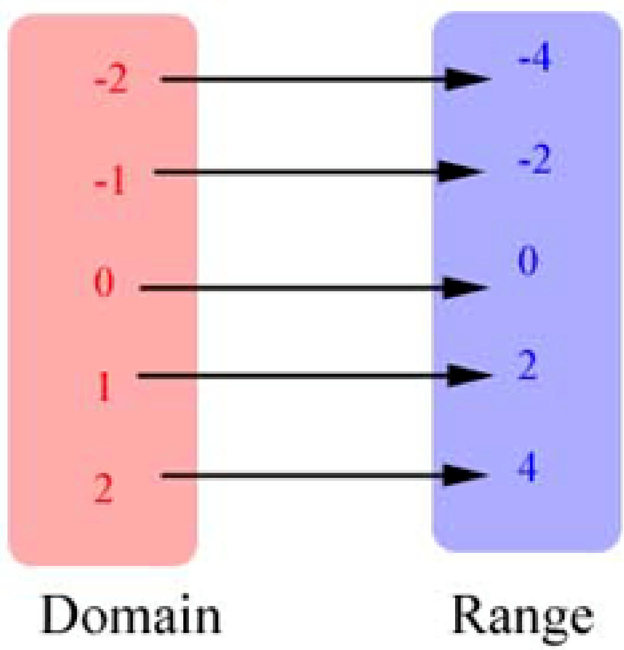
A ***function*** is a correspondence in which each member of the **Domain** is matched with exactly one member of the **Range.**

This correspondence can be illustrated by using a ***mapping diagram*** as shown below.



Functions are often named by letters and may use the letters ***f, g, h.***

Two different notations may be used to represent functions:

1) $f(x) = 2x$ which is read "***f of x***" and represents the value of the function at x.

2) $f: x \rightarrow 2x$ which is read ***f***, the function that assigns x to 2x.

Ex 1) Find the Range of the given function if the
Domain = {1, 2, 3}

This can also be written as find: f(1), f(2), and f(3) for the function.

$f(x) = x^2 - 5$ also written as $f: x \rightarrow x^2 - 5$

$f(1) = 1 \rightarrow \overset{f(x)}{\boxed{x^2 - 5}} \rightarrow -4$

$f(2) = 2 \rightarrow \overset{f(x)}{\boxed{x^2 - 5}} \rightarrow -1$

$f(3) = 3 \rightarrow \overset{f(x)}{\boxed{x^2 - 5}} \rightarrow 4$

Range = {-4, -1, 4}

Ex 2) Given that f(x) = 3x - 5 and g(x) = 2x + 4
a) find f(g(2))
b) and find g(f(2))

a) $f(g(2)) = 19$

$$2 \rightarrow \overset{g(x)}{\boxed{2x+4}} \xrightarrow{8} \overset{f(x)}{\boxed{3x-5}} \rightarrow 19$$

b) $g(f(2)) = 6$

$$2 \rightarrow \overset{f(x)}{\boxed{3x-5}} \xrightarrow{1} \overset{g(x)}{\boxed{2x+4}} \rightarrow 6$$

Ex 3) Find the Domain of the function:

$$f(x) = \frac{x}{x-5}$$

Translation: What value of x would make the denominator equal to zero?

$x \neq 5$

Domain = {all real numbers except $x \neq 5$}