

Class : IXTH

Date :

Subject : MATHS

DPP No. : 1

PREDICTING WHAT COMES NEXT: EXPLORING SEQUENCES AND PROGRESSIONS

Multiple Choice Questions

- Which of the following represents a recursive rule?
(a) $a_n = 4n + 1$ (b) $a_n = n^2 - 1$
(c) $a_n = a_{(n-1)} + 6$ (d) $a_n = 3^n$
- The first term of the sequence defined by $a_n = (-1)^{(n+1)} \cdot n$ is:
(a) -1 (b) 1
(c) 0 (d) 2
- Which of the following is explicit rule for the sequence: 5, 10, 20, 40, 80, ... ?
(a) $a_n = 5^n$ (b) $a_n = 5 \times 2^{(n-1)}$
(c) $a_n = 2 \times 5^{(n-1)}$ (d) $a_n = 5 + 2^n$
- In Tower of Hanoi puzzle, if the minimum number of moves is 127, the number of disks involved is:
(a) 5 (b) 6
(c) 7 (d) 8

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 (2 sequence defined by $a_1 = 5$ and $a_n = a_{(n-1)} + 4$, the 10th term is 41.
Reason (R) : The explicit rule of the sequence is $a_n = 4n - 1$.

Very Short Answer Questions



6. Write the first five terms of the sequence whose n^{th} term is $a_n = \frac{2n+1}{n+1}$.
7. A sequence is defined by $a_1 = 3, a_n = 2a_{n-1}$ for $n \geq 2$. Write the first six terms.
8. A sequence is defined recursively as $a_1 = a_2 = 1, a_n = a_{(n-1)} + a_{(n-2)} + 1$ for $n \geq 3$. Find the first seven terms.
9. Find the 20^{th} term of the sequence whose explicit rule is $a_n = (-1)^n \cdot (3n - 1)$.
10. Find the explicit rule for the sequence 2, 6, 12, 20, 30, ...
11. Find the minimum number of moves required in Tower of Hanoi puzzle for 8 disks.

Short Answer Questions

12. Find the recursive rule for the sequence 1,4,13,40,121, ...
13. Write both the explicit and recursive rules for the sequence 100,95,90,85,80, ...
14. How many terms of the sequence with explicit rule $a_n = 3n + 1$ are less than 100?
15. A plant grows 2 cm in the first week, 3.5 cm in the second week, 5 cm in the third week, and so on. Write the explicit rule and find the growth in the 10^{th} week.

Long Answer Questions

16. A sequence has the property that the ratio of any term to the previous term is always $\frac{1}{2}$. The first term is 64.
 - (i) Write the recursive rule.
 - (ii) Write the explicit rule.
 - (iii) Which is the first term less than 1?
 - (iv) Will any term ever equal to exactly 0?

CASE STUDY BASED QUESTIONS

17. A scientist is studying bacteria growth in a laboratory. She observes that the number of bacteria in a petri dish follows a pattern: starting with 100 bacteria, the population triples every hour. Based on the above information, answer the following questions:
 - (i) Write the explicit rule for the sequence formed by population of bacteria.
 - (ii) Write the recursive rule.
 - (a) How many bacteria will there be after 7 hours?

OR

 - (b) After how many complete hours will the population be 24,300?



ANSWER KEY

1. (c) 2. (b) 3. (b) 4. (c) 5. (c)
6. $\frac{3}{2}, \frac{5}{3}, \frac{7}{4}, \frac{9}{5}, \frac{11}{6}$
7. 3, 6, 12, 24, 48, 96
8. 1, 1, 3, 5, 9, 15, 25
9. 59
10. $a_n = n(n + 1)$
11. 255
12. $a_1 = 1, a_n = 3a_{(n-1)} + 1, n \geq 2$
13. Explicit rule: $a_n = 105 - 5n$ and Recursive rule: $a_1 = 100, a_n = a_{(n-1)} - 5, n \geq 2$
14. 32
15. $a_n = 0.5 + 1.5n$; 15.5 cm
16. (i) $a_1 = 64, a_n = \frac{a_{(n-1)}}{2}$ for $n \geq 2$
(ii) $a_n = \frac{64}{2^{(n-1)}}$
(iii) 8th term
(iv) No
17. (i) $a_n = 100(3)^{n-1}$
(ii) $a_1 = 100, a_n = 3a_{(n-1)}, n \geq 2$
(iii) (a) 2, 18, 700 OR
(b) 5



smartachievers.online



SMART ACHIEVERS
JEE | NEET | FOUNDATION

Web: www.smartachievers.online
Phone: +91-7292077839 / 7292047839