Math 136: Calculus 2
Spring 2017
Professor Levandosky
Written Homework 10

1. Determine the interval of convergence of the power series $\displaystyle\sum_{n=1}^{\infty} \frac{(x-5)^n}{n^2 3^n}$. Be sure to indicate whether or not the series converges at each endpoint of the interval.

2. Let $f(x) = \sin(x^2)$.

   (a) Write the Taylor series for f centered at $c = 0$.

   (b) Find $f^{(18)}(0)$.

   (c) Use the series in part (a) to express $\displaystyle\int_0^1 \sin(x^2)\,dx$ as an infinite series.

   (d) Use the alternating series error bound to approximate the series in part (c) to within 0.0001.

3. (a) Find the second degree Taylor polynomial of $g(x) = \sqrt{x}$ centered at $c = 9$.

   (b) Use the polynomial in part (a) to approximate $\sqrt{9.2}$.

   (c) Use the Taylor polynomial error bound to find a bound on the error of the approximation in part (b).

4. Use Taylor series expansions to evaluate $\displaystyle\lim_{x \to 0} \frac{e^{x^3} - 1 - x^3}{\sin(x^2) - x^2}$.