MAC 1140
LA session

Week 13

1. Using the definition (a_{n+1}-a_n is a constant), check whether the following sequences are arithmetic. If they are, find the common difference.

a) $\left\{\dfrac{n+1}{n}\right\}_{n=1}^{\infty}$

b) $\left\{5+n\sqrt{2}\right\}_{n=1}^{\infty}$

2. Find the n[th] term of an arithmetic sequence for which $a_1 = 2, \quad d = \dfrac{1}{4}$

3. Find the 40-th term of the arithmetic sequence whose first several terms are given below

$$1, \frac{3}{4}, \frac{1}{2}, \frac{1}{4}, 0, \cdots$$

4. Find the 100[th] term of an arithmetic sequence if the 15-th term is 5 and the 51-st term is 23.

5. Find the sum of the first 120 terms of an arithmetic sequence with $a_1 = 4, \quad d = -\dfrac{2}{3}$

6. Find the sum below of an arithmetic sequence

$$2+ 4+ 8 + \ldots + 41$$

7. Using the definition ($a_{n=1}/a_n$ is constant) check whether following sequences are geometric

a) $\left\{\dfrac{n+1}{n!}\right\}_{n=1}^{\infty}$

b) $\left\{\dfrac{2^n}{3^{n-2}}\right\}_{n=1}^{\infty}$

8. Find the sixth and the n[th] term of a geometric sequence for which $a_1 = 4, \quad r = \dfrac{1}{2}$

9. The sequence 0.1, 0.01, 0.001, …. is geometric. Find the common ratio. Find the 10[th] term and write it in scientific notation.

10 . Find the sum $\displaystyle\sum_{k=1}^{10} 5\left(\frac{1}{2}\right)^k$

11. Determine whether the following geometric series converges or diverges. If it converges, find its sum

a) $1-\dfrac{3}{4}+\dfrac{9}{16}-\dfrac{27}{64}+\cdots$

b) $\displaystyle\sum_{k=1}^{\infty} 3\left(-\frac{5}{2}\right)^k$

c) $\displaystyle\sum_{k=1}^{\infty} 2^k \cdot 3^{2-k}$

12. Find x so that x, x + 2, x + 3are consecutive terms of a geometric sequence.

13. Find x so that 2x, 3x+2, 5x +3 are consecutive terms of an arithmetic sequence.