Contents

Expression for expansion of a constant raised to the power of x

$$a^x = 1 + \frac{x}{1!}\log_e a + \frac{x^2}{2!}(\log_e a)^2 + \text{........} + \frac{x^r}{r!}(\log_e(a))^r + \text{......to}\infty$$

Scope of application of expansion of constant raised to the power of x

All values of x

Proof for the expansion of a constant raised to the power of x

- $$a = e^k$$

- $$k = \log_e(a)$$

- $$a^x = (e^k)^x = e^{kx}$$

- $$a^x = 1 + \frac{kx}{1!} + \frac{(kx)^2}{2!} + \text{......} + \frac{(kx)^r}{r!} + \text{......to}\infty$$

- $$a^x = 1 + \frac{x}{1!}\log_e a + \frac{x^2}{2!}(\log_e a)^2 + \text{........} + \frac{x^r}{r!}(\log_e a)^r + \text{......to}\infty$$