

Function Detectives

Find functions, domains, and ranges.

GRADE 8 • MA.8.F.1.1

MA.8.F.1.1 "Given a set of ordered pairs, a table, a graph or mapping diagram, determine whether the relationship is a function. Identify the domain and range of the relation."

NAME _____

DATE _____

THE BIG IDEA

A relation is a function when each input, or x-value, is paired with exactly one output, or y-value. The domain is the set of inputs, and the range is the set of outputs. Different inputs may share the same output.

WORKED EXAMPLE

Is $\{(2, 7), (4, 9), (6, 11)\}$ a function?
Identify the domain and range.

1. List the inputs: 2, 4, 6.
2. Each input is paired with only one output.
3. The domain is $\{2, 4, 6\}$.
4. The range is $\{7, 9, 11\}$.

Answer: Yes, it is a function. Domain: $\{2, 4, 6\}$; Range: $\{7, 9, 11\}$.

PRACTICE 6 problems

1 Is $\{(1, 3), (5, 8), (10, 3)\}$ a function? Identify the domain and range.

ANSWER _____

2 Is $\{(12, 4), (14, 6), (12, 9)\}$ a function? Identify the domain and range.

ANSWER _____

3 Use the table. Is the relation a function? Identify the domain and range. $x \mid y$

-4	12
0	18
4	24

ANSWER _____

4 A mapping diagram shows $13 \rightarrow 26$, $17 \rightarrow 26$, and $19 \rightarrow 31$. Is the relation a function? Identify the domain and range.

ANSWER _____

5 A graph has plotted points $(-8, 5)$, $(-3, 16)$, and $(1, 5)$. Is the relation a function? Identify the domain and range.

ANSWER _____

6 Use the table. Is the relation a function? Identify the domain and range. $x \mid y$

21	30
25	33
21	36

ANSWER _____

APPLY IT Show your work

- 1** In one online game match, the relation pairs each player ID with the points that player earned: $\{(41, 15), (43, 22), (47, 15), (50, 29)\}$. Is this relation a function? Identify the domain and range.

WORK SPACE

ANSWER _____

- 2** A photo-editing club records photo numbers and filter codes used on submitted edits: $\{(71, 2), (72, 5), (71, 9), (73, 2)\}$. Is this relation a function? Identify the domain and range.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Consider $R = \{(-12, 4), (-7, 10), (-12, 4), (3, 10), (3, 14), (18, 4)\}$. Is R a function? Identify the domain and range, then explain how you know.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Is $\{(1, 3), (5, 8), (10, 3)\}$ a function? Identify the domain and range.	Yes, it is a function. Domain: $\{1, 5, 10\}$; Range: $\{3, 8\}$.
2	Is $\{(12, 4), (14, 6), (12, 9)\}$ a function? Identify the domain and range.	No, it is not a function. Domain: $\{12, 14\}$; Range: $\{4, 6, 9\}$.
3	Use the table. Is the relation a function? Identify the domain and range. $x \mid y$ -4 12 0 18 4 24	Yes, it is a function. Domain: $\{-4, 0, 4\}$; Range: $\{12, 18, 24\}$.
4	A mapping diagram shows $13 \rightarrow 26$, $17 \rightarrow 26$, and $19 \rightarrow 31$. Is the relation a function? Identify the domain and range.	Yes, it is a function. Domain: $\{13, 17, 19\}$; Range: $\{26, 31\}$.
5	A graph has plotted points $(-8, 5)$, $(-3, 16)$, and $(1, 5)$. Is the relation a function? Identify the domain and range.	Yes, it is a function. Domain: $\{-8, -3, 1\}$; Range: $\{5, 16\}$.
6	Use the table. Is the relation a function? Identify the domain and range. $x \mid y$ 21 30 25 33 21 36	No, it is not a function. Domain: $\{21, 25\}$; Range: $\{30, 33, 36\}$.

PART 2 • APPLY IT

- Yes, it is a function. Domain: $\{41, 43, 47, 50\}$; Range: $\{15, 22, 29\}$.** Each player ID appears once, so each input has exactly one output. List the player IDs for the domain and the different point totals for the range.
- No, it is not a function. Domain: $\{71, 72, 73\}$; Range: $\{2, 5, 9\}$.** Photo number 71 is paired with both 2 and 9, so one input has two outputs. Include each number only once in the domain and range.

CHALLENGE

R is not a function. Domain: $\{-12, -7, 3, 18\}$; Range: $\{4, 10, 14\}$. It is not a function because input 3 is paired with both 10 and 14. The repeated pair $(-12, 4)$ does not cause a problem.

Accept domain and range values in any order when braces and duplicate values are handled correctly. A relation is not a function only when one input is paired with more than one different output.