

For each of the following series, determine whether it converges or diverges.

**Justify your answer:** credit is given only if you clearly indicate which tests you are using and if you apply them correctly.

$$\sum_{n=2}^{\infty} \frac{1}{n \ln n} \tag{1}$$

$$\sum_{n=1}^{\infty} \frac{3n^2 + \sqrt{n}}{\sqrt{n^5 + 3n^2}} \tag{2}$$

$$\sum_{n=0}^{\infty} (-1)^n \frac{3n^2 + \sqrt{n}}{\sqrt{n^5 + 3n^2}} \tag{3}$$

$$\sum_{n=0}^{\infty} (-1)^{n+1} \frac{e^n}{\sqrt{n^2 + 1}} \tag{4}$$

$$\sum_{n=1}^{\infty} (-1)^{n-1} \frac{1}{\sqrt{n^2 + 1}} \tag{5}$$

$$\sum_{n=1}^{\infty} \frac{1 + \cos(3n)}{e^n}. \tag{6}$$