

MATHEMATICS
WORKSHEET_120824
CHAPTER 08 SEQUENCE AND SERIES

SUBJECT: MATHEMATICS

MAX. MARKS : 40

CLASS : XI

DURATION : 1½ hrs

General Instructions:

- (i). All questions are compulsory.
- (ii). This question paper contains 20 questions divided into five Sections A, B, C, D and E.
- (iii). **Section A** comprises of 10 MCQs of 1 mark each. **Section B** comprises of 4 questions of 2 marks each. **Section C** comprises of 3 questions of 3 marks each. **Section D** comprises of 1 question of 5 marks each and **Section E** comprises of 2 Case Study Based Questions of 4 marks each.
- (iv). There is no overall choice.
- (v). Use of Calculators is not permitted

SECTION – A

Questions 1 to 10 carry 1 mark each.

1. If the third term of G.P. is 4, then the product of its first 5 terms is:
(a) 4^3 (b) 4^4 (c) 4^5 (d) none of these
2. In a G.P, the 3rd is 24 and the 6th term is 192, then the 10th term is:
(a) 1084 (b) 3290 (c) 3072 (d) 2340
3. Which term of the G.P 5, 10, 20, 40,... is 5120?
(a) 11th (b) 10th (c) 6th (d) 5th
4. 18th term from the end of the sequence 3, 6, 12,...25th term is:
(a) 393216 (b) 393206 (c) 313216 (d) 303216
5. The 5th term from the end of the sequence 16, 8, 4, 2 ... $\frac{1}{16}$ is:
(a) 1 (b) 2 (c) 3 (d) 4
6. If the 8th term of G.P is 192 with a common ratio of 2, then the 12th term is:
(a) 1640 (b) 2084 (c) 3072 (d) 3126
7. If n terms of a G.P. 3, 32, 33... are needed to give the sum 120, then the value of n is:
(a) 2 (b) 3 (c) 4 (d) 5
8. If n th term of a G.P. is 2^n , then find the sum of its first 6 terms.
(a) 126 (b) 124 (c) 190 (d) 154

For Q9 and Q10, a statement of assertion (A) is followed by a statement of reason (R). Choose the correct answer out of the following choices.

- (a) Both A and R are true and R is the correct explanation of A.
 - (b) Both A and R are true but R is not the correct explanation of A.
 - (c) A is true but R is false.
 - (d) A is false but R is true.
9. **Assertion (A):** The first term of a GP is 1. The sum of third and fifth term is 90, then the common ratio are 3 or -3.
Reason (R): Common ratio of GP $a_1, a_2, a_3, \dots$ is given by $a_2 - a_1 = a_3 - a_2 = \dots$

10. Assertion (A): Sum of 7 terms of the GP 3, 6, 12, is 381.

Reason (R): Sum of first n terms of the G. P is given by $S_n = \frac{a(r^n - 1)}{r - 1}$, where a = first term, r = common ratio and $|r| > 1$.

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. If a, b, c, d are in G.P. ; prove that, $a + b, b + c, c + d$ are also in G.P.

12. Prove that : $9^{1/3} \cdot 9^{1/9} \cdot 9^{1/27} \dots = 3$

13. Express $6.\overline{245}$ as rational numbers using G.P.

14. Find the values of p , if sum to infinity for the G.P. $p, 1, \frac{1}{p}, \dots$ is $\frac{25}{4}$.

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. Three numbers are in AP their sum is 15. If 1, 3, 9 be added to them respectively they form a GP. Find the numbers.

OR

Find the value of n , so that $\frac{a^{n+1} + b^{n+1}}{a^n + b^n}$ may be geometric mean between a and b .

16. Find the sum of ' n ' terms of the series : $0.5 + 0.55 + 0.555 + \dots n$ terms.

17. If the p th, q th and r th term of a G.P. are a, b, c respectively, prove that : $a^{q-r} \cdot b^{r-p} \cdot c^{p-q} = 1$.

OR

The 5th, 8th and 11th term of a GP are p, q and s , respectively. Show that $q^2 = ps$.

SECTION – D

Questions 18 carry 5 marks.

18. The sum of two numbers is '6' times their geometric mean, show that the numbers are in the ratio $(3 + 2\sqrt{2}) : (3 - 2\sqrt{2})$.

OR

If S_n denotes the sum of n terms of a G.P., prove that $(S_{10} - S_{20})^2 = S_{10} (S_{30} - S_{20})$.

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. A sequence of non-zero numbers is said to be a geometric progression, if the ratio of each term, except the first one, by its preceding term is always constant. Rahul, being a plant lover, decides to open a nursery and he bought few plants and pots. He wants to place pots in such a way that the number of pots in the first row is 2, in second row is 4 and in the third row is 8 and so on.....

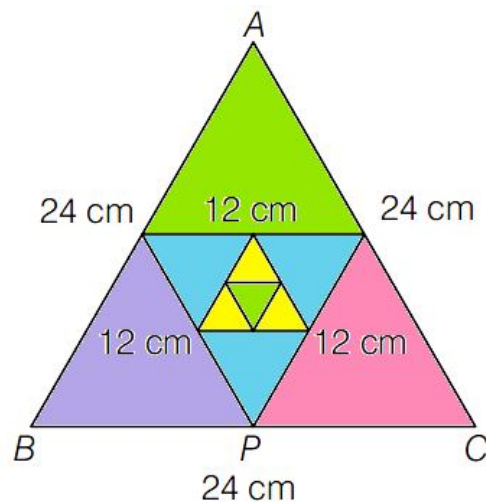


- (a) Find the constant multiple by which the number of pots is increasing in every row (1)
- (b) Find the number of pots in 8th row. (1)
- (c) Find the difference in number of pots placed in 7th row and 5th row (2)

OR

- (c) If Rahul wants to place 510 pots in total , then find the total number of rows formed in this arrangement (2)

- 20.** In Rangoli competition in school, Preeti made Rangoli in the equilateral shape. Each side of an equilateral triangle is 24 cm. The mid-point of its sides are joined to form another triangle. This process is going continuously infinite.



Based on above information, answer the following questions.

- (a) Find the side of the 5th triangle is (in cm) (1)
- (b) Find the sum of perimeter of first 6 triangle is (in cm) (2)

OR

- (b) Find the area of all the triangle is (in sq cm). (2)
- (c) Find the sum of perimeter of all triangle is (in cm). (1)

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