Basic Mathematics

Lectures 9 and 10

Assignment 5 (30 marks)

Instructions

a) Attempt all the questions. This Assignment covers lectures 9 and 10.

1) Define a sequence and a series and in each illustrate with a relevant example. (4 Points)

2) Evaluate the following given $x_1 = 2, x_2 = -2, x_3 = -1, x_4 = 3, x_5 = 0$ (3 Points)

$$\sum_{i=1}^{5}(-3x_i^3 - 2x_i - 9)$$

3) Evaluate the series below using the values of x_i given in question (2) above; (3 Points)

$$\sum_{i=1}^{3}\left(\frac{5x_i + x_i^2}{-7x_i}\right)$$

4) Consider the following series; $17 + 22 + 27 + 32 + \cdots$ Determine the; (6 Points)
   a) 200^{th} term
   b) S_∞ i.e. sum to infinity
   c) S_{1000} i.e. sum of the first 1000 terms.

5) Consider the series $0.23232323\cdots$ Determine the; (6 Points)
   a) 10^{th} term
   b) S_∞
   c) S_{10}

6) The 3^{rd} term of a GP is $\frac{18}{49}$ and the 5^{th} term is $\frac{162}{2401}$. Find the 9^{th} term. Leave your answer as a fraction. (4 Points)

7) Outline 4 areas where series and/or sequences are used or occur naturally. (4 Points)