Mathematics

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(Chapter – 8) (Predicting What Comes Next: Exploring Sequences and Progressions)
(Assignment 4)
(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. How many multiples of 4 lie between 10 and 250?

(**Hint:** All multiples of 4 form an AP. Find the smallest and largest multiples of 4 between 10 and 250.)

(a) 59 (b) 60
(c) 61 (d) 62

2. Which term of the sequence 2, $2\sqrt{2}$, 4, … is 128?

(a) 7th term (b) 12th term
(c) 13th term (d) 14th term

3. Find the 10^{th} and 26^{th} terms of the AP: 3, 8, 13, 18, ….

(a) 45 and 125 (b) 48 and 128
(c) 50 and 130 (d) 53 and 133

4. 1, 2, 3, 5, 8, 13, 21, 34, …

Can you write the next two terms of this sequence?

(a) 47 and 60 (b) 54 and 88
(c) 55 and 89 (d) 55 and 90

5. The sequence is 7, 7, 7, 7, … . Which statement is correct?

(a) Only an AP; d = 0. (b) Only a GP; r = 1.
(c) Both an AP and a GP. (d) Neither an AP nor a GP.

Section B: Very Short Answer Questions

6. Check whether the sequence 5, $\frac{15}{4}$, $\frac{45}{16}$, $\frac{135}{64}$, … is a geometric progression and find its n^{th} term.

Answer:

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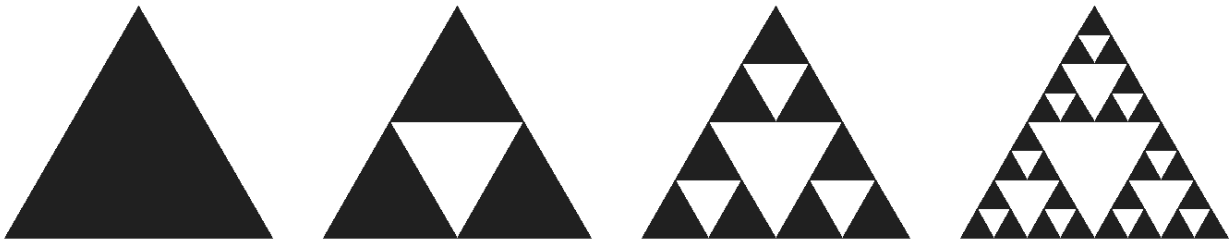
7. Check whether the following sequences are geometric progressions and find their n^{th} terms.
(iii) $3, -\frac{3}{2}, \frac{3}{4}, -\frac{3}{8}, \ldots$

Answer:

8. Can you use this to find the 10^{th}, 17^{th} and 80^{th} triangular numbers?
Here the nth triangular number is $t_n = n(n + 1)/2$.

Answer:

9. Observe the Sierpiński triangle and try to answer the following questions.
(a) How many black triangles are there in Stages 0 to 3 of the figure?



Stage 0 Stage 1 Stage 2 Stage 3

Answer:

10. To begin with, can you find the sum of the first ten natural numbers without actually adding all of them?

Answer:

Section C: Short and Long Answer Questions

11. A sequence is given by the recursive rule $t_1 = 2$, $t_{n+1} = 3t_n - 2$ for $n \geq 1$. Which term of the sequence is 730?

Answer:

12. Which term of the GP: 2, 6, 18, … is 4374? Write the explicit formula as well as the recursive formula for the n^{th} term.

Answer:

13. A culture initially contains 5 bacteria and triples in number every 2 hours. Find the number after 6 hours and after 8 hours. Write an explicit rule and a recursive rule, using k for the number of completed 2-hour intervals.

Answer:

14. The sum of the first three terms of a geometric progression is 26, and the sum of their squares is 364. Find the terms of the GP.

Answer:

15. Suppose $P_1 = 1$, $P_2 = 2$ and for $n > 2$, $P_n = P_1 + P_2 + \cdots + P_{n-1} + 1$. Find the values of $P_1, P_2, ..., P_8$. Can you find a simpler recursive formula for P_n? Can you give an explicit formula?

Answer:

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