1. (15%) Find a Maclaurin series for $f(x) = \int_0^x (e^{-t^2} - 1)dt$.

2. (15%) Find a power series for the function $f(x) = \frac{4}{3x+2}$ at the point $c = 2$, and determine the interval of convergence.

3. (15%) Find the interval of convergence of $\sum_{n=1}^{\infty} \frac{x^n}{n^2}$.

4. (15%) Find the fourth Maclaurin polynomial for $g(x) = \ln(1 + x)$.

5. (10%) Determine the convergence or divergence of (a) $\sum_{n=0}^{\infty} \frac{2^n}{n!}$ and (b) $\sum_{n=1}^{\infty} \frac{e^{2n}}{n^n}$.

6. (10%) Determine the convergence or divergence of (a)$\sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{n}$ and (b) $\sum_{n=1}^{\infty} \frac{n}{(-2)^{n-1}}$.

7. (10%) Determine the convergence or divergence of (a) $\sum_{n=1}^{\infty} \frac{1}{2+\sqrt{n}}$ and (b) $\sum_{n=1}^{\infty} \frac{\sqrt{n}}{n^2+1}$.

8. (10%) Determine the convergence or divergence of (a) $\sum_{n=1}^{\infty} \frac{n}{n^2+1}$ (by means of integral test only) and (b) $\sum_{n=0}^{\infty} \frac{(-1)^n n!}{2^n}$.