For each series, determine the following:

a. Does the series converge conditionally or converge absolutely?

b. Calculate S_{1000}.

c. How close does this approximate the value of the series?

1. $\displaystyle\sum_{n=3}^{\infty}(-1)^{n+1}\frac{n^5}{n^6-5}$

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

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