Function Detective

Use ordered pairs, tables, mappings and actual graphs.

GRADE 8 · TEKS 8.5.G

8.5.G "identify functions using sets of ordered pairs, tables, mappings, and graphs;"

NAME ______________________ DATE ____________

CONNECT THE REPRESENTATIONS

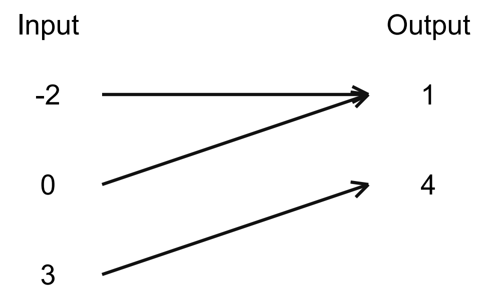
A function assigns exactly one output to each input. Many inputs may share one output. In a mapping check outgoing arrows; in a table or pair set check repeated inputs. On a graph, a vertical line may meet at most one point of a function.

WORKED EXAMPLE

Read the actual mapping. Does it define a function from input to output? Explain why two arrows may end at the same output.

1. Check the arrows leaving each input, not the arrows arriving at an output.
2. Inputs -2 and 0 both map to 1, while input 3 maps to 4. No input has two outputs.

Answer: Yes. Each input has one outgoing arrow; different inputs may share an output.



PRACTICE 4 problems

1 Classify each set as a function or not a function and cite the deciding input: R = {(1,4), (2,4), (3,1)}; S = {(0,2), (2,3), (0,4)}.

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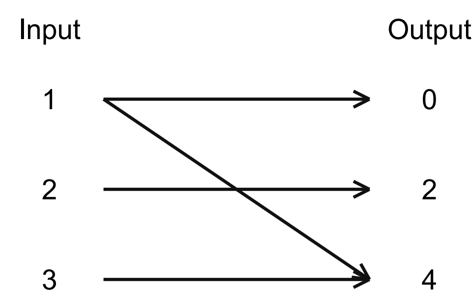
2 Does the table define y as a function of x? Identify exact rows that support your conclusion. Would repeating the same identical pair be a problem?

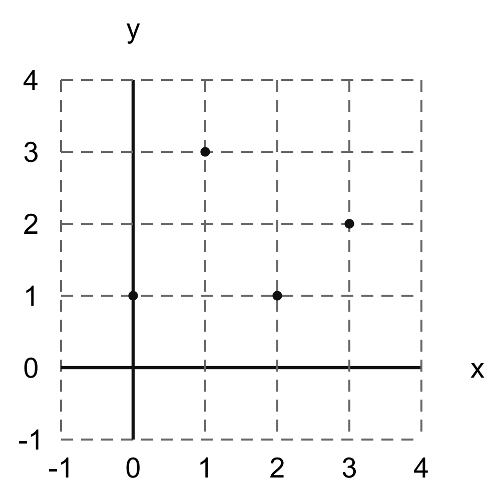
DATA TABLE

Input x	Output y
1	2
2	1
2	3
4	1

3 Use this mapping to decide whether it is a function. Name the input and its outputs that prove your answer. Remove one arrow to make it a function while keeping every shown input assigned.

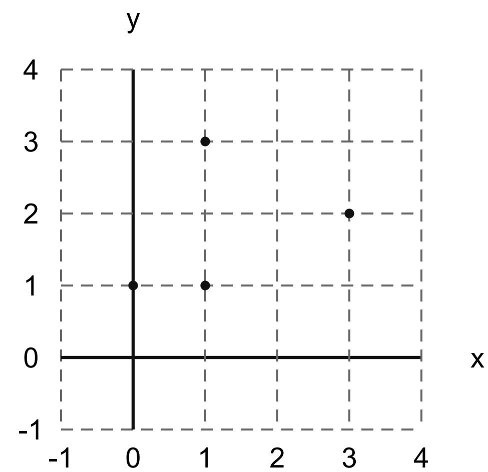


4 Read all the plotted pairs. Does the graph define y as a function of x? Explain using an imaginary vertical line, and state whether repeated y-values matter.



APPLY IT Show your work

1 Read the plotted pairs and test whether this graph is a function. Name a vertical line that gives decisive evidence, then compare it with Task 4.



2 An attendance record has (student, club): (1,7), (2,7), (3,9). Is club a function of student? Reverse all the pairs: is student a function of club? Explain both.

CHALLENGE One step up

For {(2,-1), (5,3), (x,7), (9,3)}, list every x that makes the relation not a function. Then change only the output 7 so that choosing x = 5 does make it a function.

ANSWER KEY **Function Detective** GRADE 8 · TEKS 8.5.G

Accept equivalent correct reasoning. Check plotted points and constructed representations as well as written answers. Numbered solutions match the student tasks.

PRACTICE 1

R is a function: each input has one output despite repeated 4. S is not: input 0 has outputs 2 and 4.

PRACTICE 2

No: input 2 has outputs 1 and 3. Repeating an identical pair alone is not a problem because it does not add a different output.

PRACTICE 3

Not a function: input 1 maps to both 0 and 4. Remove either 1 → 0 or 1 → 4; all three inputs then have exactly one output.

PRACTICE 4

Pairs (0,1), (1,3), (2,1), (3,2). It is a function: every vertical line hits at most one dot. Repeated y = 1 is allowed.

APPLY IT 1

Pairs (0,1), (1,1), (1,3), (3,2).
It is not a function: x = 1 meets two dots, with outputs 1 and 3. Task 4 has no repeated input with different outputs.

APPLY IT 2

Club is a function of student: each student has one club.
Reversing gives (7,1), (7,2), (9,3), which is not a function because input 7 has two outputs.

CHALLENGE

x = 2, 5 or 9 gives an existing input a second output. If x = 5, change 7 to 3; repeating (5,3) does not introduce a new output.