4.6 Relations and Functions

Lesson Vocabulary

Relation: A set of _____ _____.

Domain: The set of _____ values in an ordered pair.

Range: The set of _____ values in an ordered pair.

Function: A relation in which every x value has only one y value. The X's can't _____!!!!!

Vertical Line Test: A way to test if a graph is a function or not.

Function Notation: To write a rule in function notation, you use the symbol _____ instead of _____. It is read "F of X"
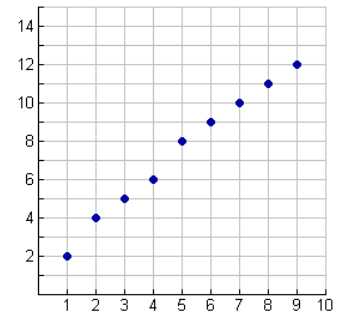

Identifying Domain and Range

List the domain and range for each relation.

1.   (4, 0) (2, 8) (6, -1) (10, 4)

2.

x	y
9	2
3	-2
-3	-6
-9	-10

3.

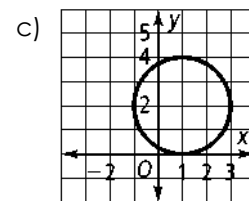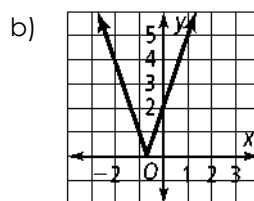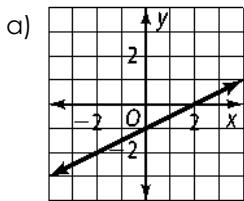### Identifying Functions by Comparing X-Values

Are the following relations functions? Compare the x-values by setting up a table or mapping.

   a)   (2, 4) (3, 5) (5, 10) (2, 7)   b)   (1, 1) (2, 2) (3, 3) (4, 4) (5, 5)

Identifying Functions Using the Vertical Line Test

Drop a straight line through the graph. If it touches it twice, it is not a function!

a)

b)

c)

Evaluating a Function

Step 1: Substitute the number inside f( ) into the equation for x.
Step 2: Simplify the equation.
Step 3: Rewrite as a solution set.

Evaluate each of the following.

   a) $f(x) = 3x + 4$ for $f(2)$ b) $f(x) = 3x^2 + 4$ for $f(6)$ c) $f(x) = -12x + 1$ for $f(-3)$

Evaluate each of the following.

a) f(x) = 3x + 4 for f(x + 1)   b) f(x) = 4(x + 2) for (3x)   c) f(x) = -(x + 3) for (x² + 2)

Finding the Range of a Function
Step 1: Substitute each value of the domain into the equation separately.
Step 2: Simplify each equation separately.
Step 3: Write your solutions in a solution set.

a) The domain of f(x) = 2x + 12 is {-2, -1, 0, 1, 2}. What is the range?

b) The domain of g(x) = –4x – 12 is {1, 3, 5, 7}. What is the range?

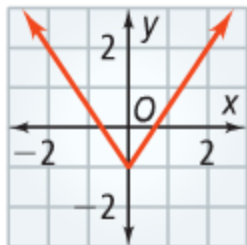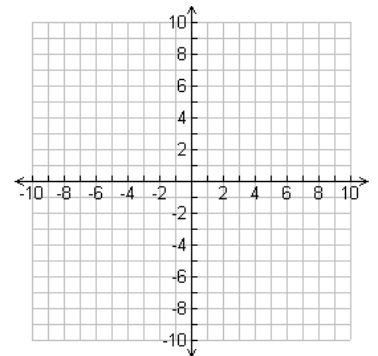**Lesson Check:** Do you know how?

1. Use the relation {(-2, 3), (-1, 4), (0, 5), (1, 6)} to answer the following questions.
    a. Identify the domain and range of the relation.
    b. Represent the relation as a graph and as a table.
    c. Is the relation a function?

x	y

Domain:

Range:

2.   Is the graph to the left a function? Use the vertical line test.

3.   What is f(2) for the function f(x) = 4x + 1?

4. The domain of f(x) = ½x is {-4, -2, 0}. What is the range?