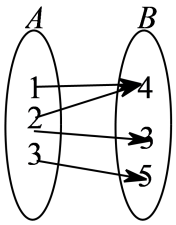
Think Academy

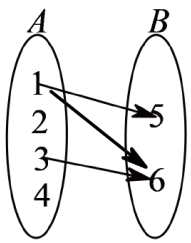
What Is a Function? Representing with Tables, Graphs, and Mappings

1 Which of the following diagrams represents a function?

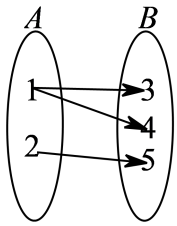
A.



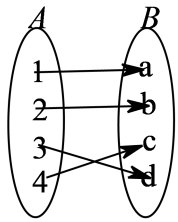
B.



C.



D.



2 Which of the following tables represents a function?

A.

x	y
1	2
1	3
2	4

B.

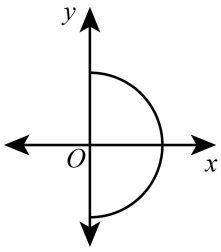
x	y
1	3
2	3
3	3

C.

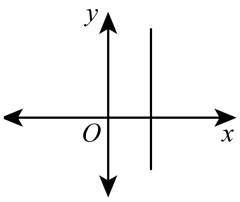
x	y
1	4
2	3
2	2

3 Which of the following graphs represents a function?

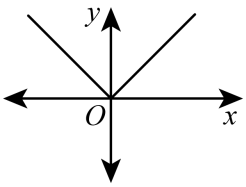
A.



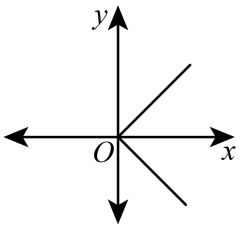
B.



C.

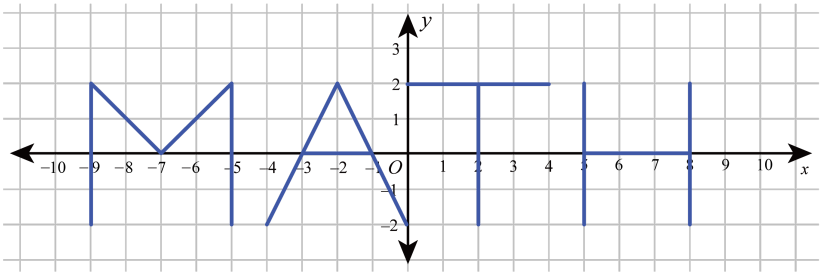


D.

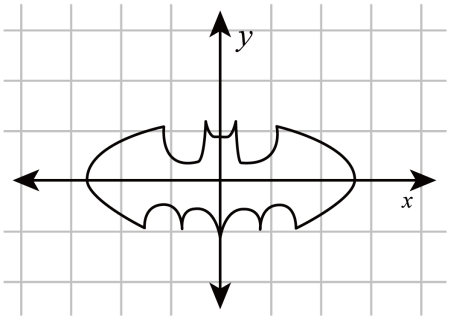


4 Which of the following graphs represents a function?

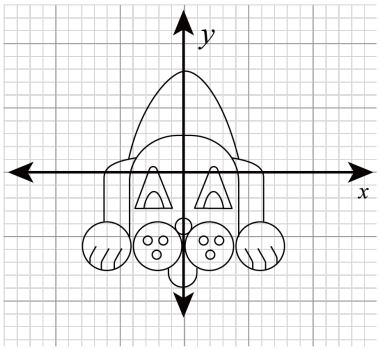
A.



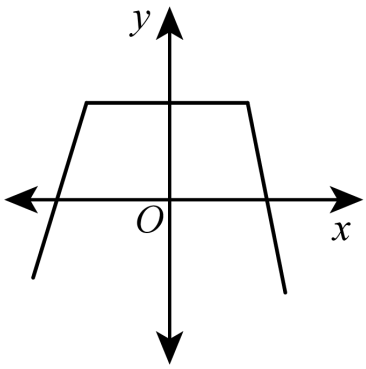
B.



C.



D.

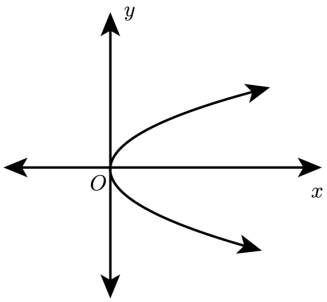


5 Which of the following does not represent a function?

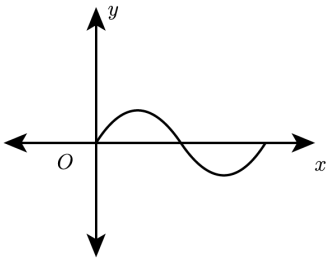
A.

x	0	5	10	15
y	3	3.5	4	4.5

B.



C.



D. $y = 2x + 1$

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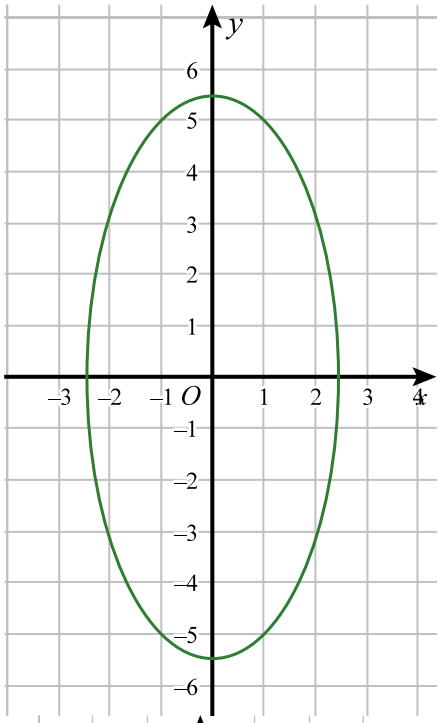
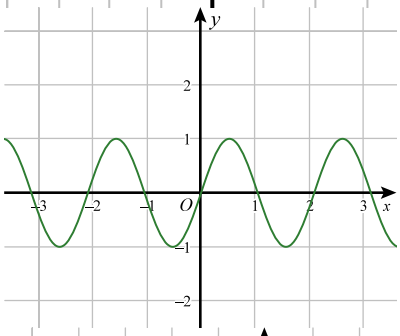
6 Which representation shows y as a function of x?

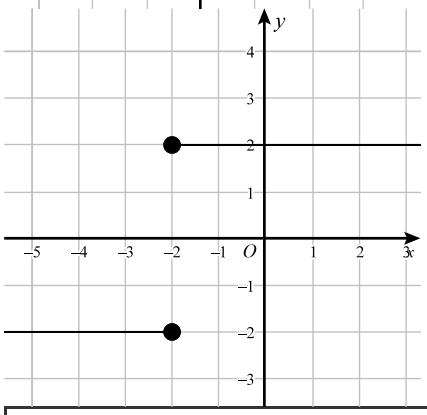
A.



B.



C.



D.

x	y
11	22
11	44
13	66
15	88

7 Which set of ordered pairs represents y as a function of x?

A. $\{(\sqrt{3}, 2.5), (\sqrt{6}, 2.5), (\sqrt{9}, 2.5), (\sqrt{12}, 2.5)\}$

B. $\{(2.5, 3), (3.5, 6), (2.5, 9), (5.5, 12)\}$

C. $\{(2.5, \sqrt{3}), (2.5, \sqrt{6}), (2.5, \sqrt{9}), (2.5, \sqrt{12})\}$

D. $\{(3, 2.5), (6, 2.5), (3, 7.5), (12, 7.5)\}$

8 Which set of ordered pairs represents y as a function of x?

A. $\{(2.5, 3), (2.5, 6), (2.5, 9), (2.5, 12)\}$

B. $\{(3, 2.5), (6, 2.5), (9, 2.5), (12, 2.5)\}$

C. $\{(2.5, 3), (3.5, 6), (2.5, 9), (5.5, 12)\}$

D. $\{(3, 2.5), (6, 2.5), (3, 2.5), (12, 2.5)\}$

9 Alice plans to buy some stationery sets, each priced at 10 dollars. She wants to purchase several sets as gifts for her grandchildren. The store is offering a 20% discount on all purchases. Which table represents the relationship between x, the number of stationery sets Alice buys, and y, the total cost?

A.

Sets of Stationery Bought, x	Total Cost, y
3	24
6	48
8	64
12	96

B.

Sets of Stationery Bought, x	Total Cost, y
10	8
20	16
30	24
40	32

C.

Sets of Stationery Bought, x	Total Cost, y
20	16
40	36
60	56
80	76

D.

Sets of Stationery Bought, x	Total Cost, y
3	36
6	72
8	96
12	144

10 A taxi driver earns a base salary of 1000 dollars per month. In addition, he receives an extra 100 dollars for every 3 passengers he picks up.

Which table shows the relationship between the number of passengers the driver picks up, x, and his total salary, y?

A.

Number of Passengers	Salary (in dollars)
24	800
48	1600
60	2000
72	2400

B.

Number of Passengers	Salary (in dollars)
24	1800
48	2600
60	3000
72	3400

C.

Number of Passengers	Salary (in dollars)
24	2800
48	3600
60	4000
72	4400

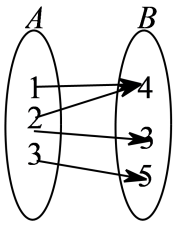
D.

Number of Passengers	Salary (in dollars)
24	900
48	1300
60	1500
72	1700

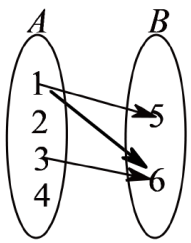
What Is a Function? Representing with Tables, Graphs, and Mappings

1 Which of the following diagrams represents a function?

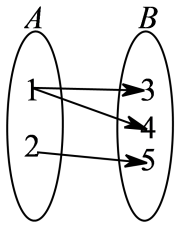
A.



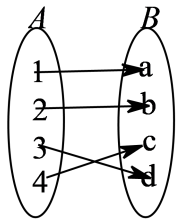
B.



C.



D.



Answer D

Solution Each input should have exactly one corresponding output.

2 Which of the following tables represents a function?

A.

x	y
1	2
1	3
2	4

B.

x	y
1	3
2	3
3	3

C.

x	y
1	4
2	3
2	2

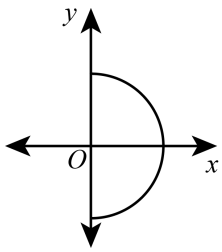
Answer B

Solution In a function, different inputs to share the same output (many-to-one) is possible, but a single input can never have two or more outputs.

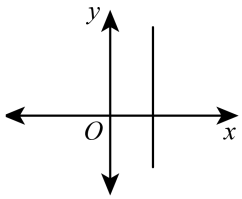
The answer is **B**.

3 Which of the following graphs represents a function?

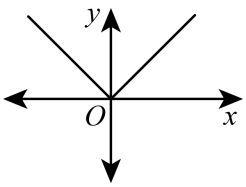
A.



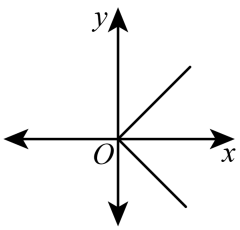
B.



C.



D.



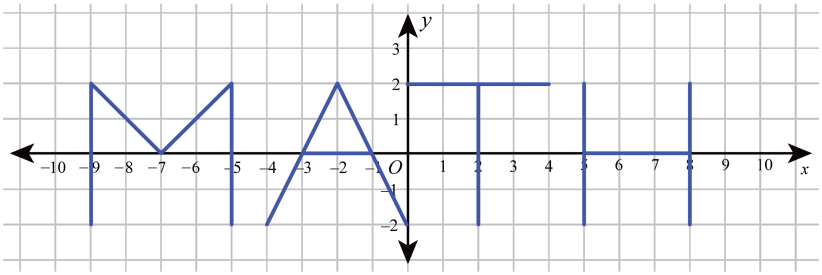
Answer C

Solution If any vertical line crosses the graph at more than one point, then it is not a function.

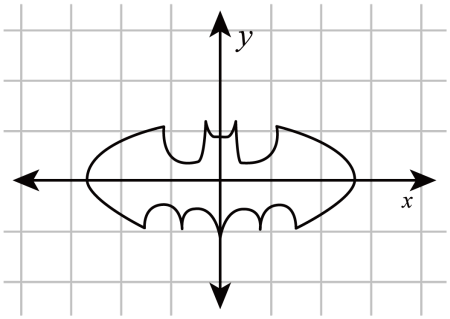
The answer is C.

4 Which of the following graphs represents a function?

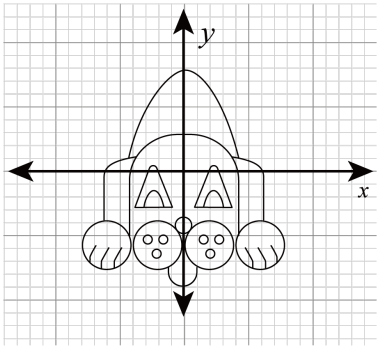
A.



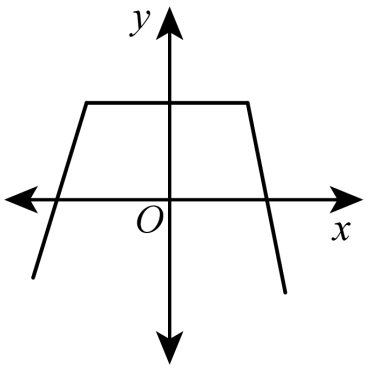
B.



C.



D.



Answer D

Solution If any vertical line crosses the graph at more than one point, then it is not a function.

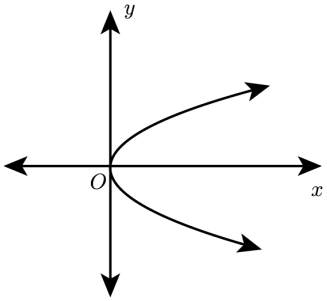
The answer is **D**.

5 Which of the following does not represent a function?

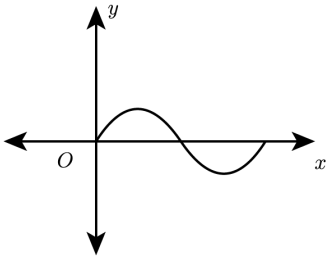
A.

x	0	5	10	15
y	3	3.5	4	4.5

B.



C.



D. $y = 2x + 1$

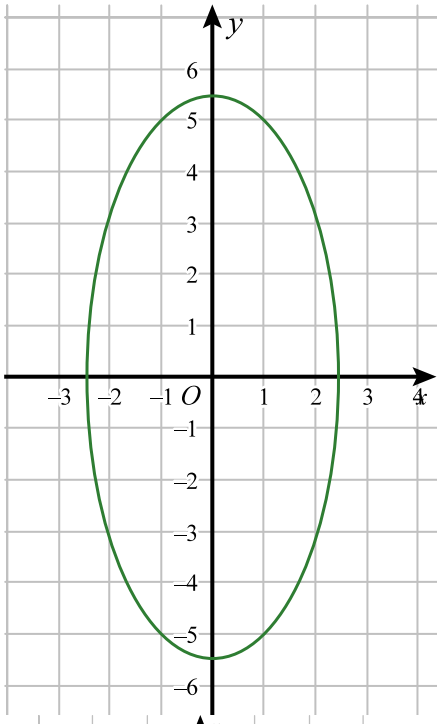
Answer B

Solution In a function, different inputs to share the same output (many-to-one) is possible, but a single input can never have two or more outputs. Also, if any vertical line crosses the graph at more than one point, then it is not a function.

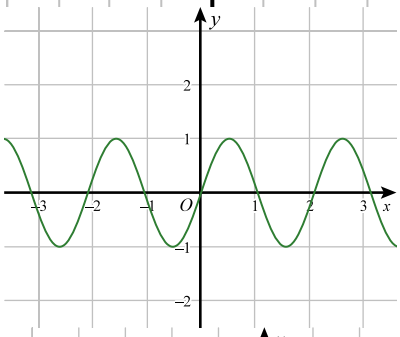
The answer is **B**.

6 Which representation shows y as a function of x?

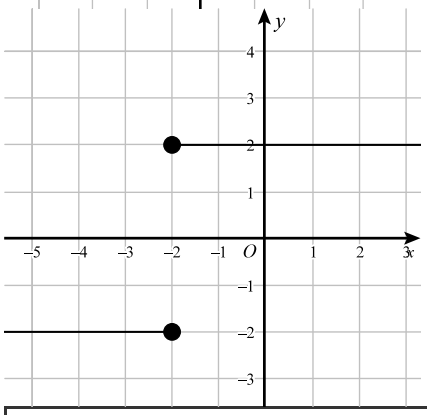
A.



B.



C.



D.

x	y
11	22
11	44
13	66
15	88

Answer B

Solution A representation shows "y as a function of x" if for every input value of x, there is exactly one output value of y, which can be visualized using the vertical line test on a graph or by examining a table or equation.

The answer is $\mathbf{B}$.

7 Which set of ordered pairs represents y as a function of x?

A. $\{(\sqrt{3}, 2.5), (\sqrt{6}, 2.5), (\sqrt{9}, 2.5), (\sqrt{12}, 2.5)\}$

B. $\{(2.5, 3), (3.5, 6), (2.5, 9), (5.5, 12)\}$

C. $\{(2.5, \sqrt{3}), (2.5, \sqrt{6}), (2.5, \sqrt{9}), (2.5, \sqrt{12})\}$

D. $\{(3, 2.5), (6, 2.5), (3, 7.5), (12, 7.5)\}$

Answer A

Solution "y is a function of x" means that for every value of x in the domain, there is exactly one corresponding value of y. In simpler terms, y's value depends on the value of x.

The answer is $\mathbf{A}$.

8 Which set of ordered pairs represents y as a function of x?

A. $\{(2.5, 3), (2.5, 6), (2.5, 9), (2.5, 12)\}$

B. $\{(3, 2.5), (6, 2.5), (9, 2.5), (12, 2.5)\}$

C. $\{(2.5, 3), (3.5, 6), (2.5, 9), (5.5, 12)\}$

D. $\{(3, 2.5), (6, 2.5), (3, 2.5), (12, 2.5)\}$

Answer B

Solution "y is a function of x" means that for every value of x in the domain, there is exactly one corresponding value of y. In simpler terms, y's value depends on the value of x.

The answer is $\mathbf{B}$.

9 Alice plans to buy some stationery sets, each priced at 10 dollars. She wants to purchase several sets as gifts for her grandchildren. The store is offering a 20% discount on all purchases. Which table represents the relationship between x, the number of stationery sets

Alice buys, and y, the total cost?

A.

Sets of Stationery Bought, x	Total Cost, y
3	24
6	48
8	64
12	96

B.

Sets of Stationery Bought, x	Total Cost, y
10	8
20	16
30	24
40	32

C.

Sets of Stationery Bought, x	Total Cost, y
20	16
40	36
60	56
80	76

D.

Sets of Stationery Bought, x	Total Cost, y
3	36
6	72
8	96
12	144

Answer A

Solution $y = 80\% \times 10x$

$y = 0.8 \times 10x$

$y = 8x$

The answer is $\mathbf{A}$.

10 A taxi driver earns a base salary of 1000 dollars per month. In addition, he receives an extra 100 dollars for every 3 passengers he picks up.

Which table shows the relationship between the number of passengers the driver picks up, x, and his total salary, y?

A.

Number of Passengers	Salary (in dollars)
24	800
48	1600
60	2000
72	2400

B.

Number of Passengers	Salary (in dollars)
24	1800
48	2600
60	3000
72	3400

C.

Number of Passengers	Salary (in dollars)
24	2800
48	3600
60	4000
72	4400

D.

Number of Passengers	Salary (in dollars)
24	900
48	1300
60	1500
72	1700

Answer B

Solution $y = \frac{100}{3}x + 1000$

The answer is $\mathbf{B}$.