

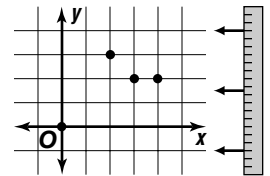
8-1 Relations and Functions (Pages 372–377)

A **relation** is a set of ordered pairs. The set of the first coordinates is the **domain** of the relation. The set of second coordinates is the **range** of the relation. You can model a relation with a table or graph.

Definition of a Function	A function is a relation in which each element in the domain is paired with exactly one element in the range. You can use the vertical line test to test whether a relation is a function.
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EXAMPLE

What are the domain and range of the relation graphed at the right? Is the relation a function?



The set of ordered pairs for the relation is $\{(2, 3), (3, 2), (4, 2), (0, 0)\}$.

The domain is $\{2, 3, 4, 0\}$.

The range is $\{3, 2, 0\}$.

Since no vertical line passes through more than one point on the graph for any x -value, the relation is a function.

Try These Together

1. What is the domain and range of this relation? Is this relation a function? $\{(2, 7), (3, 8), (2, 1)\}$

HINT: Is any x -value paired with more than one y -value?

2. What is the domain and range of this relation? Is this relation a function? $\{(11, -4), (-5, -3), (13, -3)\}$

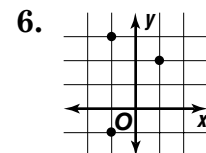
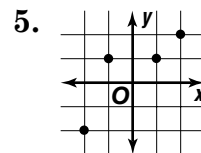
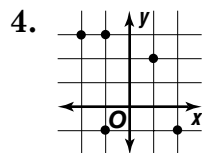
HINT: Is any x -value paired with more than one y -value?

PRACTICE

Express the relation shown in each table or graph as a set of ordered pairs. State the domain and range of the relation. Then determine whether the relation is a function.

3.

x	y
0	3
-1	4
-3	9



7. **Standardized Test Practice** What is the range of the relation $\{(7, 9), (10, 12)\}$?

A $\{7, 10\}$

B $\{9, 12\}$

C $\{7, 12\}$

D $\{9, 10\}$

<p>Answers: 1. D; 2. D; 3. $\{(0, 3), (-1, 4), (-3, 9)\}$; 4. $\{(3, 4), 9\}$; 5. $\{(1, 1), (1, 1), (1, 1)\}$; 6. $\{(1, 1), (1, 1), (1, 1), (1, 1)\}$; 7. B</p>
