

Solutions

Each answer shows the steps, then the **result**.

2.1

$$\bullet \frac{a_{n+1}}{a_n} = \frac{3^{n+1}/(n+1)!}{3^n/n!} = \frac{3}{n+1}$$

2.2

$$\bullet \frac{3}{n+1} \rightarrow 0 < 1, \text{ so the series } \mathbf{converges}$$

2.3

- The ratio test is inconclusive; use another test (the p-series rule)

3.1 C

- inconclusive when $L = 1$

3.2

(a)

$$\bullet \frac{a_{n+1}}{a_n} = \frac{(n+1)!/10^{n+1}}{n!/10^n} = \frac{n+1}{10} \rightarrow \infty$$

(b)

- $L > 1$, so it **diverges**

3.3

$$\bullet \frac{a_{n+1}}{a_n} = \frac{5^{n+1}/(n+1)^2}{5^n/n^2} = 5 \cdot \frac{n^2}{(n+1)^2} \rightarrow 5; L = 5 > 1, \text{ so it } \mathbf{diverges}$$