

MATH141(0332/0342) Calculus II Fall 2009

Worksheet 10, Section 9.5-9.6

Name: _____

1. (4 points) Estimate the 5th truncation error for the series $\sum_{n=1}^{\infty} ne^{-n}$.
Hint: You might use integral by parts. You can use $e^{-4} = 0.0183$, $e^{-5} = 0.0067$, $e^{-6} = 0.0025$.

2. (6 points) Use the Comparison Test, the Limit Comparison Test, or the Integral Test to determine whether the series converges or diverges.

$$(1) \sum_{n=2}^{\infty} \frac{\sqrt{n} - \sqrt[3]{n}}{(2n^2 + 2n - 3)^{3/4}}$$

$$(2) \sum_{n=1}^{\infty} \frac{[\sin(n) + \cos(5n)]\sqrt[3]{7n^2 + 5}}{4n^2 + 2n + 3}$$

$$(3) \sum_{n=1}^{\infty} \sin \frac{1}{n}$$

3. (10 points) Determine whether the following infinite sum converges or diverges.

$$(1) \sum_{n=1}^{\infty} \frac{n!}{2n^2}$$

$$(2) \sum_{n=1}^{\infty} \frac{(2n)!}{n!(2n)^n}$$

$$(3) \sum_{n=1}^{\infty} \frac{1 \cdot 3 \cdot 5 \cdots (2n-1)}{2 \cdot 5 \cdot 8 \cdots (3n-1)}$$

$$(4) \sum_{n=1}^{\infty} \left(\frac{n!}{n^n} \right)^n$$

$$(5) \sum_{n=1}^{\infty} \left(\sum_{k=1}^n \frac{1}{k} \right)^n$$