Exam Review, Chapter 11 Sections 8 - 11

1. Find the Maclaurin series and interval of convergence for e^x, $\sin x$, $\cos x$, and $\tan^{-1} x$.

2. Find the Taylor series at $x = 1$ for $\ln x$. Find the interval of convergence.

3. Use a fourth degree Taylor polymomial at $x = 1$ to estimate $\sqrt{1.2}$. Use Taylor's Inequarity to establish an upper bound on the error in your estimate.

4. Find a Maclaurin series that can be used to generate π.

5. Use a Maclaurin polynomial (and Taylor's inequality) te estimate $\sqrt{e}$ accurately to 3 decimal places.

6. What degree Taylor polynomial do you need to estimate $\sin(\pi/3)$ correct to 6 decimal places?

7. Use the sixth degree Maclaurin polynomial for e^{x^2} to approximate

$$\int_0^1 e^{x^2}\, dx$$

8. Use Maclaurin series to show

$$\lim_{x \to 0} \frac{\sin x}{x} = 1$$

9. Approximate these seires to within 0.0001 of the actual value.

a.

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

b.

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

a.

$$\sum_{n=4}^{+\infty} \frac{(-1)^n}{n!}$$

10. Use integrals to estimate each of the folllowing series to within 0.001 of the actual value.

a.

$$\sum_{n=1}^{+\infty} \frac{1}{n^3}$$

b.

$$\sum_{n=1}^{+\infty} \frac{1}{n^4}$$

c.

$$\sum_{n=1}^{+\infty} \frac{1}{(n+28)^2}$$

11. Find the value of n which will give an estimate of the definite integral below to within 0.001 of the actual value using the indicated method.

$$\int_0^4 \sin(x^2)\, dx$$

a. Trapezoidal
b. Midpoint
c. Simpson's Rule