

Input Output Detectives

Check whether each input has one output.

GRADE 8 • 8.F.A.1

CCSS.Math.Content.8.F.A.1 "Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. 1"

NAME _____

DATE _____

ONE INPUT, ONE OUTPUT

A relation is a function when every input is paired with exactly one output. Different inputs may share an output, but one input cannot be paired with two different outputs. A function graph is made of the ordered pairs that match each input to its output.

WORKED EXAMPLE

For the rule $y = x + 9$, find y when $x = 14$.

1. Start with $y = x + 9$.
2. Substitute 14 for x : $y = 14 + 9$.
3. Add: $y = 23$.

Answer: $y = 23$

PRACTICE 6 problems

- 1** Does the relation $\{(2, 5), (3, 6), (4, 8)\}$ represent a function?

ANSWER _____

- 2** Does the relation $\{(0, 3), (0, 4), (5, 6)\}$ represent a function?

ANSWER _____

- 3** Does this table represent a function? Input: -4, 1, 6 Output: 2, 2, 2

ANSWER _____

- 4** Does the relation $\{(1, 4), (1, 8), (3, 5)\}$ represent a function?

ANSWER _____

- 5** The rule is $y = 2x + 1$. What ordered pair has $x = 3$?

ANSWER _____

- 6** For the function $y = 3x - 2$, is the point (4, 10) on the graph?

ANSWER _____

APPLY IT Show your work

- 1** In a video game, a player earns 4 coins for each level completed. Let l be the number of levels and c be the number of coins, so $c = 4l$. Does this rule define a function? How many coins does a player earn for 5 levels?

WORK SPACE

ANSWER _____

- 2** An after-school robotics club records each team's battery choice. The record says Team A uses battery 2 and battery 5, while Team B uses battery 3. If the team is the input and the battery choice is the output, is this relation a function?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

The relation $\{(2, k), (4, 6), (2, 6), (5, 8)\}$ is a function. What value must k have? Explain your reasoning.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Does the relation $\{(2, 5), (3, 6), (4, 8)\}$ represent a function?	Yes
2	Does the relation $\{(0, 3), (0, 4), (5, 6)\}$ represent a function?	No. Input 0 has two outputs, 3 and 4.
3	Does this table represent a function? Input: -4, 1, 6 Output: 2, 2, 2	Yes
4	Does the relation $\{(1, 4), (1, 8), (3, 5)\}$ represent a function?	No. Input 1 has two outputs, 4 and 8.
5	The rule is $y = 2x + 1$. What ordered pair has $x = 3$?	(3, 7)
6	For the function $y = 3x - 2$, is the point (4, 10) on the graph?	Yes, because $3(4) - 2 = 10$.

PART 2 • APPLY IT

- Yes. A player earns 20 coins for 5 levels.** Each number of completed levels gives exactly one number of coins, so $c = 4l$ is a function. Substitute $l = 5$: $c = 4(5) = 20$.
- No. Team A has two outputs, battery 2 and battery 5.** A function cannot assign two different outputs to the same input. Team A is matched with two battery choices.

CHALLENGE

$k = 6$. Input 2 must have exactly one output, so its output must be 6 both times.

Accept equivalent explanations that identify a repeated input with different outputs as not a function. For items that are functions, accept a clear statement that each input has only one output, even when outputs repeat.