

DoNow

1. Does the Maclaurin series for $\cos(x)$ at $x = 1$ converge conditionally or absolutely? Explain.
2. Does the Maclaurin series for $\ln(1 + x)$ at $x = 1$ converge conditionally or absolutely? Explain.

From Yesterday for the Board

3. Without consulting your notes, demonstrate how to find the first 4 non-zero terms of the Maclaurin series for:

(a) e^x

(d) $\frac{1}{1-x}$

(g) $\frac{1}{1+x^2}$

(b) $\sin(x)$

(e) $\frac{1}{1+x}$

(h) $\arctan(x)$

(c) $\cos(x)$

(f) $\ln(1+x)$

New Questions

4. For what values of x does this power series

$$\sum_{k=1}^{\infty} \frac{kx^k}{3^k}$$

converge. Explain your reasoning.

5. These are converging Maclaurin series. For each series:

- Identify the function.
- Identify the value of x .
- Find the sum.

(a) $1 + 1 + \frac{1}{2!} + \frac{1}{3!} + \frac{1}{4!} + \dots$

(b) $1 - \frac{1}{3} + \frac{1}{3^2} - \frac{1}{3^3} + \dots$

(c) $\frac{1}{2!} - \frac{1}{3!} + \frac{1}{4!} - \frac{1}{5!} + \dots$

(d) $1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \dots$

(e) $1 - \frac{1}{3!} + \frac{1}{5!} - \frac{1}{7!} + \dots$

(f) $1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \dots$

6. Use sigma notation to rewrite each series in question 5. Here is an example for (a):

$$S_a(x) = \sum_{k=0}^{\infty} \frac{x^k}{k!}$$

Note that *zero factorial* has a defined value of 1.