Mathematics

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(Chapter – 8) (Predicting What Comes Next: Exploring Sequences and Progressions)
(Assignment 1)
(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. Which term of the sequence $t_n = 5n - 3$ for $n \geq 1$ is 607?

(a) 120th term (b) 121st term
(c) 122nd term (d) 123rd term

2. Is 1, 2, 4, 8, 16, … a geometric progression? If so, what is the common ratio?

(a) Yes; r = 1. (b) Yes; r = 2.
(c) Yes; r = 4. (d) No.

3. Find the first five terms of the sequence in which the n^{th} term is given by (i) $t_n = 3n - 4$ for $n \geq 1$.

(a) −1, 2, 5, 8, 11 (b) 1, 4, 7, 10, 13
(c) −4, −1, 2, 5, 8 (d) 3, 6, 9, 12, 15

4. Can you find the rule describing the n^{th} term of the sequence of square numbers?

(a) $t_n = 2n$ (b) $t_n = 2n - 1$
(c) $t_n = n^2$ (d) $t_n = n + 2$

5. Which description is correct for the sequence −2, 0, 2, 4?

(a) An infinite AP with d = 2. (b) A finite AP with d = 2.
(c) A finite GP with r = 2. (d) Neither an AP nor a GP.

Section B: Very Short Answer Questions

6. Can you write t_5, t_6, t_7 and t_8 for the sequence of triangular numbers?

Answer:

7. Using the explicit rule $u_n = 2n - 1$, find the 53^{rd} term, the 108^{th} term, and the 1170^{th} term of the odd number sequence.

Answer:

8. Find the 10^{th} and n^{th} terms of the GP: 5, 25, 125, … .

Answer:

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

(i) $\frac{1}{2}, \frac{5}{2}, \frac{9}{2}, \frac{13}{2}$, …

Answer:

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

(iii) Is 557 a term of this sequence? Why or why not?

Answer:

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Section C: Short and Long Answer Questions

11. A sequence is given by the recursive rule $t_1 = -5$, $t_{n+1} = t_n + 3$ for $n \geq 1$. Find the first five terms of the sequence. Is 52 a term of this sequence? If so, which term is it?

Answer:

12. How many 2-digit numbers are divisible by 3? What is the sum of all these 2-digit numbers?

Answer:

13. Meera saves ₹40 in the first week and ₹15 more each week than in the previous week. Find her saving in the 10th week and her total saving over 10 weeks.

Answer:

14. Find the 31st term of an AP whose 11th term is 38 and 16th term is 73.

Answer:

15. The figure shows Stages 0 to 3 of the Sierpiński square carpet. Stage 0 of this fractal is a square sheet of paper. To construct Stage 1, each side of the square is trisected and the points of trisection of opposite sides are joined to obtain nine smaller squares. The centre square is then removed and the 8 smaller squares are retained, leaving a square hole in the centre. The same process is repeated on the eight smaller shaded squares to obtain Stage 2 and so on.

Look at the figure and try to answer the following questions.

(iv) Suppose the area of the square in Stage 0 is 1 square unit. What is the area of the red region in Stages 1, 2 and 3? What will be the area of the red region in Stages 4 and 5? Find the explicit as well as the recursive formula for the area of the red region at the nth stage. What happens to this area as n, the number of stages, goes on increasing?



Stage 0 Stage 1 Stage 2 Stage 3

Answer:

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