Math 132 - Quiz 5

April 9, 2020

Name _____

Score _____

Show all work to receive full credit. Supply explanations when necessary. You must work individually on this quiz. This quiz is due no later than April 14.

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1. (2 points) Consider the infinite series $\sum_{n=1}^{\infty} \ln\left(\frac{n}{n+1}\right)$.

   (a) After rewriting $\ln\left(\frac{n}{n+1}\right) = \ln n - \ln(n+1)$, you should see that this series is a telescoping series. Find a formula for the nth partial sum, S_n.

   (b) Determine whether the series converges or diverges. Explain your reasoning.

2. (2 points) Consider the series $\sum_{k=1}^{\infty} \frac{\pi}{3^k}$.

   (a) This series converges. Explain in a phrase or sentence how we that it converges.

   (b) Find the sum of the series.

3. (2 points) For each problem below, consider the series $\sum_{n=1}^{\infty} a_n$. Apply the nth term test and describe the conclusion of the test.

   (a) $a_n = e^{-2/n}$

   (b) $a_n = \dfrac{(\ln n)^2}{\sqrt{n}}$

4. (2 points) Consider the series $\sum_{n=2}^{\infty} \dfrac{1}{n(\ln n)^2}$. Does the integral test apply? Explain. If it applies, use it to determine convergence or divergence.

5. (2 points) Use either direct or limit comparison to determine whether $\sum_{k=1}^{\infty} \dfrac{1}{5k^2 - 3k}$ converges or diverges.