1. Compute the following Taylor polynomials.
   
   (a) Taylor polynomial of order 3 with base point \( a = \pi/6 \) for the function \( f(x) = \cos(x) \).
   
   (b) Taylor polynomial of order 2 with base point \( a = 0 \) for the function \( f(x) = (1 - x)^{\frac{2}{3}} \).

2. Use the remainder term to estimate the maximum error if the Maclaurin polynomial of order 4 for \( \cos(x) \) is used to approximate \( \cos(x) \) for \( |x| \leq \pi/2 \).

3. Consider the following series.
   \[
   \sum_{k=1}^{\infty} \frac{1}{(k + 2)^3}
   \]
   Use the integral test to show that this series converges. Make sure that you verify the hypotheses are satisfied. Then, estimate the error that is made by approximating the series by the sum of the first ten terms.

4. Use power series to evaluate the following limit.
   \[
   \lim_{x \to 0} \frac{xe^{(-x^2)} - x + x^3}{x^2(sin(x) - x)}
   \]

5. Use the absolute ratio test to determine the interval of convergence of the following power series. Do not examine convergence at the endpoints of the interval.
   \[
   \sum_{k=0}^{\infty} \frac{k^2x^k}{4^k(k + 3)}
   \]

6. First, write down the Maclaurin series for \( e^x \). Then, use subtraction, division and integration to find the first three non-zero terms in the series for
   \[
   f(x) = \int_0^x \frac{e(t^2) - 1}{t^2} \, dt
   \]