Math 1232 Fall 2024
Single-Variable Calculus 2 Section 11
Mastery Quiz 12
Due Monday, November 18

This week's mastery quiz has three topics. Everyone should submit M4. If you have a 4/4 on M3, or a 2/2 on S8, you don't have to submit them.

Don't worry if you make a minor error, but try to demonstrate your mastery of the underlying material. Feel free to consult your notes, but please **don't discuss the actual quiz questions with other students in the course**.

Remember that you are trying to demonstrate that you understand the concepts involved. For all these problems, justify your answers and explain how you reached them. Do not just write "yes" or "no" or give a single number.

Please turn this quiz in class on Monday. You may print this document out and write on it, or you may submit your work on separate paper; in either case make sure your name and recitation section are clearly on it. If you absolutely cannot turn it in in person, you can submit it electronically but this should be a last resort.

Topics on This Quiz

- Major Topic 3: Series Convergence

- Major Topic 4: Taylor Series

- Secondary Topic 8: Power Series

Name:

Recitation Section:

M3: Series Convergence

(a) $\displaystyle\sum_{n=1}^{\infty} ne^{-n^2+1}$

(b) $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n \sqrt{n}}{2n+3}$

(c) Analyze the convergence of the series $\displaystyle\sum_{n=2}^{\infty} \frac{\ln(n)+n}{n^2-1}$

M4: Taylor Series

(a) Write a power series expression for $\frac{2x^2}{4x+1}$ centered at 0. What is the radius of convergence?

(b) Let $f(x) = \cos^2(x)$. Use *the definition of a Taylor series* to find $T_4(x, \pi)$ for this function. (That is, find the terms up through the degree four term.)

(c) If $f(x) = \displaystyle\sum_{n=0}^{\infty} \frac{3^n}{n!}(x+2)^n$, compute $\frac{d}{dx}f(x)$ and $\int f(x)\,dx$.

S8: Power Series

(a) Find the radius of convergence and the interval of convergence of $\displaystyle\sum_{n=0}^{\infty}(n(x-3))^n$.

(b) Find the radius of convergence and the interval of convergence of $\displaystyle\sum_{n=0}^{\infty} \frac{(5x-3)^n}{\sqrt{n}}$.