

The Binomial Series and Applications of Taylor Series

The binomial series for $-1 < x < 1$

$$(1+x)^m = 1 + \sum_{k=1}^{\infty} \binom{m}{k} x^k$$

$$\left(1 - \frac{2}{x}\right)^{\frac{1}{3}} = 1 + \sum_{k=1}^{\infty} \binom{\frac{1}{3}}{k} \left(\frac{-2}{x}\right)^k$$

$$(1+x^2)^3 =$$

$$\int_0^{-2} \frac{e^{-x} - 1}{x} dx =$$

$$\lim_{\theta \rightarrow 0} \frac{\sin \theta - \theta + \left(\frac{\theta^3}{6}\right)}{\theta^5} =$$

$$x^2 - 2x^3 + \frac{2^2 x^4}{2!} - \frac{2^3 x^5}{3!} + \frac{2^4 x^6}{4!} - \dots =$$