**5.5 – Graphs of Relations and Functions**

**Reminder:**

 A ***function*** is a relation where each value of x associates with EXACTLY ONE value of y.

The ***domain*** of a function is the set of values of the independent (*x*) variable.

The ***range*** of a function is the set of values of the dependent (*y*) variable.

**Note:**

When the domain is restricted to the set of ***discrete*** (whole #’s that can be counted, like # of people or age) values, the points on the graph are not connected. One way to remember this is as follows: NOT continuous, NOT connected.

**Vertical Line Test**

A graph represents a function when no two points on the graph lie on the same vertical line.



**Example 1: Identifying the Graph of a Function**

Which of these graphs represents a function? Justify each answer.

a) b)

 

**Answers:**

a) is a function because it passes the vertical line test; b) does not pass the vertical line test as there will be one domain value (-1) that is associated with two range values (2, -1), which violates the definition of a function

**Reminder:**

A dot at the end of a graph indicates that the graph stops at that point.

**Example 2: Determining the Domain and Range of a Function**

Determine the domain and range of each function below.



Domain: *x ≤ 4* Range: *y ≤ 2* Domain: *-1 ≤ x ≤ 3* Range: *-4 ≤ y ≤ 0*

**Example 3: Finding Values from the Graph of a Function**

Here is a graph of the function *f(x) = −2x – 4.*

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*a)* Determine the range value when the domain value is 3.

*b)* Determine the domain value when the range value is 6.

**Answers:**

There are 2 methods in which to solve this problem:

1. Using the graph

2. Using substitution

*a) f(x) = −2x – 4*

 *y = −2(3) – 4*

 *y = −10*

**Note:** You could also have extended the graph and drawn vertical and horizontal lines to find this value.

*b) f(x) = −2x – 4*

 *(6) = −2x – 4*

 *10 = −2x*

 *x = −5*