8-1 Introducing Functions

Objectives

I can identify whether a relation is a function.

I can identify whether a graph is a function.

Vocabulary

Function:

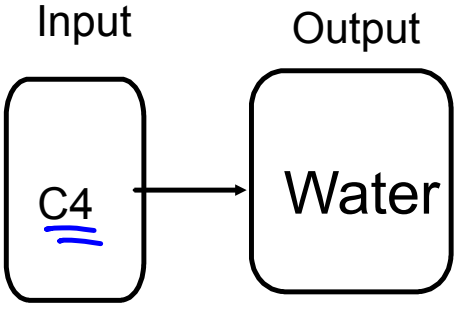
Function (graph): passes vertical line test

Function (notation): $f(x)$

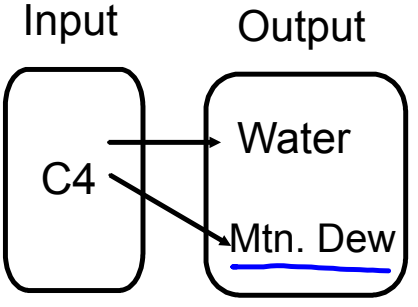
f of x

every input has only one output

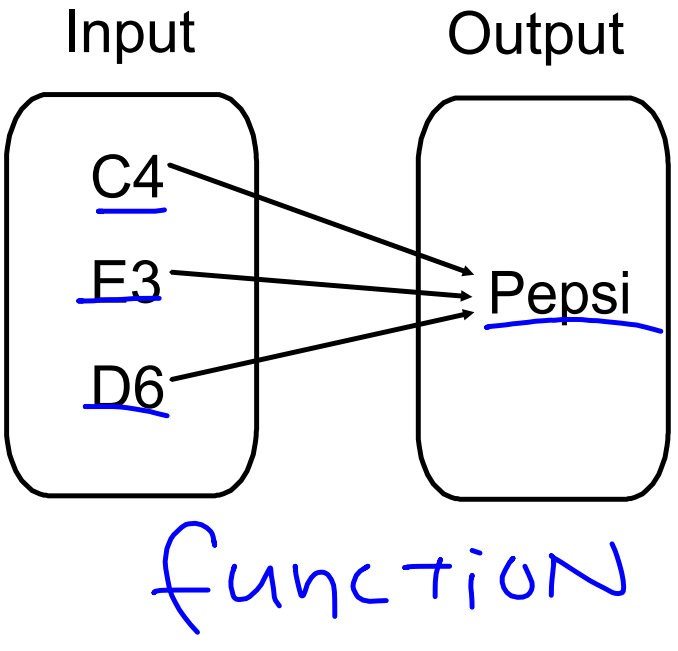
Vending Machine



Function



Not a Function

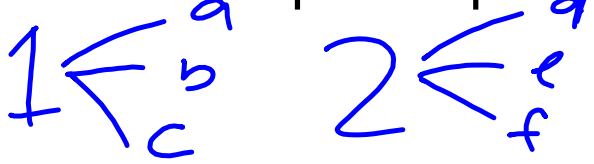


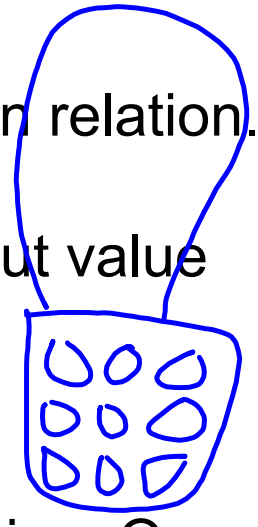
function

Texting is..... MATH!

T-9 Texting represents a non function relation. Each button represents a few letters, or each input value relates to a couple output values.

NOT a function

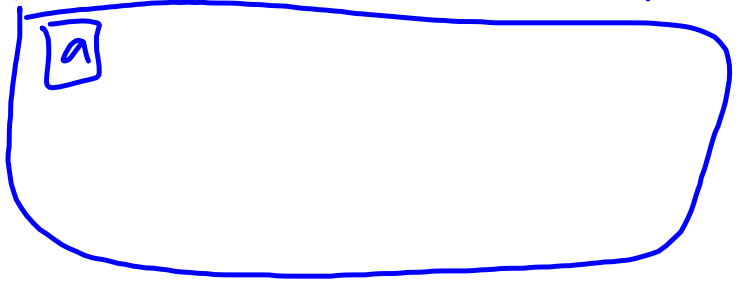




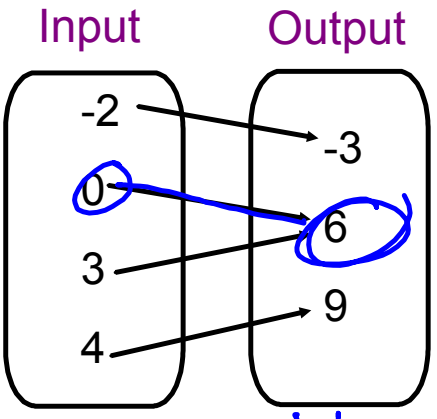
Keyboard Texting represents a function. One button represents one letter, or each input value relates to one output value.

ONLY

Function!

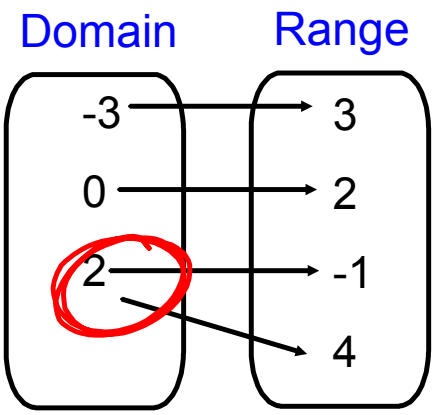


Are the following relations functions? Why or why not?



yes!

each input → only 1 output

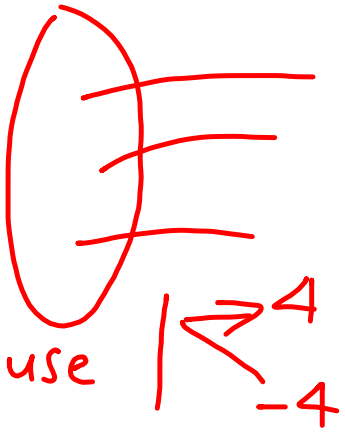


No

$2 < 4$

Are the following relations functions? Why or why not?

Input	1	3	5	1
Output	4	2	4	-4



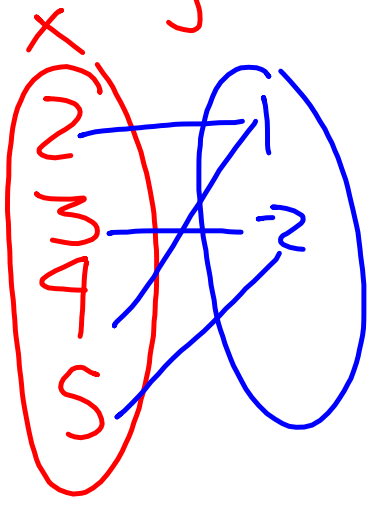
y or f(x)

Not a function because 1 ⇒ 4, 1 ⇒ -4

$\{(2,1), (3,-2), (4,1), (5,-2)\}$

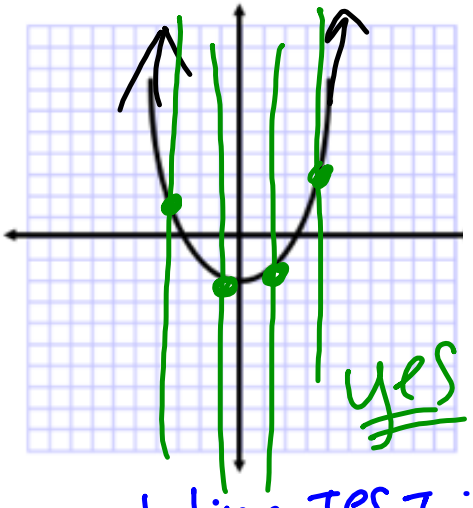
input : x coordinate

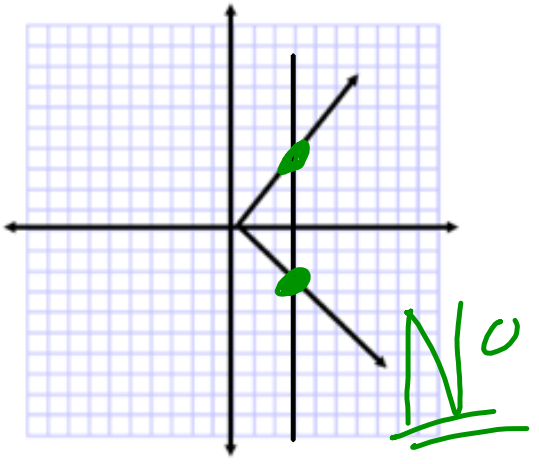
output : y coordinate



yes!

How to identify functions graphically.

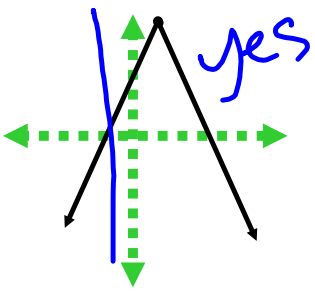


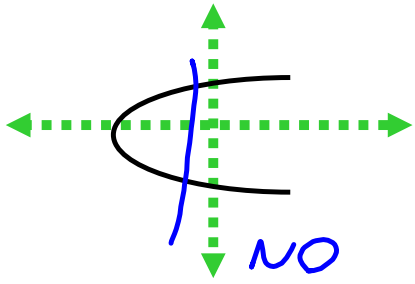


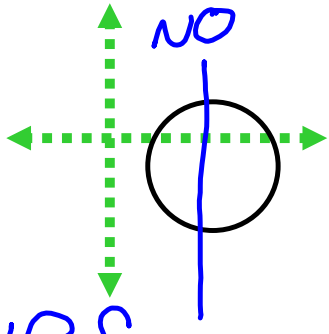
Vertical line test:
draw a vertical line ANYWHERE }
ONLY HIT the graph once ⟶ Function

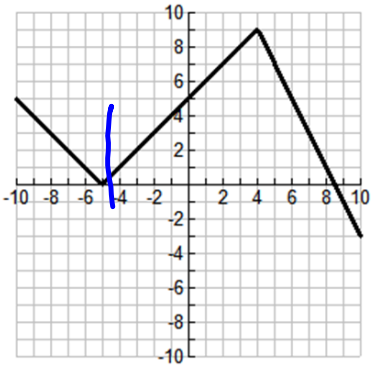
draw vertical line ANYWHERE }
hit graph 2+ times ⟶ Not Function

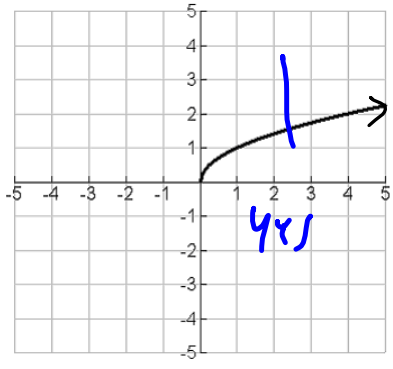
Use the vertical line test to determine whether the graph represents a function.

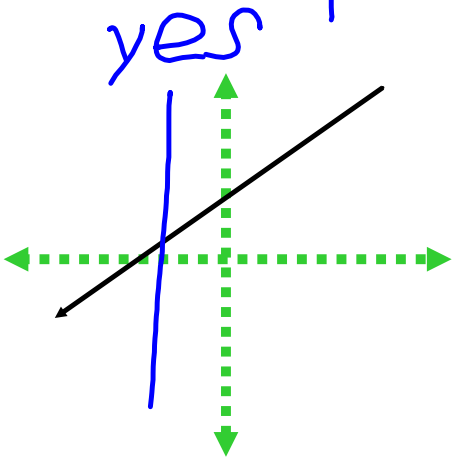












Function notation: f(x) "f of x"

$$f(x) = y$$

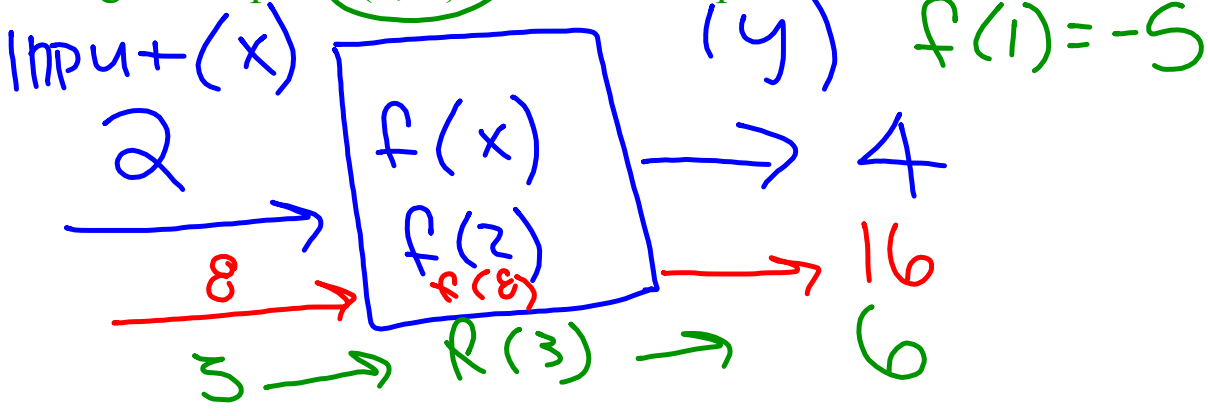
f(*x*)= means: the value of the function *f* at *x*.
y= means: the value of the equation at x.

~~Equation~~
~~y= 3x – 8~~

Function Notation
f(x)= 3x – 8

f(1)=3(1)-8=-5
y
f(1)=-5
(y)

Plug in the point (1,-5) to each example:



Write the following values in function notation

x (input)	2	5	6	7
f(x) (output)	-2	0	3	5

$f(2) = -2$ $f(5) = 0$ $f(6) = 3$ $f(7) = 5$

$f(\text{input}) = \text{output}$

Given f(-1)=3, f(0)=5, f(1)=7, f(2)=9, write the relationship as a table of values.

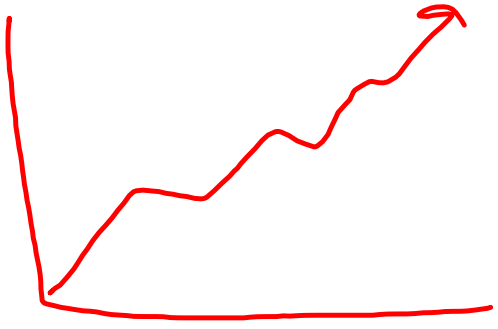
x	-1	0	1	2
f(x)	3	5	7	9

A **discrete** function is used to represent values that do not build upon each other and are not connected. Each value is represented individually.

Example: How much a movie theatre makes on concessions each month

A **continuous** function is used to represent values that build upon each other and are connected.

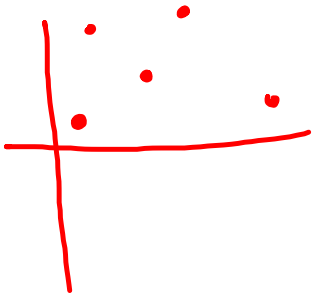
Example: How much money a movie theatre makes off of ticket sales



A graph that consists of points that are not connected is a discrete function

A function that is graphed with a line, connected points, is a continuous function

Discrete



Continuous