## Algebraic operation on function

If f and g are real-valued functions of x with domains A and B, respectively, then both f and g are defined within their respective domains. $A \cap B$ Now we defined $f + g, f - g, (f, g)$ and (f/g) as follows:

$$\left.\begin{aligned}(f \pm g)(x) = f(x) \pm g(x)\\ (f.g)(x) = f(x) \cdot g(x)\end{aligned}\right] - \text{ domain in each case is } A \cap B$$

$(\frac{f}{g})(x) = \frac{f(x)}{g(x)}$ domain is $\{x \mid x \in A \cap B \text{ such that } g(x) \neq 0\}$.

$(kf)(x) = hf(x)$ where k is a scalar.

## Equal or identical Function

Two functions, f and g, are considered equal if.

**1.** The domain of f equals the domain of g.

**2.** The range of f is equal to the range of g, and

**3.** $f(x) = g(x)$, for every x belonging to their common domain eg. $f(x) = \frac{1}{x}$ & $g(x) = \frac{x}{x^2}$ are identical function.

**Ex.** The mathematical function $f(x) = \log(\frac{x-1}{x-2})(x - 1) - \log(x - 2)$ and $g(x) = \log$ are identical when x lies in the interval.

**Sol.** Since $f(x) = \log(x - 1) - \log(x - 2)$.

Domain of f(x) is $x > 2$ or $x \in (2, \infty)$ ... (1)

$g(x) = \log(\frac{x-1}{x-2})$ is defined if $\frac{x-1}{x-2} > 0$

$x \in (-\infty, 1) \cup (2, \infty)$ ... (2)

From (1) and (2) $x \in (2, \infty)$