

Teacher Notes 1.E.1

Quantitative Relationships

Vocabulary	Definition	Example (x, y)
Relation	A set of ordered pairs; can be represented in tables, graphs, or mapping diagrams	$\{(-3, -2), (-1, 1), (7, 3), (9, 5)\}$
Domain	The set of all x-values for the relation	$\{-3, -1, 7, 9\}$
Range	The set of all y-values for the relation	$\{-2, 1, 3, 5\}$

Functions are Relations that Follow Rules

Some relations follow specific rules. Given an input, you can reliably predict the output based on the rule.

Definition

Because each input follows a specific rule, a function is a relation in which

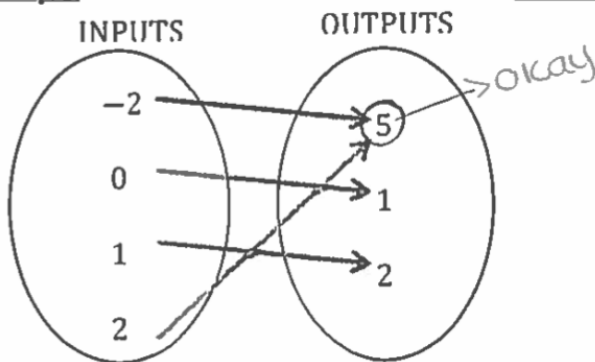
Each input produces
Exactly one output

Characteristics

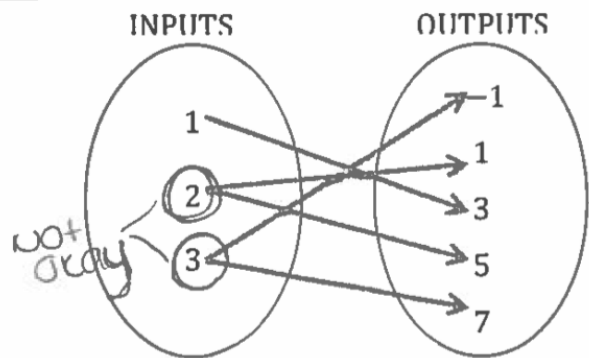
- A function MAY have an output with more than one input.
- A function MAY NOT have an input with more than one output.

Function

Example



Non-Example



Strategy for Classifying Different Representations without Mapping Diagrams

Representation	Strategy
Graph	Vertical Line Test: If a vertical line more than 1 point; NOT A FUNCTION.
Table	If the domain repeats, NOT A FUNCTION
Ordered Pairs	If the domain repeats, NOT A FUNCTION
Domain & Range	If the domain has FEWER values than range; NOT A FUNCTION

For each relation card, make (or try to make) a mapping diagram. Glue the card in the correct column.

Relation	Function	Not a Function																								
Graph		<p>NO Function Fails VLT</p>																								
Table	<table border="1"> <thead> <tr> <th>X</th> <th>Y</th> </tr> </thead> <tbody> <tr> <td>-2</td> <td>5</td> </tr> <tr> <td>-1</td> <td>2</td> </tr> <tr> <td>0</td> <td>1</td> </tr> <tr> <td>1</td> <td>2</td> </tr> <tr> <td>2</td> <td>5</td> </tr> </tbody> </table> <p>yes Function</p>	X	Y	-2	5	-1	2	0	1	1	2	2	5	<table border="1"> <thead> <tr> <th>X</th> <th>Y</th> </tr> </thead> <tbody> <tr> <td>4</td> <td>2</td> </tr> <tr> <td>1</td> <td>1</td> </tr> <tr> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>-1</td> </tr> <tr> <td>4</td> <td>-2</td> </tr> </tbody> </table> <p>NO Function not okay</p>	X	Y	4	2	1	1	0	0	1	-1	4	-2
X	Y																									
-2	5																									
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0	0																									
1	-1																									
4	-2																									
Ordered Pairs	$\{(-2, 0.5), (0, 2.5), (4, 6.5), (5, 2.5)\}$	$\{(6, 5), (4, 3), (6, 4), (5, 8)\}$ <p>NO Function domain repeats</p>																								
Domain & Range	<p>D: $\{-5, -2, 0, 2, 5\}$ R: $\{0, 4, 25\}$</p> <p>yes Function.</p>	<p>D: $\{0, 1, 2\}$ R: $\{-1, 0, 1, 1.4\}$</p> <p>Fewer values in domain than in range</p>																								

Function Notation:

The expression $f(x)$ is read as function of x or f of x.

It refers to the output when x is the input.

Ex. Evaluate the function $f(x) = -3x + 5$ when $x = -2$ and $x = 7$.

$$f(-2) = -3(-2) + 5$$

$$f(-2) = 6 + 5$$

$$f(7) = -3x + 5$$

$$f(7) = -3(7) + 5$$

$$f(7) = -21 + 5 \quad \therefore f(7) = -16$$