Goal: Give definitions, properties and representations of functions
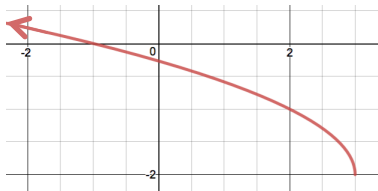
Notes	Questions

Warm Up: Determine whether the relation is a function in 1-2. Explain. Then list the domain and range.

1.

2.

x	y
1	-2
-1	2
-2	4
1	3

Vocabulary

relation:

independent variable:

dependent variable:

What is a Function?

A **function** is a _____ (x, y) in which each first component (x) is paired with _____ second component (y).

    Example　　　　　　　　　　Non-example

$$f = \left\{(1,2),(2,4),(3,7)\right\}$$　　$$g = \left\{(1,2),(2,4),(1,7)\right\}$$

domain:

range:

1

Questions	
	real functions:

The symbol	represents the set of all
$\mathbb{Z}$	integers.
$\mathbb{R}$	real numbers.
$\mathbb{Q}$	rational numbers.
$\mathbb{N}$	natural numbers.

Example 1: A bakery charges $2.00 per muffin. Customers get a $2.00 discount for every 6 muffins purchased.

    a. Which statement is true: "the cost c is a function of the number m of muffins" or "the number m of muffins is a function of the cost c?"

    b. Identify the independent and dependent variables of the function.

    c. State the domain and range of the function.

Example 2:

The Sudoku Club at a high school needs t-shirts for their upcoming tournament. They were able to negotiate a "buy-two-get-one-free" deal from a local store. The cost for one t-shirt is $10.

a. Which statement is true: "the cost c is a function of the number t of t-shirts" or "the number of t-shirts t is a function of the cost c?"

b. Identify the independent and dependent variables of the function.

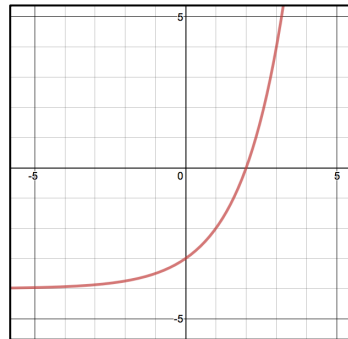c. State the domain and range of the function.

Descriptions of Functions	Questions
Descriptions of Functions	**Questions**

Descriptions of Functions

Three ways to describe/represent functions are:

1.

2.

3.

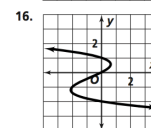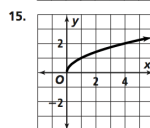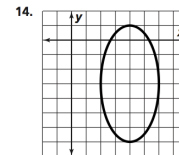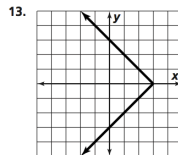Example 3: A rule for the function graphed at the right is $y = 2^x - 4$.

Find the domain and range of the

function.

Example 4: Find the domain and range of the function with the rule

$y = 3(x-5)^2 - 1$.

Testing for Functions: Use the *vertical line test* to determine which

are functions to the right.

13.

14.

15.

16.

Questions	
	### Naming Functions & Their Values

Functions can be named with letters, such as *f* or *g*. The symbol $f(x)$ is read "_____".

<u>Example 5:</u> Suppose *f* is defined by the rule $f(x) = 4 \cdot \left(\dfrac{1}{2}\right)^x$ for all real numbers *x*.

a. Evaluate $f(5)$ b. Does $f(-2+3) = f(-2) + f(3)$?

c. Evaluate $f(n+1)$.

<u>Example 6:</u> Suppose *g* is defined by the rule $g(x) = 2x^2 - 3x - 2$ for all real numbers *x*.

a. Evaluate $g(-2)$ b. Does $g(-2+3) = g(-2) + g(3)$?

c. Evaluate $g(2n-1)$.