Functions and Relations

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What is a Function?

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- ▶ It is a relation in which every element in the domain is mapped to exactly one element in the range.

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- ▶ It is a special type of relation.
- ▶ It is a relation in which every element in the domain is mapped to exactly one element in the range.
- ▶ A set of ordered pairs is a function if no two distinct ordered pairs have equal abscissas.

Example 1

Is the following set of ordered pairs a function or not?

$$\{(1, 40), (2, 80), (3, 120), (4, 160), (5, 200)\}$$

Example 1

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$$\{(1, 40), (2, 80), (3, 120), (4, 160), (5, 200)\}$$

Function

Example 2

Is the relation described by the following table a function or not?

Minutes	Charge
1	Php 5
2	Php 5
3	Php 5
4	Php 7
5	Php 9
6	Php 11

Example 2

Is the relation described by the following table a function or not?

Minutes	Charge
1	Php 5
2	Php 5
3	Php 5
4	Php 7
5	Php 9
6	Php 11

Function

Example 3

Is the relation described by the following table a function or not?

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

Example 3

Is the relation described by the following table a function or not?

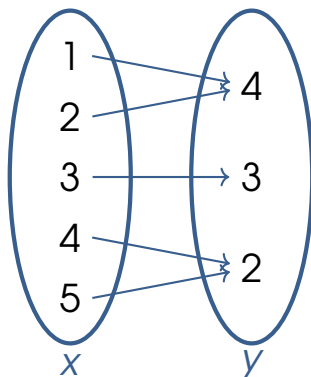| x	-2	-1	0	-1	-2
y	-4	-2	0	2	4

Not a Function

Example 4

Is the relation described by the following mapping diagram a function or not?
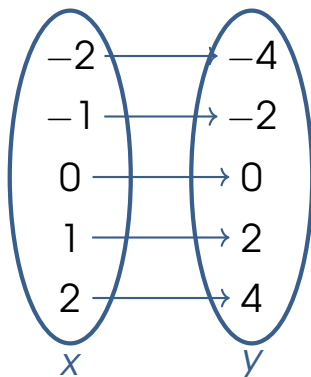
Example 4

Is the relation described by the following mapping diagram a function or not?
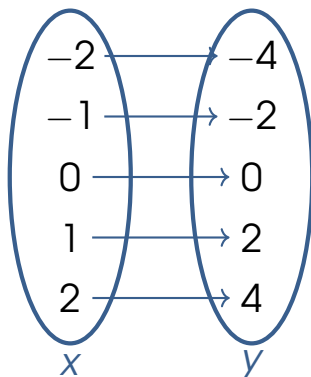
Function

Example 5

Is the relation described by the following table a function or not?

x	y
1	5
2	4
3	3
4	4
5	5

Example 5

Is the relation described by the following table a function or not?

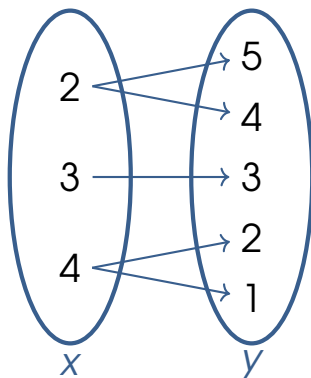| x	y
1	5
2	4
3	3
4	4
5	5

Function

Example 6

Is the relation described by the following mapping diagram a function or not?
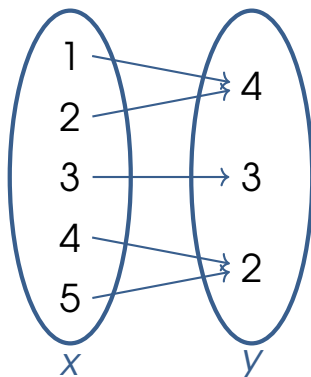
Example 6
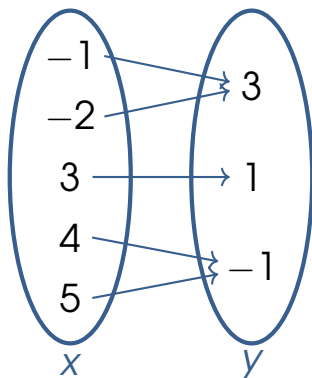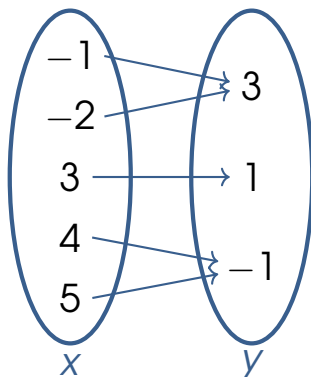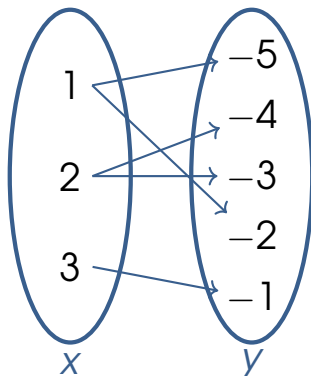
Is the relation described by the following mapping diagram a function or not?

Function

Example 7

Is the relation described by the following set of ordered pairs a function or not?

$$\{(1, 40), (2, 80), (1, 120), (2, 160), (5, 200)\}$$

.

Example 7

Is the relation described by the following set of ordered pairs a function or not?

$$\{(1, 40), (2, 80), (1, 120), (2, 160), (5, 200)\}$$

.

Not a Function

Example 8

Is the relation described by the following table a function or not?

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

Example 8

Is the relation described by the following table a function or not?

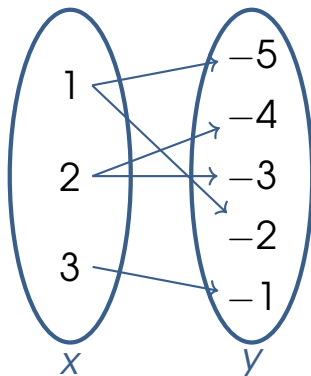| x	-2	-1	0	1	2
y	-4	-2	0	-2	-4

Function

Example 9

Is the relation described by the following mapping diagram a function or not?
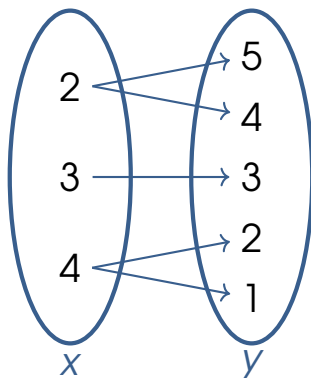
Example 9

Is the relation described by the following mapping diagram a function or not?

Not a Function

Example 10

Is the relation described by the following mapping diagram a function or not?

Example 10

Is the relation described by the following mapping diagram a function or not?

Function

Example 11

Is the relation described by the following mapping diagram a function or not?

Example 11

Is the relation described by the following mapping diagram a function or not?

Not a Function

Example 12

Is the relation described by the following set of ordered pairs a function or not?

$$\{(1, 40), (2, 80), (3, 120), (4, 160), (5, 200)\}$$

.

Example 12

Is the relation described by the following set of ordered pairs a function or not?

$$\{(1, 40), (2, 80), (3, 120), (4, 160), (5, 200)\}$$

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Function

Example 13

Is the relation described by the following table a function or not?

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

Example 13

Is the relation described by the following table a function or not?

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

Function

Example 14

Is the relation described by the following table a function or not?

x	1	2	3	2	1
y	-2	-1	0	1	2

Example 14

Is the relation described by the following table a function or not?

x	1	2	3	2	1
y	-2	-1	0	1	2

Not a Function

Example 15

Find the domain and range of the relation represented in this graph, then determine whether it is a relation or a function.
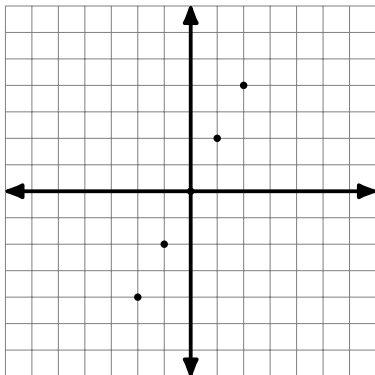
Example 15

Find the domain and range of the relation represented in this graph, then determine whether it is a relation or a function.
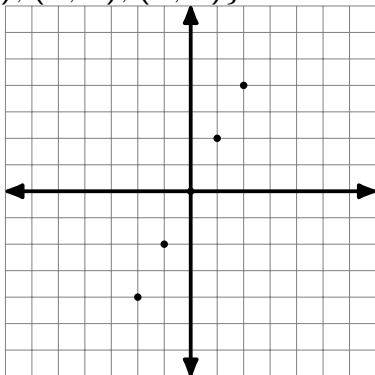
$$\{(-2, -4), (-1, -2), (0, 0), (1, 2), (2, 4)\}$$

Example 15

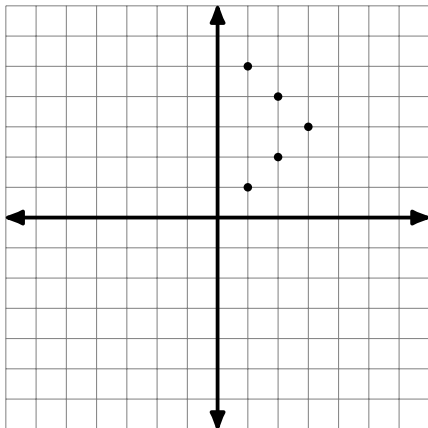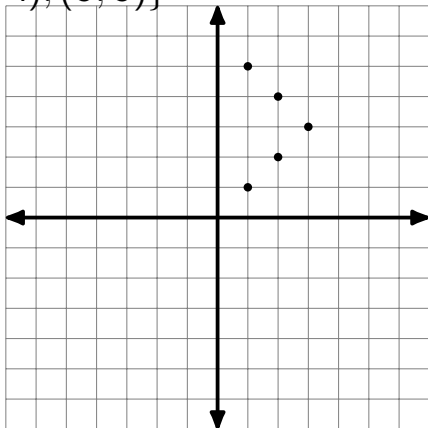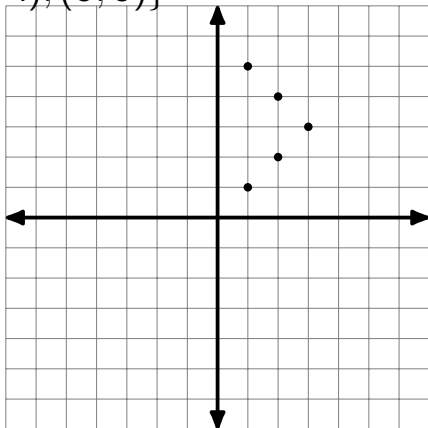Find the domain and range of the relation represented in this graph, then determine whether it is a relation or a function.
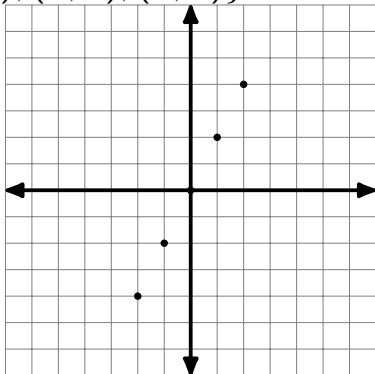
$\{(-2, -4), (-1, -2), (0, 0), (1, 2), (2, 4)\}$
$D = \{-2, -1, 0, 1, 2\}$

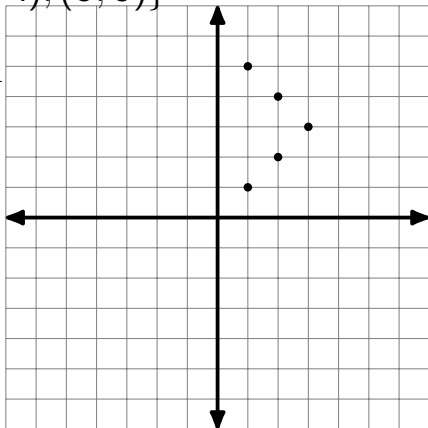# Example 15

Find the domain and range of the relation represented in this graph, then determine whether it is a relation or a function.

$\{(-2, -4), (-1, -2), (0, 0), (1, 2), (2, 4)\}$
$D = \{-2, -1, 0, 1, 2\}$
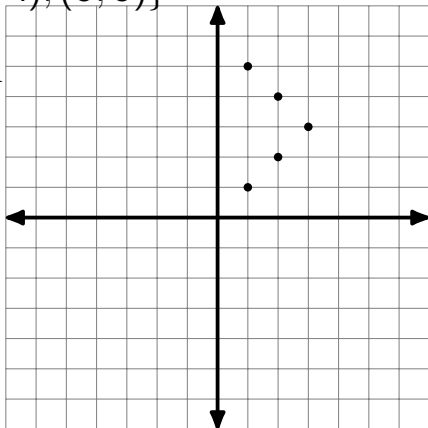$R = \{-4, -2, 0, 2, 4\}$
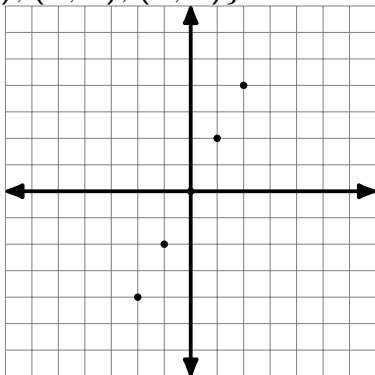
Example 15

Find the domain and range of the relation represented in this graph, then determine whether it is a relation or a function.

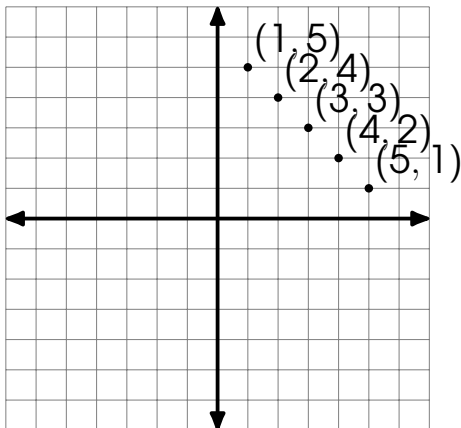$\{(-2, -4), (-1, -2), (0, 0), (1, 2), (2, 4)\}$
$D = \{-2, -1, 0, 1, 2\}$
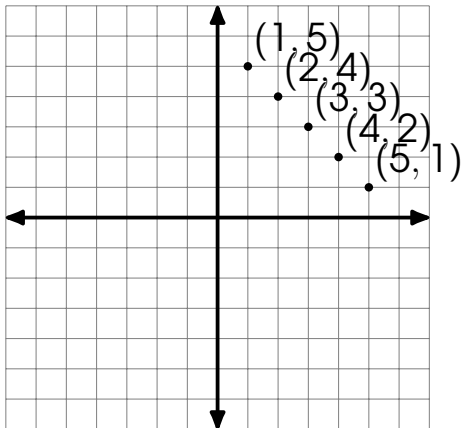$R = \{-4, -2, 0, 2, 4\}$
Function
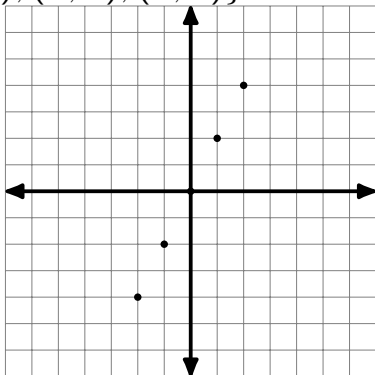
Example 16

Find the domain and range of the relation represented in this graph, then determine whether it is a relation or a function.

Example 16

Find the domain and range of the relation represented in this graph, then determine whether it is a relation or a function.

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

Example 16

Find the domain and range of the relation represented in this graph, then determine whether it is a relation or a function.

$\{(1,1),(1,5),(2,2),(2,4),(3,3)\}$
Domain $= \{1,2,3\}$

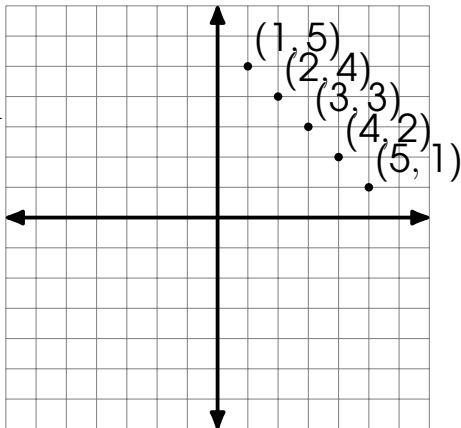# Example 16

Find the domain and range of the relation represented in this graph, then determine whether it is a relation or a function.

$\{(1,1),(1,5),(2,2),(2,4),(3,3)\}$
Domain $= \{1,2,3\}$
Range $= \{1,2,3,4,5\}$

Example 16

Find the domain and range of the relation represented in this graph, then determine whether it is a relation or a function.

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

Domain $= \{1, 2, 3\}$

Range $= \{1, 2, 3, 4, 5\}$

Not a Function

Example 17

Find the domain and range of the relation represented in this graph, then determine whether it is a relation or a function.

Example 17

Find the domain and range of the relation represented in this graph, then determine whether it is a relation or a function.

$D = \{1, 2, 3, 4, 5\}$

Example 17

Find the domain and range of the relation represented in this graph, then determine whether it is a relation or a function.

$D = \{1, 2, 3, 4, 5\}$
$\text{Range} = \{5, 4, 3, 2, 1\}$

Example 17

Find the domain and range of the relation represented in this graph, then determine whether it is a relation or a function.

$D = \{1, 2, 3, 4, 5\}$
Range $= \{5, 4, 3, 2, 1\}$
Function
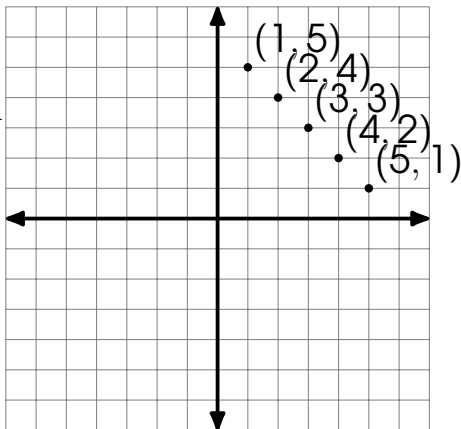
What is the Vertical Line Test?

If every vertical line intersects the graph no more than once, the graph represents a function.

Example 19

Is the relation described by the following graph a function or not?
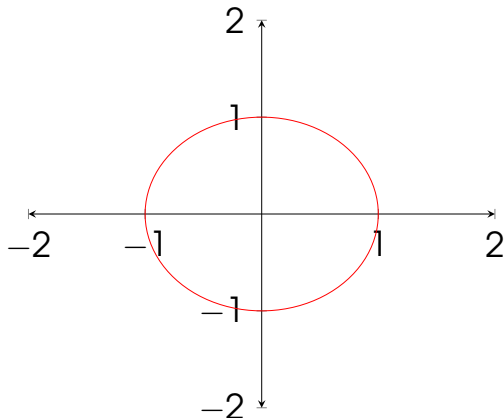
Example 19

Is the relation described by the following graph a function or not?
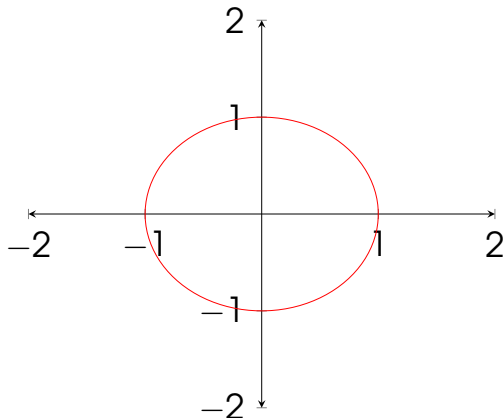
Not a Function

Example 20

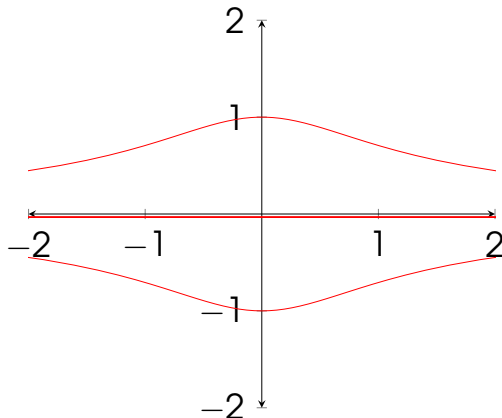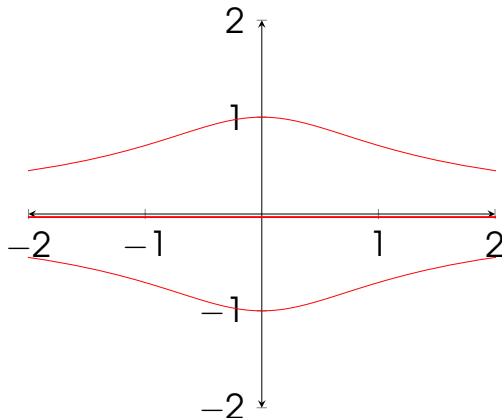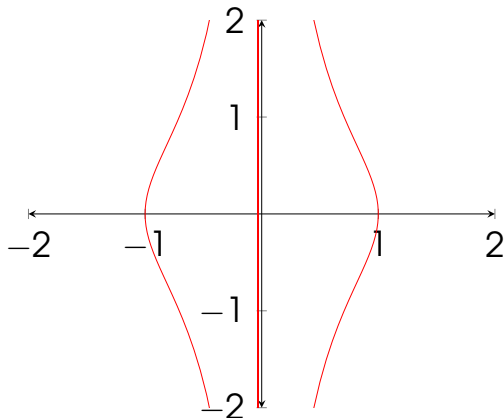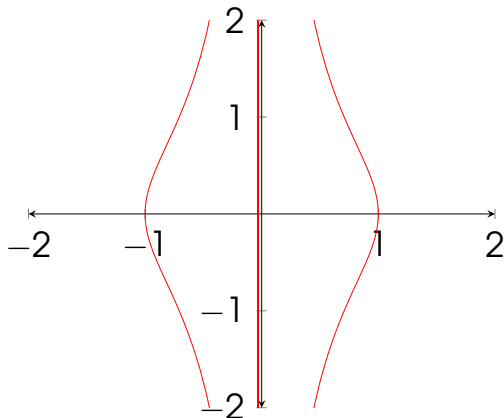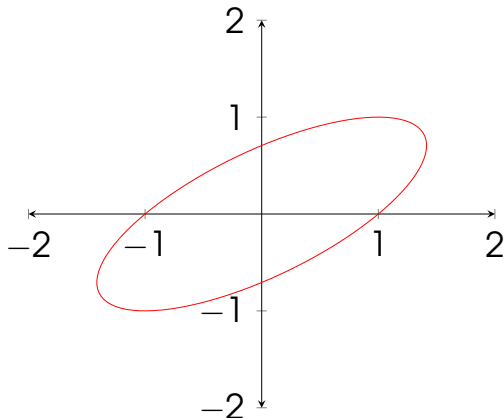Is the relation described by the following graph a function or not?
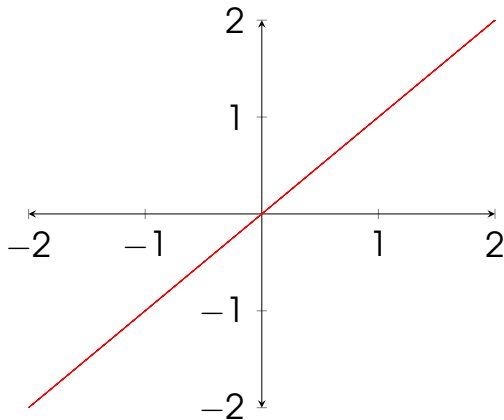
Example 20

Is the relation described by the following graph a function or not?
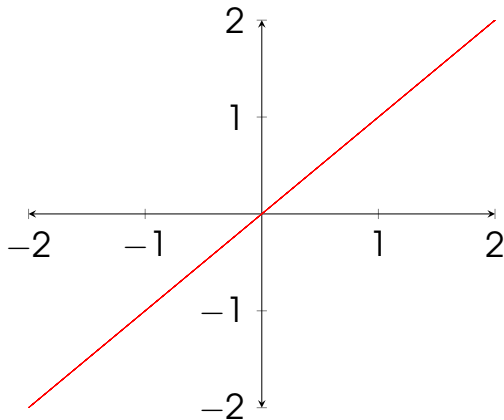
Function

Example 21

Is the relation described by the following graph a function or not?

Example 21

Is the relation described by the following graph a function or not?

Not a Function

Example 22

Is the relation described by the following graph a function or not?

Example 22

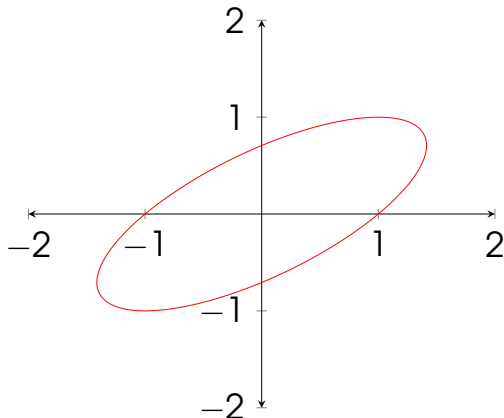Is the relation described by the following graph a function or not?

Not a Function

Example 23

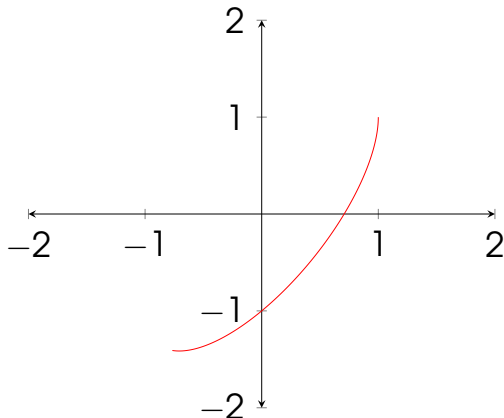Is the relation described by the following graph a function or not?

Example 23

Is the relation described by the following graph a function or not?
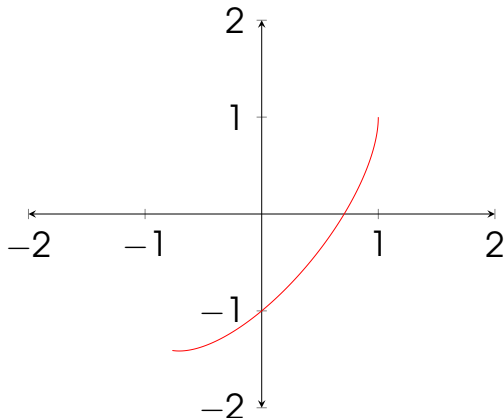

Not a Function

Example 24

Is the relation described by the following graph a function or not?
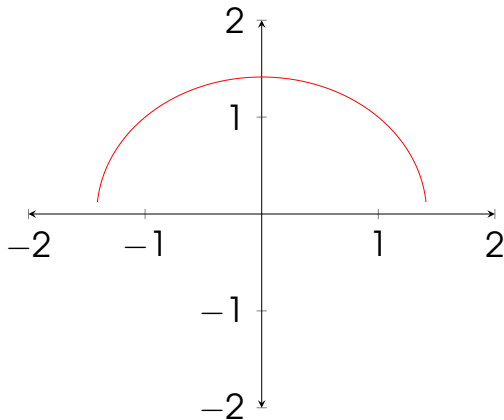
Example 24

Is the relation described by the following graph a function or not?
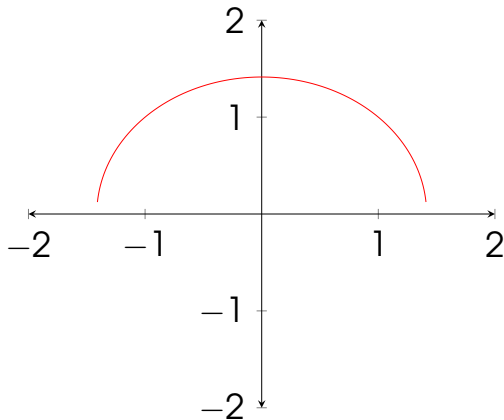

Function

Example 25

Is the relation described by the following graph a function or not?

Example 25

Is the relation described by the following graph a function or not?

Function

Thank you for watching.