

ARITHMETIC PROGRESSIONS

1. $S_{17} - S_{16} = ?$
(a) S_1 (b) T_1 (c) T_{17} (d) $2d$
2. T_{10} of an AP = 31 & $T_{20} = 71$ then $T_{30} = ?$
(a) 171 (b) 222 (c) 112 (d) 111
3. No. of terms of the sequence $-12, -9, -6, -3, \dots$ must be added to make the sum 54 are ____
(a) 33 (b) -46 (c) 10 (d) 12
4. If 'n' times the 'n'th term an AP is equal to m times its 'm'th term, then $(m + n)$ th term is ____
(a) 0 (b) 1 (c) -1 (d) 2
5. The sum of three numbers in an AP is (-3) , and their product is 8. Then numbers are
(a) $-4, -1, 2$ (b) $-4, -1, -2$ (c) $4, 1, 2$ (d) $2, 1, -4$
6. The sum of four numbers is 20 and sum of whose squares is 120. This nos. are ____
(a) $2, 4, -6, -8$ (b) $2, 4, 6, 8$ (c) $8, 6, 2, -1$ (d) $8, 6, -2, 1$
7. The nth term of a pattern of numbers is $2n + 1$. The common difference of this AP is _____.
(a) 2 (b) -2 (c) 3 (d) -3
8. Which term of the AP 3, 8, 13, 18, is 78 ?
(a) t_{15} (b) t_{16} (c) t_{17} (d) t_{18}
9. Which term of the sequence 114, 109, 104, is the first negative term ?
(a) t_{23} (b) t_{24} (c) t_{25} (d) None of these
10. The sum of first 18 terms of an AP whose nth term is $3 - 2n$ is
(a) -288 (b) 250 (c) -278 (d) -260
11. If $2x, x + 10, 3x + 2$ are in AP, then the value of x is
(a) 6 (b) 5 (c) 4 (d) 3
12. The 9th term of an AP is 499 and 499th term is 9. The term which is equal to zero is
(a) t_{508} (b) t_{805} (c) t_{504} (d) t_{501}
13. If in an AP $a = 1, t_n = 20$ and $S_n = 399$ then n is
(a) 19 (b) 21 (c) 38 (d) 42
14. Two APs have the same common difference. The first term of one of these -1 and that of the other is -8 . Then the difference between their 4th term is
(a) -1 (b) -8 (c) 7 (d) -9
15. Sum of n terms of the series $\sqrt{2} + \sqrt{8} + \sqrt{18} + \sqrt{32} + \dots$ is
(a) $\frac{n(n+1)}{2}$ (b) $\frac{2n(n+1)}{3}$ (c) $\frac{n(n+1)}{\sqrt{2}}$ (d) None of these
16. The sum of first 50 odd natural numbers is
(a) 2500 (b) 2400 (c) 2600 (d) 2300
17. If $\frac{a^{n+1} + b^{n+1}}{a^n + b^n}$ is the AM between a and b, then the value of n is
(a) 1 (b) -1 (c) 0 (d) None of these
18. If an AP $a = -2.5, d = 0.5, a_n = 7.5$ then n is
(a) 20 (b) 21 (c) 3.6 (d) -3.6

19. The 16th term of the AP : $15, \frac{25}{2}, 10, \frac{15}{2}, 5, \dots$ is
- (a) $\frac{45}{2}$ (b) $\frac{-45}{2}$ (c) $\frac{105}{2}$ (d) $\frac{-105}{2}$
20. The common difference of an AP in which $a_{25} - a_{12} = -52$ is
- (a) 4 (b) -4 (c) -3 (d) 3
21. Two AP's have the same common difference. The first term of one of these is -1 and that of the other is -8. Then the difference between their 4th term is
- (a) -1 (b) -8 (c) 7 (d) -9
22. If $\frac{6}{5}$, a, 4 are in AP, the value of a is
- (a) 1 (b) 13 (c) $\frac{13}{5}$ (d) $\frac{26}{5}$

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- If 18, a, b, -3 are in AP then find a + b.
- How many integers which are multiples of 4 lie between 10 and 250 ?
- The sum of three numbers is 27 and their product is 405. Find the numbers.
- Justify that $1 + n + n^2$ is the nth term of an AP or not.
- a_{100} is the 100th term of the AP 3, 3.11, 3.22, 3.33, and b_{100} is the 100th term of the AP P, P +.11, p+.22, p+.33, $a_{100} - b_{100} = .22345$. So find P.
- Split 207 into 3 parts such that these are in AP and the product of the two smaller parts is 4623.
- Raj deposited Rs.1000 at CI at the rate of 10% per annum. The amount at the end of first year, second year, third year form an AP or not. Justify it.
- Find the 11th term from the last term of the AP 10, 7, 4,, -62.
- Is 301 a term of 5, 11, 17, 23, ? Justify your answer.
- The 6th term from the end of the AP 17, 14, 11,, -40, is -15. Is it true or not ? Give reason.
- If the 9th term of an AP is zero, prove that its 29th term is twice its 19th term.
- The angles of a triangle are in AP the greatest angle is twice the least. Find the angles.
- Determine an AP where 3rd term is 16 and when 5th term is subtracted from 7th term, we get 12.
- If the sum of the first q terms of an AP is $2q + 3q^2$. What is its common difference ?
- How many terms are there in the AP : $-1, -\frac{5}{6}, -\frac{2}{3}, -\frac{1}{2}, \dots, \frac{10}{3}$?

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- Divide 32 into four parts which are in AP such that the product of extremes is to the product of means is 7 : 15.
- Four numbers are in AP. Whose sum is 20 and the sum of whose square is 120. Find the numbers
- Find the sum of first 20 terms of an AP in which 3rd term is 7 and 7th term is two more than thrice of its 3rd term.
- Find the sum of all natural numbers between 250 and 1000 which are exactly divisible by 3.
- If S_n = sum of first n terms of an AP. Prove that $S_{12} = 3(S_8 - S_4)$
- For what value of n, the nth term of the series '3 + 10 + 17 +' and '63 + 65 + 67 +' are equal ?
- Find a, b, c such that the following numbers are in AP : a, 7, b, 23, c
- Find the sum of all the 11 terms of an AP whose middle most term is 30.
- An AP consists of 21 terms. The sum of the three terms in the middle is 129 and of the last three is 237. Find the AP.
- The digits of a +ve 3 digit no are in an AP and the sum is 15. The number obtained by reversing the digits is 594 less than the original number. Find the numbers.

11. Find the sum of $7 + 10\frac{1}{2} + 14 + \dots + 84$.
12. The 4th term of an AP is three times the first and the 7th term exceeds twice the third term by 1. Find the 1st term and common difference.
13. Three numbers whose sum is 21 are in AP. If the product of the first and the third numbers exceeds the second number by 6, find the numbers.
14. Find the sum of all 3-digit natural numbers divisible by 7.
15. In an AP, the first term is 22, nth term is -11 and the sum of first n terms is 66. Find n and d.

LONG ANSWER TYPE QUESTIONS

1. Prove that no matter what the real numbers a and b are, the pattern of numbers with nth term $a + nb$ is always an AP. What is the common difference? What is the sum of the first 20 terms?
2. The ratio of the 11th term to the 18th term of an AP is 2 : 3. Find the ratio of the 5th term to the 21st term, and also the ratio of the sum of the first 5 terms to the sum of the first 21 terms.
3. If $(b - c)^2$, $(c - a)^2$, $(a - b)^2$ are in AP, show that $\frac{1}{b - c}$, $\frac{1}{c - a}$, $\frac{1}{a - b}$ are also in AP.
4. The student of a school decided to beautify the school on the Annual Day by fixing colourful flags on the straight passage of the school. They have 27 flags to be fixed at interval of every 2 m. The flags are stored at the position of the middle most flag. Raju was given the responsibility of placing the flags. Raju kept his books where the flags were stored. He could carry only one flag at a time. How much distance did she cover in completing this job and returning back to collect her books? What is the maximum distance she travelled carrying a flag?
5. The sum of first 5 terms of an AP and the sum of 1st 7 terms of the same AP is 167. If the sum of the first ten terms of this AP is 235, find the sum of the first 20 terms.
6. Find the sum of all natural numbers less than 1000 and which are neither divisible by 5 nor by 2.
7. 390 plants are to be planted in a garden in a number of rows. There are 40 plants in the 1st row, 38 plants in the second row, 36 plants in 3rd row and so on. In how many rows the 390 plants are planted? Find the no of plants in the last row also.
8. In an AP it is given that $t_n = 4$, $d = 2$, $S_n = -14$. Find n and a.
9. A sum of Rs.700 is to be used to give seven cash prizes to students of a school for their overall academic performance. If each prize is Rs.20 less than its preceding prize, find the value of each of the prizes.
10. Sum of 4th and 8th terms of an AP is 24 and sum of 6th and 10th terms is 44. Find AP.
11. The sum of first six terms of an AP is 42. The ratio of its 10th term to its 30th term is 1 : 3. Calculate the first and the thirteenth term of the AP.
12. The sum of the first five terms of an AP is 55 and sum of the first ten terms of this AP is 235, find the sum of first 20 terms.
13. The ratio of the 11th term to the 18th term of an AP is 2 : 3. Find the ratio of the 5th term to the 21st term, and also the ratio of the sum of the first five terms to the sum of the first 21 terms.

Value Based Questions.

1. A sum of Rs. 3150 is to be used to give six cash prizes to students of a school for overall academic performance, punctuality, regularity, cleanliness, confidence and creativity. If each prize is Rs. 50 less than its preceeding prize, find the value of each of the prizes.
 - a) Which value according to you should be awarded with maximum amount? Justify your answer.
 - b) Can you add more values to the above ones which should be awarded?
2. A person donates money to a trust working for education of children and women in some villages. If the person donates Rs. 5,000 in the first year and his donation increases by Rs. 250 every year, find the amount donated by him in the eighth year and the total amount donated in eight years.
 - a) What mathematical concept is being used here?
 - b) Write any two values the person mentioned here possess.

c) Why do you think education of women is necessary for the development of a society?

3. A sum of Rs. 700 is to be used to give cash prizes to 5 students of a school on the basis of their over all academic performance, regularity, creativity, confidence and cleanliness.

A child having one value is given a fixed amount.

A child having 2 or more values is given Rs. 20 more for each additional value. Find the maximum number of students who can be awarded.

Find the value of each cash prize for having only 1 value, 2 values and so on.

According to you, is there any other value which should be rewarded? How is rewarding the values helpful?

4. A contract on construction job specifies a penalty for delay of completion beyond a certain date as follows: Rs. 200 for first day, Rs. 250 for 2nd day, Rs. 300 for 3rd day and so on. If the contractor pays Rs. 27750 as penalty, find the number of days for which the construction work is delayed.

Does the penalty help in providing quality work? Which trait of contractor's personality is reflected here?

