

Finding the Radius of Convergence

Use the ratio test to find the radius of convergence of the power series

$$\sum_{n=1}^{\infty} \frac{x^n}{n}.$$

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$$\sum_{n=1}^{\infty} \frac{x^n}{n}.$$

$$\lim_{n \rightarrow \infty} \left| \frac{x^{n+1}}{n+1} \cdot \frac{n}{x^n} \right|$$

$$= \lim_{n \rightarrow \infty} \left| \frac{nx}{n+1} \right|$$

$$= \left| \frac{nx}{n} \right|$$

$$= |x|$$

$$\therefore |x| < 1.$$