# CIS7 Unit 8 In-Class Assignment: Sequences, Sums and Series

Refer to Chapter 11 notes and textbook content to solve the following problems.

1. S = {1, ½ , 1/6 , 1/8, 1/10, …}

What is the next term in S? Write a formula that represents the above sequence.

**N = 1 f(n) = 1/1**

**N = 2 f(n) = 1/2**

**N = 3 f(n) = 1/6**

**N = 4 f(n) = 1/8**

**N = 5 f(n) = 1/10**

**f(6) = 1/12 <- Next Term**

1. S = {5, 10, 15, 20, …}

What is the next term in S? Write a formula that represents the above sequence.

**N = 1 f(n) = 5**

**N = 2 f(n) = 10**

**N = 3 f(n) = 15**

**N = 4 f(n) = 20**

**f(n) = 5n**

**f(5) = 5 \* 5 = 25 <- Next Term**

1. S = {5/7, 4/14, 3/21, 2/28,….}

What is the next term in S? Write the recursive formula that represents the above sequence.

**N = 1 f(n) = 5/7**

**N = 2 f(n) = 4/14**

**N = 3 f(n) = 3/21**

**N = 4 f(n) = 2/28**

**f(n) =**

**f(5) = (6-5)/(7\*5) = 1/35 <- Next Term**

1. S = {13, 16, 19,….}

What is the next term in S? Write the recursive formula that represents the above sequence.

**N = 1 f(n) = 13**

**N = 2 f(n) = 16**

**N = 3 f(n) = 19**

**f(n) = 13 + 3(n-1) = 3n + 10**

**f(4) = 12 + 10 = 22 <- Next Term**

1. Which of the following options is an arithmetic sequence?
2. t(n) = 8n
3. t(n) = (n+1)/4n
4. t(n) = n3+ 2n
5. t(n) = −9 + 6(n − 2)
6. Given t(n) = 5n – 2. Provide the initial part of the arithmetic sequence.

**t(1) = 5 – 2 = 3**

**t(2) = 10 – 2 = 8**

**t(3) = 15 – 2 = 13**

**t(4) = 20 – 2 = 18**

**S = {3, 8, 13, 18, …}**

1. Given t(n) = −4+8(n−1). Provide the initial part of the arithmetic sequence.

**t(1) = -4**

**t(2) = -4 + 8 = 4**

**t(3) = -4 + 16 = 12**

**t(4) = -4 + 24 = 20**

**S = {-4, 4, 12, 20, …}**

1. Select the option(s) that represents a geometric sequence.
2. t(n) = 10 × 3(n-1)
3. t(n) = {1, 2, 4, 8, …}
4. t(n) = 5 + 2(n-1)
5. t(n) = 211/4 + (n – 2)
6. Given t(n)=64\*( 1/2) (n−1)

Provide the initial part of the geometric sequence.

**t(1) = 64**

**t(2) = 64 \* (1/2) = 32**

**t(3) 64 \* 1/4 = 16**

**t(4) = 64 \* 1/8 = 8**

**S = {64, 32, 16, 8, …}**

**R = ½**

1. Given t(n) = 3/7 \* (2n)

Provide the initial part of the geometric sequence.

**t(1) = 6/7**

**t(2) = 12/7**

**t(3) = 24/7**

**t(4) = 48/7**

**S = {6/7, 12/7, 24/7, 48/7, …}**

**R = 2**

1. Select the option(s) that represents a quadratic sequence.
2. t(n) = 3n2 + 6n + 1
3. t(n) = n – 4
4. t(n) = 9n + 2
5. t(n) = 5n2 – 7n + 8
6. What are the differences between an arithmetic sequence and a quadratic sequence?

An arithmetic sequence can be modeled using a linear function where the difference between terms in the sequence is a constant. In a quadratic sequence the difference between terms in the sequence is no longer a constant. Rather it is a linear function and the second difference is a constant.

1. Determine the recursive formula for the following quadratic sequence: 4, 8, 11, 13, 14, . . .

| Sequence | 4 | 8 | 11 | 13 | 14 |
| --- | --- | --- | --- | --- | --- |
| Differences |  | 4 | 3 | 2 | 1 |
| Second difference |  | 1 | 1 | 1 | 1 |

**an = an2 + bn + c**

**N = 1: a + b + c = 4**

**N = 2: 4a + 2b + c = 8**

**N = 3: 9a + 3b + c = 11**

**Difference level 1**

**4a + 2b + c = 8**

**- a + b + c = 4**

**3a + b = 4**

**9a + 3b + c = 11**

**- 4a + 2b + c = 8**

**5a + b = 3**

**Difference level 2**

**5a + b = 3**

**- 3a + b = 4**

**2a = -1**

**a = - 1/2**

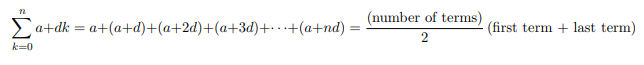
**b = 4 – 3a = 4 + 3/2 = 11/2**

**c = 8 – 4a – 2b = 8 + 2 – 11 = -1**

**a(n) =**

1. Determine the arithmetic sum for the following sequence:

−72, −60, −48, −36, −24, −12, . . .



**Sum =**

1. Find the geometric sum of the first 4 terms from the following sequence:

10, 30, 90, 270, 810,

Geometric progression

**t(n) = a · r(n−1).**

**Geometric Sum = , r** **≠ 1**

**A = 10**

**R = 3**

**N = 4**

**Sum =400**