Math 1232 Spring 2026
Single-Variable Calculus 2
Mastery Quiz 11
Due Thursday, April 9

This week's mastery quiz has three topics. Everyone should submit work on both M4. If you have a 2/2 on S8, or a 4/4 on M3, you don't need to submit them again. This is the last quiz with S8.

Don't worry if you make a minor error, but try to demonstrate your mastery of the underlying material. 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.

Feel free to consult your notes, but please **don't discuss the actual quiz questions with other students in the course**.

Please turn this quiz in class on Thursday. 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.

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) Analyze the convergence of the series $\sum_{n=1}^{\infty} \frac{4n^3+1}{n^4+n+3}$

(b) $\sum_{n=4}^{\infty} \frac{(-1)^n}{(n^2/5)+3n}$

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

M4: Taylor Series

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

(b) Let $f(x) = e^{x^2}$. Use *the definition of a Taylor series* to find $T_4(x, 0)$ for this function. (That is, find the terms up through the degree-four term.)

(c) If $f(x) = \sum_{n=0}^{\infty} 2^n n^3 (x-2)^n$, 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 $\sum_{n=0}^{\infty} \frac{2^n}{n^2+n} x^n$.

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