

Section 10.7

1. Find the Taylor Series for  $f(x) = \frac{1}{x}$  at  $x = 3$  and the associated radius of convergence.

2. Find the Maclaurin series for  $f(x) = e^x$  and the associated radius of convergence.

**3. Find the Maclaurin series for  $f(x) = \sin x$  and the associated radius of convergence.**

4. Use a known MacLaurin series derived in this section to obtain a Maclaurin Series for:

a.)  $f(x) = \cos(x^3)$

b.)  $f(x) = xe^{-x}$

c.)  $f(x) = \sin\left(\frac{x}{2}\right)$

5. Evaluate  $\int \frac{\sin 2x}{x} dx$  as an infinite series.

6. Use series to approximate

$\int_0^{0.5} \cos(x^2) dx$  with error less than  $10^{-3}$ .

Section 10.9

7. Find the third degree Taylor Polynomial for  $f(x) = \sqrt{x}$  at  $x = 1$ .

8. Find the second degree Taylor Polynomial for  $f(x) = \ln x$  at  $x = 2$ . Using Taylor's Inequality, find an upper bound on the remainder in using  $T_2(x)$  to approximate  $f(x) = \ln x$  for  $1 \leq x \leq 3.2$ .

9. What is the maximum error possible in using the approximation

$$\sin x \approx x - \frac{x^3}{3!} + \frac{x^5}{5!} \text{ for } |x| < 0.3?$$

Section 11.1

10. Find the distance between the points  $P(1, 5, 3)$  and  $Q(-2, 1, 2)$ .

11. Find the equation of the sphere with radius 5 and center  $(-1, 2, -5)$ .

12. Find the center and radius of the sphere

$$x^2 + y^2 + z^2 = 6x - 4y + 10z.$$

13. Describe the following region in  $R^3$ :  $x^2 + y^2 \leq 4$