Mathematics

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(Chapter – 8) (Predicting What Comes Next: Exploring Sequences and Progressions)
(Assignment 3)
(Class – 9)

Name _____ Date _____

Answer all 15 questions. Choose one option for each MCQ. Show your working and give reasons where required.

Section A: Multiple Choice Questions

1. Find the 12^{th} term of a GP with common ratio 2, whose 8^{th} term is 192.

(a) 768 (b) 1536
(c) 3072 (d) 6144

2. Is 1, –1, 1, –1, 1, … a geometric progression? If so, what is the common ratio?

(a) Yes; r = 1. (b) Yes; r = –1.
(c) Yes; r = 0. (d) No.

3. Find the first five terms of the sequence in which the n^{th} term is given by (iii) $t_n = n^2 - 2n + 3$ for $n \geq 1$.

(a) 2, 3, 6, 11, 18 (b) 1, 4, 9, 16, 25
(c) 2, 4, 6, 8, 10 (d) 3, 6, 11, 18, 27

4. Can you find a recursive rule for the formula $t_n = 3 \times 10^{n-1}$ that generates the geometric progression 3, 30, 300, 3000, …?

(a) $t_1 = 3$; $t_{n+1} = t_n + 10$ (b) $t_1 = 3$; $t_{n+1} = 10t_n$
(c) $t_1 = 10$; $t_{n+1} = 3t_n$ (d) $t_1 = 3$; $t_{n+1} = 3t_n$

5. Which sequence is an AP with common difference –3?

(a) 20, 17, 14, 11, … (b) 20, 14, 8, 2, …
(c) 3, 6, 12, 24, … (d) –3, –6, –12, –24, …

Section B: Very Short Answer Questions

6. Consider the expression $t_n = 3n - 7$.

(i) Find its first, second, third, 12^{th}, 18^{th} and 50^{th} terms.

Answer:

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7. Find the first four terms of the sequence given by the recursive rule $s_1 = 3$, $s_n = s_{n-1}(s_{n-1} - 1)$ for $n \geq 2$.

Answer:

8. A child arranges marbles in rows so that the first row has 1 marble, the second has 2 marbles, the third has 3, and so on up to 25 rows. How many marbles does the child use in all?

Answer:

9. Using the formula $t_n = a + (n - 1) \times d$, find the n^{th} term of the following arithmetic progressions.

(ii) 1.5, 3.5, 5.5, 7.5, ...

Answer:

10. Check whether the following sequences are geometric progressions and find their n^{th} terms.

(ii) $4, \frac{8}{3}, \frac{16}{9}, \frac{32}{27}, \ldots$

Answer:

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Section C: Short and Long Answer Questions

11. Find the first four terms of the sequence given by the recursive rule $u_1 = 1$, $u_n = 2u_{n-1} + 3$ for $n \geq 2$. Is 133 a term of this sequence?

Answer:

12. An AP consists of 50 terms in which the 3rd term is 12 and the last term is 106. Find the 29th term.

(**Hint:** If 'a' is the first term and 'd' the common difference, then we arrive at the equations $a + 2d = 12$ and $a + 49d = 106$. Solve this pair of linear equations for 'a' and 'd'.)

Answer:

13. An auditorium has 15 rows. The first row has 12 seats, and each next row has 3 more seats than the previous row. Find the number of seats in the last row and the total seating capacity.

Answer:

14. The sum of the 4^{th} and 8^{th} terms of an AP is 24 and the sum of the 6^{th} and 10^{th} terms is 44. Find the first three terms of the AP.

Answer:

15. The sum of the first three terms of a GP is $\frac{13}{12}$ and their product is –1. Find the common ratio and the terms.

Answer: