

Do the following series converge conditionally or converge absolutely?

Calculate S_{1000} . How close does this approximate the value of the series?

$$1. \sum_{n=1}^{\infty} (-1)^{n+1} \frac{n^5}{n^6 + 17}$$

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

$$3. \sum_{k=1}^{\infty} \frac{\cos(k)}{k^4 + 1} \quad (\text{Notice that this isn't an alternating series!})$$