MATHS

BOOKS - AGRAWAL PUBLICATION

ARITHMETIC PROGRESSIONS

Example

1. In an AP, if a = 3.5, d=0 and n= 101, then a_n will be:

A. 0

B. 3.5

C. 103.5

D. 104.5

Answer:

2. Fill in the blanks

Fill the two blanks in the sequence 2,....., 26,.....

sothat the sequence forms an AP.

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3. Fill in the blanks

The sum of first 16 terms of the AP 5,8,11,14,..... Is

.....

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4. Fill in the blanks

The common difference of an A.P 6, then

$a_{15} - a_{11}$.....

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5. Fill in the blanks

If `4/5, a, 2 are three consective terms of an AP

then the value of a is .....

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6. Fill in the blanks

If $4, x_1, x_2, x_3, 28$ are in AP then x_3 = ...

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7. Fill in the blanks

If $S_n = 5n^2 + 3n, then n^{th} term is$.....

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8. Fill in the blanks

Find the 16^{th} term of the AP: 2,7,12,17,.....

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9. Fill in the blanks

The number of terms of AP: 18, 16, 14, ... That make the sum zero , is .....

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10. Fill in the blanks

Secons term of the AP if its $s_n = n^2 + 2n$ is .....

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11. Find the sum of the first 100 natural numbers.

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12. It the mean of the first n natural number is 15, then find n.

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13. If in an A.P, $a = 15, d = -3$ and $a_n = 0$, then find the value of n.

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14. Find the number of terms in the A.P: 18, $15\frac{1}{2}$,13,...., -47.

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15. Find the common difference of the Arithmetic Progression (A.P)

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16. Justify whether it is true to say that $-1, -\frac{3}{2}, -2, \frac{5}{2}, \ldots\ldots$ omanAPas a_2-a_1 = a_3-a_2`.

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17. How many 2-digit numbers are divisuble by 3?

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18. In an AP, if the common difference (d) = -4, and the seventh term (a_7) is 4, then find the first term.

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19. Write the n^{th} term of the A.P.

$$\frac{1}{m}, \frac{1+m}{m}, \frac{1+2m}{m}, \ldots$$

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20. If the n^{th} term of the A.P. -1,4,9,14, ... is 129, find the value of n.

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21. Find the 9th term from the end (towards the first term) of the A.P. 5,9,13,....,185.

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22. For the AP: -3,-7,-11, ..., can we directly find $a_{30} - a_{20} without actually f \in d \in g$a_(30) and a_(20)`? Give reasons for your answer.

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23. If the first three terms of an A.P are b, c abd 2b, then find the ratio of b and c.

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24. What is the common difference of an A,P in which $a_{21} - a_7 = 84$?

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25. For what value of k will k+9, 2k -1 and 2k+7 are the consecutive terms of an A.P?

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26. Find the 16^{th} term of the AP,2,7,12,17,.....

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27. Find the mean of first eleven natural numbers.

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28. Show that $(a+b)^2, (a^2+b^2)$ and $(a+b)^2$ are in AP.

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29. If the 17^{th} term of an A.P exceeds its 10^{th} term by 7, Find the common difference.

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30. Hoe many multiples of 4 die between 10 and 205?

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31. Determine the A.P. whose third term is 16 and 7^{th} term exceeds the 5^{th} term by 12.

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32. Two AP's have the same common difference.The first term of one AP is 2 and that od the other is 7. The difference between their 10^{th} terms is the same as the difference between their 21^{st} terms, which is the same as the difference between any two corresponding terms. why?

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33. Which term of the AP 3,15,27, 39,.... Will be 120 more than its 21st term?

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34. If S_n the sum of first n terms of an AP is given by $S_n = 3n^2 - 4n$, find the nth term.

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35. Find the sum of first 8 multiples of 3.

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36. If seven times the 7^{th} term of an A.P is equal to eleven times the 11^{th} term, then what will be its 18^{th} term?

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37. The 10^{th} term of an A.P is -4 and its 22^{nd} term is (-16) . Find its 38^{th} term.

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38. Find how many integers between 200 and 500 are divisible by 8.

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39. Determine the AP whose third term is 5 and the seventh term is 9.

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40. If the sum of the first 9 terms of an AP is equal to the sum of its first 11 terms, then find the sum of its irst 20 terms.

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41. Find the number of natural numbers between 102 and 998 whixh are divisible by 2 and 5 both.

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42. For what value of n, are the n^{th} terms of two A.Ps 63,65,67... and 3,10,17,.... Equal?

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43. The common difference between the terms of two AP's is same. If the difference batween their 50^{th} terms is 100, what is the difference batween their 100^{th} terms?

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44. In an AP, if $S_n + S_7 = 167$ and $S_{10} = 235$, then find th AP, where S_n denotes the sum of its first n terms.

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45. The 4^{th} erm of an AP. Is zero. Prove that the 25th term of the A.P is three times its 11^{th} term.

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46. For an AP,it is given that the first term (a) = 5, common difference (d)= 3, and the $n^{th} term (a_n) = 50$. Find n and the sum of first n terms (S_n) of the A.P.

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47. If 6 times the 6^{th} term of an AP. Is equal to 9 times the 9^{th} term, show that its 15^{th} term is zero.

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48. Find the sum of all 11 terms of an A.P. whose middles term is 30.

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49. Find the sum first 15 multiples of 8.

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50. Two AP's have the same common difference.The diference their between their 100th terms is 100, what is the difference between 1000th terms.

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51. Justify whether it is true to say that the following are the n^{th} terms of an AP.

2n-3

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52. Justify whether it is true to say that the following are the n^{th} terms of an AP.

$3n^2 + 5$

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53. Justify whether it is true to say that the following are the n^{th} terms of an AP.

$1 + n + n^2$

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54. Find a, b, and c such that the following numbers in AP: a,7, b, 23, c.

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55. Determin the AP whose 5^{th} term is 19 and the difference of 8^{th} term from the 13^{th}term is 20.

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56. Th sum of the first 30 terms of an A.P I 1920. If the fourth term is 18, find its 11^{th} term.

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57. Which term of the A.P 20, 19 1/4 , 18 1/4, 17 1/4, ...` is the first negative term.

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58. Find the middle term of the A.P 7,13,19,.....,247.

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59. Split207 into three parts uch that these are in AP and the product of the two smaller parts is 4623.

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60. How many numbers lie between 10 and 300, which when divided by 4 leave a remainder 3?

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61. Find the sum of the two middle most terms of the AP: $-\frac{4}{3}, -1, -\frac{2}{3}, \ldots\ldots, 4\frac{1}{3}$.

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62. Show that the sum of all terms of an A.P whose first term is a, the second term is b and the last term is b and the last term is c is equal to $\frac{(a+c)(b+c-2a)}{2(b-a)}$

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63. The first term of an ap is -5 and the last term is 45. If the sum of the sum of the terms of the Ap is 120, then find the number of terms and the common difference.

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64. If S_n denotes the sum of first n terms of an AP, prove that

$S_{12} = 3(S_8 - S_4)$.

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65. If the sum of the first 6 terms of an AP is 36 and that of the fist 16 terms is 256, find the sum of the first 10 terms.

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66. The sum of the first n terms of an AP whose first term is 8 and the common difference is 20 is equal to the sum of first 2n terms of another AP whose first term is -30 and the common difference is 8 . Find n.

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67. If m^{th} term of an A.P. is $\frac{1}{n}$ and $n^{th} term is \frac{1}{m}$. Find the sum of its first

mn terms.

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68. Find the sum of n terms of the series $\left(4-\frac{1}{n}\right)+\left(4-\frac{2}{n}\right)+\left(4-\frac{3}{n}\right)+\ldots\ldots\ldots$

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69. For what value of n are the n^{th} terms of two A.P's 63,65,67, ... And 3,10,17, ... equal?

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70. Find the sum of the first 40 positive integers which give a remainder 1 when divided by 6.

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71. Divide 56 in four parts in A.P. such that the ratio of the product of their extremes (1st and 4th) to the product of means (2nd and 3rd) is 5:6.

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72. If the sum of the first 7 terms of an A.P. is 49 and that of its first 17 terms is 289, find the sum of first n terms of the A.P.

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73. If the sum of first p terms of an A.P. is equal to the sum of the first q terms, then find the sum of the first (p+q) terms.

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74. How many terms of an A.P. 9,17,25,....m must to be taken to give a sum of 636?

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75. Among the natural numbers 1 to 49, find a number x, such that the sum of numbers preceding it is equal to sum of numbers succeeding it.

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76. The 14^{th} term of an AP is twice 8^{th} term. If its 6^{th} term is -8, then find the sum of its first 20 terms.

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77. The digits of a positive number of three digits are in A.P and their sum is 15. The number obtained by reversing the digit is 594

less than the original number. Find the number.

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78. The digits of a positive number of three digits are in A.P and their sum is 15. The number obtained by reversing the digit is 594 less than the original number. Find the number.

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79. Find the sum of first 24 terms of an A.P. whose n^{th} term is given by $a_n = 3 + 2n$.

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80. Determine the A.P. whose third term is 16 and 7^{th} term exceeds the 5^{th} term by 12.

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81. The $26^{th}, 11^{th}$ and the last term of an AP are 0,3 and $\frac{1}{5}$ respectively. Find the common difference and the number of terms .

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82. Find the sum of the following series: 5 + (-41) _ 9 +(-39) + 13 + (-37) + 17 + ... + (-5) + 81 + (-3)

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83. The sum of four consecutive number in AP is 32 and the ratio of the product of the first and last terms to the product of two middle term is 7:15. Find the numbers.

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84. Solve :

$1 + 4 + 7 + 10 + \ldots\ldots + x = 287.$

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85. The sum of the first 5 terms of an AP and the sum of the first 7 terms of the same AP is 167. If the sum of the first 10 term of this AP is 235, find the sum of its first 20 terms?

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86. Find the sum of those integers between 1 and 500 which are multiples of 2 as well as of 5.

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87. Find the

sum of those integers from 1 to 500 which are

multiples of 2 as well as of 5.

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88. Find the

sum of those integers from 1 to 500 which are

multiplies of 2 or 5.

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89. An AP consists of 37 terms. The sum of the 3 middle most terms is 225 and the sum of the last 3 is 429. Find the AP.

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90. If the sum of the first 'p' terms of an A.P is 'q' and sum of the first 'q' terms is 'p', then show that the sum of the first (p+q) terms is {(-(p-q))}.

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91. Find the sum of the integers between 100 and 200 that are:

divisible by 9

92. Find the sum of the integers between 100 and 200 that are:

not divisible by 9

93. Which term of the Arithmetic Progression -7, -12, -17, -22, ... Will be -82 ? Is -100 any term of the A.P.? Give reason for your answer.

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94. How many terms of the arithmetic progression 45, 39, 33, ... must be taken so that their sum is 180? Explain the double answer.

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95. Show that the sum of an AP whose 1st term is a , the 2nd term is b and the last term c, is equal to

$$\frac{(a+c)(b+c-2a)}{2(b-a)}$$

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96. If the sum of the first four terms of an AP is 40 and that of the first 14 terms is 280, find the sum of its 'n' terms.

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97. The sum of the 4^{th} and the 8^{th} terms of an Ap is 24 and the sum of the 6^{th} and the 10^{th} terms is 44. Find the sum of the first 10 terms of the AP.

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98. If the ratio of the 11^{th} term of an AP to its 18^{th} term is 2:3, Find the ratio of the sum of the first five terms to the sum of its first 10 terms.

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99. The ratio of the sums of m terms and n terms of an A.P. is $m^2 : n^2$. Prove that the ratio of their mth and nth term will be (2m - 1) : (2n-1).

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100. Solve the equation -4 + (-1) + 2 +.... +x=437.

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101. A thief runs with a uniform speed of 100m/minute. After one minute a policeman after the thief to catch him. He goes with a speed of 100 m/minute in the first minuteand increases his soeed by 10 m/minute every succeeding minute. After how many minutes the policeman will catch the thief?

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102. If the ratio of the sum of the first n terms of two A.P. is (7n+1) :(4n _27), then find the ratio of their 9^{th} terms.

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