UNIT 1-LESSON 6 - Domain, Range and Functions

A relation is a relationship between two sets of data.

Domain - the set of all potential inputs (x-value)

Range - the set of all potential outputs (y-value)

Function - For every value of x, there is exactly one value of f(x)

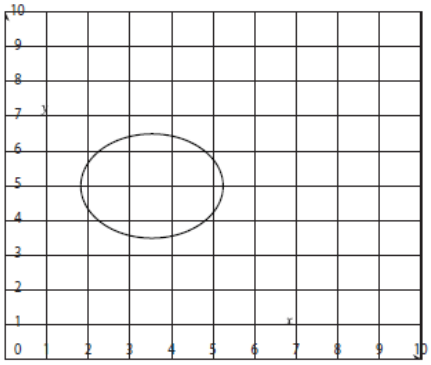
Vertical Line Test – process used to determine whether a relation is a function.

Example 1) Is the relation below a function? If the x-values do not repeat – the relation is a FUNCTION

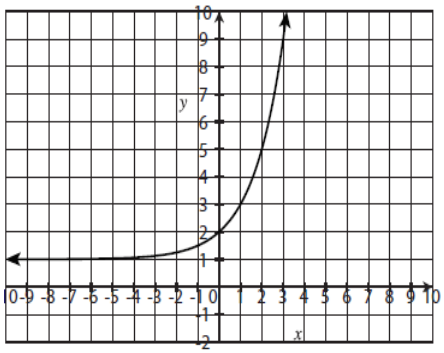
{(4,-5), (1,3), (0, 0), (1, 1), (4, 5), (9, 3)} This example is NOT A FUNCTION since the x-values repeat (1 and 4 repeat

Example 2)

Graph A



Graph B



Use the Vertical Line Test will be used for graphs. Draw a vertical line through the graph. If the line only touches the graph once – FUNCTION

Graph A – NOT A FUNCTION

Graph B - FUNCTION

Example 3)

Omar has decided to take yoga classes for one year. The yoga studio costs $10 to join and then each yoga class is $5. Omar's fees can be represented by the function f(x) = 5x + 10. What are the domain and range of the function?

The function was given: f(x) = 5x + 10
Plug in days for x = Start with 0 – 365 (number of days in a year)

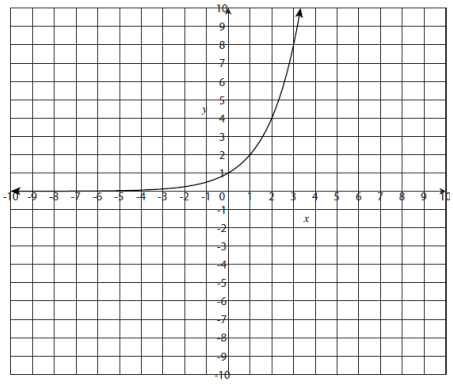
Domain= x-values; Range= y-values
Domain= {0, 1 …. 365}
Range= {10, 15 …. 1835}

f(x) = 5x + 10; when x=0
f(x) = 5(0) + 10
= 10

f(x) = 5x + 10; when x=1
f(x) = 5(1) + 10
= 15

Example 4)

Identify the domain and range of the function $f(x) = 2^x$. Use the graph below.



This is an exponential function. It is ever increasing.

Domain = {all real numbers}

Range = {y > 0} this is because the graph only has positive values

EVALUATING FUNCTIONS

Function Notation = f(x)

Means "f of x" not "f times x"

(x, f(x)) is an ordered pair of a function and a point on the graph of the function.

Example 1) Evaluate f(x) = 4x – 7 over the domain {1, 2, 3, 4}. What is the range?

For every domain (x-values) plug into the function and solve for the range (y-values)

f(x) = 4x – 7, when x = 1
= 4(1) – 7
= -3

f(x) = 4x – 7, when x = 2
= 4(2) – 7
= 1

f(x) = 4x – 7, when x = 3
= 4(3) – 7
= 5

f(x) = 4x – 7, when x = 4
= 4(4) – 7
= 9

ANSWER: Range = {-3, 1, 5, 9}

Example 2) Evaluate $g(x) = 3^x + 1$ over the domain {0, 1, 2, 3}. What is the range?

For every domain (x-values) plug into the function and solve for the range (y-values)

$g(x) = 3^x + 1$, when x = 0
$= 3^0 + 1$
$= 1$

$g(x) = 3^x + 1$, when x = 1
$= 3^1 + 1$
$= 4$

$g(x) = 3^x + 1$, when x = 2
$= 3^2 + 1$
$= 10$

$g(x) = 3^x + 1$, when x = 3
$= 3^3 + 1$
$= 28$

Example 3) Raven started an online petition calling for more vegan options in the school cafeteria. So far, the number of signatures has doubled every day. She started with 32 signatures on the first day. Raven's petition can be modeled by the function $f(x) = 32(2)^x$. Evaluate f(3) and interpret the results in terms of the petition.

X = number of days
32 = number of signatures
2 = doubled every day

$f(x) = 32(2)^x$ Plug in the x-value of 3
$f(3) = 32(2)^3$
$f(3) = 32(8)$
$f(3) = 256$ the number of signatures she collected on day 3