

Class : IXTH

Date :

Subject : MATHS

DPP No. : 3

PREDICTING WHAT COMES NEXT: EXPLORING SEQUENCES AND PROGRESSIONS

Multiple Choice Questions

- The 9th term and the general term of the progression $\frac{1}{4}, -\frac{1}{2}, 1, -2, \dots$ are:
(a) $64, (-1)^{n-1}2^{n-3}$ (b) $64, (-1)^{n-1}2^{n-2}$
(c) $64, (-1)^{n-2}2^{n-3}$ (d) $64, (-2)^{n-1}2^{n-3}$
- Which term of the GP: 2, 8, 32, ... is 131072?
(a) 9th (b) 7th
(c) 8th (d) 11th
- In a GP, the 3rd term is 24 and the 6th term is 192. The 10th term is:
(a) 3076 (b) 3071
(c) 3072 (d) 3074

Assertion-Reason Based Questions

The following questions are Assertion and Reason based questions. Two statements are given, one labelled as Assertion (A) and the other is labelled as Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.

- Both (b), (c) and (d) as given below.
 - Both A and R are true but R is not the correct explanation of A.
 - A is true, but R is false.
 - A is false, but R is true.
- Assertion (A) : The n^{th} term of a geometric progression can be zero.
Reason (R) : In a geometric progression, each term is obtained by multiplying the previous term with the common ratio.

Very Short Answer Questions

- Find the recursive rule for the GP: 3, 18, 108, 648,
- Which term of the sequence $\sqrt{3}, 3, 3\sqrt{3}, \dots$ is 729?
- Which term of the sequence 18, -12, 8, ... is $\frac{512}{729}$?
- The fourth term of a GP is 4. Find product of its first seven terms.



Short Answer Questions

9. If $k, 2k + 2, 3k + 3, \dots$ are in GP, then find the common ratio of the GP.
10. Write the explicit formula as well as the recursive formula for the n^{th} term of the GP: 2, 8, 32, ...
11. Find the n^{th} and the 15^{th} term of the GP: $1, -\frac{1}{2}, \frac{1}{4}, -\frac{1}{8}, \dots$
12. If the third, sixth and the last term of a GP are 6, 48 and 3072 respectively, find the first term and the number of terms in the GP.

Long Answer Questions

13. A ball is dropped from a height of 80 m. After each bounce, it rises to $\frac{3}{4}$ of the height from which it fell.
 - (i) Write the explicit rule.
 - (ii) Write the recursive rule.Find the height after the 5^{th} bounce

CASE STUDY BASED QUESTIONS

14. A person writes a letter to four of his friends. He asks each one of them to copy the letter and mail it to four different persons with the instruction that they move the chain similarly. Assuming that the chain is not broken and that it costs 50 paise to mail one letter.



Based on the above information, answer the following questions:

- (i) Write the sequence of letters mailed in each set
- (ii) Find the number of letters mailed in the 4^{th} set.
- (iii) Find the amount spent on the mailing of 9^{th} set.



ANSWER KEY

1.(a) 2. (a) 3. (c) 4. (d)

5. $a_1 = 3, a_n = 6a_{n-1}$ for $n \geq 2$

6. 12th term

7. 9th term

8. 16384

9. $\frac{3}{2}$

10. Explicit rule: $a_n = 2^{2n-1}$, Recursive rule: $a_1 = 2, a_n = 4a_{n-1}$ for $n \geq 2$

11. $a_n = (-1)^{n-1} 2^{1-n}, a_{15} = 2^{-14}$

12. $a = \frac{3}{2}, n = 12$

13.(i) $a_n = 80 \times \left(\frac{3}{4}\right)^{n-1}$ where a_n represents the height after $(n - 1)^{\text{th}}$ bounce.

(ii) $a_1 = 80, a_n = \left(\frac{3}{4}\right) \cdot a_{(n-1)}, n \geq 2$

(iii) 18.98 m

14.(i) 4, 4², 4³, ...

(ii) 256

(iii) ₹ 1,31,072

