

Important Series

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- **Geometric series**

$$\sum_{k=0}^{\infty} ar^k = \frac{a}{1-r}, |r| < 1.$$

- **Derivative of the Geometric series**

$$\sum_{k=0}^{\infty} akr^{k-1} = \frac{a}{(1-r)^2}, |r| < 1.$$

- **Binomial series**

$$\sum_{k=0}^{\infty} \binom{\alpha}{k} x^k = (1+x)^\alpha.$$

- **Exponential series**

$$\sum_{k=0}^{\infty} \frac{x^k}{k!} = e^x.$$

- **Taylor series (of f around a)**

$$\sum_{k=0}^{\infty} \frac{f^{(k)}(a)}{k!} (x-a)^k = f(x).$$