

Extension

Use after Lesson 1.7

Determine Whether a Relation Is a Function

TEKS A.1.B

GOAL Determine whether a relation is a function when the relation is represented by a table or a graph.

Key Vocabulary

- **relation**, p. 49

A **relation** is any pairing of a set of inputs with a set of outputs. Every function is a relation, but not every relation is a function. A relation is a function if for every input there is exactly one output.

EXAMPLE 1 Determine whether a relation is a function

Determine whether the relation is a function.

a.

Input	4	4	5	6	7
Output	0	1	2	3	4

b.

Input	3	5	7	9
Output	1	2	3	2

Solution

- a. The input 4 has two different outputs, 0 and 1. So, the relation is *not* a function.
- b. Every input has exactly one output, so the relation is a function.

USING THE GRAPH OF A RELATION You can use the *vertical line test* to determine whether a relation represented by a graph is a function. When a relation is *not* a function, its graph contains at least two points with the same x -coordinate and different y -coordinates. Those points lie on a vertical line.

KEY CONCEPT

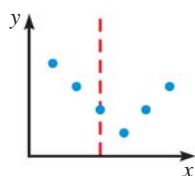
For Your Notebook

Vertical Line Test

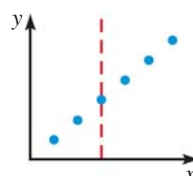
Words

A relation represented by a graph is a function provided that no vertical line passes through more than one point on the graph.

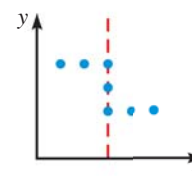
Graphs



Function



Function



Not a function