Calculus II
Sample Exam 3: Chapter 11

You may use the following facts without justification: the geometric series converges to $1/(1-x)$ if and only if $|x| < 1$; p-series converge if and only if $p > 1$; the alternating harmonic series converges; the infinite series for sin, cos, and e^x are as given in the text and in class. All other results require justification.

1. Does the series described by $\displaystyle\sum_{n=0}^{\infty}(-1)^n \frac{n^2}{2n^2-5}$ converge?

2. To what number does $\displaystyle\sum_{n=1}^{\infty} \frac{(-2)^n}{7^{n+1}}$ converge?

3. Does $\displaystyle\sum_{n=2}^{\infty} \frac{1}{n(\ln n)^4}$ converge?

4. Does $\displaystyle\sum_{n=0}^{\infty} \frac{n^2-2}{n^3+n+2}$ converge?

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

6. Does $\displaystyle\sum_{n=1}^{\infty} \frac{n^2}{n!}$ converge?

7. Find the interval of convergence and radius of convergence for $\displaystyle\sum_{n=1}^{\infty} \frac{3^n}{n} x^n$.

8. Find the interval of convergence and radius of convergence for $\displaystyle\sum_{n=0}^{\infty} \frac{n^3}{2^n}(x-2)^n$.

9. Find a power series representation for $x^2 e^x$; find the radius of convergence for your series.

10. Find a power series representation for $\cos(x^3)$; find the radius of convergence for your series.