1. Determine whether a series is convergent or divergent. State the test used to conclude.

a) $\sum_{n=1}^{\infty} \frac{1}{n^3+8}$ b) $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}-1}$ c) $\sum_{n=1}^{\infty} \frac{9^n}{3+10^n}$

d) $\sum_{n=1}^{\infty} \frac{1+\cos^2 n}{e^n}$ e) $\sum_{n=1}^{\infty} \frac{\sqrt[3]{n}}{\sqrt{n^3+4n+3}}$ f) $\sum_{n=1}^{\infty} \frac{(2n-1)(n^2-1)}{(n+1)(n^2+4)^2}$

g) $\sum_{n=1}^{\infty} \left(1+\frac{1}{n}\right)^2 e^{-n}$ h) $\sum_{n=1}^{\infty} \frac{\sqrt[3]{n}}{\sqrt{n^3+4n+3}}$ i) $\sum_{n=1}^{\infty} \frac{e^n}{n^2}$

j) $\sum_{n=1}^{\infty} \frac{3^n n^2}{n!}$ k) $\sum_{n=1}^{\infty} \frac{2^{n-1}3^{n+1}}{n^n}$ l) $\sum_{n=1}^{\infty} \frac{n^{2n}}{(1+n^2)^n}$

2. Which of the following series is absolutely convergent, conditionally convergent or divergent.

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

(b) $\sum_{n=1}^{\infty} (-1)^n \frac{3n-1}{2n+1}$

(c) $\sum_{n=1}^{\infty} \frac{(-3)^n(n+1)}{2^{2n+1}}$

(d) $\sum_{n=1}^{\infty} \frac{(-1)^n\sqrt{n}}{\ln n}$

3. How many terms are required to approximate the sum of the series $\lim_{n=1}^{\infty} \frac{(-1)^n}{n^4}$ so that the error is less than 0.001?

4. If the power series given by $\sum_{n=0}^{\infty} c_n(x-2)^n$ converges at $x=5$ and diverges at $x=-4$, what can we say about the following series?

(a) $\sum_{n=0}^{\infty} c_n$

(b) $\sum_{n=0}^{\infty} c_n(-3)^n$

(c) $\sum_{n=0}^{\infty} c_n 9^n$

(d) $\sum_{n=0}^{\infty} c_n(-5)^n$

5. Find the radius of convergence and the interval of convergence.

(a) $\sum_{n=1}^{\infty} (-1)^n \frac{x^n}{n^2 5^n}$

(b) $\sum_{n=1}^{\infty} \frac{2^n(x-2)^n}{(n+2)!}$

(c) $\sum_{n=1}^{\infty} (-1)^n \frac{(2x-1)^n}{5^n\sqrt{n}}$.