

RETEACHING 8.7 FUNCTIONS

The definition of functions and other related terms are given below, along with examples.

Definitions	Examples								
Relation A set of ordered pairs.	The set of ordered pairs $\{(2, 3), (1, 4), (-2, 4), (1, 5)\}$ is a relation.								
Domain The set of all first components of a relation.	The domain of the relation given above is $\{-2, 1, 2\}$.								
Range The set of all second components of a relation.	The range of the relation given above is $\{3, 4, 5\}$.								
Function A relation in which each element of the domain is paired with exactly one element of the range.	The relation given above is not a function because 1 in the domain is paired with both 4 and 5 in the range. The relation $\{(1, 4), (-1, 6), (2, 3), (4, 5)\}$ is a function because each element of the domain is paired with exactly one element from the range.								
Function Rule A way to describe a function.	The relation $y = 3x$ is a function and can be written as a function rule in three different ways. y is paired with $3x$ $y \rightarrow 3x$ $f(x) = 3x$ A value of x is the input for the function. The corresponding value of $f(x)$, or y , is an output . An input/output table for the function above is given below. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Input x</th> <th>Output $f(x)$</th> </tr> </thead> <tbody> <tr> <td>-2</td> <td>$f(-2) = 3(-2) = -6$</td> </tr> <tr> <td>0</td> <td>$f(0) = 3(0) = 0$</td> </tr> <tr> <td>2</td> <td>$f(2) = 3(2) = 6$</td> </tr> </tbody> </table>	Input x	Output $f(x)$	-2	$f(-2) = 3(-2) = -6$	0	$f(0) = 3(0) = 0$	2	$f(2) = 3(2) = 6$
Input x	Output $f(x)$								
-2	$f(-2) = 3(-2) = -6$								
0	$f(0) = 3(0) = 0$								
2	$f(2) = 3(2) = 6$								

EXERCISES

Identify the domain and range of each relation. Then determine if the relation is a function.

- $\{(-2, -2), (-1, 4), (0, 3), (0, 5)\}$ _____
- $\{(0, 3), (1, 5), (2, 4), (3, 5), (4, 4), (5, 2)\}$ _____

Complete the input/output table for each function.

3. $f(x) = -3x + 2$

Input x	Output $f(x)$
-1	
0	
1	

4. $f(x) = 4x - 3$

Input x	Output $f(x)$
-2	
0	
2	