

**Written Homework #10****Due at start of class Monday, 2 April 2018.**

This Written Homework has problems from sections 11.1 and 11.2. It is also a work sheet to do during the recitation section. Please work on it with other students! The submitted version must be written by you. You must show your work for full credit.

1. (a) Determine whether the sequence defined as follows is convergent or divergent:

$$a_1 = 1, \quad a_{n+1} = 4 - a_n, \quad \text{for } n \geq 1$$

- (b) What happens if  $a_1 = 2$ ?

2. Determine whether the sequence converges or diverges. If it converges, find the limit.

(a)  $a_n = \ln(n+1) - \ln(n)$

- (b)

$$a_n = \frac{(-1)^{n+1}n}{n + \sqrt{n}}$$

3. Suppose 2000 is invested at 3% interest, compounded annually. Let  $a_n$  be the value of the investment after  $n$  years.

(a) Find the first five terms of the sequence  $\{a_n\}$  and give a formula for  $a_n$ . (*Hint.* Compare problem #65 in Section 11.1.)

(b) Is the sequence convergent or divergent? Explain.

4. Find a formula for the general term  $a_n$  of the sequence. Determine whether the sequence converges or diverges. If it converges, find the limit.

$$\{1, 0, -1, 0, 1, 0, -1, 0, \dots\}$$

5. (a) What is the difference between a sequence and a series? (*Write a couple of precise sentences.*)

(b) What does it mean to say that a series is convergent?

6. Determine whether the series is convergent or divergent. If it is convergent, find its sum.

$$\frac{1}{3} + \frac{1}{6} + \frac{1}{9} + \frac{1}{12} + \frac{1}{15} + \dots$$

7. Determine whether the series is convergent or divergent. If it is convergent, find its sum.

(a)

$$\sum_{n=1}^{\infty} \frac{2^n + 4^n}{e^n}$$

(b)

$$\sum_{n=1}^{\infty} [(-0.2)^n + (0.6)^{n-1}]$$

8. Express the number as a ratio of integers.

(a)  $0.\overline{46} = 0.46464646\dots$

(b)  $1.234\overline{567}$