Exam Review Part 4 – Discrete Functions
MCR3U
Jensen

1) Find the formula for the general term t_n and then use it to calculate t_{12} for each of the following sequences:

a) 9, 15, 21, …

b) –1, 2, –4, 8, …

2) Determine the general term for each of these sequences. Are they arithmetic, geometric or neither?

a) 1, 4, 7, 10, 13

b) 2187, 729, 243, 81, 27

3) For those sequences which are arithmetic or geometric in question 3:

i) determine the value of the 10th term, t_{10}

ii) determine the sum of the series up to the 12th term, S_{12}.

4) In an arithmetic series of 50 terms, the 17th term is 53 and the 28th term is 86. Determine, a, d and S_{50}.

5) In an arithmetic series, the 12th term is 15 and the sum of the first 15 terms is 105. Determine the sum of the first three terms in the series.

6) The fifth term of a geometric series is 405 and the sixth term is 1215. Find the sum of the first nine terms.

7) Find the sum of each of the following series:

a) 251 + 243 + 235 +…–205

b) –4 – 12 – 36– … –8748

c) 21 + 23 + 25 + … + 43

d) 1280 – 640 +320 – … + 5

8) Write the first 4 term of each of the following sequences:

a) $t_I = -6$; $t_n = t_{n-1} + 5$

b) $t_1 = -2$; $t_2 = -1$; $t_n = t_{n-1} \times t_{n-2}$

9) Determine the recursive formula of each of these sequences.

a) 1, 1, 2, 3, 5, 8,...

b) 3, 8, 13, 18, 23, 28, 33, 38

10) In an arithmetic sequence, the 3rd term is 25 and the 9th term is 43. How many terms are less than 100?

11) The sum of the first 6 terms is 297 and the sum of the first 8 terms is 500. Determine the 5^{th} term if the sequence is arithmetic.

12) For $(1 - x)^{11}$:

a) find t_3

b) how many terms are in the expansion?

c) explain where the numerical coefficients of the expansion are coming from

13) Expand $(x^2 - 2y)^4$ using binomial theorem; take the coefficients from Pascal triangle n = 4

14) Expand $(4x + 2x^3)^3$ using binomial theorem.

Answers

1) a) $t_n = 9 + (n-1)6$; $t_{12} = 75$ **b)** $t_n = -1(-2)^{n-1}$; $t_{12} = 2048$

2) a) arithmetic; $t_n = 1 + (n-1)3$ **b)** geometric; $t_n = 2187\left(\frac{1}{3}\right)^{n-1}$

3) i) a) $t_{10} = 28$ **b)** $t_{10} = \frac{1}{9}$ **ii) a)** $S_{12} = 210$ **b)** $S_{12} = \frac{265720}{81}$

4) $S_{50} = 3925$

5) $S_3 = -15$

6) $S_9 = 49205$

7) a) $S_{58} = 1334$ **b)** $S_8 = -13120$ **c)** $S_{12} = 384$ **d)** $S_9 = 855$

8) a) -6, -1, 4, 9 **b)** -2, -1, 2, -2

9) a) $t_n = t_{n-1} + t_{n-2}$ **b)** $t_n = t_{n-1} + 5$

10) 27

11) $t_5 = 69$

12) a) $55x^2$ **b)** 12 **c)** 11th row of Pascal's triangle

13) $x^8 - 8x^6y + 24x^4y^2 - 32x^2y^3 + 16y^4$

14) $64x^3 + 96x^5 + 48x^7 + 8x^9$