Functions

Nov 4-10:26 AM

Warm Up:

State the domain and range for each of the following:

$$y = 3x - 2 \qquad\qquad y = -2(x-1)^2 + 3$$

$$D = \{x \in \mathbb{R}\} \qquad\qquad D = \{x \in \mathbb{R}\}$$

$$R = \{y \in \mathbb{R}\} \qquad\qquad R = \{y \in \mathbb{R} \mid y \leq 3\}$$
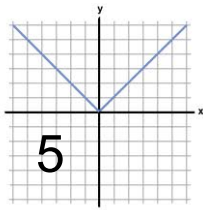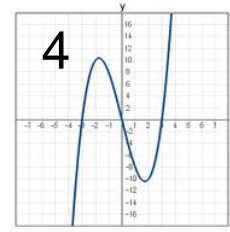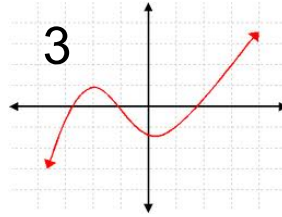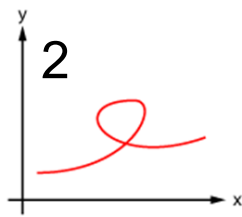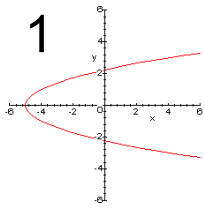
Mar 19-7:45 AM

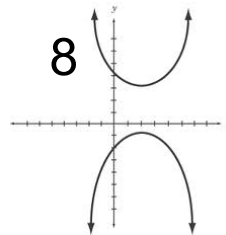Looking at the graphs below - half are functions and half are only relations. Can you sort them?

ANSWERS

1

2

3

4

5

6

7

8
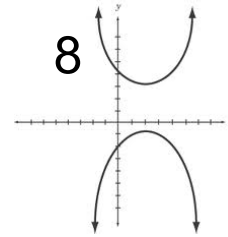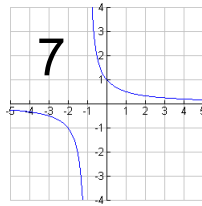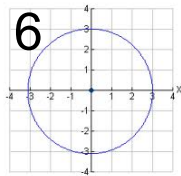
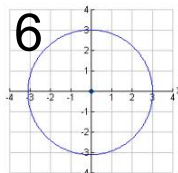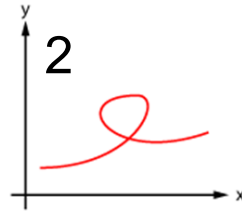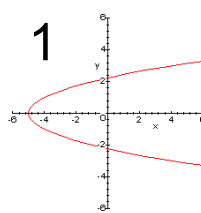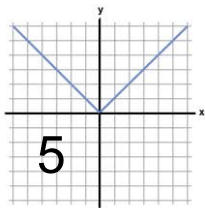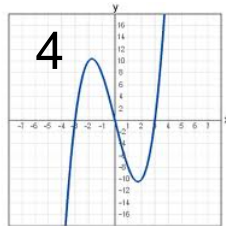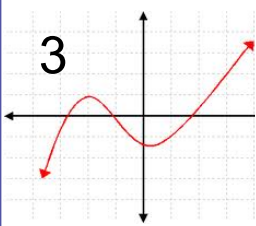Mar 19-7:45 AM

Functions   Relations

3

4

5

7

1

2

6

8
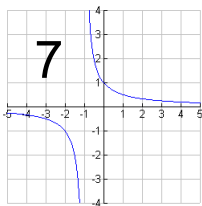
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What is a Function vs a Relation

Relation: an identified pattern between two variables that may be represented as ordered pairs, a table of values, a graph or an equation.

Function: a relation in which each value of the independent variable (x) corresponds to exactly one value of the dependent variable (y).

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Determining Functions: The Vertical Line Test (VLT)

From a graph, we can determine if a relation is a function by using the vertical line test (VLT).

The vertical line test consists of taking a vertical line and sliding it across the relation. If the line touches the function more than once at any spot, then the relation is not a function.
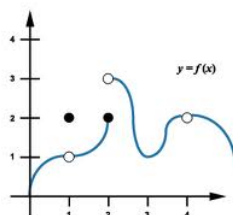
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Example

Determine if the relations are functions.

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Example

Determine if the relations are functions.

crosses in two spots -> not a function

vertical line will never cross in 2 spots -> function

crosses in two spots -> not a function

vertical line will never cross in 2 spots -> function

vertical line will never cross in 2 spots -> function

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Determining Functions: A Table of Values

To determine if we have a function when given a table of values, we need to look at the x column.

If an x-value were to repeat itself, it must have the same associated y-value to be a function.

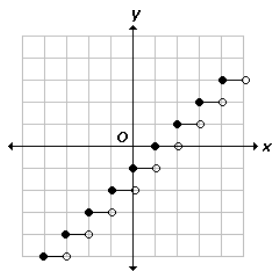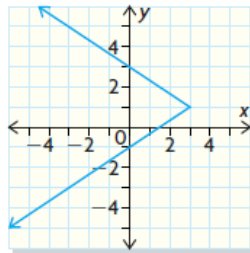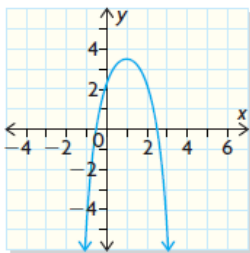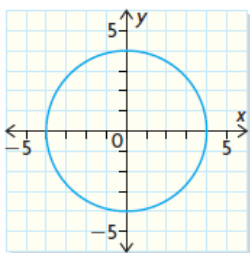If an x-value has more than one y-value associated with it, then it is a relation.

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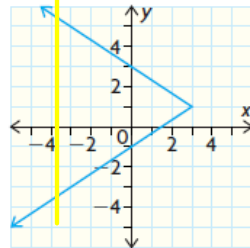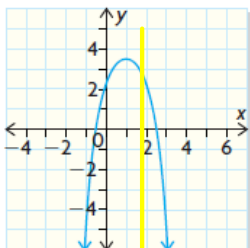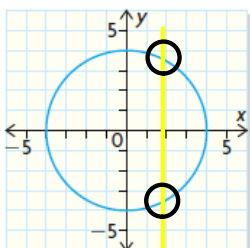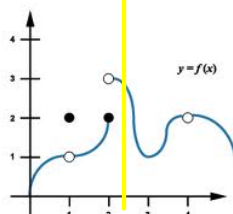# Example

ANSWERS

Determine if the relations are functions.

x	y
0	1
2	5
4	-1
8	1
10	1

x	1	2	3	4
y	5	7	9	11

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

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Example

Determine if the relations are functions.

x	y
0	1
2	5
4	-1
8	1
10	1

function: no
x-values repeat

x	1	2	3	4
y	5	7	9	11

function: no
x-values repeat

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

not a function: x=0 is repeated and has different values of y (0,4) and (0,1)

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Determining Functions: Mapping Diagrams

To read a mapping diagram, we take the value from the first "bubble" - your x, and the value from the second "bubble" - your y, and we make a point.

To determine if we have a function when given a mapping diagram, we need to look at the arrows.

If there are two arrows from the same value in the first bubble pointed to different values in the second bubble, then we don't have a function.
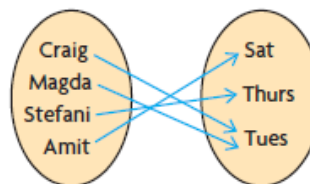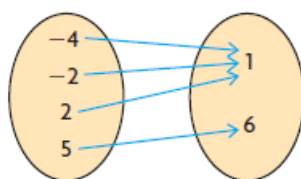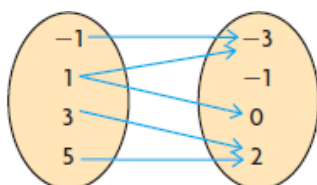
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Example

ANSWERS

Write the ordered pairs from each diagram.
Determine if the relations are functions.
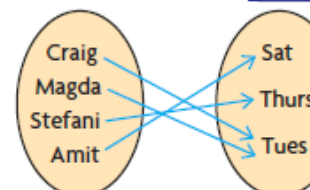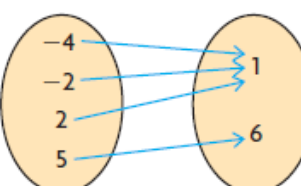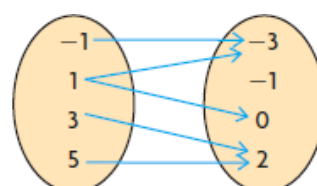

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Example

Write the ordered pairs from each diagram.
Determine if the relations are functions.

(-1,-3)
(1,-3)
(1,0)
(3,2)
(5,2)

not a function because
x=1 has two different
values of y (-3 and 0)

(-4,1)
(-2,1)
(2,1)
(5,6)

function because
no x values repeat

(Craig, Tues)
(Magda, Tues)
(Stefani, Thurs)
(Amit, Sat)

function because no
x-values repeat

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Common Functions

ANSWERS

Of the functions you have seen to this point, which are functions which are only relations?

Functions   Relations

Cubic   Quadratic   Circle   Line

Root   Absolute Value   Reciprocal

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Common Functions

Of the functions you have seen to this point, which are functions which are only relations?

Functions   Relations

Cubic   Root   Circle

Quadratic   Line

Absolute Value

Reciprocal

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Homework

Nelson Page 10 #s 1, 2, 4, 6, 7 & 9

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