

§10.8 Choosing a Convergence Test

Please Review all convergence tests (see page 701)
These are like tools in a toolbox. You need to know which is the right tool for a particular job. Knowing this takes practice and experience.

General Comments

- ① Integral test is rarely used. It comes at a cost. You need to show $f(x) > 0$ and $f(x)$ decreases and work out the integral.
- ② Integral test and comparison tests work only for positive-term series.
- ③ For series that may contain negative terms, use Theorem $\sum |a_k|$ converges $\Rightarrow \sum a_k$ converges OR root or ratio tests
- ④ Ratio test is very versital. Useful!

Exercises Pick a test and determine convergence.

$$\textcircled{1} \sum_{k=1}^{\infty} \frac{1}{e^k + 2}$$

$$\textcircled{4} \sum_{k=1}^{\infty} (-1)^k \left(\frac{k+2}{3k-1} \right)^k$$

$$\textcircled{2} \sum_{k=1}^{\infty} \frac{e^k}{3e^k + 2}$$

$$\textcircled{5} \sum_{k=1}^{\infty} \frac{\cos(e^k)}{2^k}$$

$$\textcircled{3} \sum_{k=1}^{\infty} \frac{(-1)^k}{k 5^k}$$