Calculus II	**Name:** _____
Study Guide 29	**Class:** _____
Due Date: _____	**Score:** _____

No Work $\Leftrightarrow$ No Points

Use Pencil Only $\Leftrightarrow$ Be Neat & Organized

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1. If $\lim_{n\to\infty} a_n$ exists, then the sequence converges. Otherwise it diverges.
   Determine whether each sequence below converges or diverges.

   (a) (3 points) $a_n = \dfrac{n^3}{n^3+1}$.

   (a) _____

   (b) (4 points) $a_n = \ln(n+1) - \ln n$.

   (b) _____

   (c) (4 points) $a_n = \arctan(\ln n)$.

   (c) _____

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2. Use the Test for Divergence that says if $\lim_{n\to\infty} a_n$ does not exist or $\lim_{n\to\infty} a_n \neq 0$, then the series $\sum_{n=1}^{\infty} a_n$ is divergent to show the following series diverges.

(a) (3 points) $\sum_{n=1}^{\infty} \ln\left(\frac{n^2+1}{2n^2+1}\right)$.

(a) _____

(b) (4 points) $\sum_{n=1}^{\infty} \sqrt[n]{2}$.

(b) _____

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3. (5 points) Find the sum $\sum_{n=1}^{\infty} \frac{(-3)^{n-1}}{4^{n+1}}$.

3. _____

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4. (5 points) Write out few terms of $\sum_{n=1}^{\infty} \left(e^{1/n} - e^{1/(n+1)} \right)$, then find its sum

4. _____

5. Use the Integral Test to determine whether the following series is convergent or divergent.

(a) (4 points) $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n+4}}$.

(a) _____

(b) (4 points) $\sum_{n=1}^{\infty} n^3 e^{-n^4}$.

(b) _____

6. Use the Comparison Test or the Limit Comparison Test to determine whether the following series is convergent or divergent.

(a) (4 points) $\displaystyle\sum_{n=1}^{\infty} \frac{n^2 - 5n}{n^3 + n + 1}$.

(a) _____

(b) (5 points) $\displaystyle\sum_{n=2}^{\infty} \frac{1}{n\sqrt{n^2 - 1}}$.

(b) _____

(c) (5 points) $\displaystyle\sum_{n=2}^{\infty} \frac{n \sin^2 n}{1 + n^3}$.

(c) _____