1. Determine whether the following **series** converge or diverge. Show all your work and clearly indicate any tests that you use.

(a). $\sum_{n=1}^{\infty} \frac{5n^2+n}{3-2n^2}$

(b). $\sum_{n=1}^{\infty} \frac{5\sqrt{n}+1}{3+2n^2}$

(c). $\sum_{n=1}^{\infty} \frac{\ln n}{n}$

(d). $\sum_{n=1}^{\infty} \frac{(n!)^2 3^n}{(2n)!}$

(e). $\sum_{n=1}^{\infty} \left(\frac{n}{2n-1}\right)^{3n}$

(f). $\sum_{n=1}^{\infty} \frac{\cos n}{n^2}$

[More practice can be found in Section 11.7 and the Chapter 11 Review.]

2. Does $\sum_{n=2}^{\infty} (-1)^{n-1} \frac{1}{\ln n}$ converge absolutely, converge conditionally, or diverge.

3. Given $\sum_{n=0}^{\infty} (-1)^n \frac{1}{n+4}$

(a). Find the 5th partial sum s_5.

(b). If s_5 is used to approximate the infinite series, what is the bound for the maximum possible error? (i.e. bound on $|R_5|$?)

(c). How many terms are needed for error to be less than 0.001.

4. How many terms of the series $\sum_{n=1}^{\infty} \frac{3}{n^4}$ are needed to find its sum within 0.01?

5. Find the <u>interval</u> and <u>radius</u> of convergence for the following series.

(a). $\sum_{n=1}^{\infty} \frac{3^n x^n}{n^n}$

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

(c). $\sum_{n=1}^{\infty} \frac{(2x+4)^n}{n4^n}$

6. Find the radius of convergence for the following series.

(a). $\displaystyle\sum_{n=0}^{\infty} \frac{(3x-2)^n}{n}$

(b). $\displaystyle\sum_{n=0}^{\infty} \frac{n^n x^n}{n!}$

7. Use a known power series to find a power series representation for the $f(x) = \dfrac{1}{1+3x^2}$.

8. Find a Taylor series for $f(x) = \sqrt{x}$ centered at $a = 4$.

9. Use a known Maclaurin series to find the Maclaurin Series for $f(x) = e^{x/2}$

10. Use a known Maclaurin series to evaluate $\displaystyle\int \sin(x^2)\, dx$ as an infinite series.

11. Find the sum of the series $\displaystyle\sum_{n=0}^{\infty} \frac{x^{4n}}{n!}$.