ALGEBRA

Logarithm

$If\ a^x = M, then\ x = \log_a M$

Rules of Logarithm:-

(1) $\log_a 1 = 0$

(2) $\log_a a = 1$

(3) $a^{\log_a M} = M$

(4) $\log_a MN = \log_a M + \log_a N$

(5) $\log_a \left(\frac{M}{N}\right) = \log_a M - \log_a N$

(6) $\log_a M^n = n \log_a M$

(7) $\log_a M = \log_b M \times \log_a b$

(8) $\log_b a \times \log_a b = 1$

(9) $\log_b a = \frac{1}{\log_a b}$

(10) $\log_b M = \frac{\log_a M}{\log_a b}$

(11) $\log_a M = \frac{\log M}{\log a}$

(12) $\log e = 1$

Note: $If\ base\ of\ logarithm\ is\ not\ mentioned, then\ it\ is\ taken\ 10.$

Complex Number

$z = x + iy$

$where,$

$i = \sqrt{-1}\ \&\ x, y \in R.$

$x\ is\ called\ the\ real\ part\ \&\ iy\ is\ called\ the\ imaginary\ part.$

Properties of Complex Number

(1) $|z| = |x + iy| = \sqrt{x^2 + y^2}$

(2) $Amp\ z\ (or\ Arg\ z) = \tan^{-1}\left(\frac{y}{x}\right) = \theta$

$If\ -\pi < \theta \leq \pi, then\ \theta\ is\ called\ the\ Principal\ value\ of\ the\ argument.$

(3) $If\ z = x + iy\ \&\ in\ complex\ plane,$

$(x, y)\ is\ in\ 1st\ quadrant, \quad then\ 0 < P.V.of\ \theta < \frac{\pi}{2}$

$(x, y)\ is\ in\ 2nd\ quadrant, \quad then\ \frac{\pi}{2} < P.V.of\ \theta < \pi$