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

2 x = -x = -1 = 1 x = 2

$$f(x) = 3(-2)^2 \qquad f(x) = 3(1)^2 \qquad f(x) = 3(1)^2$$
$$f(x) = 3(4) \qquad f(x) = 3(1) \qquad f(x) = 3(1)$$
$$f(x) = 12 \qquad f(x) = 3 \qquad f(x) = 3$$

From the table, take note that an input of -2 and 2 gives an output of 12 and an input of -1 and 1 gives an output of 3. The correspondence is many-to-one. For every value of x, there corresponds a unique value of f(x). Therefore, the equation $f(x) = 3x^2$ is a function.

Example 6: Determine if $( )$ $\sqrt{\ }$ is a function

Solution: Assign some values for x and compute for the corresponding values of f(x).

x	1	4	9	16
f(x)	1	2	3	4

The equation $f(x) = \sqrt{x}$ represents a function.

Function Represented by a Graph

Vertical Line Test The vertical line test determines whether a relation is a function or not by passing or drawing a vertical line through the graph of its ordered pairs. A relation is a function if the vertical line intersects or passes through its graph in only one point. Conversely, a relation is not a function if the vertical line intersects or passes through its graph in two or more points.

The following relations are examples of functions. Note that the vertical line intersects or passes through the graph of each of the relations in only one point.