



MATHS

BOOKS - NCERT EXEMPLAR MATHS (HINGLISH)

ARITHMETIC PROGRESSIONS

Arithmetic Progressions

1. In an AP, if $d = -4$, $n = 7$ and $a_n = 4$, then a is equal to

A. 6

B. 7

C. 20

D. 28

Answer: D



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2. 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: B



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3. The list of number -10, -6, -2, 2, ... is

A. an AP with $d = -16$

B. an AP with $d = 4$

C. an AP with $d = -4$

D. not an AP

Answer: B



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4. The 11th term of an AP $-5, \frac{-5}{2}, 0, \frac{5}{2}, \dots$

A. -20

B. 20

C. -30

D. 30

Answer: B



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5. The first four terms of an A.P. whose first term is -2 and the common difference is -2 are

A. $-2, 0, 2, 4$

B. $-2, 4, -8, 16$

C. $-2, -4, -6, -8$

D. $-2, -4, -8, -16$

Answer: C



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6. The 21st term of an AP whose first two terms are -3 and 4 , is

A. 17

B. 137

C. 143

D. -143

Answer: B



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7. If the 2nd term of an AP is 13 and 5th term is 25, what is its 7th term ?

A. 30

B. 33

C. 37

D. 38

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8. Which term of an AP : 21, 42, 63, 84, ... is 210 ?

A. 9th

B. 10th

C. 11th

D. 12th

Answer: B



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9. If the common difference of an AP is 5, then what is $a_{18} - a_{13}$?

A. 5

B. 20

C. 25

D. 30

Answer: C



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10. What is the common difference of an AP in which $a_{18} - a_{14} = 32$?

A. 8

B. -8

C. -4

D. 4

Answer: A



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11. Two APs have the same common difference. The first term of one of these is -1 and that of the other is -8. The difference between their 4th terms is

A. -1

B. -8

C. 7

D. -9

Answer: C



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12. If 7 times the 7th term of an AP is equal to 11 times its 11th term, then its 18th term will be

A. 7

B. 11

C. 18

D. 0

Answer: D



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13. The 4th term from the end of an AP $-11, -8, -5, \dots, 49$ is

A. 37

B. 40

C. 43

D. 58

Answer: B



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14. The famous mathematician associated with finding the sum of the first 100 natural numbers is

A. Pythagoras

B. Newton

C. Gauss

D. Euclid

Answer: C



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15. If the first term of an AP is -5 and the common difference is 2 , then the sum of the first 6 terms is

A. 0

B. 5

C. 6

D. 15

Answer: A



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16. The sum of first 16 terms of the AP 10, 6, 2, ...
is

A. -320

B. 320

C. -352

D. -400

Answer: A



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17. In an AP, if $a = 1$, $a_n = 20$ and $S_n = 399$,
then n is equal to

A. 19

B. 21

C. 38

D. 42

Answer: C



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18. The sum of first five multiples of 3 is

A. 45

B. 55

C. 65

D. 75

Answer: A



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19. Which of the following form of an AP ?

Justify Your answer.

(i) $-1, -1, -1, -1, \dots$

(ii) $0, 2, 0, 2, \dots$

(iii) 1, 1, 2, 2, 3, 3, ...

(iv) 11, 22, 33, ...

(v) $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \dots$

(vi) $2, 2^2, 2^3, 2^4$

(vii) $\sqrt{3}, \sqrt{12}, \sqrt{27}, \sqrt{48}, \dots$



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20. Justify whether it is true to say that

$-1, \frac{-3}{2}, -2, \frac{5}{2}, \dots$ Forms an AP as

$$a_2 - a_1 = a_3 - a_2.$$



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21. For the AP $-3, -7, -11, \dots$ can we find directly $a_{30} - a_{20}$ without actually finding a_{30} and a_{20} ? Give reason for your answer.



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22. Two A.P have the same common difference. The first term of one A.P is 2 and that of the other is 7. The difference between the 10th terms is the same as the difference between their 21st terms, which is the same as the

difference between any corresponding terms.

Why?



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23. Is 0 a term of the AP 31, 28, 25, ...? Justify your answer.



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24. The taxi fare after each km, when the fare is Rs. 15 for the first km and Rs 8 for each

additional km, does not form an AP as the total fare (in Rs.) after each km . Is the statement true? Give reasons.



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25. In which of the following situations, do the lists of numbers involved form an AP? Give reasons for your answers.

(i) The fee charged from a student every month by a school for the whole session, when the monthly fee is Rs. 400.

(ii) The fee charged every month by a school from classes I to XII, When the monthly fee for class I is Rs. 250 and it increases by Rs. 50 for the next higher class.

(iii) The amount of money in the account of Varun at the end of every year when Rs. 1000 is deposited at simple interest of 10% per annum.

(iv) The number of bacteria in a certain food item after each second, when they double in every second.



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26. Justify whether it is true to say that the following are the n th terms of an AP.

(i) $2n - 3$ (ii) $3n^2 + 5$ (iii) $1 + n + n^2$



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27. Match the AP's given in column A with suitable common differences given in column

B.

Column A

(A₁) 2, -2, -6, -10, ...

(A₂) $a = -18, n = 10, a_n = 0$

(A₃) $a = 0, a_{10} = 6$

(A₄) $a_2 = 13, a_4 = 3$

Column B

(B₁) $\frac{2}{3}$

(B₂) -5

(B₃) 4

(B₄) -4

(B₅) 2

(B₆) $\frac{1}{2}$

(B₇) 5



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28. Verify that each of the following is an AP and then write its next three terms.

(i) $0, \frac{1}{4}, \frac{1}{2}, \frac{3}{4}, \dots$ (ii) $5, \frac{14}{3}, \frac{13}{3}, 4, \dots$

(iii) $\sqrt{3}, 2\sqrt{3}, 3\sqrt{3}, \dots$ (iv)

$$a + b, (a + 1) + b, (a + 1) + (b + 1), \dots$$

$$(v) a, 2a + 1, 3a + 2, 4a + 3, \dots$$



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29. Write the first three terms of the AP's,
when a and d are as given below

$$(i) \quad a = \frac{1}{2}, d = -\frac{1}{6} \quad (ii)$$

$$a = -5, d = -3$$

$$(iii) a = \sqrt{2}, d = \frac{1}{\sqrt{2}}$$



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



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31. Determine the AP whose fifth term is 19 and the difference of the eighth term from the thirteenth term is 20.



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



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33. The sum of the 5th and the 7th terms of an AP is 52 and the 10th term is 46. Find the AP.



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34. Find the 20th term of the AP whose 7th term is 24 less than the 11th term, first term being 12.



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35. If the 9th term of an AP is zero, then prove that its 29th term is twice its 19th term.



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36. Find whether 55 is a term of the AP 7, 10, 13, ... or not. If yes, find which term it is.



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37. Determine k , so that

$k^2 + 4k + 8$, $2k^2 + 3k + 6$ and $3k^2 + 4k + 4$

are three consecutive terms of an AP.



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38. Split 207 into three parts such that these are in AP and the product of the two smaller parts is 4623.



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39. The angles of a triangle are in A.P. The greatest angle is twice the least. Find all the angles



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40. If the n th terms of the two AP's 9, 7, 5, ... and 24, 21, 18, ... are the same, then find the value of n . Also, that term.



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41. If sum of the 3rd and the 8th terms of an AP is 7 and the sum of the 7th and 14th terms is -3, then find the 10th term.



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42. Find the 12th term from the end of the AP
 $-2, -4, -6, \dots, -100$.



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43. Which term of the AP $53, 48, 43, \dots$ is the first negative term ?



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



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45. Find the sum of two middle terms of the

$$\text{AP } -\frac{4}{3}, -1, -\frac{2}{3}, -\frac{1}{3}, \dots, 4\left(\frac{1}{3}\right)$$



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



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47. Find the sum

(i)

$$1 + (-2) + (-5) + (-8) + \dots + (-236)$$

(ii)

$$\left(4 - \frac{1}{n}\right) + \left(4 - \frac{2}{n}\right) + \left(4 - \frac{3}{n}\right) + \dots$$

upto n terms.

$$(iii) \frac{a-b}{a+b} + \frac{3a-2b}{a+b} + \frac{5a-3b}{a+b} + \dots \text{ to } 11$$

terms.



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48. Which term of the AP $-2, -7, -12, \dots$ will be -77 ? Find the sum of this AP upto the term -77 .



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49. If $a_n = 3 - 4n$, then show that a_1, a_2, a_3, \dots form an AP. Also, find S_{20} .



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50. In an AP, if $S_n = n(4n + 1)$, then find the AP.



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51. In an AP, if $S_n = 3n^2 + 5n$ and $a_k = 164$, then find the value of k.



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52. If S_n denotes the sum of first n terms of an AP, then prove that $S_{12} = 3(S_8 - S_4)$.



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53. Find the sum of first 17 terms of an AP whose 4th and 9th terms are -15 and -30 , respectively.



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



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55. Find the sum of all the 11 terms of an AP whose middle most term is 30.



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56. Find the sum of last ten terms of the AP 8, 10, 12, ..., 126.



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57. Find the sum of first seven numbers which are multiples of 2 as well as of 9.



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58. How many terms of the AP $-15, -13, -11, \dots$ are needed to make the sum -55 ?



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59. 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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60. Kanika was given her pocket money on Jan 1st , 2008. She puts Rs. 1 on day 1, Rs. 2 on day 2, Rs. 3 on day 3 and continued doing so till the end of the month, from this money into her piggy bank she also spent Rs. 204 of her pocket money, and found that at the end of the month she still had Rs. 100 with her. How much was her pocket money for the month ?



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61. Yasmeen saves Rs. 32 during the first month, Rs. 36 in the second month and Rs. 40 in the third month. If she continues to save in this manner, in how many months will she save Rs. 2000 ?



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62. The sum of the first five terms of an AP and the sum of the first seven terms of the same AP is 167. If the sum first ten terms of this AP is 235, find the sum of its first twenty terms.



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63. Find the

(i) sum of those integers between 1 and 500 which are multiples of 2 as well as of 5.

(ii) sum of those integers from 1 to 500 which are multiples of 2 as well as of 5.

(iii) sum of those integers from 1 to 500 which are multiples of 2 or 5.



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64. The eighth term of an AP is half its second term and the eleventh term exceeds one-third of its fourth term by 1. Find the 15th term.



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



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

(i) divisible by 9. (ii) not divisible by 9.



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67. 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.





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



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69. Solve the equation

$$-4 + (-1) + 2 + \dots + x = 437.$$

A. 40

B. 50

C. 25

D. None

Answer: B



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70. Jaspal Singh repays his total loan of Rs. 118000 by paying every month starting with the first installment of Rs. 1000. If he increases the installment by Rs. 100 every month, what

amount will be paid by him in the 30th installment? What amount of loan does he still have to pay after the 30th installment?



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71. The students 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 intervals of every 2 m. The flags are stored at the position of the middle most flag. Ruchi

was given the responsibility of placing the flags.

Ruchi kept her books where the flags were stored. She could carry only one flag at a time.

How much distance she did cover in completing this job and returning back to collect her books ? What is the maximum distance she travelled carrying a flag ?



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