

## MEMO 2023-12ED-00001(1) Arithmetic Sequences

(1) Write the next three terms in each of the following sequences:

[Also indicate which of the sequences are arithmetic sequences. **AS**]

(a)  $3 ; 6 ; 12 ; 24 ;$  **48 ; 96 ; 192**

(b)  $3 ; -4 ; -11 ; -18 ;$  **-25 ; -32 ; -39** **AS**

(c)  $113 ; 115 ; 117 ; 119 ;$  **121 ; 123 ; 125** **AS**

(d)  $0,17 ; 0,37 ; 0,57 ; 0,77 ;$  **0,97 ; 1,17 ; 1,37** **AS**

(e)  $\frac{1}{2} ; \frac{2}{3} ; \frac{3}{4} ; \frac{4}{5} ;$   **$\frac{5}{6} ; \frac{6}{7} ; \frac{7}{8}$**  [Numerator and denominator increase with 1.]

(f)  $2 ; 8 ; 18 ; 32 ;$  **50 ; 72 ; 98** [Increases with 4 more each time.]

(2) Write the first four terms in each of the following sequences:

[Also indicate which of the sequences are arithmetic sequences. **AS**]

(a)  $T_n = -3n \rightarrow$  **-3 ; -6 ; -9 ; -12** **AS**

(b)  $T_n = 2^n \rightarrow$  **2 ; 4 ; 8 ; 16**

(c)  $T_n = n + 10 \rightarrow$  **11 ; 12 ; 13 ; 14** **AS**

(d)  $T_n = 4n + 1 \rightarrow$  **5 ; 9 ; 13 ; 17** **AS**

(e)  $T_n = n^2 \rightarrow$  **1 ; 4 ; 9 ; 16**

(f)  $T_n = \frac{n}{2} \rightarrow$   **$\frac{1}{2} ; 1 ; 1\frac{1}{2} ; 2$**  **AS**

(3) Consider the sequence: 3 ; 7 ; 11 ; 15 ; ... ..

(a) Calculate the general term of the sequence.

$$\begin{aligned} a &= 3 & T_n &= a + (n - 1)d \\ d &= 7 - 3 = 4 & &= 3 + (n - 1)(4) \\ T_n &= ? & &= 3 + 4n - 4 \\ & & \therefore T_n &= 4n - 1 \end{aligned}$$

(b) Calculate  $T_{25}$ .

$$\begin{aligned} T_n &= 4n - 1 \\ T_{25} &= 4(25) - 1 \\ \therefore T_{25} &= 99 \end{aligned}$$

(c) Calculate  $n$  if  $T_n = 87$ .

$$\begin{aligned} T_n &= 4n - 1 \\ \therefore 87 &= 4n - 1 \\ \therefore 87 + 1 &= 4n \\ \therefore 4n &= 88 \\ \therefore n &= 22 \end{aligned}$$

- (4) How many terms are there in the following sequence: 65 ; 59 ; 53 ; 47 ; .... ; -85?

$$a = 65$$

$$T_n = a + (n - 1)d$$

$$d = 59 - 65 = -6$$

$$-85 = 65 + (n - 1)(-6)$$

$$T_n = -85$$

$$\therefore -85 = 65 - 6n + 6$$

$$n = ?$$

$$\therefore 6n = 71 + 85$$

$$\therefore 6n = 156$$

$$\therefore n = 26$$

- (5) Place 6 terms between 8 and 29 for it to form an arithmetic sequence.

$$\therefore 8 ; \_ ; \_ ; \_ ; \_ ; \_ ; \_ ; 29$$

$$a = 8$$

$$T_n = a + (n - 1)d$$

$$d = ?$$

$$29 = 8 + (8 - 1)d$$

$$T_8 = 29$$

$$29 = 8 + 7d$$

$$n = 8$$

$$\therefore 21 = 7d$$

$$\therefore d = 3$$

$$\therefore 8 ; 11 ; 14 ; 17 ; 20 ; 23 ; 26 ; 29$$