

Math 2300-007: Quiz 7

Name: _____

Score: _____

Collaborators:

Directions: This take-home quiz will be due at the beginning of class on Wednesday, March 7. You may use your notes, textbook, and colleagues from our class as resources, but your final write-up should be in your own words. If you work with collaborators from our class, please include their names on this quiz. You can earn 1 bonus point for discussing this quiz with me during my office hours.

1. (5 points) Determine if the **sequence** converges or diverges. If it converges, find the limit. Justify each answer in a way that would make sense to a colleague from class.

(a) $a_n = \left(1 + \frac{5}{n}\right)^{3n}$

(b) $a_n = \frac{\ln(n) \cos(n)}{1 + n^2}$

(c) $a_n = \sqrt[n]{3^n + 5^n}$

(d) $a_n = (-1)^n \frac{5n^2 - 7n}{\sqrt[3]{n^6 + 3n^2 - 1}}$

2. (5 points) For each of the following **series**, determine if the series converges or diverges. If the series converges, find its sum. Justify each answer in a way that would make sense to a colleague from class.

(a) $\sum_{n=1}^{\infty} \sqrt[n]{4}$

(b) $\sum_{n=2}^{\infty} \frac{(-3)^n}{7^{n+3}}$

$$(c) \sum_{n=3}^{\infty} \frac{1}{n\sqrt{\ln(n)}}$$

$$(d) \sum_{n=1}^{\infty} \ln \left| \frac{\cos\left(\frac{1}{n}\right)}{\cos\left(\frac{1}{n+1}\right)} \right|$$