What is a Function?

Given a Table

Given a Graph

What is a Relation?

Given Ordered Pairs

Given a Mapping

What is a Relation?

A relation _____

_____

The set of x-values is called the _____.

The set of y-values is called the _____.

What is a Function?

A function _____

_____

1) If x values _____, then the relation is not a function.

2) If a vertical line intersects a graph _____, then it is not a function.

Given Ordered Pairs

Is the relation a function? If so, state the domain and range.

ex. $\{(1,6),(3,2),(5,7),(6,3),(8,4)\}$

ex. $\{(2,4),(3,6),(3,1),(5,7),(7,8)\}$

Given a Table

Is the relation a function? If so state the domain and range.

ex.

x	y
1	3
2	1
4	6
2	4
7	8

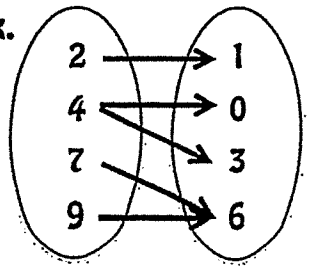
ex.

x	y
1	4
3	1
5	8
7	2
9	6

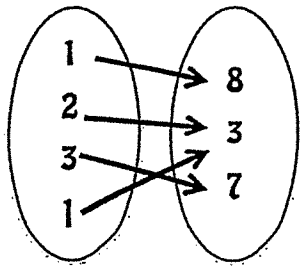
Given a Mapping

Is the relation a function? If so, state the domain and range.

ex.



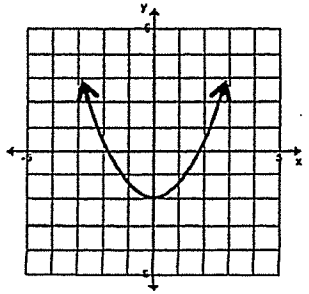
ex.



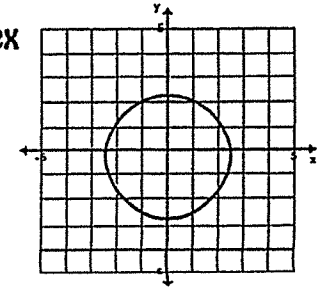
Given a Graph

Is the relation a function? If so, state the domain and range.

ex.



ex



RELATIONS AND FUNCTIONS

A FUNCTION IS A _____

THAT PAIRS EACH _____ WITH _____

OUTPUT.

YES!

Input	Output
−9	0
−2	5
5	10
12	

NO!

Input	Output
−2	3
−1	4
0	5
1	6
2	7

Words

output- input-

is- of-

less than- twice-

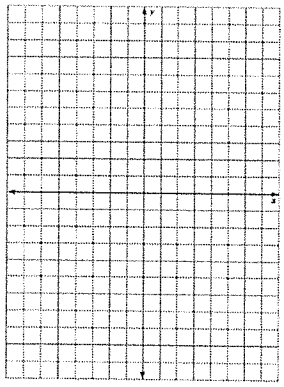
more than- squared-

Equation

Input-Output Table

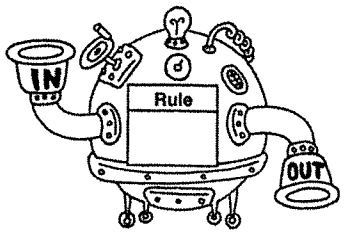
Input, x	Output, y
−1	
0	
1	
2	

Graph



Mapping Diagram

Input Output



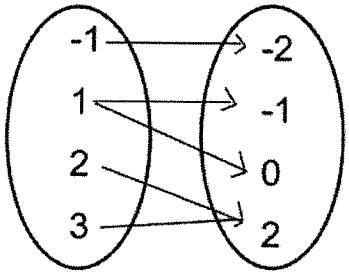
Name: Period:

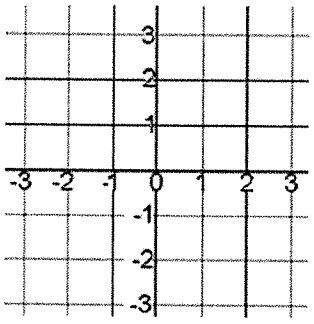
First Score:	First attempt due:	Final Score:
	Final corrections due:	

Practice: Relations & Functions

Use the given form of each relation to complete the other forms. Then determine if the relation is a function.

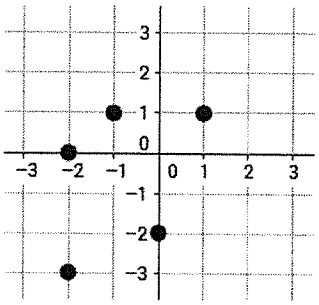
1] Rewrite the relation given in the mapping diagram as a scatterplot.

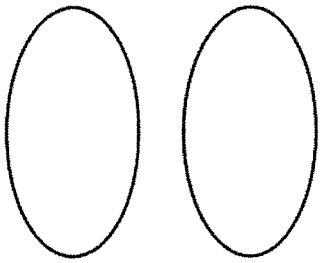




Is the relation also a function?

2] Rewrite the relation given in the scatter plot as a mapping diagram.

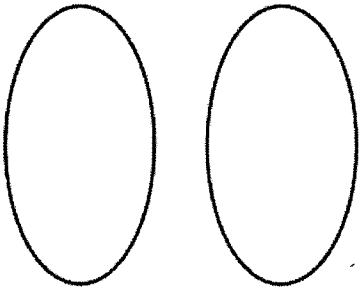




Is the relation also a function?

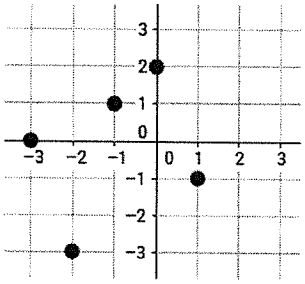
3] Rewrite the relation given in the table as a mapping diagram.

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



Is the relation also a function?

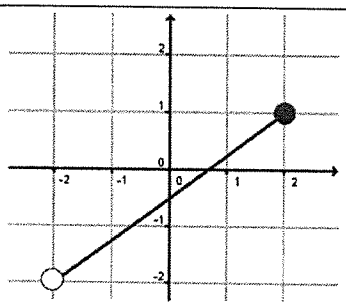
4] Rewrite the relation given in the scatter plot as a **set** of ordered pairs (NOT a table).



Is the relation also a function?

Identify the domain and range, then determine if each graph shows a function or a relation only.

5]

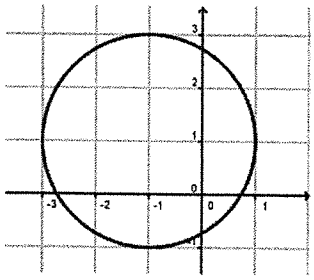


Domain:

Range:

Function?

6]

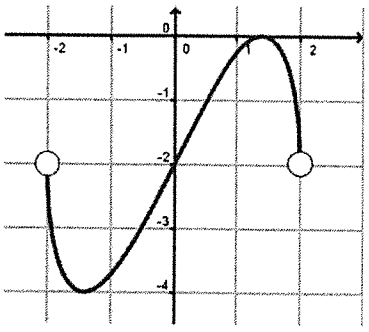


Domain:

Range:

Function?

7]



Domain:

Range:

Function?

Identify the domain and range, then evaluate each function for the given value of x.

8] $f = \{(10,7), (-2,4), (5,3), (4,10)\}$

Domain:

Range:

$f(10) =$

9]

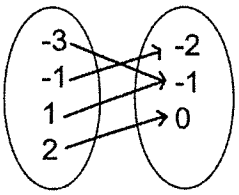
x	y
-3	3
-1	1
0	0
1	1

Domain:

Range:

$f(-1) =$

10]

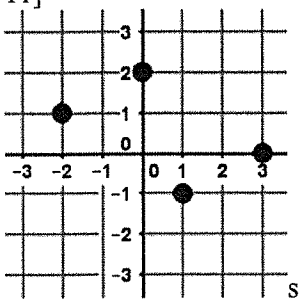


Domain:

Range:

$f(-3) =$

11]

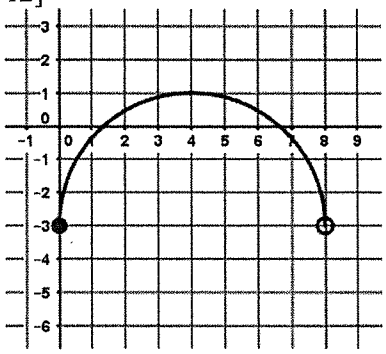


Domain:

Range:

$f(3) =$

12]

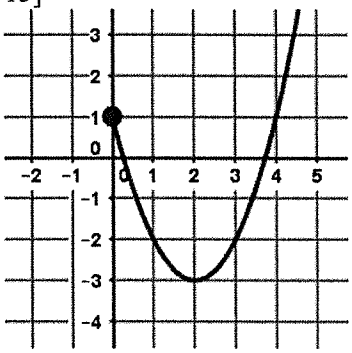


Domain:

Range:

$f(0) =$

13]

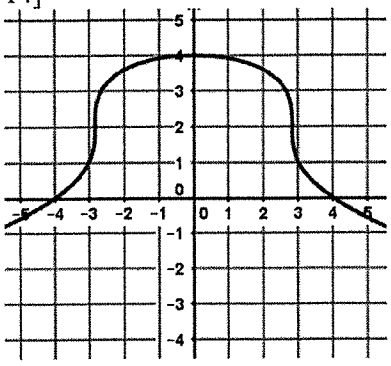


Domain:

Range:

$f(4) =$

14]

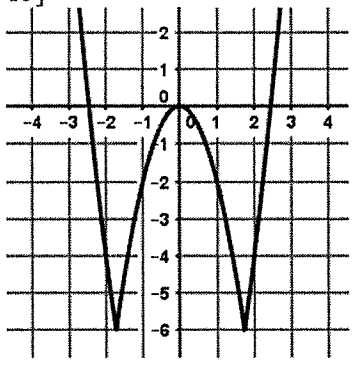


Domain:

Range:

$f(-3) =$

15]

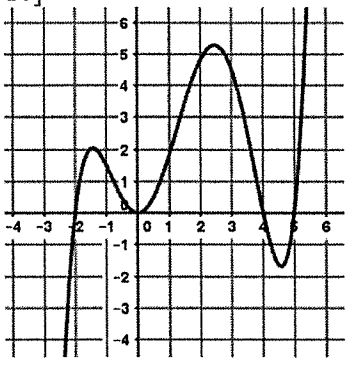


Domain:

Range:

$f(2) =$

16]



Domain:

Range:

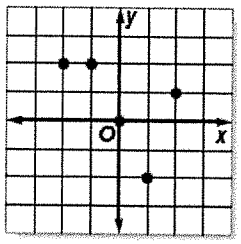
$f(-2) =$

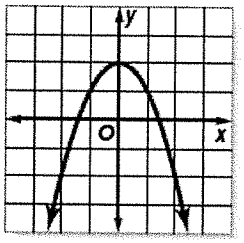
NAME _____ DATE _____

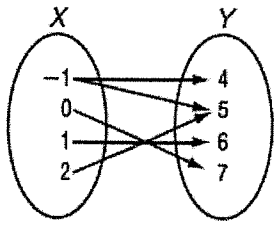
UNIT 3 FUNCTIONS

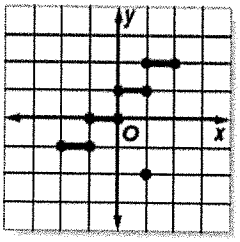
HOMEWORK #1

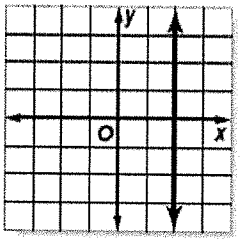
I. Determine whether each of the following relations is a function. Write YES or NO.

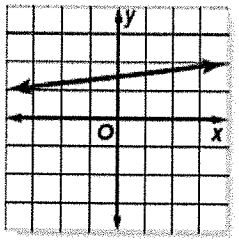
1. 

2. 

3. 

4. 

5. 

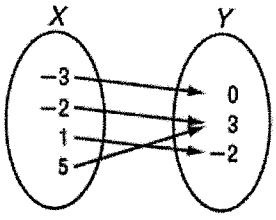
6. 

7. $\{(4, 2), (2, 3), (6, 1)\}$

8. $\{(-3, -3), (-3, 4), (-2, 4)\}$

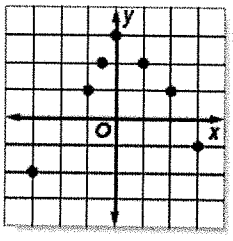
9. $\{(-1, 0), (1, 0)\}$

II. Determine whether each of the following relations is a function. Write YES or NO.

1. 

2.

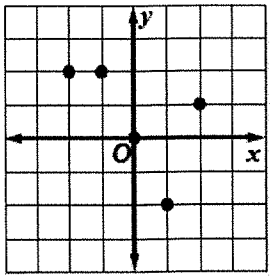
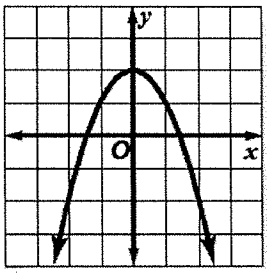
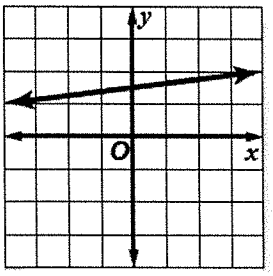
x	y
1	−5
−4	3
7	6
1	−2

3. 

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

5. $\{(6, -4), (2, -4), (-4, 2), (4, 6), (2, 6)\}$

III. Determine whether each of the following functions is discrete or continuous.

1)	2)	3)
		

IV. Sketch the following examples.

1. A continuous function

2. A discrete function

3. A continuous relation
4.

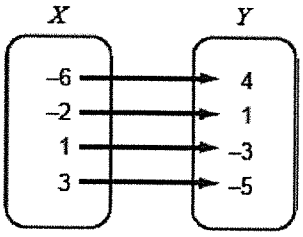
NAME _____ DATE _____

1-7 FUNCTIONS

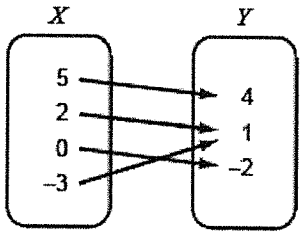
HOMEWORK #2

I. Determine whether each of the following relations is a function. Write YES or NO.

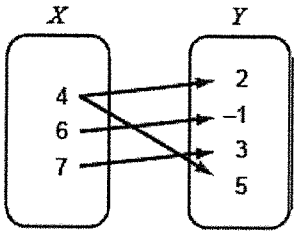
1.



2.



3.



4.

x	y
4	−5
−1	−10
0	−9
1	−7
9	1

5.

x	y
2	7
5	−3
3	5
−4	−2
5	2

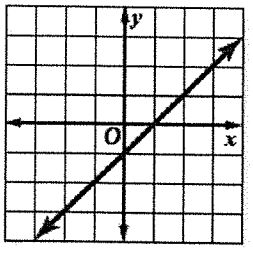
6.

x	y
3	7
−1	1
1	0
3	5
7	3

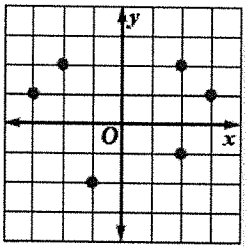
7. $\{(2, 5), (4, -2), (3, 3), (5, 4), (-2, 5)\}$

8. $\{(6, -1), (-4, 2), (5, 2), (4, 6), (6, 5)\}$

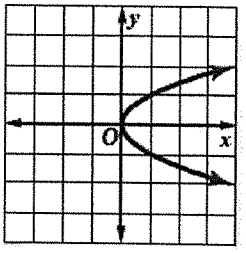
9.



10.



11.



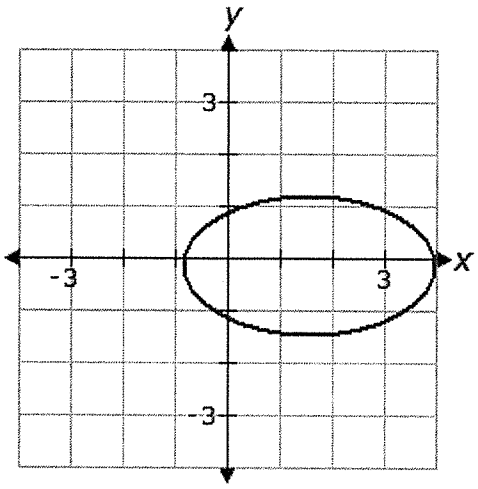
II. Given the functions below, evaluate each of the following. Show all work!!

$f(x) = 3x + 2$ $g(x) = x^2 - x$ $h(x) = 4x - 1$

1) f(4)	2) g(5)	3) h(-3)
4) g(k)	5) h(m)	6) g(-2)
7) f(3c)	8) h(7) + 6	
9) g(7) - 18	10) f(w - 2)	

RELATIONS & FUNCTIONS Worksheet

1.

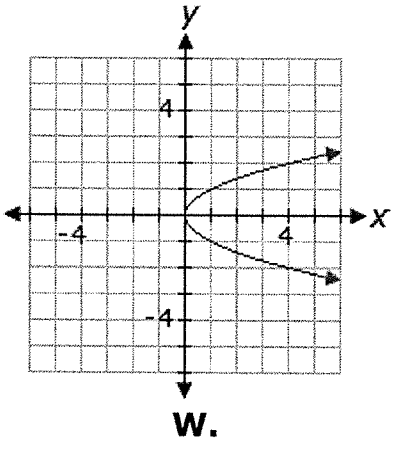


Using the vertical line test, determine if the graph above shows a relation, a function, both a relation and a function, or neither a relation nor a function.

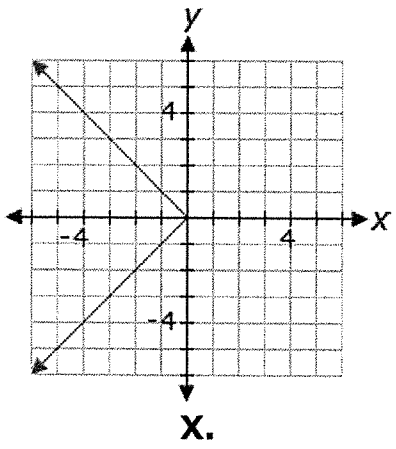
- ○ **A.** neither a relation nor a function
- ○ **B.** relation only
- ○ **C.** both a relation and a function
- ○ **D.** function only

---

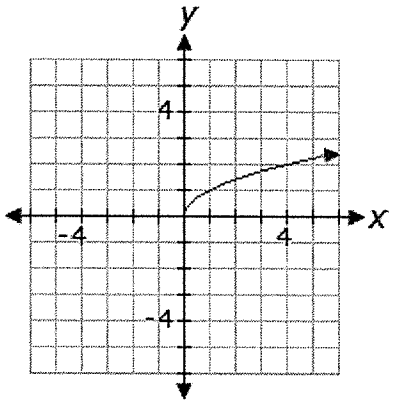
2. Which of these graphs represents a function?



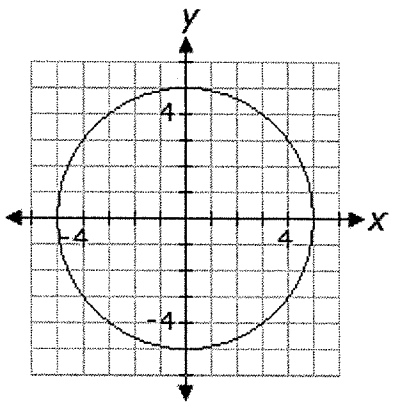
W.



X.



Y.



Z.

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

---

3. Which of these t-tables represents a function?

x	*f(x)*
5	-1
3	0
5	1
7	2

W.

x	*f(x)*
2	-2
0	0
2	2
8	4

X.

x	*f(x)*
-2	0
0	2
2	0
1	1.7

Y.

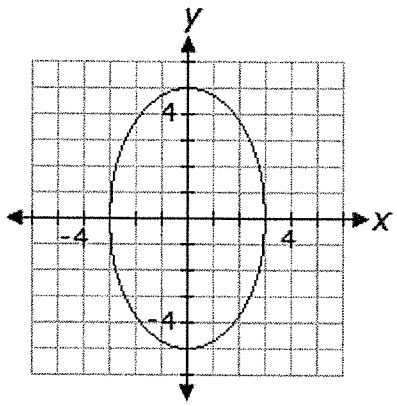
x	*f(x)*
-2	0
0	2
2	0
0	-2

Z.

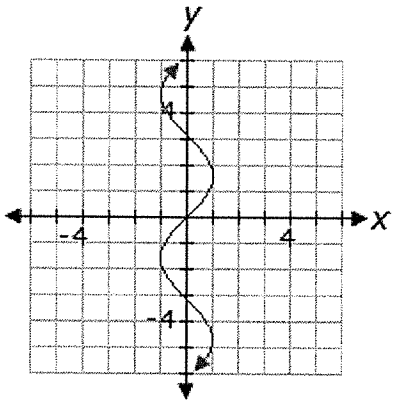
- **A.** W
- **B.** Y
- **C.** Z
- **D.** X

---

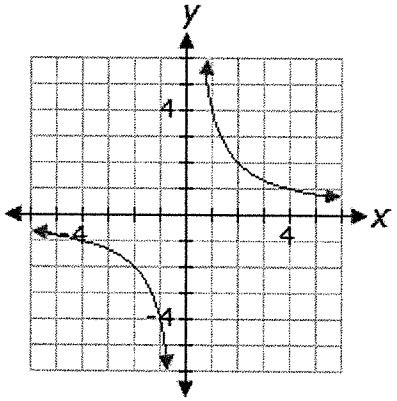
4. Which of these graphs represents a function?



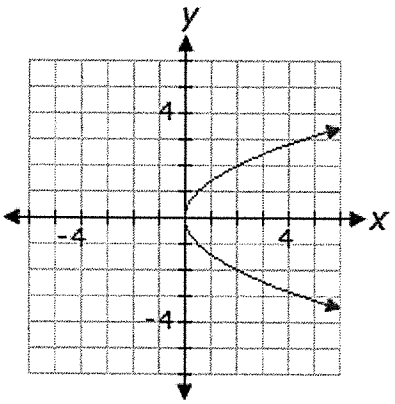
W.



X.



Y.



Z.

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

---

5. Which of the following relations describes a function?

○ **A.** { (0, 0), (0, 2), (2, 0), (2, 2) }

○ **B.** { (2, 2), (2, 3), (3, 2), (3, 3) }

○ **C.** { (2, -1), (2, 1), (3, -1), (3, 1) }

○ **D.** { (-2, -3), (-3, -2), (2, 3), (3, 2) }

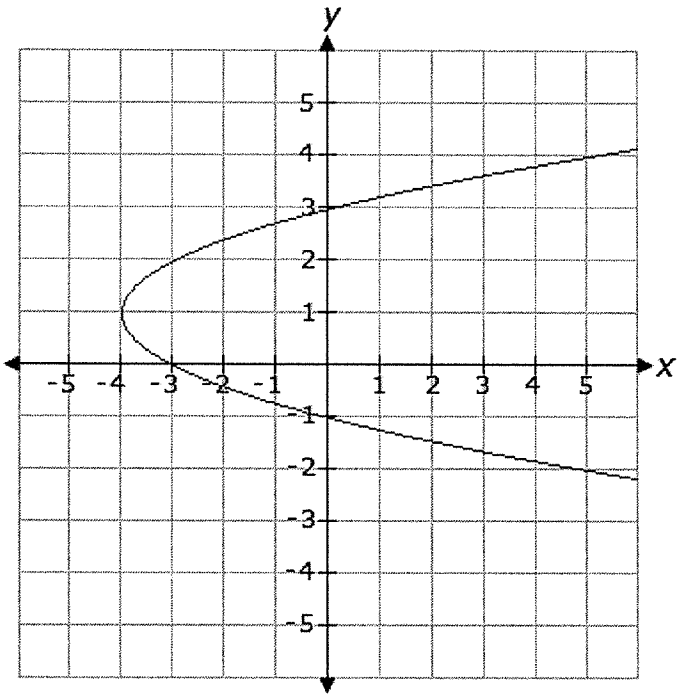
---

6. Do the ordered pairs below represent a relation, a function, both a relation and a function, or neither a relation nor a function?

$$(-2,-1)\ ,\ (1,-4)\ ,\ (7,-10)\ ,\ (8,-11)$$

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

7.

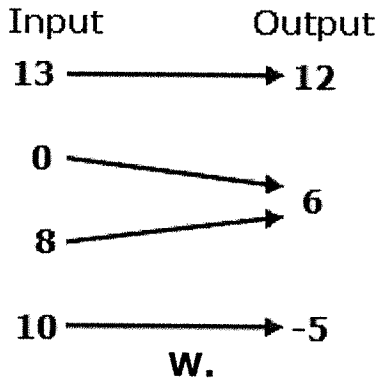


Determine whether this picture is an example of a function, relation, function and relation, or neither relation nor function.

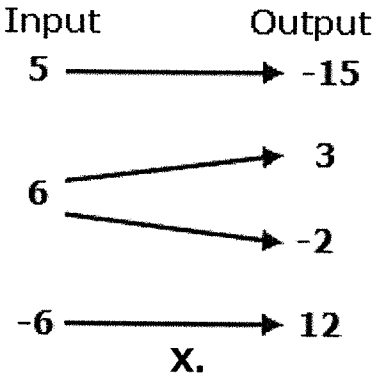
- ○ **A.** function and relation
- ○ **B.** function only
- ○ **C.** relation only
- ○ **D.** neither function nor relation

---

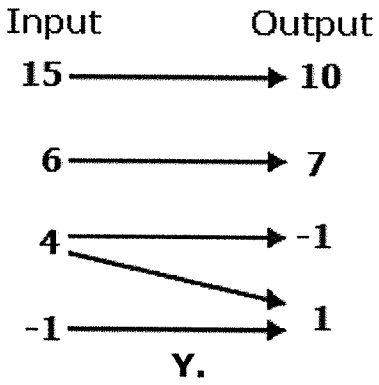
8. Which relation diagram represents a function?



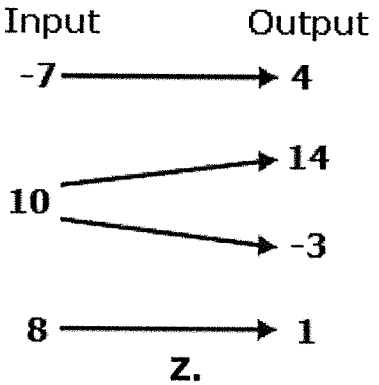
W.



X.



Y.



Z.

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

---

9. Which of the following relations describes a function?

○ **A.** { (2, 2), (3, 2), (4, 2), (5, 2) }

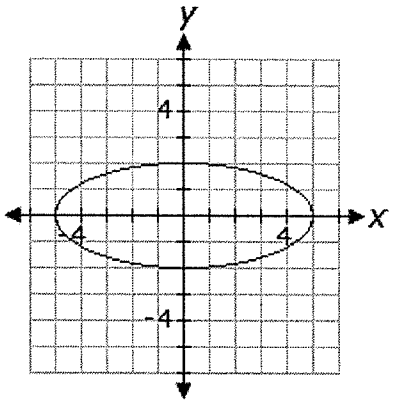
○ **B.** { (-2, 0), (0, -2), (0, 2), (2, 0) }

○ **C.** { (0, 0), (2, -2), (2, 2), (3, 3) }

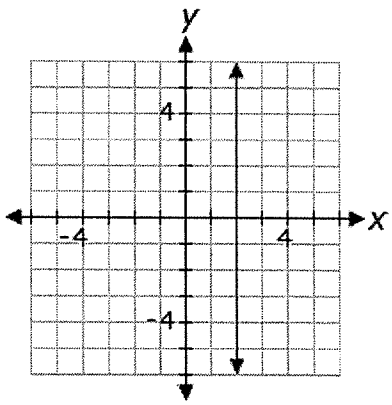
○ **D.** { (2, 3), (2, 4), (2, 5), (2, 6) }

---

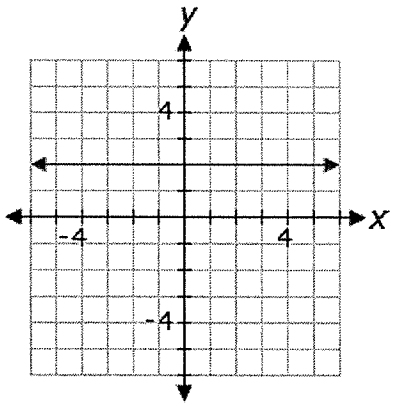
10. Which of these graphs represents a function?



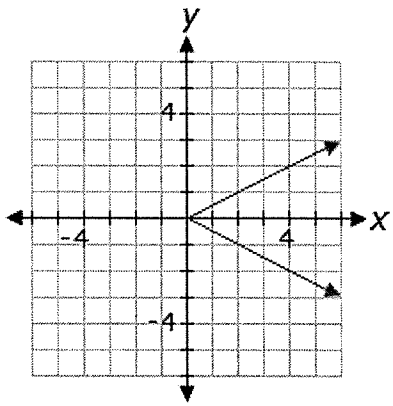
W.



X.



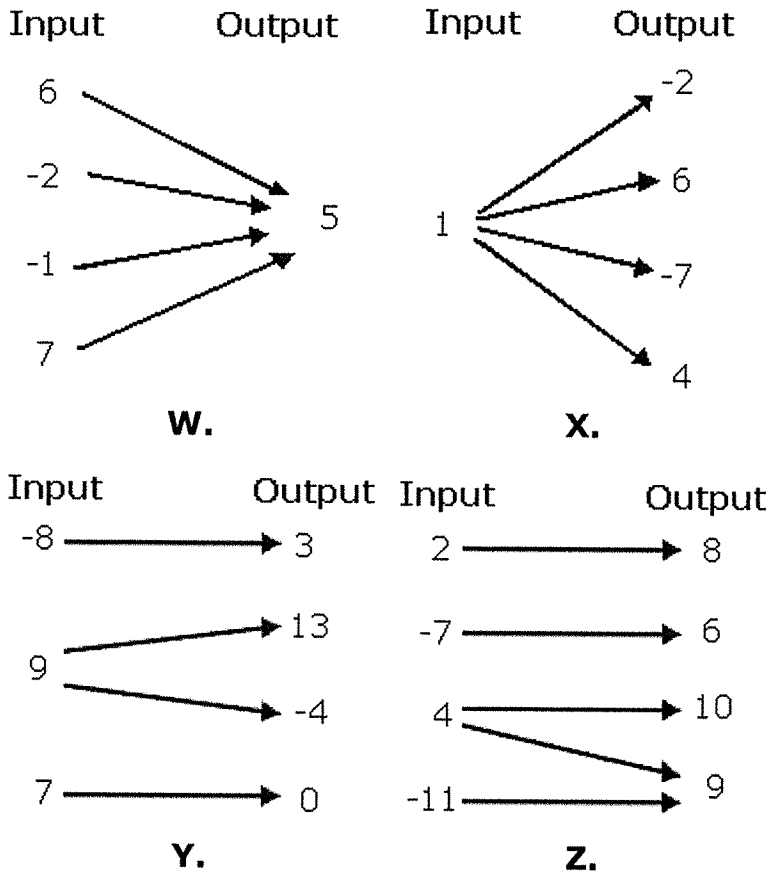
Y.



Z.

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

11. Which relation diagram represents a function?



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

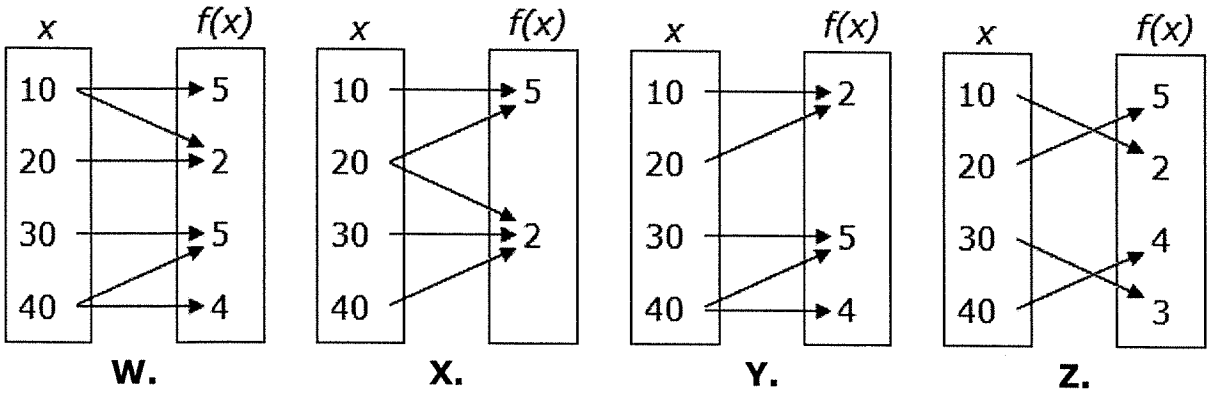
---

12. Which of the following relations describes a function?

- ○ **A.** { (0, 0), (1, -1), (1, 1), (2, 2) }
- ○ **B.** { (-2, 2), (-1, -1), (-1, 1), (0, 0) }
- ○ **C.** { (-1, 0), (0, 1), (1, 0), (0, -1) }
- ○ **D.** { (-2, 2), (-1, 1), (1, 1), (2, 2) }

---

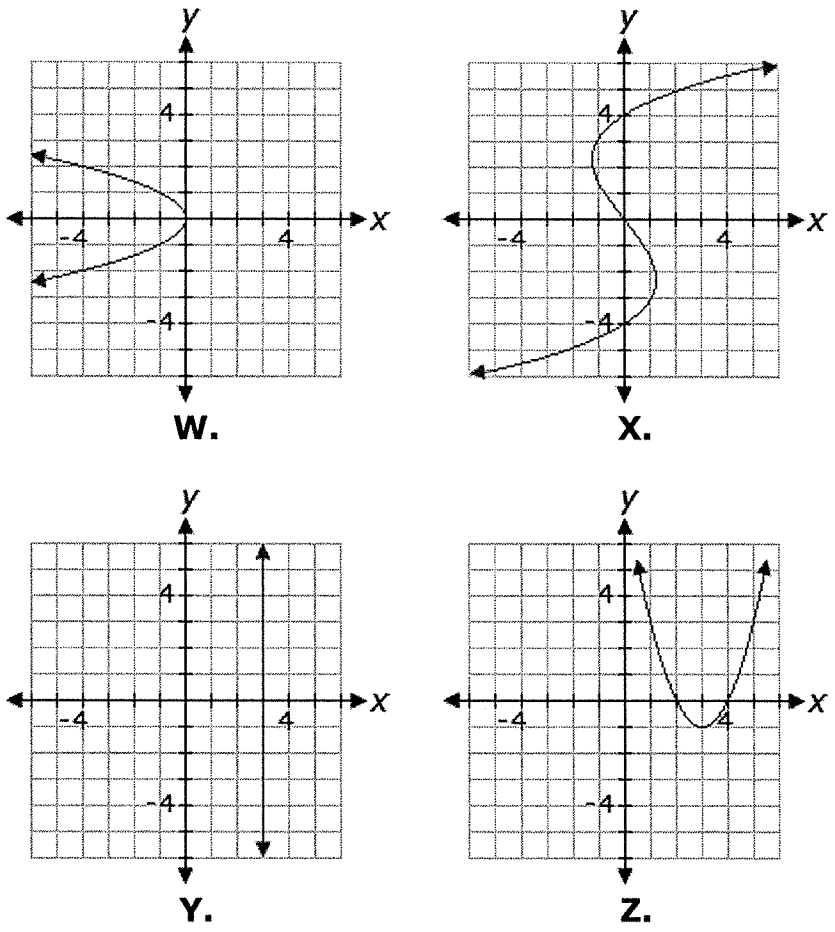
13. Which of these mappings is a function?



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

---

14. Which of these graphs represents a function?

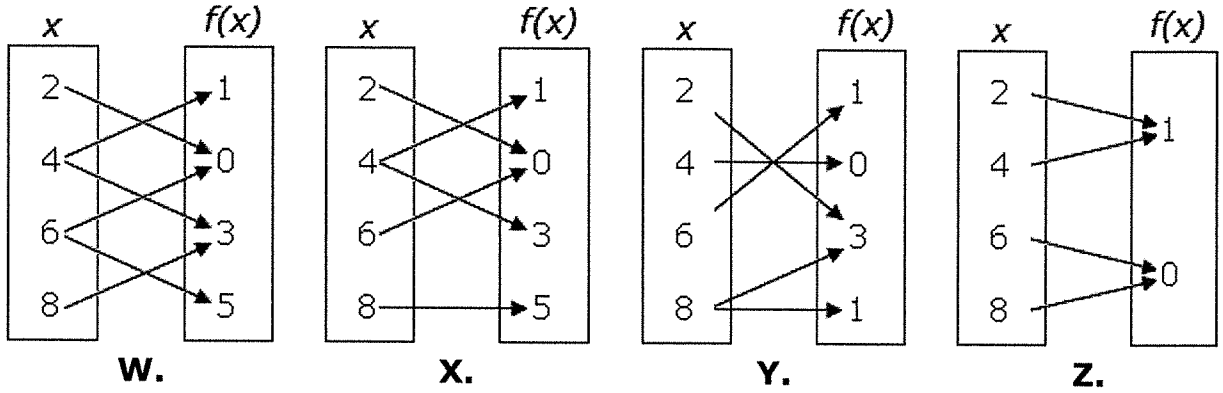


○ **A.** X

○ **B.** W
○ **C.** Y
○ **D.** Z

---

15. Which of these mappings is a function?



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

---

16. Which of the following represents a relation and not a function?

○ **A.**

x	$-\frac{1}{10}$	-6	$-\frac{1}{10}$	1
y	34	32	40	34

○ **B.**

x	$-\frac{1}{10}$	-6	-2	1
y	34	32	40	34

○ **C.**

x	$-\frac{1}{10}$	-6	6	12
y	34	32	40	34

○ **D.**

x	6	-6	12	$-\frac{1}{10}$
y	34	32	40	34

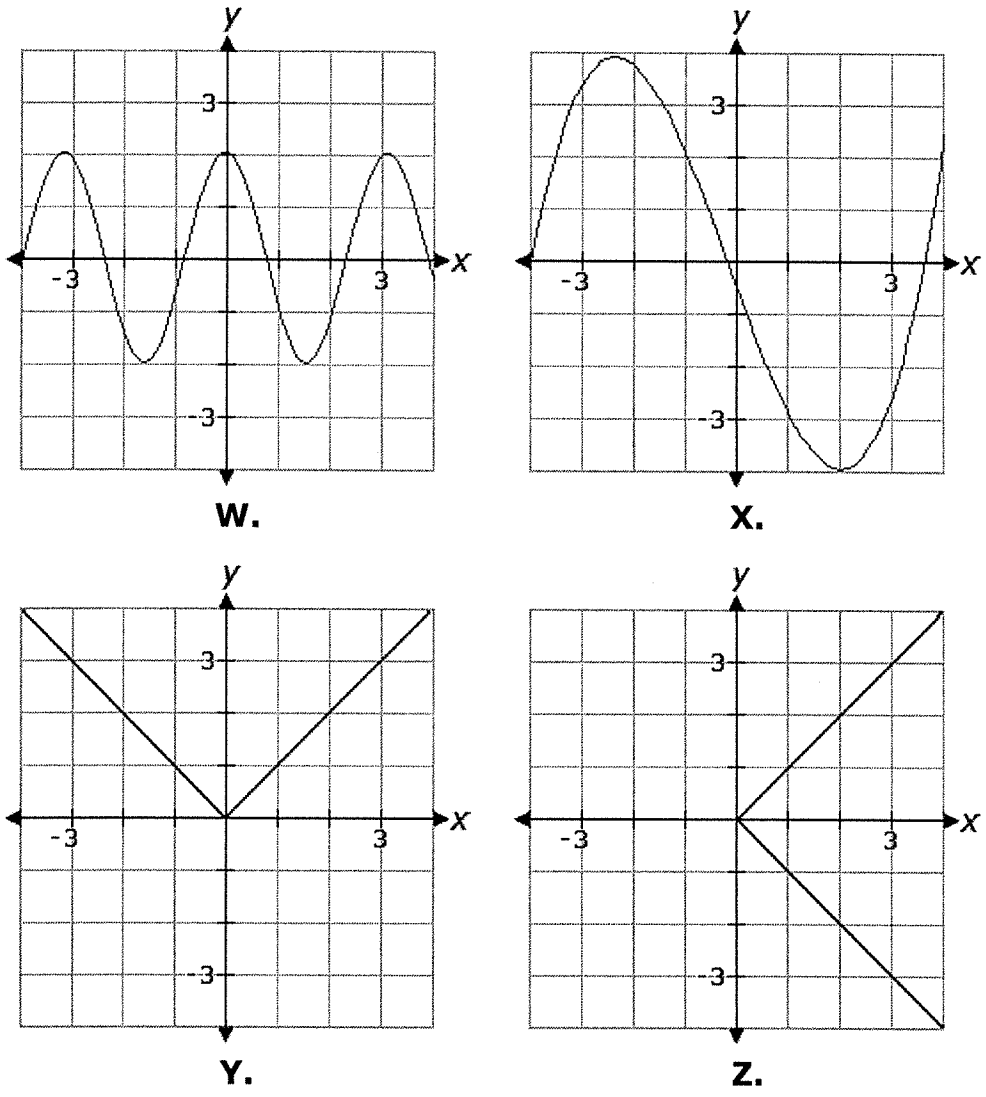
---

17. Think about the vertical line test and answer the following question. Would a vertical line be a relation, a function, both a relation and a function, or neither a relation nor a function?

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

---

18. Which of the following graphs is not a function?



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

---

19. Which of these t-tables represents a function?

W.

x	$f(x)$
-2	0
0	1
2	0
0	-1

X.

x	$f(x)$
-4	2
-1	-1
0	0
-1	1

Y.

x	$f(x)$
-1	-1
0	0
1	1
2	8

Z.

x	$f(x)$
-4	2
-2	-1
0	0
-2	1

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

---

20. Which of the following relations describes a function?

○ **A.** { (-3, 9), (-2, 4), (2, 4), (3, 9) }

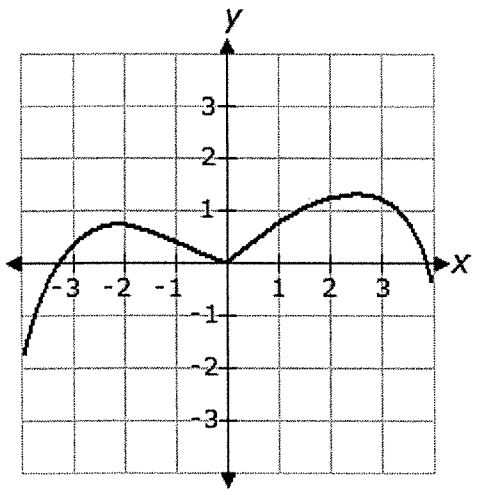
○ **B.** { (2, -2), (0, 0), (2, 2), (3, 3) }

○ **C.** { (-2, 0), (0, 2), (2, 0), (0, -2) }

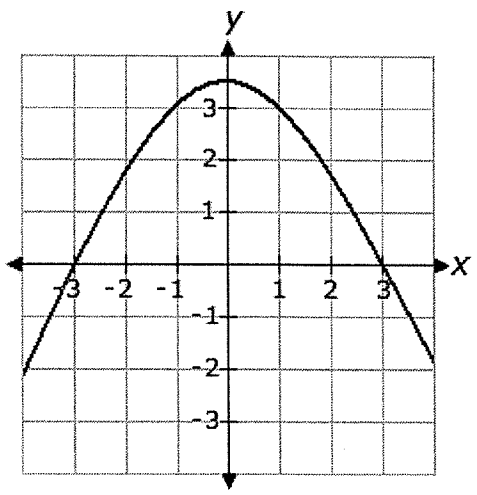
○ **D.** { (9, -3), (4, -2), (4, 2), (9, 3) }

---

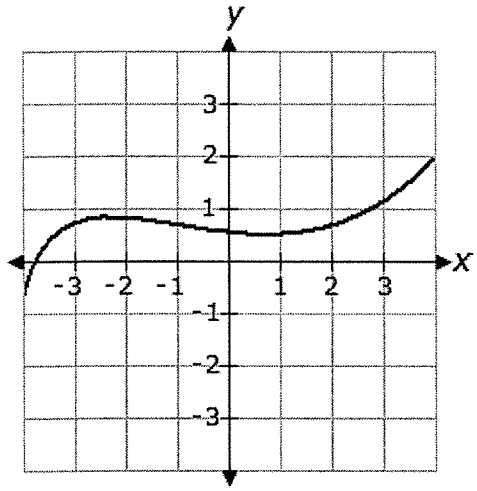
21. Which of the following graphs is not a function?



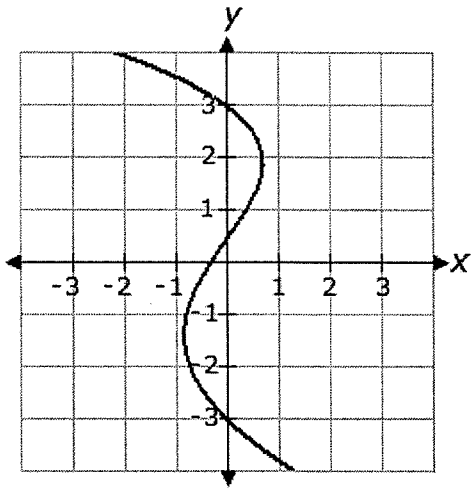
W.



X.



Y.



Z.

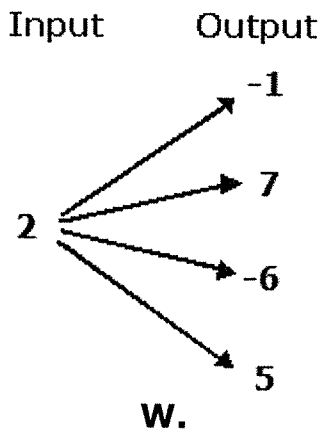
○ **A.** W, X, Y and Z

○ **B.** Z

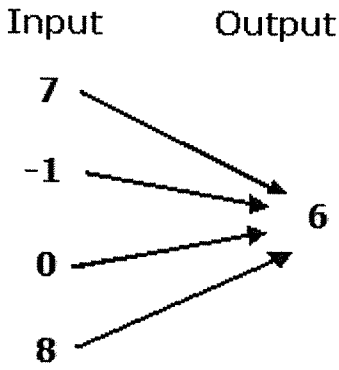
○ **C.** Y and Z

○ **D.** X and Y

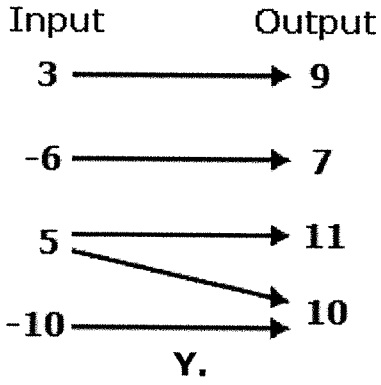
22. Which relation diagram represents a function?



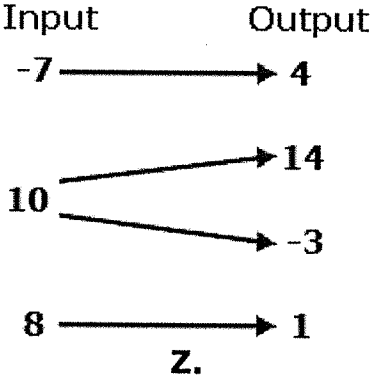
W.



X.



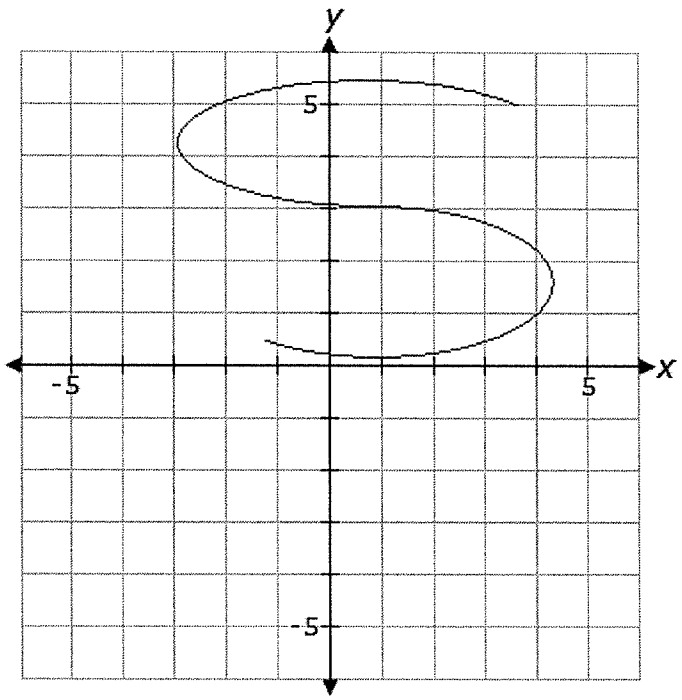
Y.



Z.

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

23.



Determine whether this picture is an example of a function, relation, function and relation, or neither relation nor function.

○ **A.** neither function nor relation

○ **B.** relation only

○ **C.** function only

○ **D.** function and relation

---

24. Do the ordered pairs below represent a relation, a function, both a relation and a function, or neither a relation nor a function?

(-4,-3) , (1,-8) , (-4,-14) , (9,-16)

○ **A.** function only

○ **B.** both a relation and a function

○ **C.** neither a relation nor a function

○ **D.** relation only

---

25. Which of these t-tables represents a function?

W.

x	$f(x)$
0	-1
-1	0
0	1
3	2

X.

x	$f(x)$
-1	0
0	1
1	0
0	-1

Y.

x	$f(x)$
-1	3
0	1
1	3
2	5

Z.

x	$f(x)$
3	-1
1	0
3	1
5	2

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

Answers

1. B
2. D
3. B
4. D
5. D
6. B
7. C
8. C
9. A
10. A
11. A
12. D
13. B
14. D
15. D
16. A
17. D
18. C
19. C
20. A
21. B
22. D
23. B

24. D
25. A

Explanations

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

A *function* is a relation in which each element of the domain is paired with EXACTLY one element of the range.

The Vertical Line Test: Given the graph of a relation, if a vertical line can be drawn that crosses the graph in more than one place, then the relation is not a function.

The graph does not pass the vertical line test; therefore, the graph is not a function, and it is a **relation only**.

2. Use the vertical line test to determine if the graphs represent a function.

The only graph given that passes the vertical line test is **Y**.

3. A function maps each domain element to only one range element.

The t-table **Y** is the only table that does not show a domain element paired with two or more range elements.

4. Use the vertical line test to determine if the graphs represent a function.

The only graph given that passes the vertical line test is **Y**.

5. A function is a set of ordered pairs such that for each domain element there is only one range element.

The set of ordered pairs { **(-2, -3), (-3, -2), (2, 3), (3, 2)** } is the only set that does not pair a domain element with two or more range elements.

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

A *function* is a relation in which each element of the domain is paired with EXACTLY one element of the range.

In this case, there is one y-coordinate for every x-coordinate.

The vertical line test can be used to determine this.

Therefore, it is **both a relation and a function**.

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

A *function* is a relation in which each element of the domain is paired with EXACTLY one element of the range.

The Vertical-Line Test: Given the graph of a relation, if a vertical line can be drawn that does not cross the graph in more than one place, it is a function.