NUMBER PATTERNS 3: QUIZ SOLUTIONS

Question 1

Which of the following is a geometric sequence?

A. -3; 1; 5; 9; . . .
B. 1; 2; 4; 8; . . .
C. 11; 13; 17; 25; . . .
D. 1; 1; 2; 3; . . .

Solution

For A, pattern is: $-3+4=1;\quad 1+4=5;\quad 5+5=9;\quad \Rightarrow$ not a geometric sequence.

For B, pattern is: $1\times 2=2;\quad 2\times 2=4;\quad 4\times 2=8;\quad \Rightarrow$ geometric sequence

For C, pattern is: $11+2=13;\quad 13+4=17;\quad 17+8=25 \Rightarrow$ not a geometric sequence

For D, pattern is:

$0+1=1;\quad 1+1=2;\quad 1+2=3;\quad \Rightarrow$ not a geometric sequence (Fibonacci sequence)

So, the correct option is B.

Question 2

If the general term of a geometric sequence is $T_n = 3(2)^{n-1}$, what are the first three terms?

A. 3; 6; 9
B. 1; 6; 36
C. 6; 12; 18
D. 3; 6; 12

Solution

$$T_n = 3(2)^{n-1}$$
$$\therefore T_1 = 3(2)^0 = 3$$
$$\therefore T_2 = 3(2)^1 = 6$$
$$\therefore T_3 = 3(2)^2 = 12$$

So, the correct solution is D.

Question 3

What is the general term of the geometric sequence 18; 6; 2; ?

A. $2\cdot 3^{3-n}$
B. $6\cdot 3^{1-n}$
C. $2\cdot 3^{n-3}$
D. $18\cdot 3^{n-1}$

Solution

For the sequence 18; 6; 2; $a = 18$, $r = \frac{6}{18} = \frac{2}{6} = \frac{1}{3}$.

$$\therefore T_n = ar^{n-1} = 18\left(\frac{1}{3}\right)^{n-1}$$
$$= 2.3^2.3^{1-n}$$
$$= 2.3^{3-n}$$

So, the correct answer is A.

Question 4

What is the 8th term of the geometric sequence 4; -8; 16; . . .?

A. 512 B. 128 C. -128 D. -512

Solution

For the sequence 4; -8; 16; . . , $a = 4$, $r = \frac{-8}{4} = \frac{16}{-8} = -2$.

$$\therefore T_8 = ar^7 = 4(-2)^7$$

$$= -512$$

So, the correct answer is D.

Question 5

5. If the first three terms of a geometric sequence are $5x$, $\frac{5x}{4}$ and $\frac{5x}{16}$, what is the value of the common ratio, r?

A. 4 B. $\frac{5}{4}$ C. $\frac{4}{5}$ D. $\frac{1}{4}$

Solution

$$T_1 = 5x,\ T_2 = \frac{5x}{4},\ T_3 = \frac{5x}{16}$$

$$r = \frac{T_2}{T_1} = \frac{T_3}{T_2}$$

$$\therefore r = \frac{\frac{5x}{4}}{5x} = \frac{\frac{5x}{16}}{\frac{5x}{4}} = \frac{5x}{4} \times \frac{1}{5x} = \frac{5x}{16} \times \frac{4}{5x} = \frac{1}{4}$$

So, the correct answer is D.