

Name:

Date:

Period:

Domain: The set of x-values in a relation

(Domain , Range)

Range: The set of y-values in a relation

(x , y)

A relation is a function when the DOMAIN does not repeat. For EACH input (x-value), there is exactly ONE output (a different y-value). There are several ways you will be given information to determine if a relation is a function.

- Ordered Pairs
- Table of Values
- Function Mapping
- Graph

When given a **list of ordered pairs or a table of values**, focus on the x-values (domain) of the information provided and make sure none repeat.

In Questions 1-3, tell whether the list of **ordered pairs** is a function, then explain why or why not?

1. (2, 11), (3, 15), (4, 19), (5, 23)

2. (1, 4), (2, 8), (3, 12), (2, 16), (4, 20)

3.

| x | y |
|---|---|
| 1 | 1 |
| 2 | 1 |
| 3 | 1 |
| 4 | 1 |

4. What is the range of this relation? Is it a function? Why or why not? (1, 2), (3, 4), (5, 6), (7, 8), (7, 10)

5. Which relation is a function?

[a] (1, 3), (2, 2), (3, 3), (3, 4)

[b] (10, 15), (20, 40), (20, 45), (30, 50)

[c] (12, 28), (14, 28), (16, 30), (18, 32)

[d] (22, 11), (24, 12), (26, 12), (26, 13)

6. Which relation is a function?

[a] (-1, 1), (2, 8), (-1, -1), (-2, -8)

[b] (-3, 9), (-2, 4), (2, 4), (3, 9)

[c] (1, 2), (2, 8), (3, 18), (2, 32)

[d] (1, 5), (2, 10), (-2, 10), (1, 15)

7. Which relation is **not** a function?

[a] $(\frac{1}{2}, \frac{1}{3}), (\frac{1}{4}, \frac{1}{5}), (\frac{1}{6}, \frac{1}{7}), (\frac{1}{8}, \frac{1}{9})$

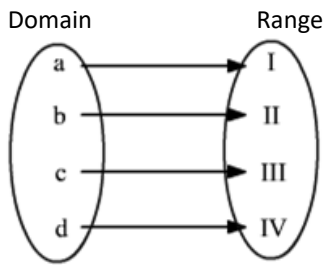
[b] $(\frac{1}{2}, \frac{2}{2}), (\frac{1}{3}, \frac{3}{2}), (\frac{2}{3}, \frac{2}{3}), (\frac{3}{5}, \frac{4}{3})$

[c] $(\frac{1}{2}, \frac{1}{5}), (\frac{3}{2}, \frac{1}{6}), (\frac{4}{2}, \frac{1}{7}), (\frac{5}{2}, \frac{1}{8})$

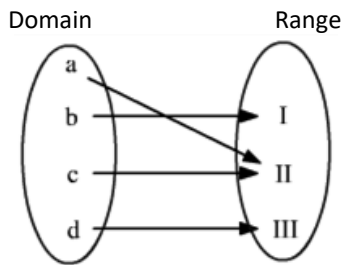
[d] $(\frac{1}{2}, \frac{1}{4}), (\frac{1}{4}, \frac{1}{8}), (\frac{4}{8}, \frac{1}{16}), (\frac{4}{16}, \frac{1}{32})$

Mapping is another way to represent the pairing of domain and range elements. It is like a flow chart for a function, showing the **input** and **output** values. A mapping diagram consists of two columns. The first column represents the domain of a function, and the other column its range. Lines or arrows are drawn from domain to range to represent the relation between any two elements.

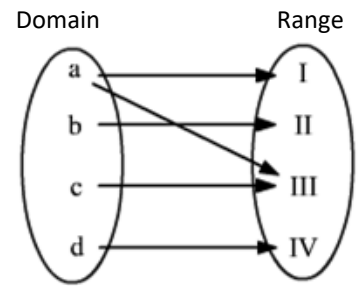
Consider the following mapping diagrams:



In the mapping above, since each domain is paired with exactly one element of the range, **this is a function.**

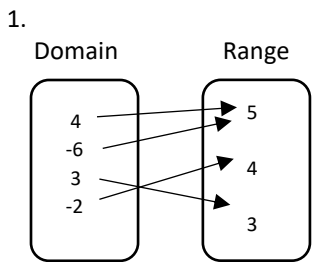


In the mapping above, since each domain is paired with exactly one element of the range (even though the range is repeated), **this is a function.**



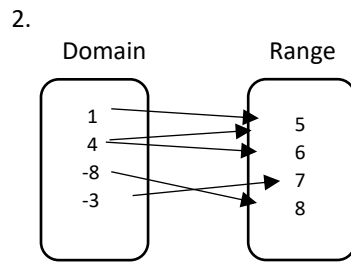
In the mapping above, the first element in the domain is mapped to **more than one element** of the range, therefore it is **NOT** a function.

List the ordered pairs and tell whether the mapping represents a function. Why or Why not?



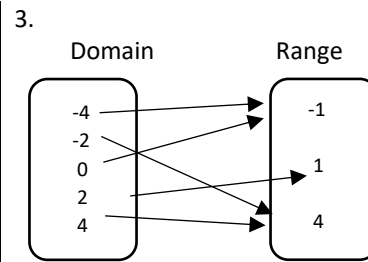
Ordered Pairs:

Yes No



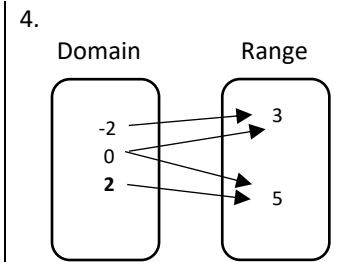
Ordered Pairs:

Yes No



Ordered Pairs:

Yes No

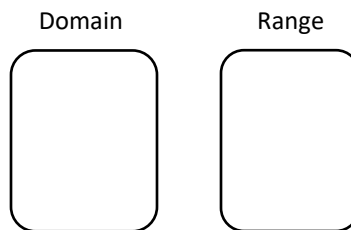


Ordered Pairs:

Yes No

5. Students in Mrs. Hein's class were asked about the names of their pets. Some of the responses are shown. Complete a mapping diagram and tell whether it is a function.

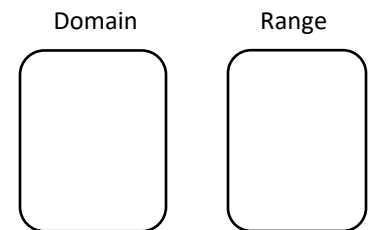
| Student | Pet name |
|----------|----------------|
| Kiara | Tiny |
| Adrienne | Rover Betty |
| Simon | Mimi |



Is this a function? Why or Why not?

6. Students were asked about the number of cell phone minutes they use. Some of the responses are shown. Complete a mapping diagram and tell whether it is a function.

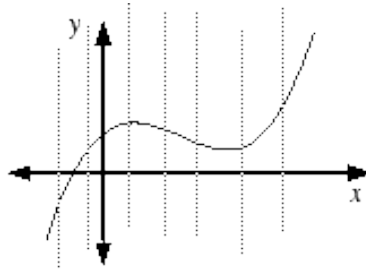
| Student | # of min |
|---------|----------|
| Sarah | 275 |
| Max | 220 |
| Jacob | 350 |
| Rebekah | 275 |



Is this a function? Why or Why not?

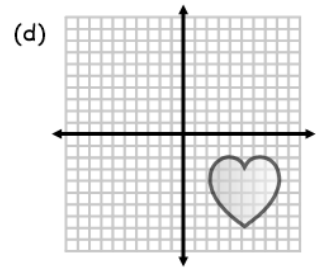
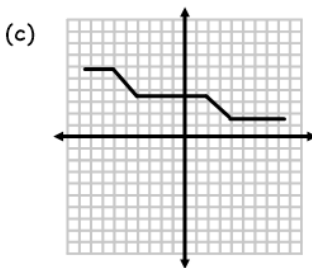
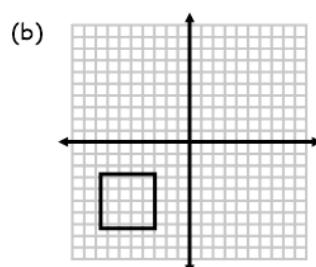
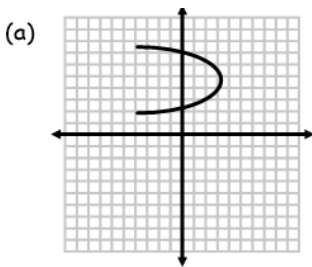
When you are given a graph, the **vertical line test** is a visual way to determine if it is a graph of a function or not. A function can only have one output, y , for each unique input, x .

A relation is a function if there are no vertical lines that intersect the graph at **more than one** point.

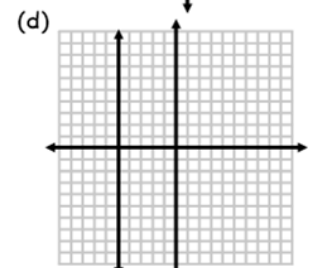
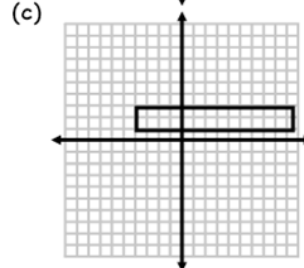
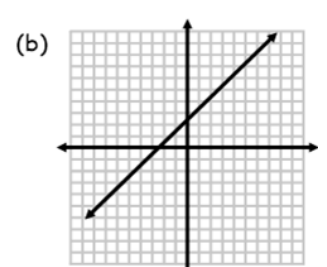
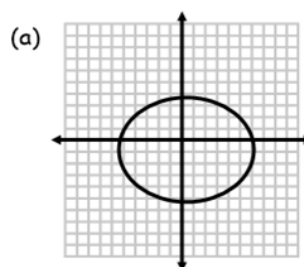


The graph **IS** a function because no vertical line hits the graph more than once.

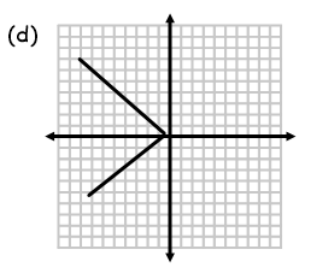
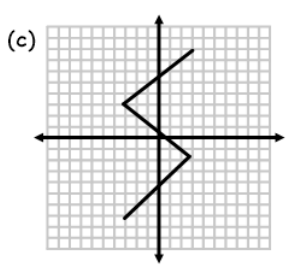
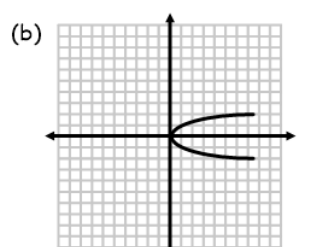
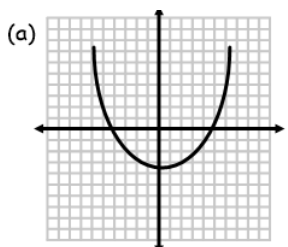
1. Which graph shows a function?



2. Which graph represents a function?



3. Which graph represents a function?



4. Which graph does NOT show a function?

