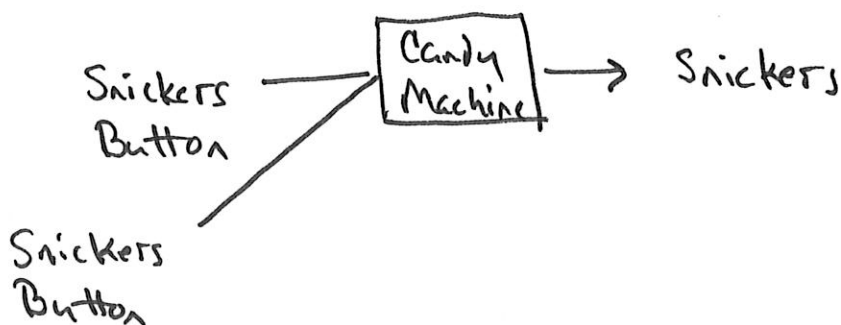
★ FUNCTION → a relation where there is exactly one output for every input.

$\downarrow$   
 $f(x)$

$x$

Ex 1 Is the relation a function?

$F = \{(1, 2), (-2, 4), (3, 4)\}$       Function!



2.3

Day 1

(2)

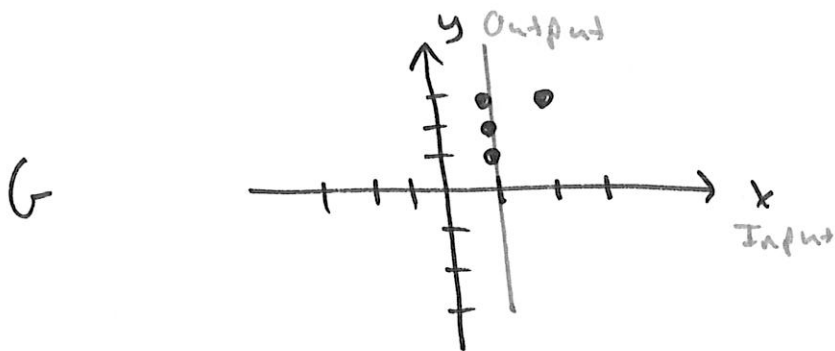
$$G = \{(1,1) (1,2) (1,3) (2,3)\}$$

Not a function

Input 1 has more than one output

---

Function Mapping



Vertical Line Test

If any vertical line passes through more than one point on the graph, it is NOT a function (NO FUN).

---

Domain - Set of all independent (x) values.

Range - Set of all dependent (y) values.

**Ex 2** Find Domain and Range

(a)  $\{(3, -1) (4, 2) (4, 5) (6, 8)\}$  Not Fun.

Domain  $\{3, 4, 6\}$

Range  $\{-1, 2, 5, 8\}$

(b)  Function, Yes

Domain  $\{4, 6, 7, -3\}$  Range  $\{100, 200, 300\}$

(c) 

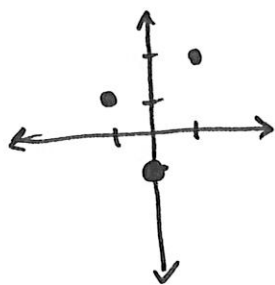
x	y
-5	2
0	2
5	2

 Function, Yes

Domain  $\{-5, 0, 5\}$  Range  $\{2\}$

**Ex 3**

(a)

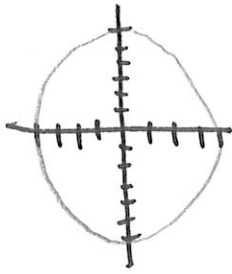


Passes VLT  
Function, Yes

Domain  $\{-1, 0, 1\}$

Range  $\{-1, 1, 2\}$

(b)

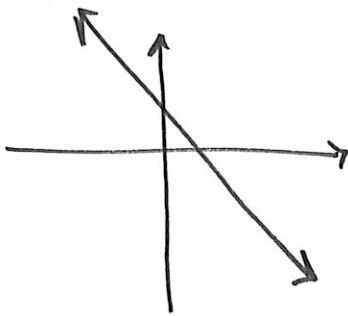


Function, NO  
Fails VLT

Domain:  $[-4, 4]$  ← Interval Notation  
 $-4 \leq x \leq 4$  (Inequality)

Range:  $[-6, 6]$

(c)

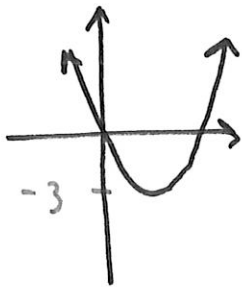


Yes, FUN.

Domain  $(-\infty, \infty)$

Range  $(-\infty, \infty)$

(d)



Yes FUN!

Domain  $(-\infty, \infty)$

Range  $[-3, \infty)$

Square bracket  $[$  means  $\bullet$ , graph touches that point

$($  means  $\circ$ , graph approaches, but doesn't touch point.

Function Notation

$$y = f(x)$$

$$f(x) = 3x - 5$$

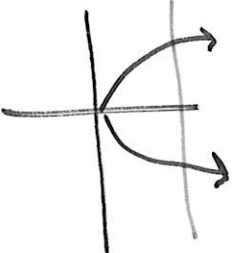
$$f(2) = 3(2) - 5 = 6 - 5 = 1$$

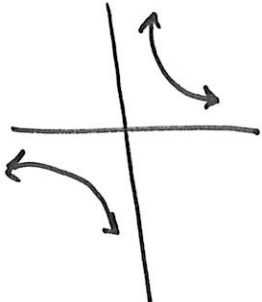
↑  
when  $x = 2$ ,  $y = 3x - 5$  yields 1

**Ex 5** Does the relation represent a function?

(a)  $y = x + 4$  All lines except vertical lines are functions.

(b)  $y = \sqrt{2x - 1}$   FUN!

(c)  $y^2 = x$   No Fun  
Fails VLT

(d)  $y = \frac{5}{x - 1}$   Yes FUN!