Introduction to Functions – Day 1
Notes

Name ___________________________
Date ______________ Period ______

A function is a set of ordered pairs (x, y) in which each x-coordinate is paired with only one y-coordinate. In a list of ordered pairs belonging to a function, no x-coordinate is repeated.

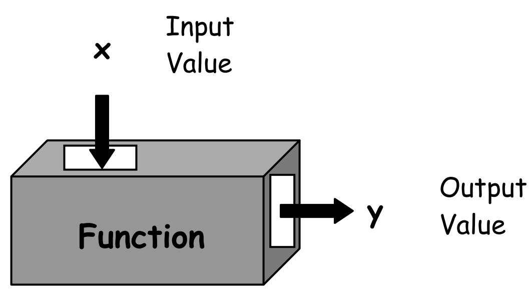
You can use a table to represent a function. Suppose you read a book at a constant rate of 50 pages an hour.

Elapsed Time	1	2	3	4	5	6
Pages Read	50	100	150	200	250	300

The number of pages you read can be described in terms of the number of hours you read.

In a functional relationship, for any given input there is a unique output.

In a functional relationship, for any given input there is a unique output.



If you are given an x-value belonging to a function, you can find the corresponding y-value.

If you input 5 hours into the function above, the output will be 250 pages.

There are two ways to test a set of ordered pairs to see whether it is a function.

<u>Examine the list of ordered pairs.</u>

If a set of ordered pairs is a function, no x-coordinate in the set is repeated. No x-coordinate should be listed with two different y-coordinates.

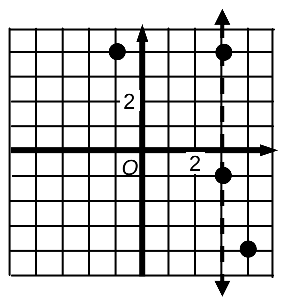
Is the set of ordered pairs a function? {(0, 4), (–2, 2), (0, 0)} • Two ordered pairs, (0, 4) and (0, 0), have the same x-coordinate. In a functional relationship, no x-coordinate should repeat. This set of ordered pairs is not a function.	Is the set of ordered pairs a function? {(5, –1), (–3, 4), (0, –1), (2, 7)} • Two ordered pairs, (5, –1) and (0, –1) have different x-coordinates but the same coordinate for y. This does not prevent the set of ordered pairs from being a functional relationship. This set of ordered pairs is a function.

Introduction to Functions – Day 1 Name ___________________________
Notes Date _______________ Period _______

Examine a graph of the function.

Use a vertical line to determine whether two points have the same x-coordinate. If two points in the function lie on the same vertical line, then they have the same x-coordinate, and the set of ordered pairs is not a function.

Do the ordered pairs graphed below represent a function?



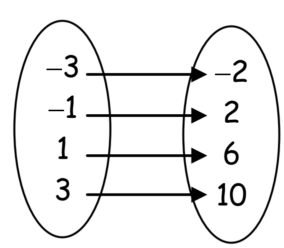
The ordered pairs (3, 4) and (3, –1) lie on a common vertical line.

They have the same x-coordinate, 3, but different y-coordinates, 4 and –1.

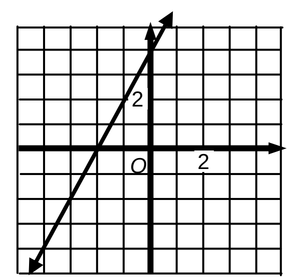
This graph does not represent a function because two points lie on the same vertical line.

In a function, the y-coordinate is described in terms of the x-coordinate. The value of the y-coordinate depends on the value of the x-coordinate.

Functional relationships can be represented in a variety of ways.

<table>
<tr><th>Method</th><th>Description</th><th>Example</th></tr>
<tr><td>List</td><td>List the ordered pairs.</td><td>{(–3, –2), (–1, 2), (1, 6), (3, 10)}</td></tr>
<tr><td>Table</td><td>Place the ordered pairs in a table.</td><td><table><tr><th>x</th><th>y</th></tr><tr><td>–3</td><td>–2</td></tr><tr><td>–1</td><td>2</td></tr><tr><td>1</td><td>6</td></tr><tr><td>3</td><td>10</td></tr></table></td></tr>
<tr><td>Mapping</td><td>Draw a picture that shows how the ordered pairs are formed.</td><td></td></tr>
</table>

Introduction to Functions – Day 1 Name ___________________________
Notes Date _______________ Period _______

Verbal Description	Use words to describe the functional relationship.	The y-values for the set of points are 4 more than twice the corresponding x-values.
Equation	Write an equation that describes the y-coordinate in terms of the x-coordinate.	$y = 2x + 4$
Function Notation	Write a special type of equation that uses f(x) to represent y.	$f(x) = 2x + 4$
Graph	Graph the ordered pairs.	

To use **function notation** to describe a function, give the function a name, typically a letter such as f, g, or h. Then use an algebraic expression to describe the y-coordinate of an ordered pair.

Suppose $f(x) = 2x + 5$.

- This function is read as "f of x equals 2 times x plus 5."
- If you input x, the output will be $2x + 5$.
- This means that the y-coordinate of an ordered pair is $2x + 5$.

The function described by $f(x) = 2x + 5$ is the same as the function described by $y = 2x + 5$.