

## CALCULUS III & ANALYSIS

**Competency 210.2.4: Infinite Series** - The graduate demonstrates understanding of the properties of series and their applications and determines the convergence of series.

### Introduction:

There are a variety of tests used to determine the convergence of infinite series.

### Requirements:

- A. Use the comparison test to determine the convergence or divergence of the series  $4 + \frac{1}{5} + 0.3 + \frac{1}{3+\sqrt{2}} + \frac{1}{9+\sqrt{3}} + \frac{1}{27+\sqrt{4}} + \frac{1}{81+\sqrt{5}} + \dots$ , showing all work.
- B. Use the  $n$ th term test to determine the convergence or divergence of the series  $\sum_{j=1}^{\infty} \frac{j^2+1}{j^2}$ , showing all work.
- C. Use the integral test to determine the convergence or divergence of the series  $\sum_{k=1}^{\infty} \frac{1}{3k+1}$ , showing all work.
- D. Use the alternating series test to show the convergence or divergence of the series  $\sum_{i=1}^{\infty} (-1)^{i+1} \frac{i+3}{i^2+10}$ , showing all work.
- E. Use the root test to determine the convergence or divergence of the series  $\sum_{n=1}^{\infty} \frac{100n}{e^n}$ , showing all work.
- F. When you use sources, include all in-text citations and references in APA format.

*Note: For definitions of terms commonly used in the rubric, see the Rubric Terms web link included in the Evaluation Procedures section.*

*Note: When using sources to support ideas and elements in an assessment, the submission MUST include APA formatted in-text citations with a corresponding reference list for any direct quotes or paraphrasing. It is not necessary to list sources that were consulted if they have not been quoted or paraphrased in the text of the assessment.*

*Note: No more than a combined total of 30% of a submission can be directly quoted or closely paraphrased from outside sources, even if cited correctly. For tips on using APA style, please refer to the APA Handout web link included in the APA Guidelines section.*