**Lab 08 -Sequences and Summations**

**Objective**

Solving exercises from the text book in chapter 2.4

**Current Lab Learning Outcomes (LLO)**

By completion of the lab, the students should be able to:

1. will understand Sequences and summations

2. They will be able to solve shorter/easier or longer / harder problems given in the textbook.

**Lab Requirements**

Students allowed using their lecture notes in the lab and use blackboard slides in order to solve the exercises.

**Lab Assessment**

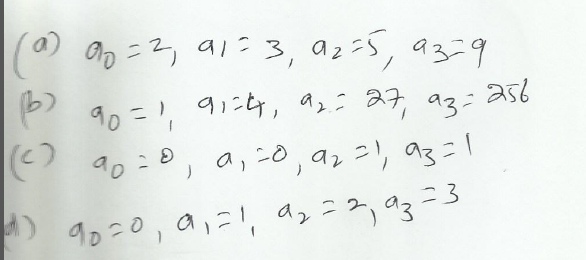
1- Divide students to groups and let them to solve the given example.

2- Discuss the answers with the groups and write on board the optimal solution.

**Lab Description**

1. What are the terms *a*0, *a*1, *a*2, and *a*3 of the sequence {*an*}, where *an* equals, a, c





1. List the first 10 terms of each of these sequences.

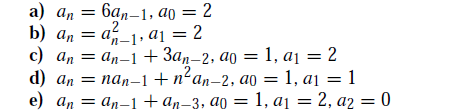
**a)** The sequence obtained by starting with 10 and obtaining each term by subtracting 3 from the previous term

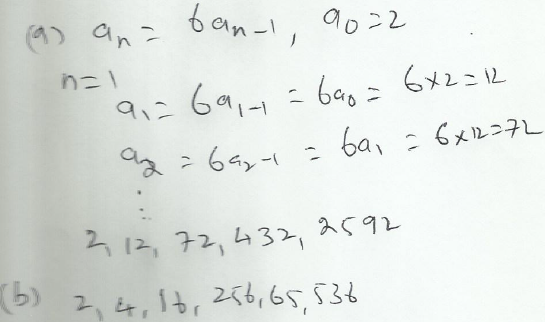
10,7,4,1,-3,-6,-9….

**b)** The sequence whose *n*th term is the sum of the first *n* positive integers

**n(n+1)/2 1,3,6,10,15,….**

1. Find the first five terms of the sequence defined by each of these recurrence relations and initial conditions. Then find their formulas.





1. an=6(an-1)= 6 (6(an-2)) = 6(6(6(an-3)))=63(an-3)=6n(an-n)=6na0=2\*6n
2. an=(an-1)2=((an-2)2)2=((an-3)2)2)2=
3. For each of these lists of integers, provide a simple formula or rule that generates the terms of an integer sequence that begins with the given list. Assuming that your formula or rule is correct, determine the next three terms of the sequence.

**a)** 3*,* 6*,* 12*,* 24*,* 48*,* 96*,* 192*, . . .*

**b)** 15*,* 8*,* 1*,*−6*,*−13*,*−20*,*−27*, . . .*

**c)** 3*,* 6*,* 11*,* 18*,* 27*,* 38*,* 51*,* 66*,* 83*,* 102*, . . .*

**d)** 7*,* 11*,* 15*,* 19*,* 23*,* 27*,* 31*,* 35*,* 39*,* 43*, . . .*

a) 3(2)n

b) 15-7n

c) the pattern is an+1=an+2n+1, next three terms are 123,146,171

d)the pattern is an+1=an+4, next three terms are 47,51,55

1. Find the nth term {an} of the following:

a) The geometric sequence with a0= 4 and a4=¼.

b) The arithmetic progression with a1=2 and a4= -7.

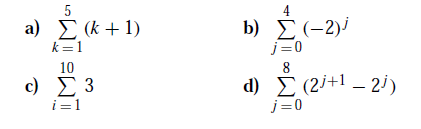
1. **Geometric sequence means it is in the form {an} = arn. Following that we get:**

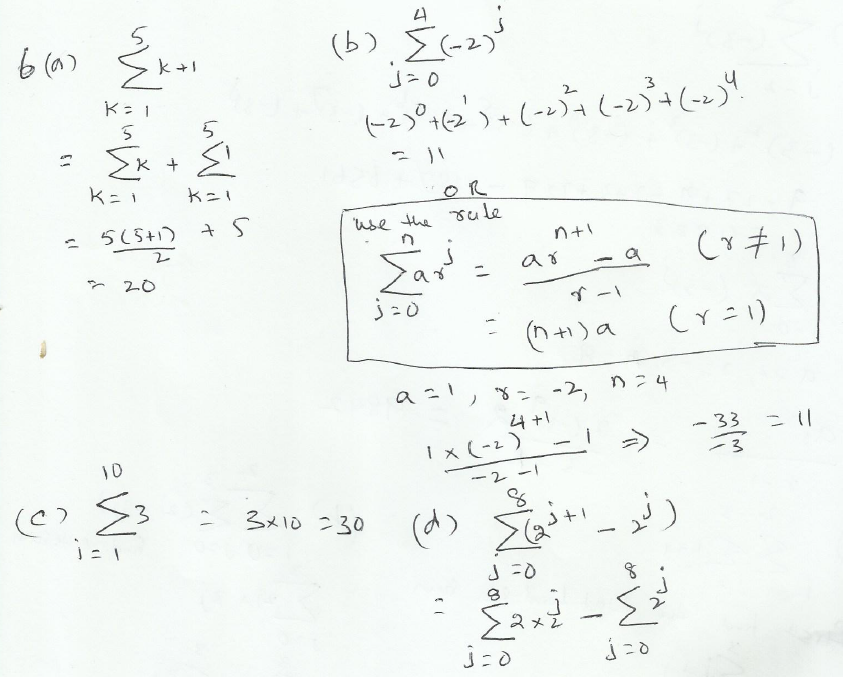
**a0= ar0 = a =4 and a4=ar4 =1/4 . By substituting a in the second equation we get r4=1/16 🡺 r = 1/2. Therefore, {an} = 4(1/2)n**

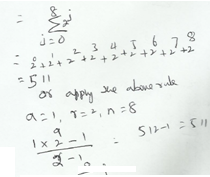
1. **Arithmetic sequence means it is in the form {an} = a+dn. Following that we get:**

**a1= a+d = 2 and a4=a+4d =-7 . By subtracting both equations (a4-a0)we get 3d= -9 🡺 d= -3. Then, by substituting d in first equation a - 3=2 🡺 a=5. Therefore, {an} = 5-3n.**

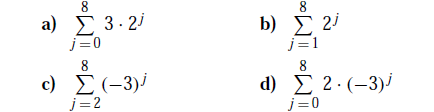
1. What are the values of these sums? a,c

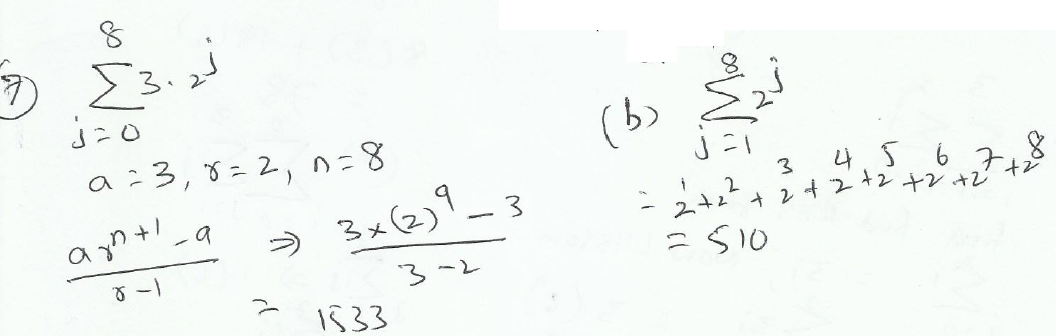


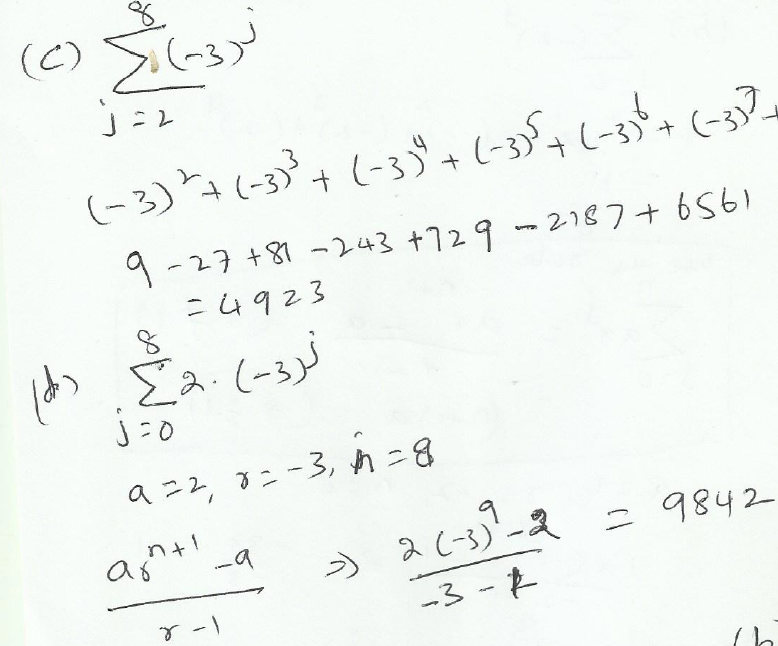




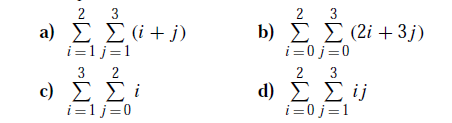
1. What is the value of each of these sums of terms of a geometric progression?

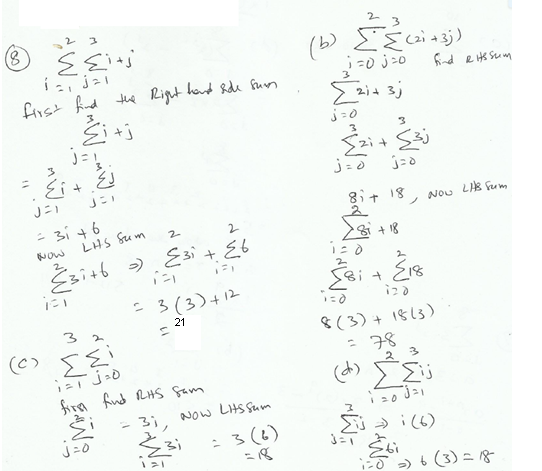




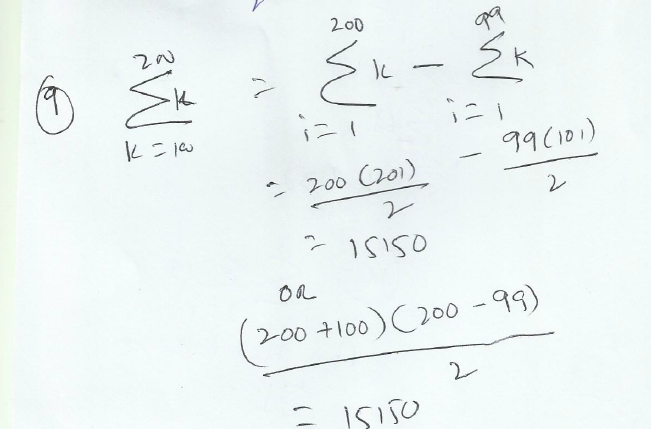


1. Compute each of these double sums.





1. Find



1. Find

