

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

(Notice that this isn't an alternating series!)