

Do the following series converge conditionally, converge absolutely, or diverge?

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

$$2. \sum_{k=1}^{\infty} (-1)^{k+1} \frac{k^2}{k^2 + 1}$$

$$3. \sum_{k=1}^{\infty} \frac{\cos(k)}{k^4 + 1}$$

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