

Show ALL justification steps and tests used.

1. Determine convergence/divergence.

(a) $\sum_{n=1}^{\infty} \frac{n^2}{n^4+1}$

(b) $\sum_{n=1}^{\infty} \frac{1}{3^n+1}$

(c) $\sum_{n=1}^{\infty} \frac{n+1}{n^3+6}$

(d) $\sum_{n=1}^{\infty} \frac{\sin^2 n}{n^2}$

(e) $\sum_{n=1}^{\infty} \frac{1}{ne^n}$

(f) $\sum_{n=1}^{\infty} \frac{(n!)^2}{(2n)!}$

(g) $\sum_{n=1}^{\infty} \frac{\sqrt{n}}{1+\sqrt{n}}$

(h) $\sum_{n=6}^{\infty} \frac{\ln(n)+3}{n-4}$

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

2. For what values of a does this converge?

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

3. Converge/diverge?

$$\sum_{n=1}^{\infty} \frac{(n-1)\cos^2(n)}{7n^6 + 2n^4 + n}$$