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$$\cos x = (\sin x)'$$

$$= 1 - \frac{x^2}{2!} + \frac{x^4}{4!} \dots$$

$$= \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n}}{n!}$$

By ratio test $\lim_{n \rightarrow \infty}$

$$\frac{1}{R} = \lim_{n \rightarrow \infty} \left| \frac{a_{n+1}}{a_n} \right| = \left| \frac{x^2}{(n+1)(2n+2)} \right| \leq 0$$

$\Rightarrow$ for every $x \in \mathbb{R}$ the series
conv.