# Calculus II

## Assignment 11

20180720

Name : ________________________

Student ID : ____________________

1. Find a formula for the general term $a_n$ of the sequence, assuming that the pattern of the first few terms continues.
   (a) $\{1, \frac{1}{3}, \frac{1}{5}, \frac{1}{7}, \frac{1}{9}, \ldots\}$
   (b) $\{1, -\frac{1}{3}, \frac{1}{9}, -\frac{1}{27}, \frac{1}{81}, \ldots\}$
   (c) $\{1, 0, -1, 0, 1, 0, -1, 0, \ldots\}$
2. Determine whether the sequence converges or diverges. If it converges, find the limit.
   (a) $a_n = 1 - (0.2)^n$
   (b) $a_n = \frac{n^3}{n^3+1}$
3. Determine whether the sequence is increasing, decreasing, or not monotonic. Is the sequence bounded ?
   (a) $a_n = (-2)^{n+1}$
   (b) $a_n = \frac{1}{2n+3}$
4. Determine whether the geometric series is convergent or divergent. If it is convergent, find its sum.
   $3 - 4 + \frac{16}{3} - \frac{64}{9} + \cdots$
5. Determine whether the series is convergent or divergent. If it is convergent, find its sum.
   (a) $\frac{1}{3} + \frac{1}{6} + \frac{1}{9} + \frac{1}{12} + \frac{1}{15} + \cdots$
   Hint : Harmonic Series.
   (b) $\sum_{n=1}^{\infty} \sqrt[n]{2}$
   Hint : Test for Divergence.

(c) $\sum_{n=1}^{\infty} \left( \frac{1}{e^n} + \frac{1}{n(n+1)} \right)$

6. Use the Integral Test to determine whether the series is convergent or divergent.
   $\sum_{n=1}^{\infty} \frac{1}{n^5}$
7. * Find the limit of the sequence
   $\{\sqrt{2}, \sqrt{2\sqrt{2}}, \sqrt{2\sqrt{2\sqrt{2}}}, \ldots\}$

Notice : * is an optional question.

Reading materials : Textbook (Calculus 6ed Stewart) Section $12.1 \sim 12.3$, especially
— Section 12.1, Example 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12.
— Section 12.2, Example 1, 2, 3, 6, 7, 8, 9.
— Section 12.3, Example 1, 2, 3.

Or alternate Textbook (Calculus Early Transcendentals 6ed Stewart) Section $11.1 \sim 11.3$, especially
— Section 11.1, Example 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12.
— Section 11.2, Example 1, 2, 3, 6, 7, 8, 9.
— Section 11.3, Example 1, 2, 3.