MAT 146

Quiz #8 (Sequences and Series) Name _____

10 points

Impact on Course Grade: approximately 2% Score _____

Show calculus evidence to fully support your responses. Show exact values unless otherwise requested.

6. Determine whether $\sum_{n=2}^{\infty} \frac{n^2+3}{n^3-1}$ is a divergent series or a convergent series. Explain and justify your response.

7. Alfalfa is quite sure that $\sum_{n=1}^{\infty} \frac{(-1)^n}{n}$ diverges, because, in his words, "it looks a lot like the Harmonic Series." Is Alfalfa correct? Explain and justify your response, including a comment on any connection to the Harmonic Series.

8. Determine whether $\sum_{n=1}^{\infty} \frac{5^n}{4^{n+2}}$ is a divergent series or a convergent series. Explain and justify your result.

9. Determine whether $\sum_{n=1}^{\infty} \frac{4n^2+n}{\sqrt[3]{n^7+n^3}}$ is a divergent series or a convergent series. Explain and justify your result.

10. Show that all three requirements of the **Integral Test** can be met for the series $\sum_{n=1}^{\infty} \frac{2n-3}{6n^2+1}$.

Problem (C): Solve this problem. Use a *separate sheet* of paper marked (C) on one side, with each portion (i thru v) clearly indicated. Write your name on the paper.

i. Prove that $S = \sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{3^n-2n}$ is a convergent series. (5 pts)

ii. Kelley claims that the ***partial sums***, S_k, associated with this series, are ***bounded above*** by 1 and ***bounded below*** by 4/5. Explain how you know Kelley is correct, or provide evidence to refute Kelley's claim. (2 pts)

iii. ***Why*** is it useful to have accurate information about upper and lower bounds, such as what Kelley conjectured in (ii)? Be specific. (2 pts)

iv. Use technology to approximate S, accurate to ***eight places*** to the right of the decimal point. (1 pt)

v. **BONUS!** Determine the smallest positive integer k such that $|S_{k+1} - S_k| \le \frac{1}{100{,}000{,}000}$. Briefly describe how you determined k. (2 pts)