

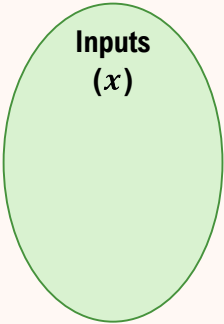
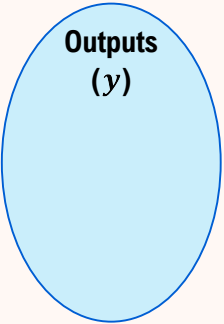
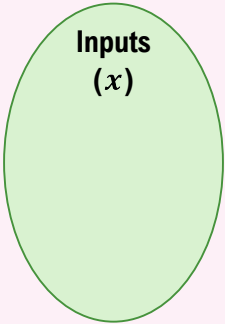
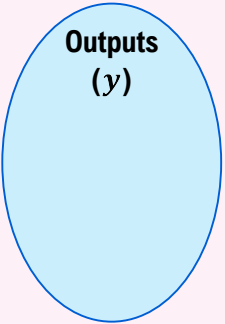
TOPIC: INTRO TO FUNCTIONS AND NOTATION

Intro to Relations and Functions

- ◆ A **relation** is a connection between **inputs** (x) & **outputs** (y) often represented as a set of ordered pairs (x, y).
- ▶ A **function** is a relation where each input (x) is paired with at most ____ output (y).

EXAMPLE

For each relation, list the inputs & outputs and draw arrows showing how the values correspond.

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

- ◆ Relations can be represented as a set of ordered pairs, a correspondence, table, graph, or equation.

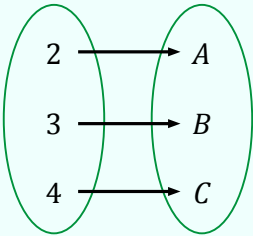
EXAMPLE

Determine if each relation is a function.

(A)

x	y
$\frac{1}{2}$	4
1	$\frac{3}{2}$
2	$\frac{3}{2}$
$\frac{1}{2}$	5

(B)



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Function Notation

◆ If an equation is a function, we can write it using **function notation** $y = f(x)$, read as " f ____ x ".

► $f(x)$ represents the y -value that corresponds to the given x -value. Ex: $f(1)$ is the y -value when $x = 1$.

EXAMPLE

Evaluate $f(x) = 3x - 1$ at $x = 4$. *Hint: Plug 4 in for x & simplify.*

New

Function Notation

$$y = 3x - 1$$

↓

$$f(x) = 3x - 1$$

Function name Input Expression

$$f() =$$

◆ You may see functions represented using different letters (_____) or without the "of x " (_____).

EXAMPLE

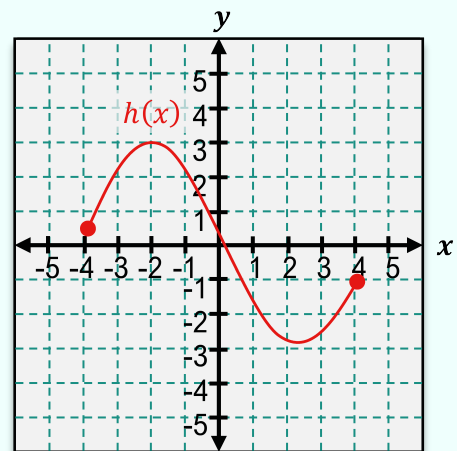
Evaluate the functions at the given input.

(A)

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

$$g(1) =$$

(B)



$$h(-2) =$$

TOPIC: INTRO TO FUNCTIONS AND NOTATION

PRACTICE

Find $f(-3)$ for the following functions.

(A)

$$f(x) = 2x^2 - 4x + 1$$

(B)

$$f(x) = \frac{x + 4}{x - 1}$$

EXAMPLE

Define the function $f(x)$ that defines y as a function of x in each equation. *Hint: Solve for y first.*

(A)

$$3x - 2y = 8$$

(B)

$$4x + 5y = 15$$

TOPIC: INTRO TO FUNCTIONS AND NOTATION

EXAMPLE

The given table shows the percentage of the U.S. population using the internet over the years indicated.

- (A) Does the table define a function?
-

- (B) What are the domain and range?
-

- (C) If the function is defined as f , find $f(2015)$. What does this mean?
-

- (D) If $f(x) = 92.0$, what does x equal to?

Year	Internet Usage (% of population)
2000	43.1
2005	68.0
2010	74.0
2015	88.5
2020	90.0
2022	92.0

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Vertical Line Test

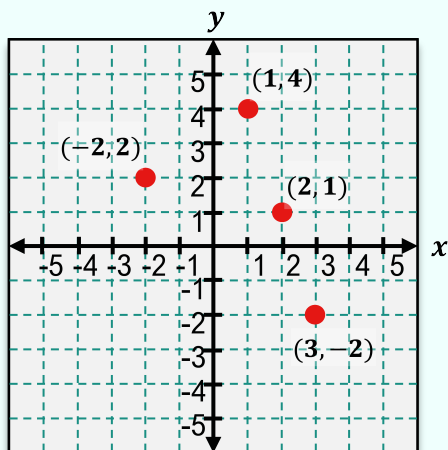
◆ When a relation is represented on a graph, you can determine if it is a function using the **vertical line test**.

► If you can draw **any** vertical line that passes through more than 1 point, the graph _____ a function.

EXAMPLE

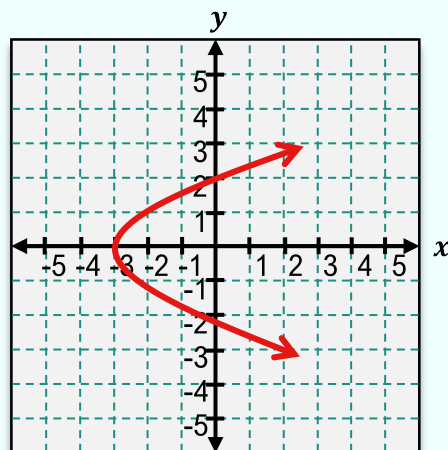
Use the vertical line test to determine if each graph is a function.

(A)



[FUNCTION | NOT A FUNCTION]

(B)

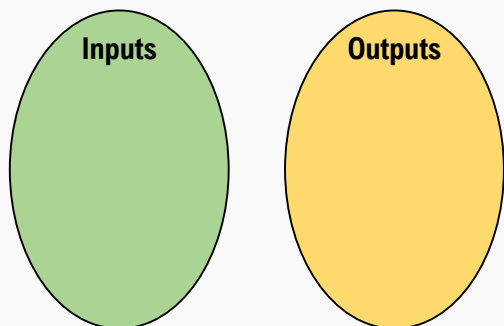


[FUNCTION | NOT A FUNCTION]

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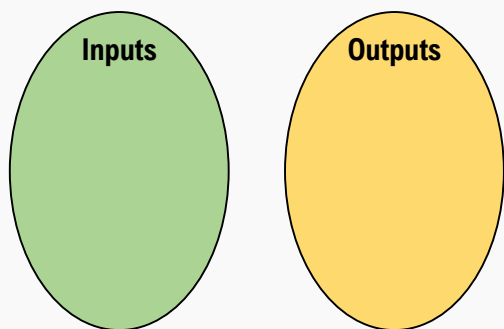
PRACTICE

State the inputs and outputs of the following relation. Is it a function? $\{(-3, 5), (0, 2), (3, 5)\}$



PRACTICE

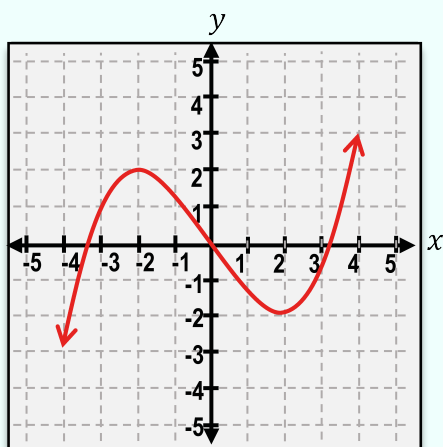
State the inputs and outputs of the following relation. Is it a function? $\{(2, 5), (0, 2), (2, 9)\}$



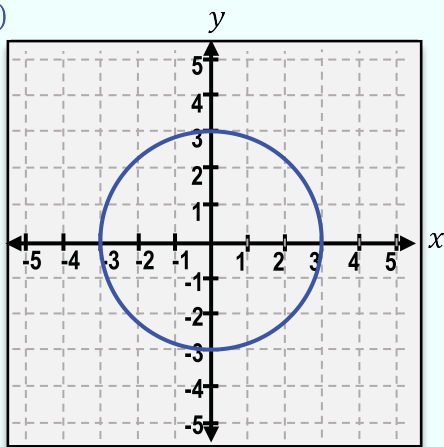
EXAMPLE

Determine below which of the graphs are functions (select all that apply).

(A)



(B)



(C)

