

Lesson 37: Functions, Domain & Range

By the end of this lesson you will be able to:

- ~ Determine if mapping, ordered pairs, and graphs are functions
- ~ Determine domain and range of functions

Functions

A function can be written in the form of $f(x)$ (recall linear programming). Remember, that $f(x) = y$. This means that the equation is written in terms of variable x .

An equation is considered a function if you plug in a value for x and get **ONLY ONE** answer (y) in return.

Examples of a Function

$$\sim f(x) = x^2$$

$$\sim f(x) = |x|$$

$$\sim f(x) = x^2 - 4$$

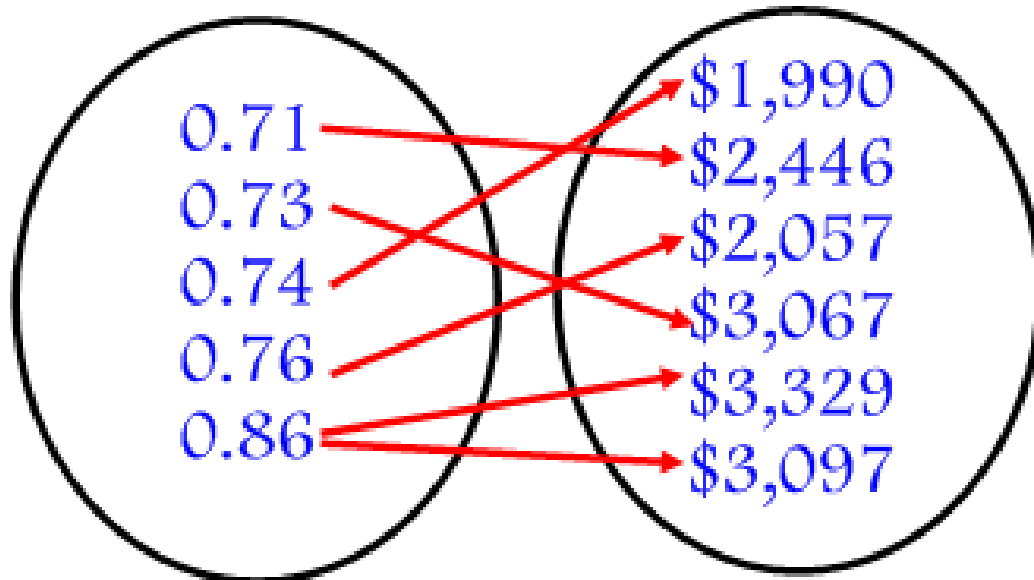
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Determine whether a **Mapping** (bubbles) is a function.

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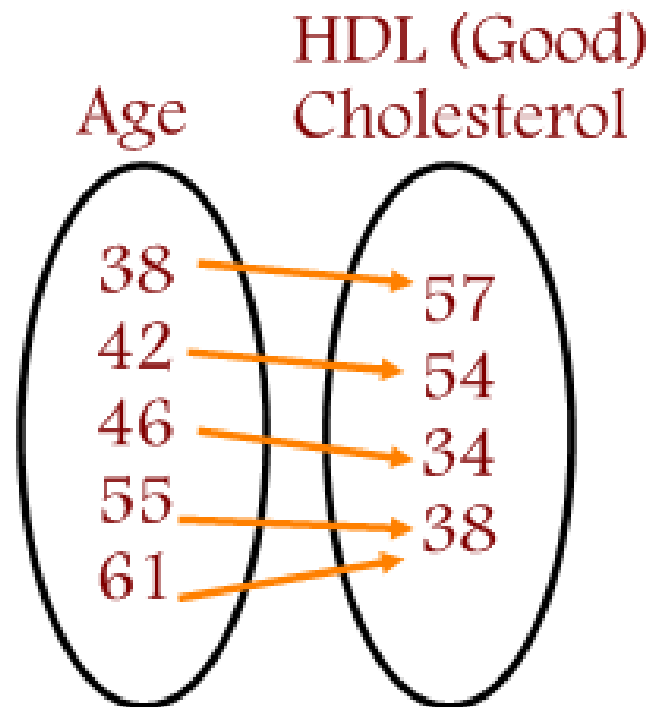
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Function or not?



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Determine whether a Mapping is a function.



Function or not?

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Function or not?

a.) $\{(1,3), (-1,4), (0,6), (2, 8)\}$

b.) $\{(-2, 6), (-1,3), (0,2), (1,3), (2, 6)\}$

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

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Function or not?

a.)

x	y
-1	7
0	4
1	-1
2	2

b.)

x	y
5	-2
2	-1
1	0
2	1
5	2

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Function or not?

a.) $\{(1,3), (-1,4), (0,6), (2, 8)\}$

Function

b.) $\{(-2, 6), (-1,3), (0,2), (1,3), (2, 6)\}$

Function

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

Not a Function - 4 goes to too many outputs.

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Determine if an equation is a function.

To determine if an equation is a function, we need to:

1. Solve for y
2. Check to see if one x (input) results in **ONLY** one y (output).

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Examples:

a.) $y = -2x + 5$

b.) $y = \pm 3x$

c.) $y = x^2 + 5x$

d.) $x + y^2 = 9$

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Examples:

a.) $y = -2x + 5$

Yes

b.) $y = \pm 3x$

No

c.) $y = x^2 + 5x$

Yes

d.) $x + y^2 = 9$

No

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Determine if a graph is a function.

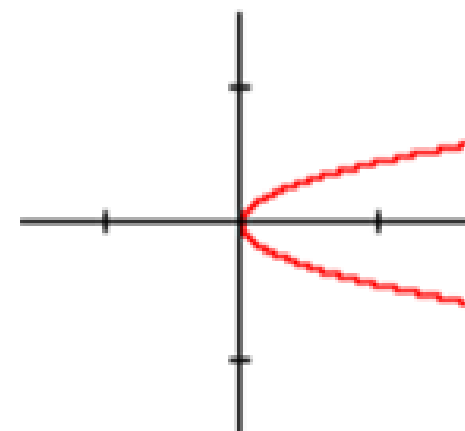
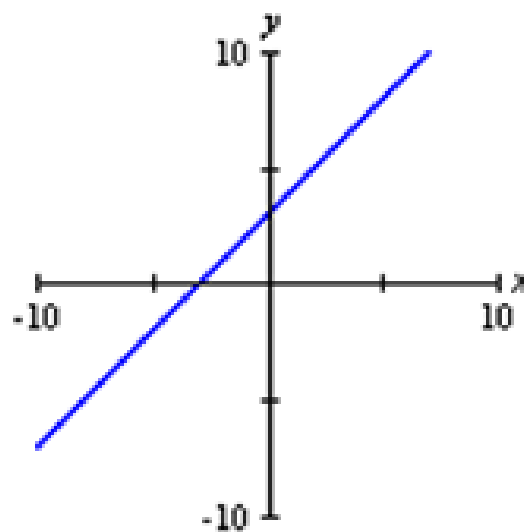
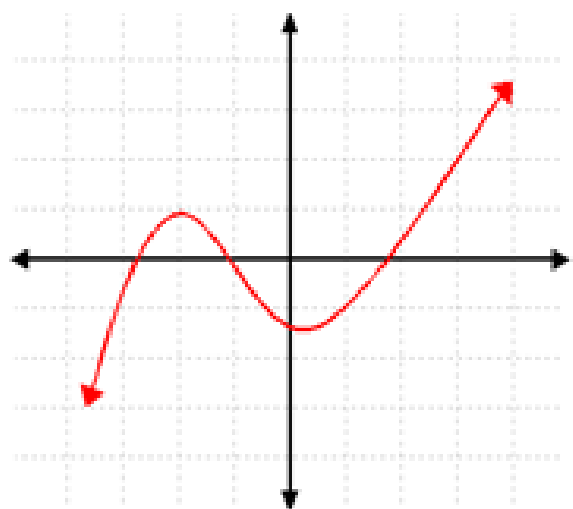
To determine if an equation is a function, we need to use the Vertical Line Test.

The Vertical Line Test states:

A set of points in the xy -plane is the graph of a function if and only if every vertical line intersects the graph in at MOST one point.

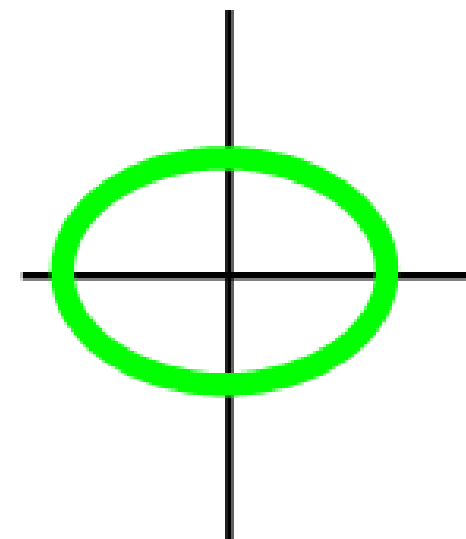
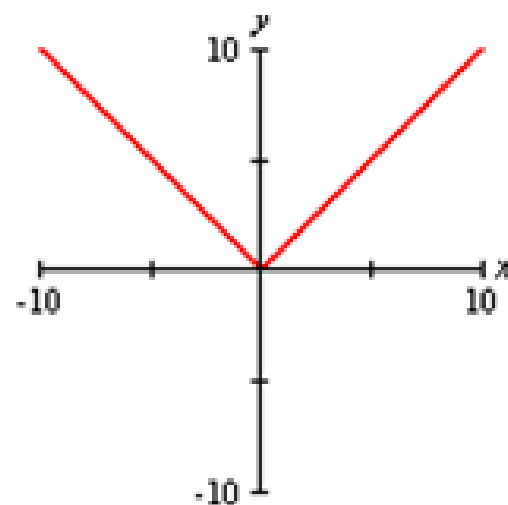
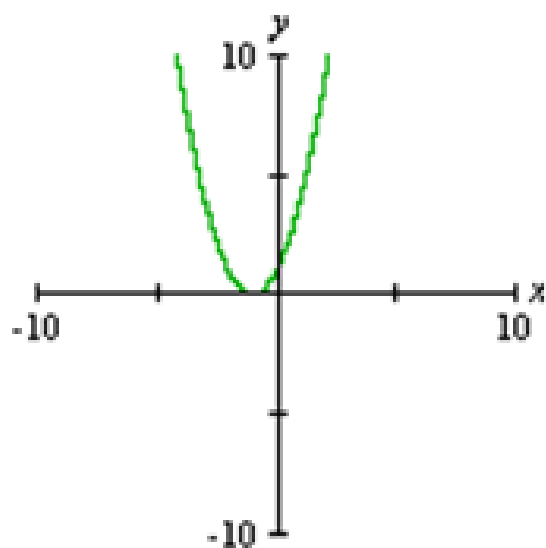
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Function or not?



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Function or not?



Domain and Range

Domain: All acceptable x -values for the function.

Range: All acceptable y -values for the function.

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Domain and Range - graph on the Calculator

Find the domain and range for the function.

$$y = 2x + 3$$

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Domain and Range - graph on the Calculator

Find the domain and range for the function.

$$y = -x^2 + 4x + 1$$

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Domain and Range - graph on the Calculator

Find the domain and range for the function.

$$y = \sqrt{x - 4}$$

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Domain and Range - graph on the Calculator

Find the domain and range for the function.

$$y = |x + 3|$$

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Domain and Range

Find the domain and range. Is it a function?

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

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Can you?

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Homework:

Assignment 37