1. Test the following series for convergence or divergence
\[ \sum_{n=1}^{\infty} \frac{\sin(n/2)}{n^2 + 4n} \]

2. Find the sum of the series
   (a) \[ \sum_{n=0}^{\infty} \frac{(-1)^n \pi^{2n+1}}{4^{2n+1}(2n+1)!} \]
   (b) \[ 1 - e + \frac{e^2}{2!} - \frac{e^3}{3!} + \frac{e^4}{4!} - \cdots \]
3. Evaluate the integral as a power series

\[ \int \frac{t}{1 - t^6} \, dt \]

4. Find the radius and interval of convergence of the series

\[ \sum_{n=0}^{\infty} \frac{(-3)^{n+1}(2x + 1)^n}{\sqrt{n + 1}} \]