

11.12 Binomial Series

Whole numbers: n, m Real number: x Combinations: ${}^n C_m$

$$1242. (1+x)^n = 1 + {}^n C_1 x + {}^n C_2 x^2 + \dots + {}^m C_n x^m + \dots + x^n$$

$$1243. {}^n C_m = \frac{n(n-1)\dots[n-(m-1)]}{m!}, \quad |x| < 1.$$

$$1244. \frac{1}{1+x} = 1 - x + x^2 - x^3 + \dots, \quad |x| < 1.$$

$$1245. \frac{1}{1-x} = 1 + x + x^2 + x^3 + \dots, \quad |x| < 1.$$

$$1246. \sqrt{1+x} = 1 + \frac{x}{2} - \frac{x^2}{2 \cdot 4} + \frac{1 \cdot 3x^3}{2 \cdot 4 \cdot 6} - \frac{1 \cdot 3 \cdot 5x^4}{2 \cdot 4 \cdot 6 \cdot 8} + \dots, \quad |x| \leq 1.$$

$$1247. \sqrt[3]{1+x} = 1 + \frac{x}{3} - \frac{1 \cdot 2x^2}{3 \cdot 6} + \frac{1 \cdot 2 \cdot 5x^3}{3 \cdot 6 \cdot 9} - \frac{1 \cdot 2 \cdot 5 \cdot 8x^4}{3 \cdot 6 \cdot 9 \cdot 12} + \dots, \quad |x| \leq 1.$$