

8.1

$$39 \mid a_n = n \sin\left(\frac{1}{n}\right)$$

$$\lim_{n \rightarrow \infty} \frac{n \sin\left(\frac{1}{n}\right)}{\frac{1}{n}}$$

$$\lim_{n \rightarrow \infty} \frac{\cos\left(\frac{1}{n}\right) \left[\frac{-1}{n^2}\right]}{\left[\frac{-1}{n^2}\right]} = 1$$

$$\rightarrow x = \frac{1}{n} \quad \lim_{x \rightarrow 0} \frac{1}{x} \sin x$$

$$\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$$

$$53 \mid a_n = n \sin\left(\frac{3\pi}{n}\right)$$

$$\lim_{n \rightarrow \infty} \frac{n \sin\left(\frac{3\pi}{n}\right)}{\frac{3\pi}{n}}$$

$$\lim_{n \rightarrow \infty} \frac{\cos\left(\frac{3\pi}{n}\right) \left[\frac{-3\pi}{n^2}\right]}{\left[\frac{-3\pi}{n^2}\right]} = 3\pi \quad D$$

$$41 \mid \lim_{n \rightarrow \infty} \frac{\sin n}{n} = 0$$

$$35 \mid a_n = (-1)^n \frac{n-1}{n+3}$$

$$\lim_{n \rightarrow \infty} (-1)^n \frac{n-1}{n+3} \quad \text{DIVERGES}$$

$$43 \mid \lim_{n \rightarrow \infty} \frac{1}{n!} = 0$$