Understanding Functions

Question 1 .

What is a set of ordered pairs called?

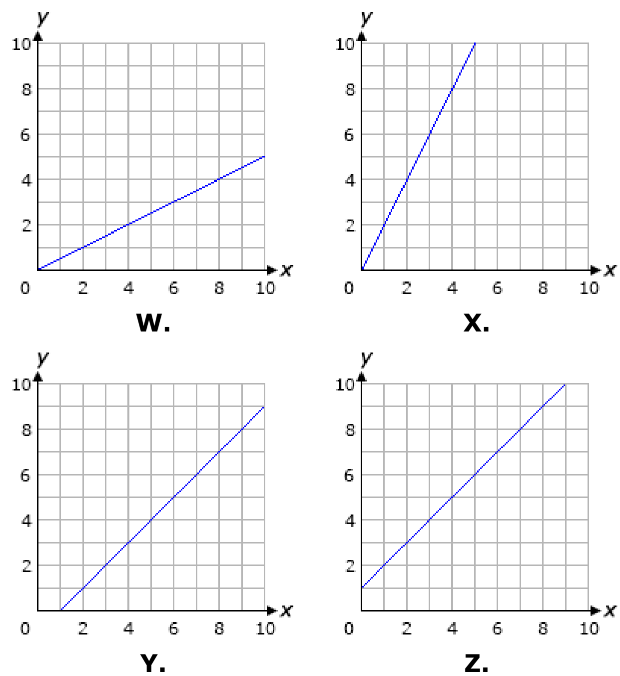
- **A.** an input
- **B.** a function
- **C.** a relation
- **D.** an output

Question 2 .

Consider the table shown below.

Input	0	1	2	3
Output	0	2	4	6

Which of the following graphs correctly shows the above function?



- **A.** W
- **B.** X
- **C.** Z
- **D.** Y

Question 3 .

Malcolm is taking a speed-reading course. He records the number of words per minute that he can read correctly *x* weeks after he starts taking the course.

The following set of ordered pairs represents the recorded details, where the *x*-coordinate is the number of weeks and the *y*-coordinate is the number of words per minute.

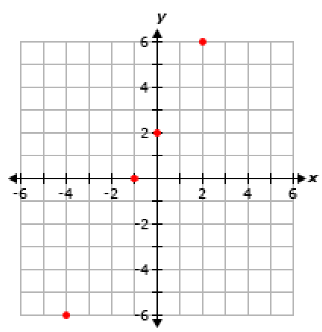
$$\{(1,132),\ (2,132),\ (3,154),\ (4,187),\ (5,221)\}$$

Which of the following describes the set of ordered pairs?

- **A.** both a relation and a function
- **B.** a function only
- **C.** neither a function nor a relation
- **D.** a relation only

Question 4 .

Which of the following describes the following graph?



- **A.** neither a function nor a relation
- **B.** function only
- **C.** both a function and a relation
- **D.** relation only

Question 5 .

Which statement best describes the relationship shown in the equation?

$$x^2 + y^2 = 10$$

- **A.** This is not a functional relationship.
- **B.** This is a functional relationship.
- **C.** It cannot be determined if this is or is not a functional relationship.

Question 6 .

Directions: Select all the correct locations on the graph.

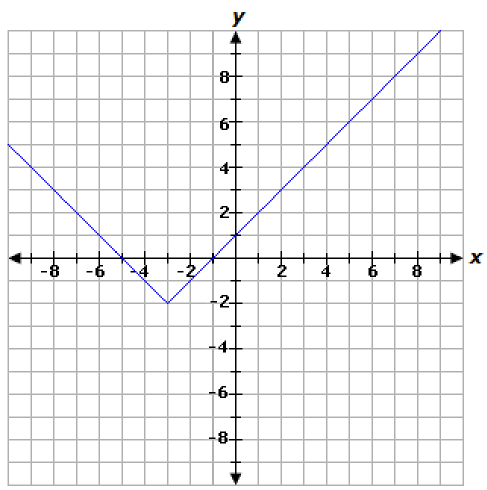
A function is shown on the graph.

Select all of the possible points that can be included to keep the graph a function.

Question 7 .

Directions: Drag each tile to the correct box.

Consider the function graphed below.



Using the given function, order the following tiles based on the output value from least to greatest for each of the corresponding input values.

input = 5
output = ?

input = -3
output = ?

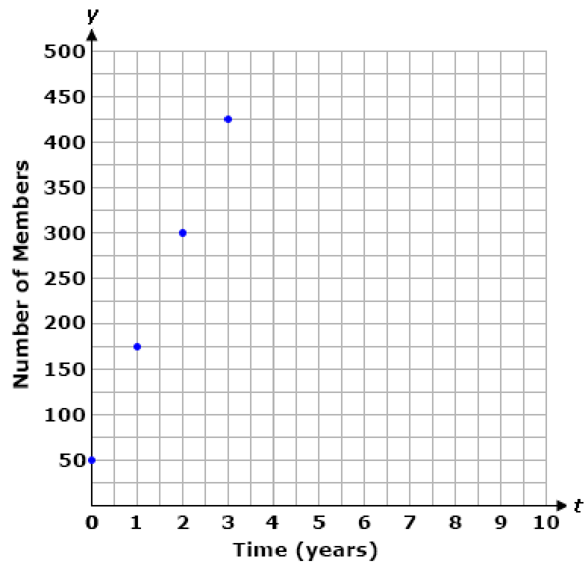
input = -5
output = ?

input = -8
output = ?

___ , ___ , ___ , ___

Question 8 .

A library opened in 1998. The graph below shows the number of members, y, in any given year, where t represents the number of years since 1998.

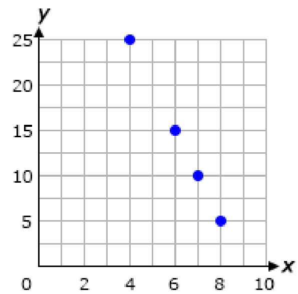


Which of the following describes the graph?

- **A.** both a relation and a function
- **B.** neither a function nor a relation
- **C.** a function only
- **D.** a relation only

Question 9 .

Which table of values matches the following graph?



A.

Input	25	15	10	5
Output	4	6	7	8

B.

Input	4	6	7	8
Output	25	15	10	5

C.

Input	25	15	10	5
Output	4	5	7	8

D.

Input	4	6	7	8
Output	25	15	12	5

Question 10 .

Which statement best describes the relationship shown in the equation?

$$y = x^2$$

A. This is a functional relationship.

B. It cannot be determined if this is or is not a functional relationship.

C. This is not a functional relationship.

Answers

1. C
2. B
3. A
4. C
5. A
6. --
7. --
8. A
9. B
10. A

Explanations

1. A set of ordered pairs is called **a relation**.

2. The input and output values can be used to create ordered pairs for the graph of the function.

Input	Output	Ordered Pair
0	0	(0,0)
1	2	(1,2)
2	4	(2,4)
3	6	(3,6)

The correct graph will pass through the points (0,0), (1,2), (2,4), and (3,6).

The only graph that passes through these ordered pairs is **X**.

3. A relation is a set of one or more ordered pairs.

A function is a relation in which each input has exactly one output. A set of ordered pairs represents a function if, for every value of x, there is only one value of y.

In the given situation, the x-coordinate is the number of weeks since he starts taking the course and the y-coordinate is the number of words per minute.

It can be seen from the given set that each x-value corresponds with exactly one y-value.

Therefore, the set of ordered pairs is best described as **both a relation and a function**.

4. A relation is a set of one or more ordered pairs.

A function is a relation in which each input has exactly one output. In other words, for each x-value of a function, there is only one corresponding y-value.

In the given graph, each x-value corresponds with exactly one y-value.

Therefore, the graph is best described as **both a function and a relation**.

5. An equation is a functional relationship if each input value has exactly one output value.

In other words, for each x-value, there is only one corresponding y-value.

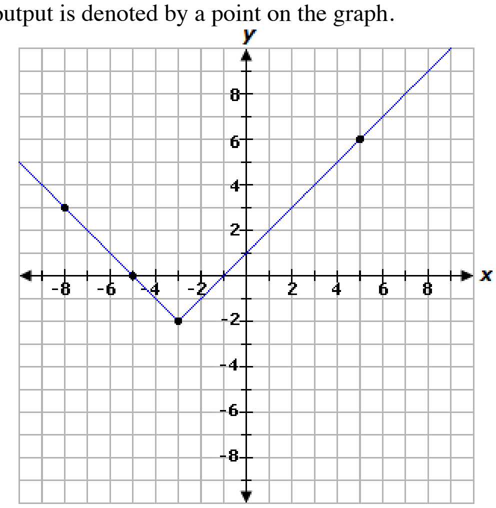
For the equation $x^2 + y^2 = 10$, find the y-value for different x-values.

x	y
-3	$\pm$ 1
-1	$\pm$ 3
1	$\pm$ 3
3	$\pm$ 1

Since there are two corresponding y-values for a given x-value, **this is not a functional relationship.**

6. In a function, each input has a single output.
Point P has coordinates (-9,3). There are no other outputs for the input of -9, so point P can be included in the function.
Point Q has coordinates (-6,-4). There is already an output for the input of -6, so point Q can not be included in the function.
Point R has coordinates (-3,-7). There is already an output for the input of -3, so point R can not be included in the function.
Point S has coordinates (1,6). There is already an output for the input of 1, so point S can not be included in the function.
Point T has coordinates (5,-5). There is already an output for the input of 5, so point T can not be included in the function.
Point U has coordinates (7,6). There are no other outputs for the input of 7, so point U can be included in the function.
The points that can be included in the function and keep it a function are point **P** and point **U**.

7. In the function given below, each input and output is denoted by a point on the graph.



Recall that the input represents the *x*-coordinate, and the output represents the *y*-coordinate. Record all of the outputs for each input as follows.

input = -8 output = 3
input = -5 output = 0
input = -3 output = -2
input = 5 output = 6

Ordering by the output value from least to greatest gives the following sequence.

input = -3 output = ? , input = -5 output = ? , input = -8 output = ? , input = 5 output = ?

8. A relation is a set of one or more ordered pairs.

A function is a relation in which each input has exactly one output. In other words, for each *x*-value of a function, there is only one corresponding *y*-value.

In the given situation, *t* represents the number of years since 1998 and *y* represents the number of members in the library.

It can be seen from the graph that each *x*-value corresponds with exactly one *y*-value.

Therefore, the graph is best described as **both a relation and a function**.

9. To find the table of values that matches the given graph, determine the coordinate pairs of the points marked on the graph.

In this case, the points that are marked on the graph are (4,25), (6,15), (7,10), and (8,5).

The first coordinate in each pair represents the input, and the second coordinate represents the output.

Therefore, the following table matches the given graph.

Input	4	6	7	8
Output	25	15	10	5

10. An equation is a functional relationship if each input value has exactly one output value.

In other words, for each *x*-value, there is only one corresponding *y*-value.

For the equation $y = x^2$, find the *y*-value for different *x*-values.

x	y
-1	1
0	0
1	1
2	4
3	9

Since there is exactly one corresponding *y*-value for each *x*-value, **this is a functional relationship.**