Math 102 Practice #2 for Exam 2

Spring 2008

1. Find the Taylor polynomial of degree 4 for \( f(x) = \cos x \) at \( a = \frac{\pi}{4} \).

2. Determine whether the infinite series \( \sum_{n=0}^{\infty} \frac{5^{2^n}}{2^n} \) converges or diverges. If it converges, find its sum.

3. Determine whether the following infinite series converge or diverge.
   
   (a) \( \sum_{n=1}^{\infty} \frac{n}{10n + 17} \).
   
   (b) \( \sum_{n=1}^{\infty} \frac{\ln n}{n} \).
   
   (c) \( \sum_{n=1}^{\infty} \frac{4 + 3\sin 2n}{n} \).

4. Use the Taylor series for \( \cos x \) to find a power series representation for \( x^2 \cos(2x) \).

5. Consider the series \( \sum_{n=1}^{\infty} \frac{(-1)^n}{3n + 4} \). Does it converge? Does it converge absolutely?

6. Find the interval of convergence of the power series, \( \sum_{n=0}^{\infty} \frac{(2n)!}{(3n)!} x^n \).