Algebra 1 Notes SOL A.7 (1.6 1.7) Intro to Functions Mrs. Grieser

Name: _____ Block: _____ Date: _____

Functions

A function is a relationship that pairs inputs with outputs such that each input is paired with one and only one output.

Indicate whether the following pairings are functions:

a) (-1, 5), (0, 5), (2, 4), (6, -1): Function? (yes/no) _____ Why? _____

b) (-2, 10), (0, 1), (2, 8), (-2, -10): Function? (yes/no)_____ Why? _____

Functions consist of:

- A set of inputs called the domain.
- A set of outputs called the range.

An input-output table may be used to represent function pairings. The domain will be the set of inputs and the range will be the set of outputs.

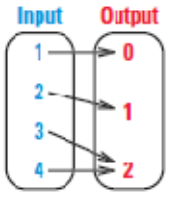
Example 1: The input-output table below represents the cost of various amounts of regular gasoline when the price per gallon is $1.99:

Input	10	12	13	17
Output	19.99	23.99	25.99	33.98

The domain of the function is: _____

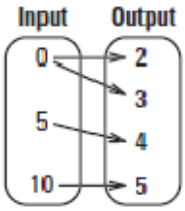
The range of the function is: _____

Mapping Diagrams may be used to represent a function. The output may be paired with more than one input, but there is no input that is paired with more than one output (because then it would not be a function.



Example 2: Tell whether the pairings below represent a function.

a)



This pairing is / is not a function.

Why?

b)

Input	Output
0	0
1	2
4	8
6	12

This pairing is / is not a function.

Why?

Function rules relate one variable to another. The input variable is the independent variable and the output variable is the dependent variable, since its value is dependent on the value of the input.

Example 3: The rule for a function is y = 2x. The domain is 0, 2, 5, 7, and 8. Make a table for the function, then identify the range.

Input	0	2	5	7	8
Output					

Range = _____

Example 4: Write a rule for the function represented by the table below:

Input	0	1	4	6	10
Output	2	3	6	8	12

Let x be the independent variable and y be the dependent variable.

Each output is _____ more than the input. So the rule is y = _____.

Example 5: You are buying concert tickets that cost $15 each. You can buy up to 6 tickets. Write the amount (in dollars) you spend as a function of the number of tickets you buy. Identify the independent and dependent variables. Then identify the domain and range of the function.

Independent variable: _____ Dependent variable: _____

Let n = the number of tickets bought. The rule would be: y = _____

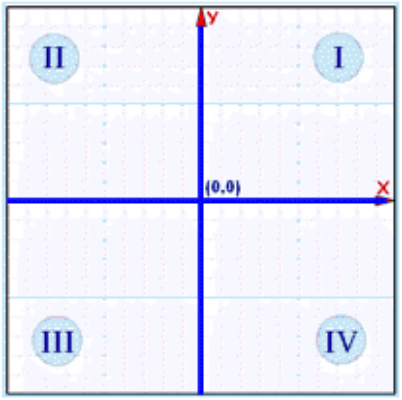
Because you can buy up to 6 tickets, the domain would be: _____

Input	0	1	2	3	4	5	6
Output							

The range would be: _____

Graphically Representing Functions

Given a table of values that represents a function, we can graph the values on a graph using the Cartesian coordinate system. Each input and output in the table make up an ordered pair. The ordered pairs are plotted on a graph, made up of two intersecting, perpendicular lines. These lines are called axes, and they divide the graph into four quadrants. The horizontal axis is the x-axis, and the vertical axis is the y-axis. We put input values, called x-coordinates, horizontally along the x-axis and output values, called y-coordinates, vertically along the y-axis.



Table

Input, x	Output, y
1	2
2	3
4	5

Ordered Pairs

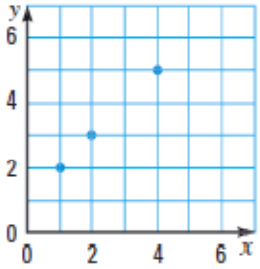
(input, output)

(1, 2)

(2, 3)

(4, 5)

Graph



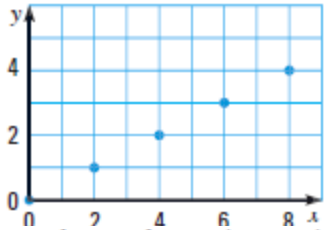
Example 1: Graph the function $y = \frac{1}{2}x$ with domain 0, 2, 4, 6, 8.

Solution:

STEP 1 **Make** an input-output table.

x	0	2	4	6	8
y	0	1	2	3	4

STEP 2 **Plot** a point for each ordered pair (x, y).

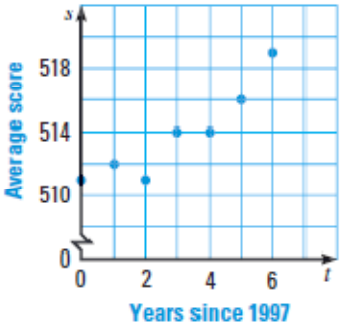


Example 2: **SAT SCORES** The table shows the average score s on the mathematics section of the Scholastic Aptitude Test (SAT) in the United States from 1997 to 2003 as a function of the time t in years since 1997. In the table, 0 corresponds to the year 1997, 1 corresponds to 1998, and so on. Graph the function.

Years since 1997, t	0	1	2	3	4	5	6
Average score, s	511	512	511	514	514	516	519

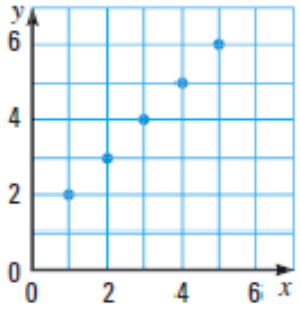
STEP 1 **Choose** a scale. The scale should allow you to plot all the points on a graph that is a reasonable size.

- The t-values range from 0 to 6, so label the t-axis from 0 to 6 in increments of 1 unit.
- The s-values range from 511 to 519, so label the s-axis from 510 to 520 in increments of 2 units.



STEP 2 **Plot** the points.

Example 3: Write a rule for the function represented by the graph.



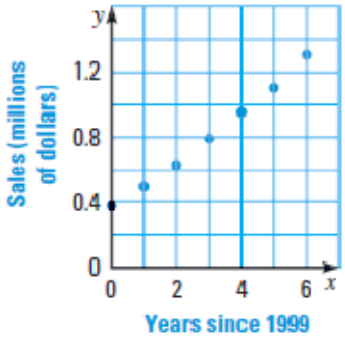
Step 1: Create a table of points.

x	1	2	3	4	5
y	2	3	4	5	6

Step 2: Look for a relationship between inputs and outputs. We can see that each output is one more than its input.

Step 3: Write a rule for the relationship: $y = x + 1$

Example 4: The graph at the right shows guitar sales (in millions of dollars) for a chain of music stores for the period 1999 – 2005. Identify the independent and dependent variables. Describe how sales changed over the period and how you would expect sales in 2006 to compare to sales in 2005.



Solution: The independent variable is the years since 1999. The dependent variable is the sales. The graph shows sales increasing. If the trend continues the same way it has been, sales in 2006 should be greater than they were in 2005.