

8-1 Definition of a Function

Vocabulary Words

Function

Vertical Line Test

Function Notation

Identifying Functions

A **FUNCTION** is a relationship between **input** values and **OUTPUT** values.

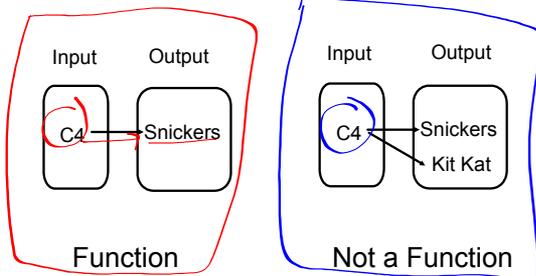
There is exactly **ONE** output for each input.

The **input** represents the **x** value and the output represents the **y** value.

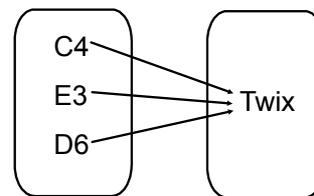
There is exactly one **y** value for each x value.

There is exactly one **Range** value for each value of the domain.

The Candy Machine



Input Output



~~Not~~ a Function

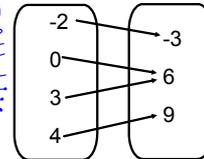
Texting is..... MATH!

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

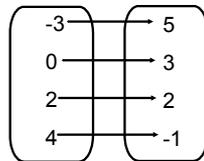
Keyboard Texting represents a function. One button represents one letter, or each input value relates to one output value.

Are the following relations functions? Why or why not?

MAPPING



Yes! Every x has 1 y
" girl has 1 bf.



Yes! Every x has 1 y.

Are the following relations functions? Why or why not?

Table

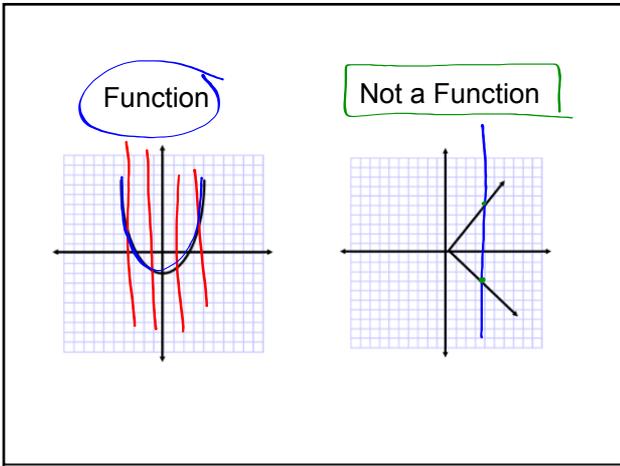
Input	1	3	5	1
Output	4	2	4	-4

NOT a function!
1 is w/ 4 & -4

$\{ (2,1), (3,-2), (3,1), (2,-2) \}$ NOT a function
2 is w/ 1 & -2

We can use the **Vertical line test** to see if a graph represents a function.

If a vertical line intersects the graph more than once, then the graph is not a function. If it intersects the graph only once then the graph is a function.



Function Notation

When one variable depends on another variable we can show this relationship by

Using Function Notation.

Think about Disneyland. The amount of money that they make **depends** on the number of tickets that are sold.

Let x = the number of tickets sold and y = amount of money

Since the amount of money, y , depends on the number of tickets sold, x , we can write this in function notation by replacing y with $f(x)$. We say this "f of x"

$f(x) = y$

The number represented by $f(x)$ is the value of the function f at x .

Equation

$y = 3x - 8$

Function Notation

$f(x) = 3x - 8$ *what happens*

function \rightarrow $f(x)$

input \rightarrow x

Write the following values in function notation

x <i>input</i>	2	5	6	7
$f(x)$ <i>output</i>	-2	0	3	5

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

$\{(2, 4), (-3, 1), (0, -2), (5, 0)\}$
 $f(2) = 4$ $f(-3) = 1$ $f(0) = -2$ $f(5) = 0$

A mapping diagram showing the function f . The domain elements $2, -3, 0, 5$ are listed vertically on the left, and the codomain elements $4, 1, -2, 0$ are listed vertically on the right. Blue arrows connect each domain element to its corresponding codomain element: $2 \rightarrow 4$, $-3 \rightarrow 1$, $0 \rightarrow -2$, and $5 \rightarrow 0$. The domain elements are grouped by a blue oval, and the codomain elements are grouped by a green oval.

