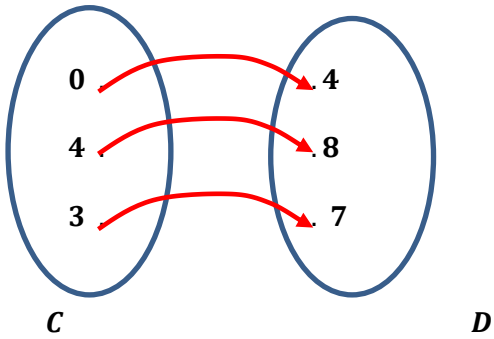


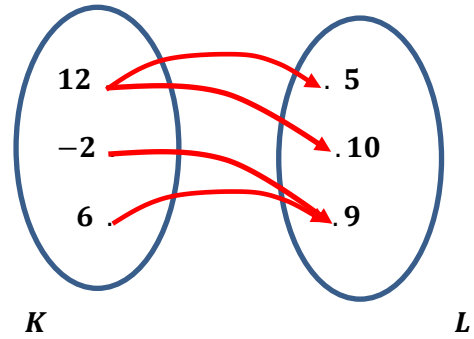
# Functions Assignment

Determine each relation if it is a function.

1.



2.



3.

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

4.

$x$	0	1	1	3	9
$y$	3	-7	6	4	2

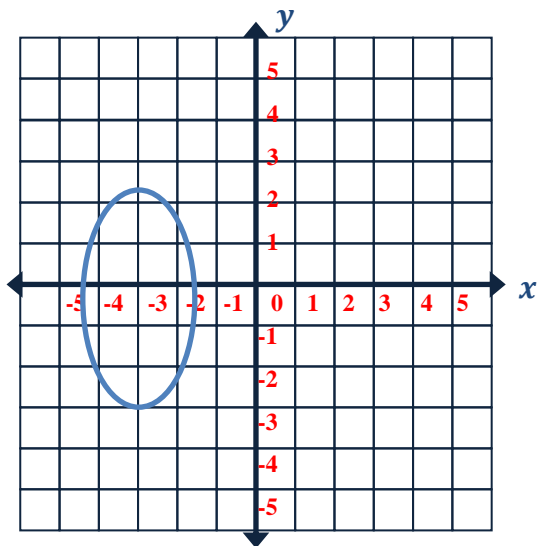
5.  $R = \{(-1, 3); (2, 4); (-1, -3); (-2, 4)\}$

6.  $R = \{(0, 3); (-3, 9); (3, 9); (1, 1)\}$

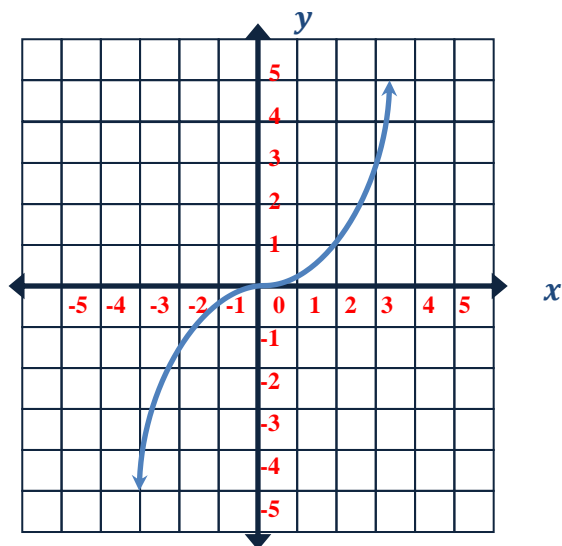
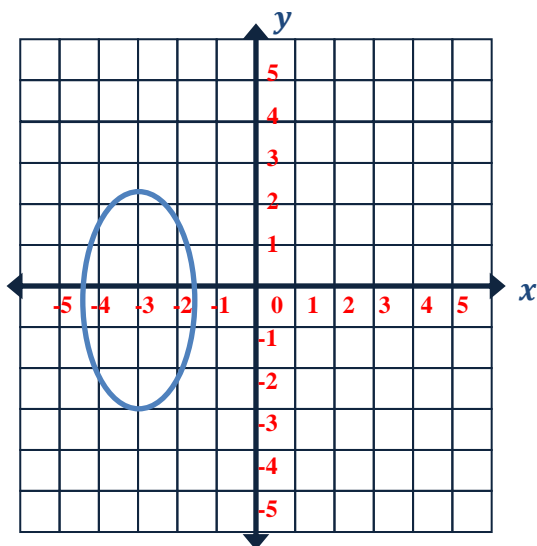
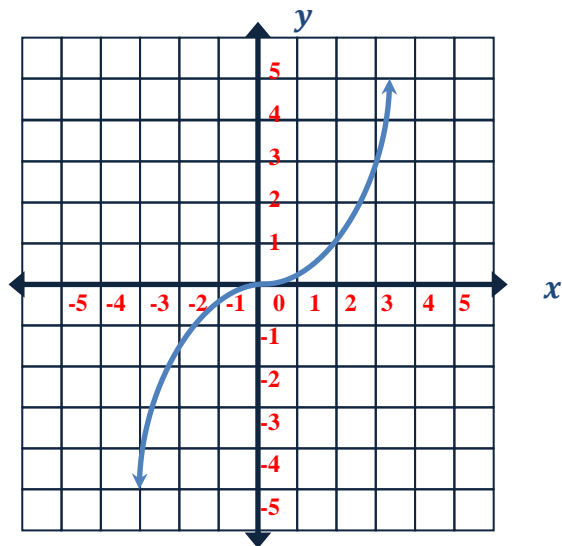
# Functions Assignment

Use the Vertical Line Test to determine which of the following graphs describes  $y$  as a function of  $x$ .

7.



8.



Evaluate each function.

9.  $f(x) = 2x^2 - x + 1$   
 $f(2) = ?$

10.  $f(x) = x^2 - 6$   
 $f(a + 1) = ?$

**Functions** Assignment

11.  $g(t) = -2t^3 - 10t + 3$   
 $g(-3) = ?$

12.  $h(y) = 3y - 4y^4$   
 $h(-1) = ?$

13.  $f(x) = \frac{x^2 - 2x + 1}{x + 6}$   
 $f(-2) = ?$

14.  $f(x) = \frac{2x + 1}{x + 6}$   
 $f(3a + 1) = ?$

15.  $f(x) = 12 - \sqrt{x^2 - 9}$   
 $f(-3) = ?$

16.  $g(t) = \sqrt{3t + 4t^2}$   
 $g(2m) = ?$

17.  $f(x) = 10 + 4x$   
 $f(x) = 12$

18.  $g(t) = 3t - 16$   
 $g(t) = 5$

State the domain of each function. Write in interval notation.

19.  $f(x) = 2x^2 - x + 1$

20.  $f(x) = \frac{2}{x - 5}$

**Functions** Assignment

21.  $g(t) = \frac{1}{t} + \frac{2}{t-2}$

22.  $h(x) = \sqrt{2x-4}$

23.  $f(x) = \frac{\sqrt{x-5}}{x-6}$

24.  $h(x) = \frac{3x^2}{\sqrt{3x-12}}$

Evaluate each function.

$$25. f(x) = \begin{cases} -x + 14, & \text{if } x < -4 \\ 2x^2, & \text{if } -4 < x < 0 \\ -x^3, & \text{if } x > 0 \end{cases}$$

$f(-5) = ?$   
 $f(5) = ?$

$$26. f(x) = \begin{cases} -10, & \text{if } x < -5 \\ \sqrt{x-2}, & \text{if } -5 < x < 10 \\ -\frac{x}{3} + 3, & \text{if } x > 10 \end{cases}$$

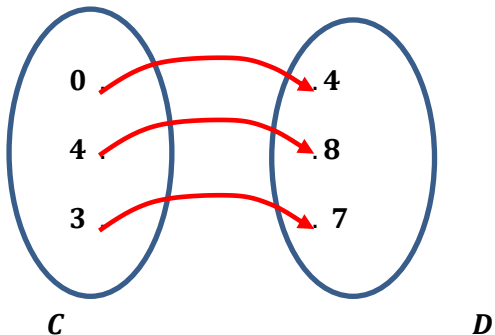
$f(6) = ?$   
 $f(12) = ?$

# Functions Assignment

## ANSWERS

Determine each relation if it is a function.

1.



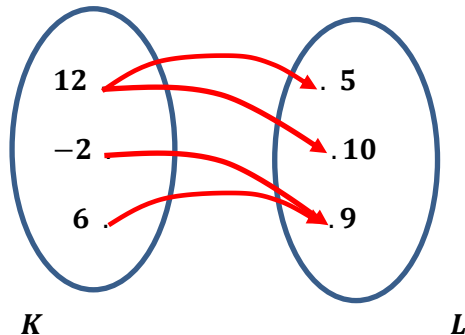
$$C = \{0, 4, 3\}$$

$$D = \{4, 8, 7\}$$

$$R_1 = \{(0, 3); (4, 8); (3, 7)\}$$

Each element of  $C$  HAS unique output in  $D$ .  
The relation is **A FUNCTION**.  
It is **A ONE TO ONE FUNCTION**.

2.



$$K = \{12, -2, 6\}$$

$$L = \{5, 10, 9\}$$

$$R_2 = \{(12, 5); (12, 10); (-2, 9); (6, 9)\}$$

Each element of  $K$  has **NOT** unique output in  $L$ .  
The relation is **NOT A FUNCTION**.

3.

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

Each input value HAS unique output.  
The relation is **A FUNCTION**.  
It is **A ONE TO ONE FUNCTION**.

4.

$x$	0	1	1	3	9
$y$	3	-7	6	4	2

The relation is **NOT A FUNCTION** because input 1 has two different outputs.

5.  $R = \{(-1, 3); (2, 4); (-1, -3); (-2, 4)\}$

The relation is **NOT A FUNCTION** because input -1 has two different outputs.

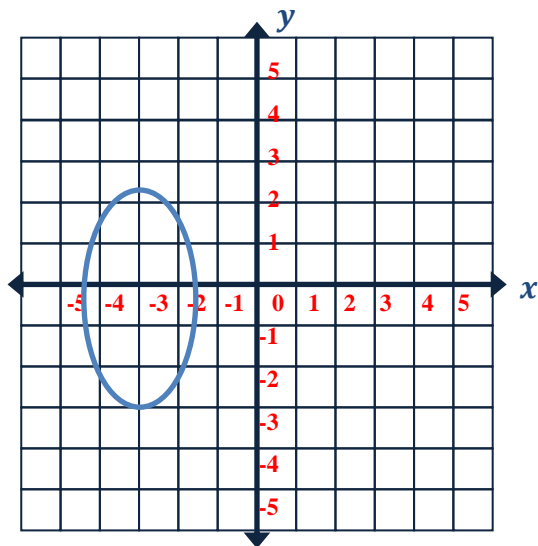
6.  $R = \{(0, 3); (-3, 9); (3, 9); (1, 1)\}$

Each input value HAS unique output.  
So the relation is **A FUNCTION**.

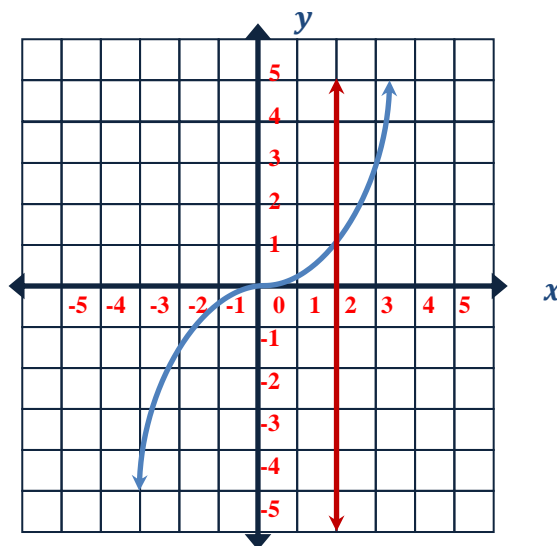
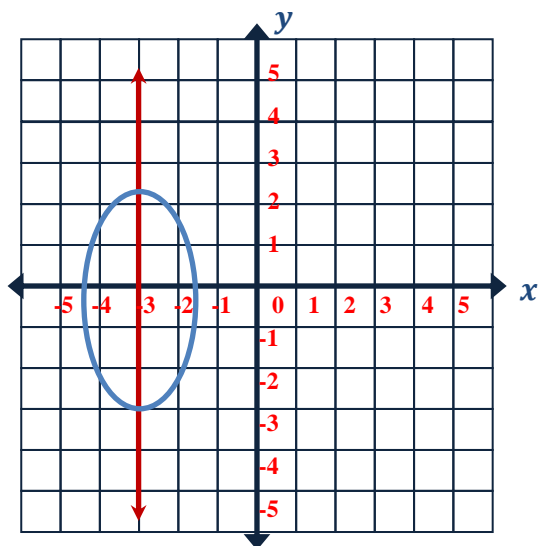
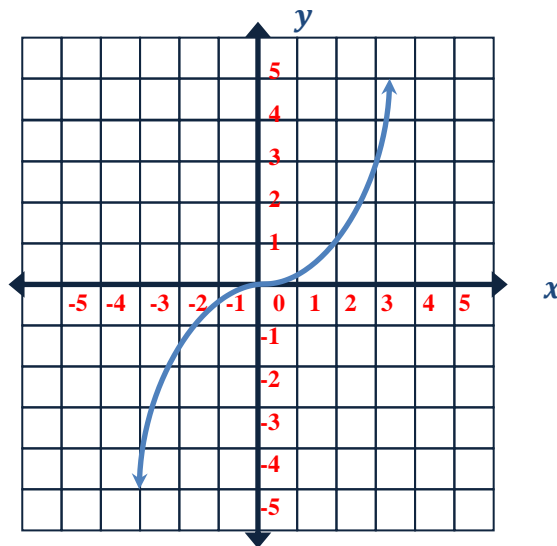
# Functions Assignment

Use the Vertical Line Test to determine which of the following graphs describes  $y$  as a function of  $x$ .

7.



8.



In the graph, vertical line  $x = -3$  crosses the graph more than once, so graph does not represent  $y$  as a function of  $x$ .

In the graph, every vertical line  $x = 2$  crosses the graph at most once, so graph does represent  $y$  as a function of  $x$ .

Evaluate each function.

9.  $f(x) = 2x^2 - x + 1$   
 $f(2) = ?$

$$f(2) = 2 * 2^2 - 2 + 1$$

$$f(2) = 2 * 4 - 2 + 1$$

$$f(2) = 8 - 2 + 1$$

$$f(2) = 6 + 1$$

$$f(2) = 7$$

10.  $f(x) = x^2 - 6$   
 $f(a + 1) = ?$

$$f(a + 1) = (a + 1)^2 - 6$$

$$f(a + 1) = (a^2 + 2a + 1) - 6$$

$$f(a + 1) = a^2 + 2a - 5$$

**Functions** Assignment

11.  $g(t) = -2t^3 - 10t + 3$   
 $g(-3) = ?$

$$g(-3) = -2 * (-3)^3 - 10 * (-3) + 3$$

$$g(-3) = -2 * (-27) - 10 * (-3) + 3$$

$$g(-3) = 54 + 30 + 3$$

$$g(-3) = 84 + 3$$

$$g(-3) = 87$$

12.  $h(y) = 3y - 4y^4$   
 $h(-1) = ?$

$$h(-1) = 3 * (-1) - 4 * (-1)^4$$

$$h(-1) = 3 * (-1) - 4 * 1$$

$$h(-1) = -3 - 4$$

$$h(-1) = -7$$

13.  $f(x) = \frac{x^2 - 2x + 1}{x + 6}$   
 $f(-2) = ?$

$$f(-2) = \frac{(-2)^2 - 2 * (-2) + 1}{-2 + 6}$$

$$f(-2) = \frac{4 - 2 * (-2) + 1}{-2 + 6}$$

$$f(-2) = \frac{4 + 4 + 1}{4}$$

$$f(-2) = \frac{9}{4}$$

14.  $f(x) = \frac{2x + 1}{x + 6}$   
 $f(3a + 1) = ?$

$$f(3a + 1) = \frac{2(3a + 1) + 1}{3a + 1 + 6}$$

$$f(3a + 1) = \frac{6a + 2 + 1}{3a + 1 + 6}$$

$$f(3a + 1) = \frac{6a + 3}{3a + 7}$$

15.  $f(x) = 12 - \sqrt{x^2 - 9}$   
 $f(-3) = ?$

$$f(-3) = 12 - \sqrt{(-3)^2 - 9}$$

$$f(-3) = 12 - \sqrt{9 - 9}$$

$$f(-3) = 12 - 0$$

$$f(-3) = 12$$

16.  $g(t) = \sqrt{3t + 4t^2}$   
 $g(2m) = ?$

$$g(t) = \sqrt{3 * 2m + 4(2m)^2}$$

$$g(t) = \sqrt{6m + 4 * 4m^2}$$

$$g(t) = \sqrt{6m + 16m^2}$$

17.  $f(x) = 10 + 4x$   
 $f(x) = 12$

$$12 = 10 + 4x$$

$$12 - 10 = 10 - 10 + 4x$$

$$2 = 4x$$

$$x = \frac{2}{4} = \frac{1}{2}$$

18.  $g(t) = 3t - 16$   
 $g(t) = 5$

$$5 = 3t - 16$$

$$5 + 16 = 3t - 16 + 16$$

$$21 = 3t$$

$$21 = 3t$$

$$t = 7$$

State the domain of each function. Write in interval notation.

19.  $f(x) = 2x^2 - x + 1$

$$\text{Domain} = (-\infty, \infty)$$

20.  $f(x) = \frac{2}{x - 5}$

$$x - 5 \neq 0$$

$$x \neq 5$$

$$\text{Domain} = (-\infty, 5) \cup (5, \infty)$$

**Functions** Assignment

21.  $g(t) = \frac{1}{t} + \frac{2}{t-2}$

$t \neq 0$

$t - 2 \neq 0$

$t \neq 2$

**Domain** =  $(-\infty, 0) \cup (0, 2) \cup (2, \infty)$

22.  $h(x) = \sqrt{2x-4}$

$2x - 4 \geq 0$

$2x \geq 4$

$x \geq 2$

**Domain** =  $[2, \infty)$

23.  $f(x) = \frac{\sqrt{x-5}}{x-6}$

$x - 5 \geq 0$

$x \geq 5$

$x - 6 \neq 0$

$x \neq 6$

**Domain** =  $[5, 6) \cup (6, \infty)$

24.  $h(x) = \frac{3x^2}{\sqrt{3x-12}}$

$3x - 12 > 0$

$3x > 12$

$x > 4$

**Domain** =  $(4, \infty)$

Evaluate each function.

25.  $f(x) = \begin{cases} -x + 14, & \text{if } x < -4 \\ 2x^2, & \text{if } -4 < x < 0 \\ -x^3, & \text{if } x > 0 \end{cases}$

$f(-5) = ?$

$f(5) = ?$

To find  $f(-5)$  use  $f(x) = -x + 14$ 

$f(-5) = -(-5) + 14$

$f(-5) = 5 + 14$

**$f(-5) = 19$**

To find  $f(5)$  use  $f(x) = -x^3$ 

$f(5) = -5^3$

**$f(5) = -125$**

26.  $f(x) = \begin{cases} -10, & \text{if } x < -5 \\ \sqrt{x-2}, & \text{if } -5 < x < 10 \\ -\frac{x}{3} + 3, & \text{if } x > 10 \end{cases}$

$f(6) = ?$

$f(12) = ?$

To find  $f(6)$  use  $f(x) = \sqrt{x-2}$ 

$f(6) = \sqrt{6-2}$

$f(6) = \sqrt{4}$

**$f(6) = \pm 2$**

To find  $f(12)$  use  $f(x) = -\frac{x}{3} + 3$ 

$f(12) = -\frac{12}{3} + 3$

$f(12) = -4 + 3$

**$f(12) = -1$**