September 16, 2015

Why is the concept of a function important
and how do I use function notation to show
variety of situations modeled by functions

Today's Standards

MGSE9-12.F.IF.1. Understand that a function from one set (called the domain) assigns to each element of the range. If *f* is a function and *x* is an element of its domain, then *f*(*x*) denotes the output of *f* corresponding to the input *x*. The graph of *f* is the graph of the equation *y* = *f*(*x*). (*Draw examples from linear and exponential functions.*)

MGSE9-12.F.IF.2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. (*Draw examples from linear and exponential functions.*)

Relation

A relation is any set of [redacted]s.

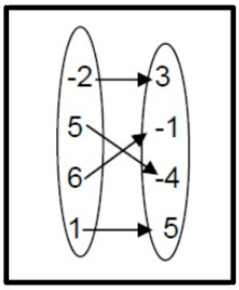
Examples: {(1, 4), (-3, 7), (-6, -8)}
{(1, 4), (2, 5), (1, 6)} Y

In math a relation can be a table, a mapping or a graph. Think of a relation as "relationship" -- things that are paired together!

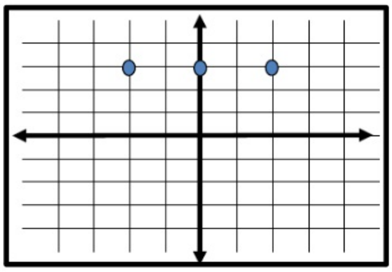
Table

x	y
2	2
-2	3
0	-1

Mapping



Graph



Everyday examples of a relation

Names of studen~~ts~~ Homerooms
Names of U.S. citize~~ns~~ Social Security #'s

Domain and Range of a Relation

Domain: the set of all the x-values of a rela

Range: the set of all the y-values of a relat

Example: {(1, 4), (-3, 7), (-6, -8)}

Domain: {-6, -3, 1}

Range: {-8, 4, 7}

Function

A function is a relation where every element of the domain is paired with EXACTLY one element of the range.

FUNCTION

{(1, 4), (-3, 7), (-6, -8)}

NOT A FUNCTION

{(1, 4), (2, 5), (1, 6)}

Let's decide what could be a function!

Examples:

1. [redacted]

F NF

Reason:

2.. [redacted]

F NF

Reason:

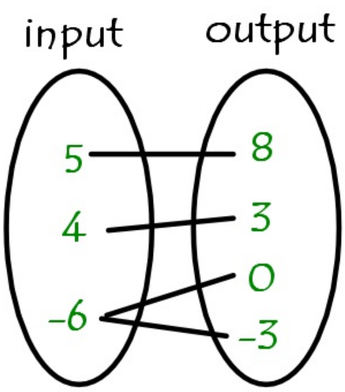
3.

x	y
12	-8
2	3
7	4
-9	4

F NF

Reason:

4.



F NF

Reason:

Input vs. Output

The domain of a function is also called the function's input. It gets put "in" to the functio

The range of a function is also called the function's output. It is what you get "out" of the function!

REMEMBER: Each input can have ONLY one unique output if the relation is a function! However, different inputs can have the same output!

[redacted]

Example: {(1, 4), (2, 4), (-3, 4)}

Domain & Range

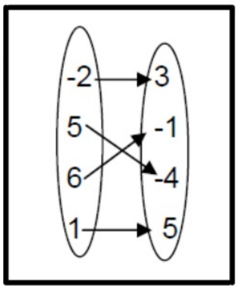
List the domain and range for each of the following.

1.

[redacted]

Domain: {-8, -4, 2, 5}
Range: {-2, 3, 5}

2.



Domain: {-2, 5, 6, 1}
Range: {-4, -1, 3, 5}

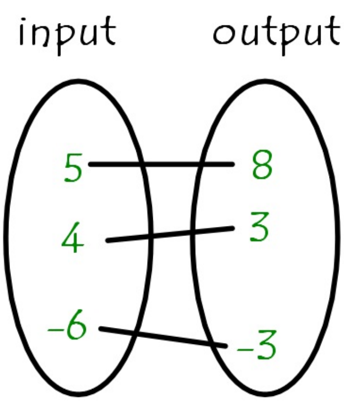
3.

x	y
12	-8
2	3
7	4
-9	4

Domain: {-9, 2, 7, 12}
Range: {-8, 3, 4}

[redacted]

4.



[redacted]

Domain: {-6, 4, 5}
Range: {-3, 3, 8}

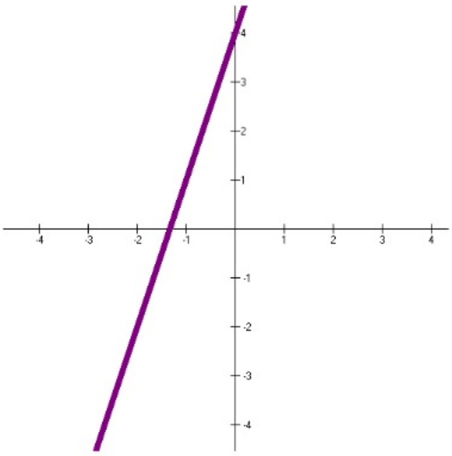
[redacted]

Now let's look at the Vertical Line Test (VLT)

The vertical line test for functions states that a graph is a function if any vertical line intersects the graph at no more than one point (at a particular time).

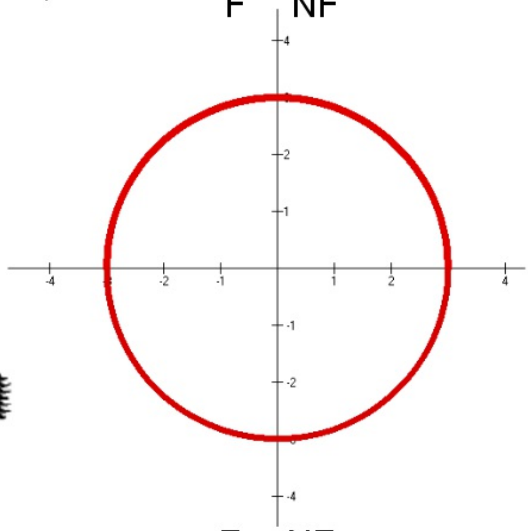
5.

F NF



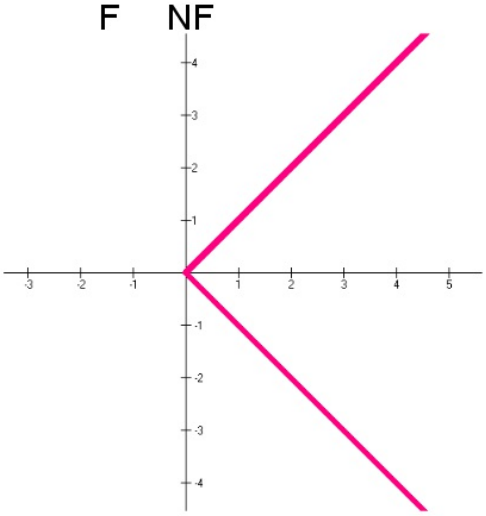
6.

F NF



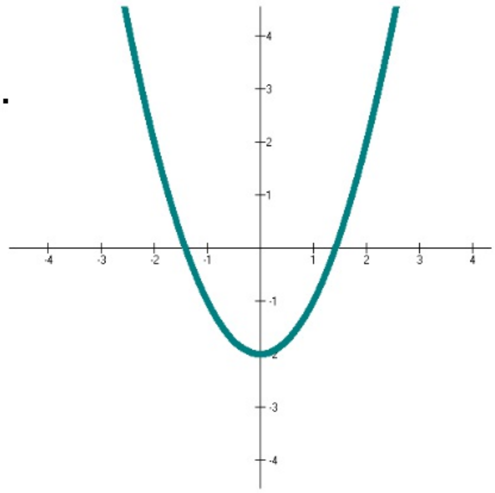
7.

F NF



8.

F NF



Function Notation

[redacted] [redacted]

f(*x*) is read "f of x"

[redacted] [redacted]

$y = 2^x$ $g(x) = 2^x$

g(*x*) is read "g of x"

Functions do not always use the letter *f*. Any letter can be used but *f* and *g* are used most often when dealing with functions.

Write the following equations in function notation.

1. $y = -6x - 2$

   $f(x) = -6x - 2$

2. $y = 4x + 1$

   $g(x) = 4x + 1$

3. $y = \frac{2}{3}x - 7$

   $g(x) = \frac{2}{3}x - 7$

4. $y = 123 + \frac{7}{8}x$

   $f(x) = 123 + \frac{7}{8}x$

5. $y = 5^x$

   $f(x) = 5^x$

6. $y = x^2 - 4$

   $g(x) = x^2 - 4$

Homework

Complete
Practice Handout