1.4 Functions

<u>**A function**</u> is a set of ordered pairs in which each input has exactly one output (there is no x value that occurs MORE THAN ONCE.)

Characteristics of a function from set A to set B:

1. Each element in A must be matched with an element in B
2. Some elements in B may not be matched with any element in A
3. Two or more elements in A may be matched with the same element in B
4. An element in A (the domain) cannot be matched with two different elements in B

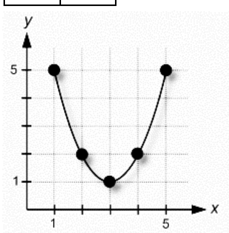
Testing for Functions

Determine whether the relation represents y as a function of x

a.) The input value x is the number , and the output value y is the

b.)

x	y

c.) 

Function Notation

When an equation is used to represent a function, it is convenient to name the function so that it can be referred to easily. *Input* *Output* *Equation* $f(x)$ and y are the same thing!

x $f(x)$ $f(x) = x^2 - 3$

How to evaluate a function → example: $f(x) = 3 - 2x$ for $x = -1$ $\boldsymbol{f(-1)} = 3 - 2(-1) = 3 + 2 = 5$

Examples: Let $g(x) = -x^2 + 4x + 1$. Find each function value.

a.)

b.)

c.)

Example: d.) Evaluate the piece-wise function when $x = -1, 0, and\ 1$.

Domain and Range

The **domain** of a function, or relation, are the x values. They are all of the values for which a function is defined.

> On a graph, to determine the domain, you are going to ask yourself if and where there is a point where the graph stops and does not go any farther to the left, and/or stops and does not go any father to the right.

The **range** of a function, or relation, are the y values.

> On a graph, to determine the range, you are going to ask yourself if and where there is a point where the graph stops and does not go any farther up, and/or stops and does not go any father down.

Examples: Find the domain of each function.

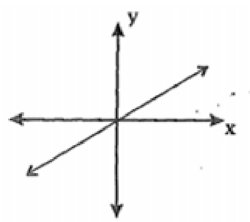
d.)

e.)

$f.)$

Examples – Determine the domain and range of each.

g.)



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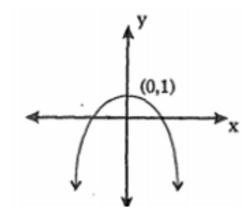

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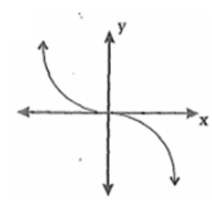

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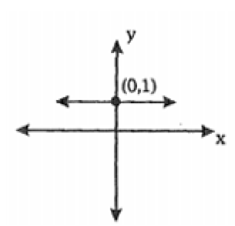
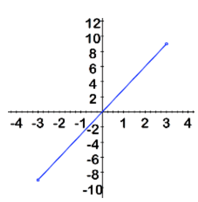


k.)



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