Calculus II – Quiz 12

Attach extra paper with your work if needed.

1. Use Taylor's Theorem to obtain an upper bound for the error of the following estimation:

$$\sin(0.1) \sim \frac{0.1}{1!} - \frac{(0.1)^3}{3!} + \frac{(0.1)^5}{5!}$$

Find the nth Taylor polynomial centered at c for each function in problems 2 to 5.

2. $f(x) = e^{-x^2}, \quad n = 3, \quad c = 0.$

3. $f(x) = \dfrac{1}{\sqrt[5]{x+1}}, \quad n = 3 \quad c = 0.$

4. $f(x) = \ln x^2, \quad n = 4, \quad c = 1.$

5. $f(x) = \csc x, \quad n = 2, \quad c = \dfrac{\pi}{2}.$

Find the interval of convergence of each series. Check the convergence at the endpoints for problems 6 and 7 only. You do not need to check endpoints in problems 8 and 9.

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

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

8. $\displaystyle\sum_{n=1}^{\infty} \frac{(n!)^2}{(2n)!} x^n$

9. $\displaystyle\sum_{n=1}^{\infty} \frac{3^n + (-2)^n}{n} (x+1)^n$