Mathematics 10C

Unit RF: Relations and functions

Relations and functions

One locker, one combination

- Locker 14 has one combination.
- A sign-up lists Alex in room 4 and Alex in room 9.
- The same name has two rooms.

One output for each input

- The pairs (1, 4) and (2, 4) give input 2 a single output.
- A function pairs each input with exactly one output.

Key terms

relation

A set of ordered pairs, shown as a list, a table, or a graph. (a set of ordered pairs)

function

A relation in which each input pairs with exactly one output. (one output for each input)

ordered pair

A pair that lists an input first and its output second. ((x, y))

vertical line test

A check that slides a vertical line across a graph and expects a single meeting point. (one meeting point)

A repeated input

- The set is {(1, 4), (1, 9), (3, 7)}.
- Input 1 has outputs 4 and 9.
- This relation stays outside the functions.

Each input once

input	output
1	4
2	4
3	7

Input 1 twice

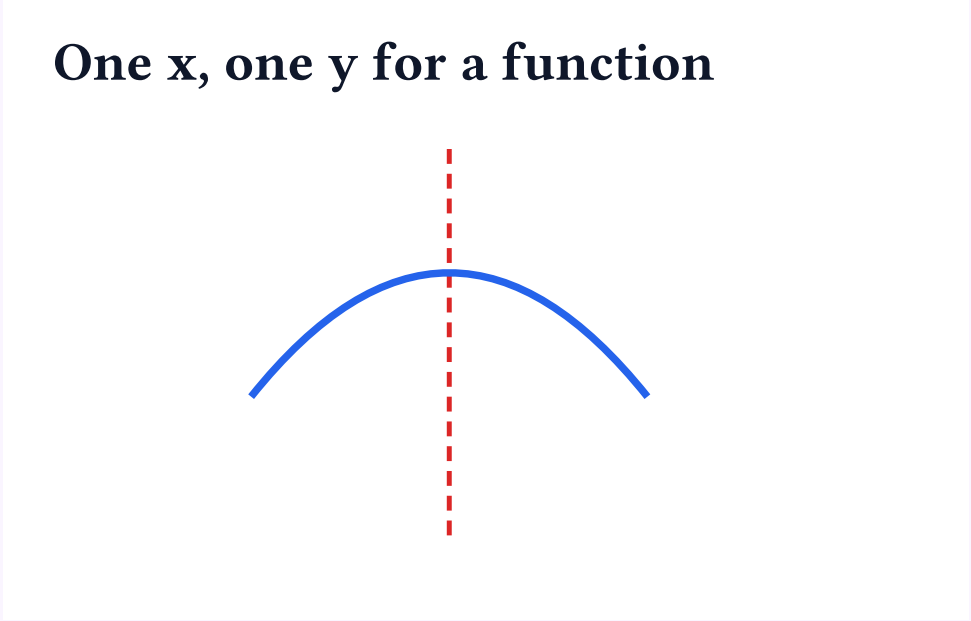
input	output
1	4
1	9
3	7

A set that passes

- The set $\{(0, 1), (2, 1)\}$ has inputs 0 and 2.
- Each input appears once.
- The set is a function, and the shared output 1 is allowed.

A vertical line on a graph

- A vertical line through one x meets a function graph once.
- A graph shaped like a C opening to the right meets that line twice.
- The C-shaped graph stays outside the functions.



Rules in words

- Each locker number pairs with one combination.
- That sentence is the function rule, with the graph put away.

One locker → one combo

Function rule in words

Four examples

- Set A = {(0, 1), (2, 1)} is a function.
- Set B = {(3, 4), (3, 5)} stays outside the functions.
- A horizontal line is a function. A C opening right stays outside.

Quick check

- The set {(2, 5), (2, 8), (4, 5)} stays outside the functions.
- A vertical line meets a horizontal graph once, so that graph is a function.

One output per input

- Check the inputs before you check the outputs.
- A repeated input with two outputs stays outside the functions.