

Spring 2008 Math 152

courtesy: Amy Austin

(covering section 10.7, 10.9, 11.1, 11.2)

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 $1 \leq x \leq 3$.

Section 11.1

9. Find the distance between the points $P(1, 5, 3)$ and $Q(-2, 1, 2)$.
10. Find the equation of the sphere with radius 5 and center $(-1, 2, -5)$.
11. Find the center and radius of the sphere $x^2 + y^2 + z^2 = 6x - 4y + 10z$.
12. Describe the following region in R^3 : $x^2 + y^2 \leq 4$

Section 11.2

13. $\mathbf{a} = \langle 1, 2, -1 \rangle$ and $\mathbf{b} = \langle 0, 3, -5 \rangle$, find:
 - a.) $\mathbf{a} + 2\mathbf{b}$
 - b.) $|\mathbf{a} - \mathbf{b}|$
 - c.) A unit vector in the direction of \mathbf{b} .
14. Find $\mathbf{a} \cdot \mathbf{b}$ if it is known that $|\mathbf{a}| = 2$, $|\mathbf{b}| = 5$ and the angle between the vectors is 60° .
15. Find the angle between the vectors $\langle 1, 0, -2 \rangle$ and $\langle 2, -1, 3 \rangle$.
16. The points $A(0, -1, 6)$, $B(2, 1, -3)$ and $C(5, 4, 2)$ form a triangle. Find the angle located at the vertex A .
17. Find the vector and scalar projection of $\langle 1, -1, 3 \rangle$ onto $\langle 0, 2, 1 \rangle$.