

DETERMINE IF EACH OF THE FOLLOWING SERIES IS

a) ABSOLUTELY CONVERGENT, b) CONDITIONALLY CONVERGENT, OR c) DIVERGENT,

SHOW ALL YOUR WORK, AND IDENTIFY THE TESTS YOU ARE USING.

$$\textcircled{1} \sum_{n=1}^{\infty} (-1)^{n+1} \frac{n}{n^2+9}$$

$$\textcircled{9} \sum_{n=1}^{\infty} (-1)^n \frac{n^{n+1}}{(2n-1)^n}$$

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

$$\textcircled{10} \sum_{n=1}^{\infty} (-1)^n \frac{5^n (n!)^2}{(2n+1)!}$$

$$\textcircled{3} \sum_{n=1}^{\infty} (-1)^n \frac{n^n}{3^n n!}$$

$$\textcircled{11} \sum_{n=1}^{\infty} (-1)^{n+1} n \sin \frac{\pi}{n}$$

$$\textcircled{4} \sum_{n=2}^{\infty} (-1)^n \frac{1}{n(\ln n)^2}$$

$$\textcircled{12} \sum_{n=1}^{\infty} (-1)^{n+1} \frac{n}{(n+8)^2}$$

$$\textcircled{5} \sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{\sqrt[3]{n}}$$

$$\textcircled{13} \sum_{n=1}^{\infty} \frac{5^n \sin n}{n!}$$

$$\textcircled{6} \sum_{n=1}^{\infty} (-1)^{n+1} \frac{3^n n^9}{5^n}$$

$$\textcircled{14} \sum_{n=1}^{\infty} (-1)^n \frac{\ln n}{n^2}$$

$$\textcircled{7} \sum_{n=1}^{\infty} (-1)^n \frac{1}{\sqrt{n(n+1)}}$$

$$\textcircled{15} \sum_{n=1}^{\infty} (-1)^{n+1} \tan^{-1}\left(\frac{1}{n^2}\right)$$

$$\textcircled{8} \sum_{n=2}^{\infty} \frac{\cos n}{n(n-1)}$$

$$\textcircled{16} \sum_{n=1}^{\infty} (-1)^{n+1} \sin\left(\frac{\pi}{2n}\right)$$