NUMBER PATTERNS 2: QUIZ SOLUTIONS

Question 1

Which term of the arithmetic sequence -4; 1; 6; . . . is equal to 56?

A. T_9 B. T_{11} C. T_{13} D. T_{16}

Solution

1. a = -4, d = 5 and $T_n = 56$.

$$\therefore -4 + (n-1)(5) = 56$$
$$\therefore -4 + 5n - 5 = 56$$
$$\therefore 5n = 65$$
$$\therefore n = 13 \qquad \text{i.e., } T_{13} = 56$$

So, the correct answer is C.

Question 2

If the third and seventh terms of an arithmetic sequence are 15 and -1 respectively, which term will have a value of -53?

A. T_5 B. T_{16} C. T_{20} D. T_{38}

Solution

$T_3 = 15$, $T_7 = -1$ and $T_n = -53$

$$\therefore a + 2d = 15$$
and $a + 6d = -1$

Subtract: $\therefore 4d = -16$

$$\therefore d = -4$$
$$\therefore a + 2(-4) = 15$$
so $a = 23$
$$\therefore T_n = 23 + (n-1)(-4) = -53$$
$$\therefore 27 - 4n = -53$$
$$\therefore 4n = 80$$
$$\therefore n = 20 \qquad \text{i.e., } T_{20} = -53$$

So, the correct answer is C

Question 3

The first term of an arithmetic sequence is 10 and the sixth term is 85. What is the fourth term?

A. 15 B. 25 C. 40 D. 55

Solution

$T_1 = 10$, $T_6 = 85$

$\therefore a = 10$ and $a + 5d = 85$

$\therefore 5d = 75$

$\therefore d = 15$

$\therefore T_4 = a + 3d = 10 + 45 = 55$

So, the correct solution is D.

Question 4

If $x + 2$, $3x - 1$ and $4x - 3$ are the first three terms of an arithmetic sequence, what are their values?

A. -1; 1; 3 B. 3; 2; 1 C. -5; -10; -15 D. 1; 2; 3

Solution

$T_2 - T_1 = T_3 - T_2$

$\therefore (3x - 1) - (x + 2) = (4x - 3) - (3x - 1)$

$\therefore 2x - 3 = x - 2$

$\therefore x = 1$

The first three terms are 3, 2, 1.

So, the correct solution is B.

Question 5

5. The first three terms of an arithmetic sequence are $3k - 1$, $2k + 3$ and $2k - 1$. What is the nth term?

A. $T_n = 27 - 4n$ B. $T_n = 4n - 19$ C. $T_n = 4n - 27$ D. $T_n = 4n + 19$

Solution

$T_2 - T_1 = T_3 - T_2$

$\therefore (2k + 3) - (3k - 1) = (2k - 1) - (2k + 3)$

$\therefore -k + 4 = -4$

$\therefore k = 8$

$\therefore T_n = a + (n - 1)d = 23 + (n - 1)(-4)$

$= 27 - 4n$

So, the correct answer is A.