

## Warm Up 1/5/18

Evaluate each expression for:

$a = 2$ ,  $b = -3$ , and  $c = 8$ .

1.  $a + 3c$

$$2 + 3(8) \\ = 26$$

2.  $ab - c$

$$2(-3) - 8 \\ -6 - 8 = -14$$

3.  $\frac{1}{2}c + b$

$$\frac{1}{2}(8) + -3 \\ 4 + -3 \\ 1$$

4.  $b^a + c$

$$-3^2 \\ 9 + 8 = 17$$

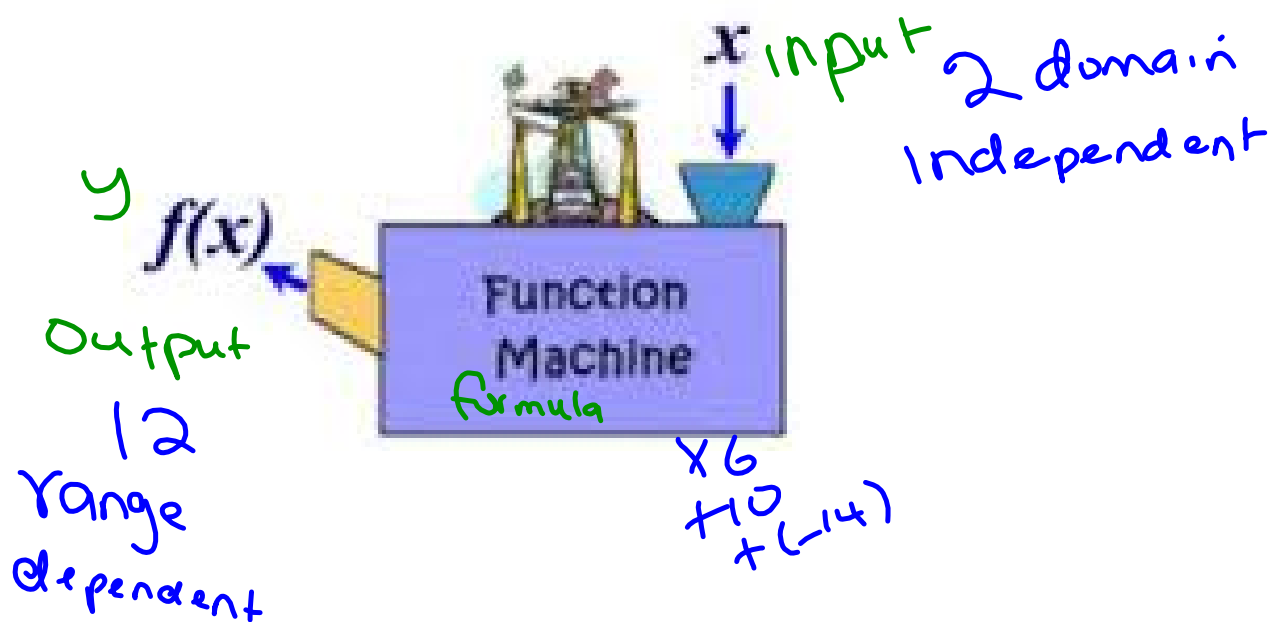
**DeltaMath Code:** Teacher Code: 760933

The screenshot shows a web browser window with the DeltaMath student interface. The browser tabs include 'Cobb Cour', 'Microsoft', 'Shared wit', 'Unit 2 - Re', '1.3-Indepe', 'Pauline Aik', 'Weebly - V', 'Welcome', and 'DeltaMath'. The address bar shows 'https://www.deltamath.com/student'. The page header includes the DeltaMath logo, a 'Return to Teacher Account' link, and a 'Tools' menu with a calculator icon. The main content area is titled 'Upcoming Assignments' and contains a table of assignments:

Unit 2 A: Review Solving Equations	0%
? Two Step Equations	0/5
? Three Step Linear Equations	0/5
? Linear Equations w/ Distribution (Lev 1)	0/5
? Linear Equations w/ Distribution (Lev 2)	0/5
? Fractional Linear Equations	0/5
? Fractional Linear Equations (Type 2)	0/5
Due: Jan 09, 08:00 am	Mrs. Aikhuele

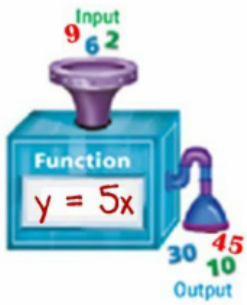
At the bottom of the page, there are links for 'Privacy Policy', 'Follow @MrDeltaMath', and 'Terms of Service', along with a copyright notice: 'Copyright © 2017 DeltaMath.com. All Rights Reserved.' The Windows taskbar at the bottom shows the search bar, several application icons, and the system tray with the time '10:37 PM 1/4/2018'.

# Function Introduction




Evaluating Functions in Function Notation

### Let's Review



The diagram shows a blue function machine with a purple funnel on top and a purple spout on the right. The word "Function" is written on the front, and the equation  $y = 5x$  is displayed in a red box. Above the funnel, the word "Input" is written in green, with the numbers 9, 6, and 2 below it. Below the spout, the word "Output" is written in blue, with the numbers 30, 45, and 10 below it.

The output is equal to the input times 5.



The diagram shows a blue function machine with a purple funnel on top and a purple spout on the right. The word "Function" is written on the front, and the area where the equation would be is blank. Above the funnel, the word "Input" is written in green, with the numbers 9, 6, and 2 below it. Below the spout, the word "Output" is written in blue, with the numbers -18, -27, and -6 below it.

The output is equal to the input times -3.

Recorded with SCREENCAST MATIC

Essential Question:

1/5/18



How do you represent functions?

Function Notation

$$y = f(x)$$

Output      Name of Function      Input


We all mean the same!

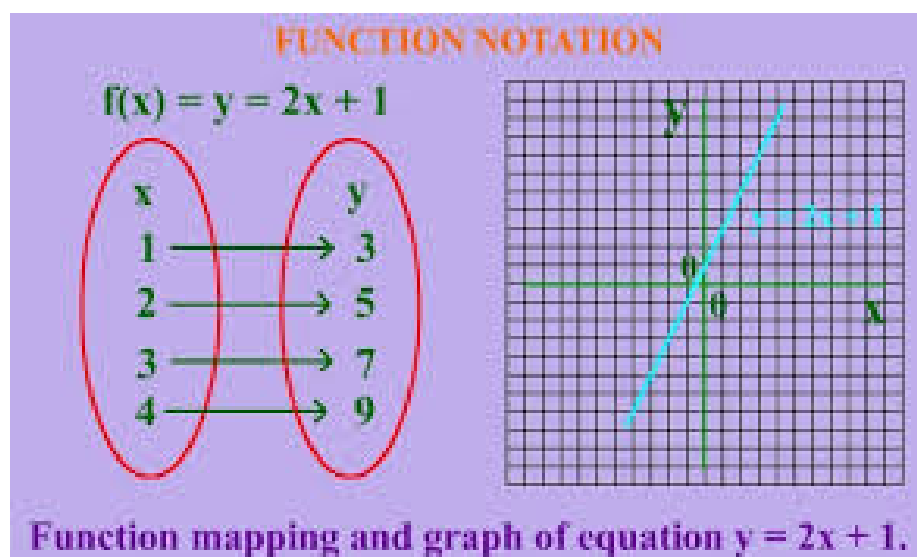
linear function	linear equation
$F(x) = mx + b$ slope      y-intercept	$Y = mx + b$ slope      y-intercept

**Equation**  
 $y = 2x - 3$

**Function Notation**  
 $f(x) = 2x - 3$

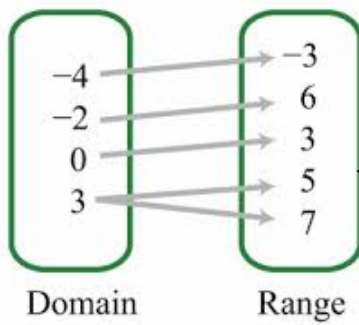
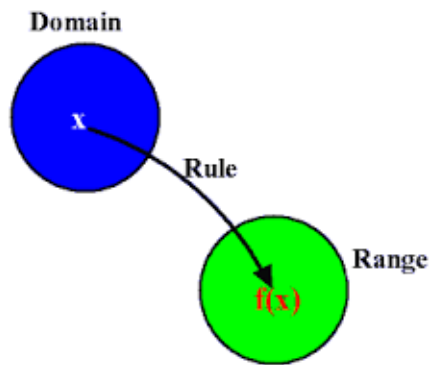
# Function Notation PPT

 Functions notation notes.ppt



A function pairs each element in **one** set, called the **domain**, with exactly **one** element in a second set, called the **range**.

Picture of Function



Independent variable

dependent variable



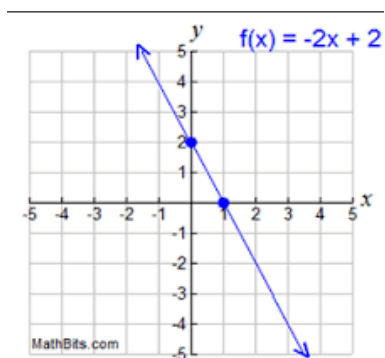
## Are these functions?

yes

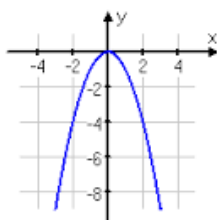
no

## Why or why not?

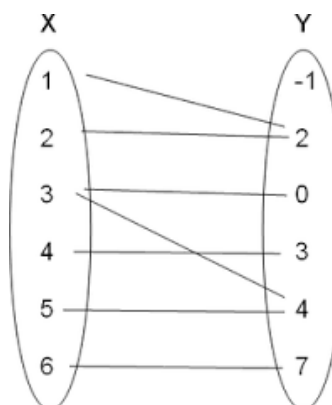
1.



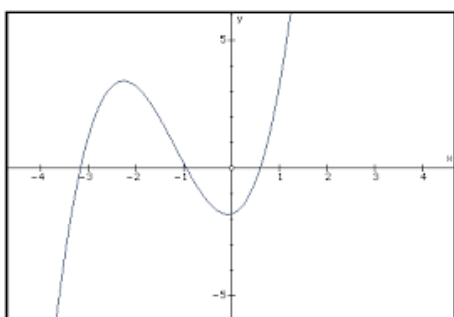
2.



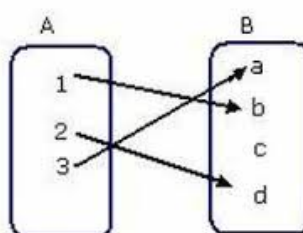
3.



4.



5.



6.  $(2,4), (3,6), (7, -4), (3, -2), (5,2)$

7.

$x$	3	2	1	0	1	2	3
$y$	1	-2	2	4	-3	-2	-1

8.

$x$	$y$
-1	-5
0	-2
1	1
2	4
3	7

What is the difference in the two tables?

Which one is a function? Which is not?

X	Y
1	2
2	4
3	6
4	8
5	10
6	12

X	Y
1	2
2	4
1	5
3	8
4	4
5	10



**Definition**

A relation is a set of pairs of input (x) and Output (y) values.

Input

Output

- X-values, y-values.
- x-coordinates, y-coordinates
- domain, range
- independent, dependent.

**Characteristics**

There are multiple ways to represent a relation:

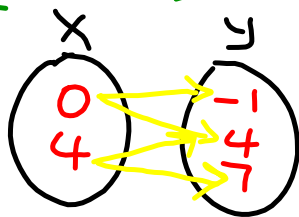
- ordered pairs
- coordinate points on graph
- input/output table of values
- Mapping Diagram
- Equation
- words in a sentence.

**Relation**

**Examples**

$\{(4,7), (3,2), (0,0)\}$

input (x)	output (y)
-2	1
0	4
3	7



**Non-Examples**

$4 \rightarrow \text{constant}$

$7x \rightarrow \text{expression}$

$x$   
↓  
variable



### Definition

A Function is a relation where every input ( $x$ ) has exactly one output ( $y$ ).

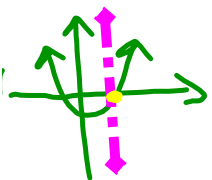
### Characteristics

- X-coordinates does not repeat.
- Vertical Line Test: If you can draw a Vertical line through the graph and it touches the graph only once, then it is a function.

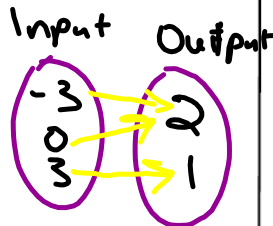
# Function

### Examples

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

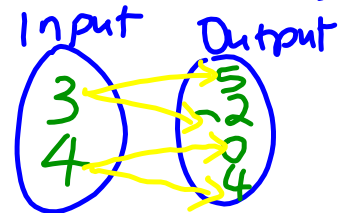
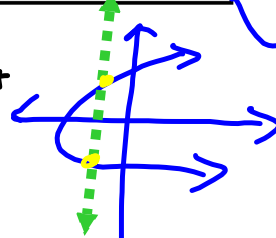


x	y
-1	4
0	2
-1	4
2	2



### Non-Examples

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



# Class Work 1/5/18

Math Models Name \_\_\_\_\_  
 Worksheet 4.1 Relations and Functions

**Relations Expressed as Ordered Pairs**

Determine if the following relations are functions. Then state the domain and range.

1.  $\{(1, -2), (-2, 0), (-1, 2), (1, 3)\}$

Function: No  
 Domain: 1, -2, -1, 1  
 Range: -2, 0, 2, 3

2.  $\{(1, 1), (2, 2), (3, 5), (4, 10), (5, 15)\}$

Function: Yes  
 Domain: {1, 2, 3, 4, 5}  
 Range: {1, 2, 5, 10, 15}

3.  $\left\{\left(17, \frac{15}{4}\right), \left(\frac{15}{4}, 17\right), \left(15, \frac{17}{4}\right), \left(\frac{17}{4}, 15\right)\right\}$

Function: Yes  
 Domain: 17, 15, 15, 17  
 Range: 15, 17, 17, 15

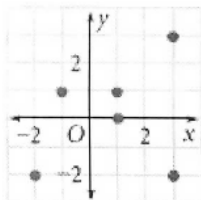
4.  $\left\{\left(-3, \frac{2}{5}\right), \left(-3, \frac{3}{5}\right), \left(\frac{3}{2}, -5\right), \left(5, \frac{2}{5}\right)\right\}$

Function: No  
 Domain: {-3, 3/2, 5}  
 Range: {2/5, 3/5, -5, 2/5}

**Relations Expressed as Graphing**

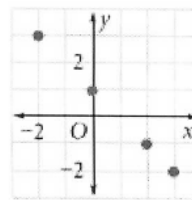
Write each of the following as a relation, state the domain and range, then determine if it is a function.

5.

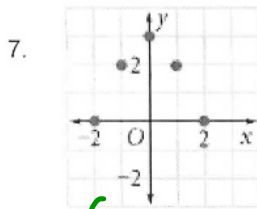


Relation: {(-2, 2), (-1, 1), (1, 0), (1, 1), (3, 3), (3, -2)}  
 Domain: {-2, -1, 1, 3}  
 Range: {2, 1, 0, 1, 3, -2}  
 Function: No

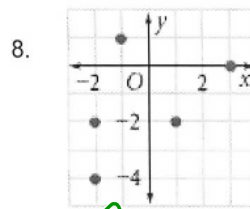
6.



Relation: {(-2, 3), (0, 1), (2, -1), (3, -2)}  
 Domain: {-2, 0, 2, 3}  
 Range: {3, 1, -1, -2}  
 Function: Yes



Relation:  $\{(-2, 0), (1, 2), (0, 3), (1, 2)\}$   
 Domain:  $\{-2, -1, 0, 1, 2\}$   $(2, 0)$   
 Range:  $\{0, 2, 3\}$   
 Function: Yes

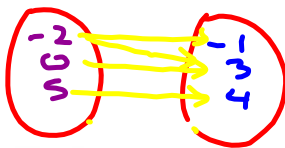


Relation:  $\{(-2, 2), (-2, 4), (-1, 1), (1, -2)\}$   
 Domain:  $\{-2, -1, 1\}$   
 Range:  $\{-2, 4, 1, -2\}$   
 Function: No

**Relations Expressed as Mappings**

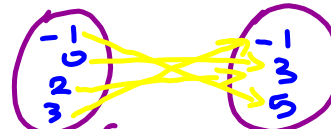
Express the following relations as a mapping, state the domain and range, then determine if is a function.

9.  $\{(-2, -1), (0, 3), (5, 4), (-2, 3)\}$



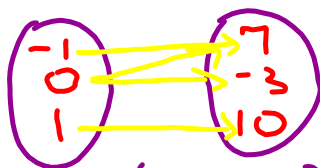
Domain: \_\_\_\_\_  
 Range: \_\_\_\_\_  
 Function: No

10.  $\{(-1, 5), (0, 3), (2, 3), (3, -1)\}$



Domain:  $\{-1, 0, 2, 3\}$   
 Range:  $\{-1, 3, 5\}$   
 Function: Yes

11.  $\{(-1, 7), (0, -3), (1, 10), (0, 7)\}$



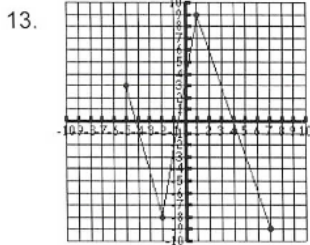
Domain:  $\{-1, 0, 1\}$   
 Range:  $\{-3, 7, 10\}$   
 Function: No

12.  $\left\{\left(\frac{1}{2}, 2\right), \left(\frac{1}{4}, 2\right), \left(\frac{1}{8}, 2\right), \left(-\frac{1}{2}, 2\right)\right\}$

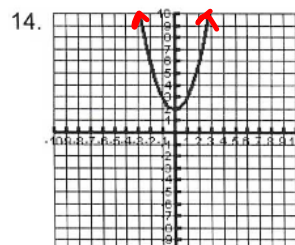


Domain:  $(\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, -\frac{1}{2})$   
 Range:  $\{2\}$   
 Function: Yes

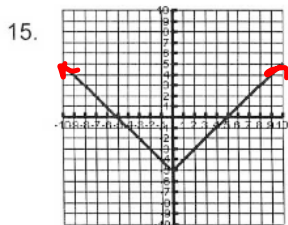
Determine if the graph is a function, then state the domain and range.



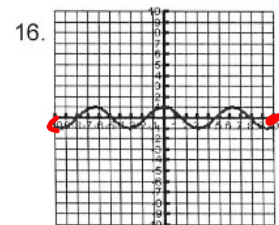
Domain:  $[-5, 7]$   
 Range:  $[-9, 9]$   
 Function: Yes



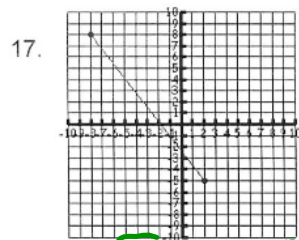
Domain:  $(-\infty, \infty)$   
 Range:  $[2, \infty)$   
 Function: Yes



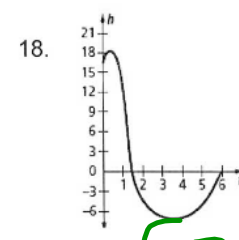
Domain:  $(-\infty, \infty)$   
 Range:  $[-5, \infty)$   
 Function: Yes



Domain:  $(-\infty, \infty)$   
 Range:  $[-1, 1]$   
 Function: Yes

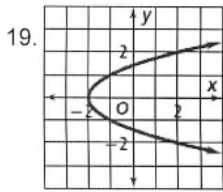


Domain:  $[-8, 8]$   
 Range:  $[-8, 8]$   
 Function: Yes

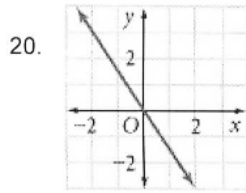


Domain:  $[0, 6]$   
 Range:  $[-6, 17]$   
 Function: Yes

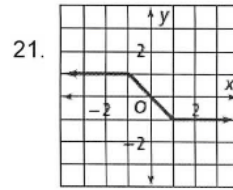




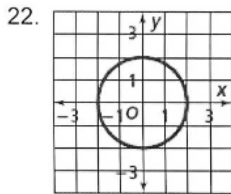
D:  $[-2, \infty)$   
 R:  $(-\infty, \infty)$   
 F: No



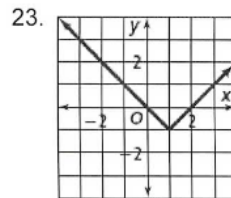
D:  $(-\infty, \infty)$   
 R:  $(-\infty, \infty)$   
 F: Yes



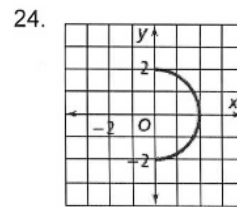
D:  $(-\infty, \infty)$   
 R:  $[-1, 1]$   
 F: Yes



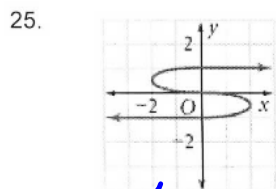
D:  $(-2, 2]$   
 R:  $[-2, 2]$   
 F: No



D:  $(-\infty, \infty)$   
 R:  $[-1, \infty)$   
 F: Yes



D:  $[0, 2]$   
 R:  $[-2, 2]$   
 F: No




Domain:  $(-\infty, \infty)$   
 Range:  $[-1, 1]$   
 Function: No

# HW Assignment

Functions Practice Worksheet

Due on Monday 1/8/18

 Functions Practice HW.docx

## Student Led Closing 1/5/18

- How is a function different from a Relation?
- What are the words used to describe an input variable and an output variable?

## Attachments

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Functions notation.ppt

Functions Practice HW.docx

Functions notation notes.ppt