

NUMBER PATTERNS 8: QUIZ SOLUTIONS

Question 1

A geometric series with 10 terms has first term a and common ratio r . What is the sum of the series?

A. $S_{10} = \frac{a(r^{10} - 1)}{r - 1}$ B. $S_{10} = \frac{a(1 - r^9)}{1 - r}$ C. $S_{10} = \frac{a(r^9 - 1)}{r - 1}$ D. $S_{10} = \frac{a(1 - r^{10})}{1 - r}$

Solution

$$T_1 = a, \text{ common ratio} = r (< 1) \text{ and } n = 10$$

$$\therefore S_{10} = \frac{a(1 - r^{10})}{1 - r}$$

So, the correct answer is D.

Question 2

A geometric series with eight terms is $x + xy + xy^2 + \dots$. What is the sum of the series?

A. $S_8 = \frac{x(1 - y^7)}{1 - y}$ B. $S_8 = \frac{x(y^8 - 1)}{y - 1}$ C. $S_8 = \frac{x(y^7 - 1)}{y - 1}$ D. $S_8 = \frac{x(1 - y^8)}{1 - y}$

Solution

$$n = 8, S_8 = x + xy + xy^2 + \dots (y > 1) \text{ (8 terms)}$$

$$\therefore S_8 = \frac{x(y^8 - 1)}{y - 1}$$

So, the correct answer is B.

Question 3

What is the sum of the geometric series $1 + 3 + 9 + \dots + 3^k$?

A. $\frac{1}{2}(3^{k+1} - 1)$ B. $\frac{1}{2}(3^{n+1} - 1)$ C. $\frac{1}{2}(3^k - 1)$ D. $\frac{1}{2}(3^{n-1} - 1)$

$$a = 1, r = 3, n = k + 1$$

$$T_{k+1} = \frac{1(3^{k+1} - 1)}{3 - 1} = \frac{1}{2}(3^{k+1} - 1)$$

So, the correct answer is A.

Question 4

What is the value of k for the following geometric series:

$$3 + 6 + 12 + \dots + (\text{to } k \text{ terms}) = 93$$

- A. 4 B. 5 C. 6 D. 10

Solution

$$T_1 = a = 3, r = 2, n = k$$

$$\therefore \frac{3(2^k - 1)}{2 - 1} = 93$$

$$\therefore 2^k - 1 = 31$$

$$\therefore 2^k = 32 = 2^5$$

$$\therefore k = 5$$

So, the correct answer is B.

Question 5

If $\sum_{k=1}^m 8(1)^{k-1} = 800$, what is the value of m ?

- A. 8 B. 10 C. 100 D. 200

Solution

$$\sum_{k=1}^m 8(1)^{k-1} = 8 + 8 + 8 + (\text{to } m \text{ terms}) = 800$$

$$\therefore m = 100$$

So, the correct answer is C.