

Math 1552
Summer 2022
Test 3
July 21, 2022

Name (Print): _____

Canvas email: _____

Time Limit: 60 Minutes

Teaching Assistant/Section: _____

GT ID:

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By signing here, you agree to abide by the **Georgia Tech Honor Code**: *I commit to uphold the ideals of honor and integrity by refusing to betray the trust bestowed upon me as a member of the Georgia Tech Community.*

Sign Your Name: _____

1. (5 points) Give an example of a series that converges by the Limit Comparison Test. What series would you compare your original series with?

2. (5 points) Give an example of an alternating series that converges absolutely. How do you know it converges absolutely?

3. (5 points) How many terms would you need to sum together in order to estimate the value of the alternating series $\sum_{n=1}^{\infty} \frac{(-1)^n}{2^n}$ within an error of 0.1?

4. (5 points) Find the third degree Taylor polynomial for $f(x) = \frac{1}{x}$ centered at $x = 1$.
You do not need to simplify your answer.

5. (10 points) Find the radius and interval of convergence of the power series below.

A correct answer without work will not receive full credit.

$$\sum_{n=1}^{\infty} \frac{(4 - 3x)^n}{\sqrt{2n + 4}}$$

6. (10 points) Find the maximum error when $(1.2)^{1/3}$ is approximated by using a 2nd degree Taylor polynomial of the function $f(x) = x^{1/3}$ centered at $x = 1$.
The Taylor remainder is given by

$$|R_n(x)| \leq \max_{c \text{ in } (a,x)} \left| f^{(n+1)}(c) \right| \frac{|x - a|^{n+1}}{(n + 1)!}$$

7. (10 points) Find a MacLaurin series (a Taylor series centered at $x = 0$) for the function below. For what values of x does your series converge?

$$f(x) = 2x \ln(1 + 4x^5)$$