Mathematics — Ganita Manjari

Chapter 8 Test 5

Predicting What Comes Next: Exploring Sequences and Progressions

Class IX | 2026–27

Time Allowed: 45 Minutes | Maximum Marks: 25

General Instructions

1. All 13 questions are compulsory. Choose one option in A; show working in B–D.
2. No calculators. Give exact answers unless an approximation is requested.
3. Term positions start at 1 unless a stage number of 0 is explicitly given.

SECTION A

(5 questions × 1 mark = 5 marks)

1. For the GP 4,12,36,108, …, which calculation gives the common ratio?

(A) $12/4$ (B) $4/12$

(C) $12 - 4$ (D) $36 - 12$

2. In $t_n = ar^{n-1}$, why is the exponent $n - 1$?

(A) The first term is zero

(B) There are n ratios

(C) There are $n - 1$ multiplications after the first term

(D) Every GP has n terms

3. Which sequence is a GP but is not an AP?

(A) 2,4,6,8, … (B) 5,5,5,5, …

(C) 1,3,6,10, … (D) 3,6,12,24, …

4. If $a > 0$ and $r > 1$, the terms of the GP $a, ar, ar^2, \ldots$:

(A) Decrease

(B) Strictly increase

(C) Alternate in sign

(D) Stay constant

5. The nth term of 5,25,125, … is:

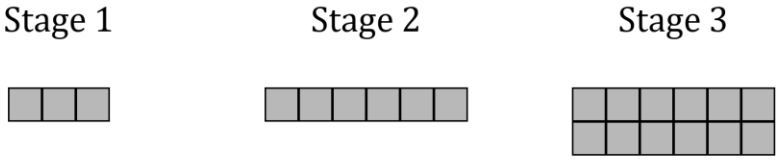
(A) 5^n (B) 5^{n-1}

(C) n^5 (D) $5n$

SECTION B

(4 questions × 2 marks = 8 marks)

6. At each stage in figure, every tile is replaced by two tiles. Write explicit and recursive rules for the total number of tiles.



7. Which term of 2,6,18, … is 4374?

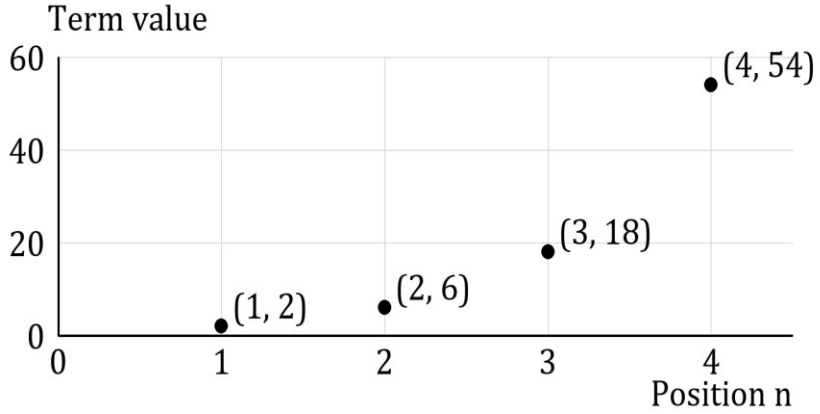
8. A positive-ratio GP has second term 12 and fourth term 108. Find its common ratio and first term.

9. The list 3,6,12,25,48 was meant to be the first five terms of a GP of ratio 2. Identify and correct the error.

SECTION C

(3 questions × 3 marks = 9 marks)

10. The graph in figure follows a GP. Find its fifth term and explain, using successive differences, why the plotted points do not lie on one straight line.



11. A sequence has $u_1 = 2$ and $u_{n+1} = 3u_n - 2$. Set $v_n = u_n - 1$. Show that v_n is a GP and determine which term of u_n is 730.

12. Prove that for a GP with non-zero terms, $t_2 t_6 = {t_4}^2$.

SECTION D

(1 application question × 3 marks = 3 marks)

13. A culture contains 30 bacteria at time 0 and doubles each hour. Find the populations after 2 and 4 hours, and the first completed hour when the population exceeds 1000.