



# MATHS

## BOOKS - NAVBODH MATHS (HINGLISH)

### ARITHMETIC PROGRESSION

#### Examples For Practice

1. What is the sum of first  $n$  natural numbers ?

A. 
$$\frac{n(n - 1)}{2}$$

B.  $\frac{n(n + )}{2}$

C.  $\frac{n}{2}(n - 2)$

D.  $\frac{n(n + 2)}{2}$

**Answer: B**



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2. The first four terms of an A.P. having the first term - 7 and the common difference 3 are

A.  $- 7, - 10, - 13, - 6, \dots$

B.  $-7, 4, -1, 2, \dots$

C.  $-7, 4, -1, 2, \dots$

D.  $-7, 10, -13, 16, \dots$

**Answer: C**



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**3.** Which of the following is the sum of the first 20 natural numbers?

A. 200

B. 400

C. 420

D. 210

**Answer: D**



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4. For an A.P. , if  $t_n = 24$ ,  $n = 12$ ,  $d = 2$ , then what is the value of  $a$ ?

A. 2

B. 1

C. 12

D. 24

**Answer: A**



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5. What is the 16th term of an A.P. whose first two terms are 100, 105?

A. 195

B. 185

C. 175

D. 165

**Answer: C**



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**6.** If for an A.P.,  $d=10$  , what is the value of  $t_6 - t_2$

?

A. 10

B. 20

C. 30

D. 40

**Answer: D**



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7. Which of the following are the terms of an

A.P.?

A. 1, 3, 6, 10,...

B. 3, 6, 12, 24,...

C. 28, 26, 24, 22,...

D. 4, 2, 3, 1,...

**Answer: C**



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**8. What is the sum of first 10 terms of the A.P. 15, 10, 5 ...?**

A. -75



B. -125

C. 75

D. 125

**Answer: A**



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**9.** For an A.P. , if  $a = 2$  and  $d = 2.5$ , then which is the seventh term?

A. 17

B. 15

C. 13

D. 11

**Answer: A**



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**10.** The first term of an A.P. is 2 and the  $n$ th term is 41. What is the value of  $n$ , if  $S_n = 860$  ?

A. 31

B. 30

C. 41

D. 40

**Answer: D**



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**11.** For an A.P.,  $a = 3$  and  $d = 5$  . What is the value of  $n$ , If  $t_{11} = 263$

A. 53

B. 58

C. 85

D. 35

**Answer: A**



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**12.** For an A.P. if  $a = 1$ ,  $d = 4$ . What is the value of  $n$ , if  $t_n = 81$ ?

A. 22

B. 21

C. 20

D. 19

**Answer: B**



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**13.** Which of the following sequences are in A.P.?

(i) 1, 3, 6, 10, ...      (ii) 3, 8, 13, 18, ...

(iii) 7, 4, 1, - 1, ...      (iv) - 10, 13, - 16, 19, ...

A. (i) and (ii)

B. (ii)and(iii)

C. (iii)and(iv)

D. (iv)and(i)

**Answer: B**



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**14.** What is the common difference of the A.P. 10, 11.5, 13, 14.5...?

A. 1.5

B. -1.5

C. 2.5

D. -2.5

**Answer: A**



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**15.** The first term of an A.P. is 1 and  $n$ th term is

25 If  $S_n = 520$ , then  $n = \dots$

A. 45

B. 30

C. 50

D. 40

**Answer: D**



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**16.** which of the following sequence are A.P.? (i) 1, 3, 6, 10,... (ii) 1, 4, 7, 10,... (iii) 22, 26, 28, 31, (iv) -10, -13, -16, -19,...



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17. The  $n$ th term of the A.P. 3, 8, 13, 18,... Is 148.

Find  $n$ .



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18. write the next four terms of an A.P. whose first term Is 11 and the common difference 2.



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19. For an A.P. ,  $t_3 = 7$  and  $t_4 = 3$ , Find the common difference and the first term.



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20. Write the next two terms of the A.P. 2,5,8,11,

.....



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**21.** The 1st term and the common difference of an A.P. are 10,000 and 2000 respectively . Find the sum of the first 12 terms.



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**22.** The first term of an A.P. is  $-3$  and the  $10^{th}$  term is 15 Find  $S_{10}$ .



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23. For an A.P., if  $S_{10} = 150$  and  $S_9 = 125$ , find  $t_{10}$



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24. Find the 11th term of the A.P. 4, 9, 14, ....



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25. Find the 18th terms of the A.P. 7, 13, 19, 25



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**26.** Find the common difference of the A.P., if  $a = 100$  and  $t_{20} = 176$ .



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**27.** Find  $t_{12}$  for the A.P. 12, 9, 6, ...



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**28.** There are 25 rows of seats in an auditorium.

The first row is of 20 seats, the second of 22

seats, the third of 24 seats and so on . How many seats are there in the 21st row ?



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**29.** Find the sum of the first 100 natural numbers.



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**30.** Find the sum of the first 50 even natural numbers.





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**31.** Find the sum of the first 25 odd natural numbers.



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**32.** For an A.P.  $t_6 = -10$  and  $t_{14} = -34$ . Find the value of  $t_{10}$ .



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**33.** For an A.P.  $a = 25$  and  $t_{20} = 500$ . Find the common difference  $d$ .



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**34.** Complete the activity by filling the boxes, to find  $S_{30}$ , if the first term of an A.P. is 10 and the common difference 5.

Activity

Here,  $a = 10$ ,  $d = 5$ ,  $S_{30} = ?$

$$S_n = \frac{n}{2} [\square + (n - 1)d]$$

$$\therefore S_n = \frac{30}{2} [20 + (30 - 1) \times \square]$$



$$= 15 \times [20 + \square]$$

$$= \square$$

$$S_{30} = \square$$



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**35.** Complete the following activity , to find the two digit numbers which are divisible by 4.

Activity : Two-digit numbers divisible by 4 are 12, 16, 20, ...,96.

$$\therefore a = 12, d = 4, t_n = 96$$

$$t_n = \square + (n - 1) \times \square \dots(\text{Formula})$$

$$\therefore \square = \square + (n - 1) \times 4 \dots(\text{Substituting the$$

values)

$$\therefore \square = 8 + \square \quad \therefore 4n = \square \quad \therefore n = \square$$

Ans. There are  $\square$  two-digit number divisible by 4.



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**36.** The first term of an A.P. is 5 and the common difference is 4. Complete the following activity and find the sum of first 12 terms of the A.P.

Here,  $a = 5$ ,  $d = 4$ ,  $S_{12} = ?$

$$S_n = \frac{n}{2} [\dots\dots\dots]$$

$$\therefore S_{12} = \frac{12}{2} [10 + \dots\dots\dots]$$

$$= 6 \times \dots\dots\dots = \dots\dots\dots$$



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**37.** Fill up the boxes and find out the number of terms in A.P. 1, 3, 5, ..., 149. Here,

$$a = 1, d = \square, t_n = 149$$

$$t_n = a + (n - 1)d \quad \therefore 149 = \square$$

$$\therefore 49 = 2n - \square$$

$$\therefore n = \square.$$



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38. Which term of the A.P. 3, 11, 19, 27,... is 547?



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39. How many two -digit numbers are divisible by 3?



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40. Find  $t_n$  for the A.P. 3, 8, 13, 18, ...



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41. Is the sequence  $-10, -4, 2, 8, \dots$  is an A.P.? Find the 31st term, if it is an A.P.



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42. Find the value of  $t_7 + t_9$  for the A.P.  
 $7, 13, 19, 25, \dots$



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43. Which term of the A.P. 50, 40, 30, 20, ... is the number -940?



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44. Find  $S_{10}$  if for an A.P.  $a = 10$  and  $d = 3$



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45. Find  $S_{10}$  for an A.P.  $\frac{1}{6}, \frac{1}{4}, \frac{1}{3}, \dots$



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**46.** The sum of the third and seventh terms of an A.P. is 6 and their product is 8. Find the first term and the common difference of the A.P.



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**47.** Find the sum of all natural numbers between 1 and 145 which are divisible by 4.



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**48.** If the 9th and 21st terms of an A.P. are 75 and 183 respectively, find its 81st term.



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**49.** Find the sum of even numbers between 1 to 300.



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**50.** The sum of the first 45 terms of an A.P. is 3195. Complete the following activity to find the 23rd term.



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**51.** The sum of three consecutive terms of an A.P. is 30 and their product is 360. Find the terms.



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52. The sum of four consecutive terms of an A.P. is 2. The sum of the 3rd and 4th terms is 11. Find the terms.



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## Practice Set 3 1

1. Which of the following sequences are A.P.? If they are A.P. find the common difference.

2,4,6,8,...



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2. Which of the following sequences is an A.P.? If they are A.P., find the common difference.

$$2, \frac{5}{2}, 3, \frac{7}{2} \dots$$



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3. Which of the following sequences are A.P.? If they are A.P. find the common difference

$$-10, -6, -2, 2, \dots$$



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4. Which of the following sequences are *A. P.*? If they are *A. P.* find the common difference.

0.3, 0.33, 0.333,.....



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5. Which of the following sequences are *A. P.*? If they are *A. P.* find the common difference.

0, - 4, - 8, - 12.....



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6. Which of the following sequences are A.P.? If they are A.P. find the common difference

$$-\frac{1}{5}, -\frac{1}{5}, -\frac{1}{5}, \dots$$



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7. Which of the following sequences are A.P.? If they are A.P. find the common difference

$$3, 3 + \sqrt{2}, 3 + 2\sqrt{2}, 3 + 3\sqrt{3}, \dots$$



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8. Which of the following sequences are A.P.? If they are A.P. find the common difference

127, 132, 137, ...



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9. write an A.P. whose first term is  $a$  and common difference  $d$  in each of the following.

$a = 10$ ,  $d = 5$



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10. write an A.P. whose first term is  $a$  and common difference  $d$  in each of the following.

$$a = -3, d = 0$$



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11. write an A.P. whose first term is  $a$  and common difference  $d$  in each of the following.

$$a = -7, d = \frac{1}{2}$$



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12. write an A.P. whose first term is  $a$  and common difference  $d$  in each of the following.

$$a = -1.25, d = 3$$



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13. write an A.P. whose first term is  $a$  and common difference  $d$  in each of the following.

$$a = 6, d = -3$$



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**14.** write an A.P. whose first term is  $a$  and common difference  $d$  in each of the following.

$$a = -19, d = -4$$



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**15.** Find the first term and common difference for each of the A.P.

$$5, 1, -3, -7$$



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**16.** Find the first term and common difference for each of the A.P.

0.6,0.9,1.2,1.5,.....



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**17.** Find the first term and common difference for each of the A.P.

127,135,143,151,.....



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**18.** Find the first term and common difference for each of the A.P.

$$\frac{1}{4}, \frac{3}{4}, \frac{5}{4}, \frac{7}{4}, \dots$$



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## Practice Set 3 2

**1.** Write the correct number in the given boxes from the following A.P.

$$1, 8, 15, 22, \dots$$



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2. Write the correct number in the given boxes from the following A.P.

3,6,9,12,....



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3. Write the correct number in the given boxes from the following A.P.

-3, -8, -13, -18



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4. Write the correct number in the given boxes from the following A.P.

70, 60, 50, 40,.....

Here,  $t_1 = \square, t_2 = \square, t_3 = \square, \dots$

$\therefore a = \square, d = \square$



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5. Decide whether following sequence is an A.P., if so find  $20^{th}$  term of the progression.

-12,-5,2,9,16,23,30, ...



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**6. Find the 24th term of the A.P. 12,16,20,24,....**



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**7. Find the 19th term of the A.P. 7,13,19,25,....**



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8. Find the  $27^{\text{th}}$  term of the following A.P.

9, 4, -1, -6, -11, ...



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9. How many three-digit numbers are divisible by 5 ?



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**10.** The  $11^{\text{th}}$  term and the  $21^{\text{th}}$  term of an A.P. are 16 and 29 respectively, then find the  $41^{\text{th}}$  term of that A.P.



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**11.** 11,8,5,2, ... In this A.P. which term is number -151?



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12. In the natural numbers from 10 to 250, how many are divisible by 4?



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13. In an A.P.  $17^{th}$  term is 7 more than  $10^{th}$  term.  
Find the common difference?



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**Practice Set 3 3**

1. First term and common difference of an A.P. are 6 and 3 respectively : Find  $S_{27}$



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2. Find the sum of first 123 even natural number.



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3. Find the sum of all even number between 1 to 350.



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4. In an A.P.  $19^{th}$  term is 52 and  $38^{th}$  term is 128,  
Find sum of first 56 terms.



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5. Find the sum of all numbers from 1 to 140  
which are divisible by 4.



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6. Sum of first 55 terms in an A.P. is 3300, find its  $28^{th}$  term.



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7. In an A.P. the sum of three consecutive terms is 27 and their product is 504. Find the terms. ( Consider the terms to be in ascending order. )



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8. Find four consecutive terms in an A.P. whose sum is 12 and the sum of 3<sup>rd</sup> and 4<sup>th</sup> term is 14.

(Let four consecutive terms be  $a-d, a, a+d, a+2d$ )



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



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1. On 1st Jan 2018, Sanika decides to save Rupees 10, Rupees 11 on the second day, Rupees 12 on the third day . She decides to save like this . What would be her total savings at the end of the year ?



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2. A man Borrows Rs. 8000 and agrees to repay with a total interest of Rs. 1360 in 12 monthly instalments. Each instalment being less than

the preceding one by Rs. 40. Find the amount of the first and last instalments.



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3. Sachin invested Rs. 5000 for the 1st year, Rs. 7000 for the 2nd year, Rs. 9000 in the 3rd year in National Savings Certificate scheme. How much amount did he invest in 12 years?



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4. There is an auditorium with 27 rows of seats.

There are seats in the first row, 22 seats in the second row, 24 seats in the third row and so on.

Find the number of seats in  $15^{th}$  row and also find how many total seats are there in the auditorium?



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5. Kargil's temperature was recorded in a week from Monday to Saturday. All readings were in A.P. The sum of temperatures of Monday and



Saturday was  $5^{\circ}\text{C}$  more than sum of temperatures of Tuesday and Saturday. If temperature of Wednesday was  $-30^{\circ}\text{C}$  Then find the temperature on the other five days.



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6. On the world environment day tree plantation programme was arranged on a land which is triangular in shape. Trees are planted such that in the first row there is one tree, in the second row there are two tree, in the third

row three trees and so on. Find the total number of trees in 25 rows.



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7. Choose the correct alternative answer for each of the following subquestions:

(1) The sequence  $-10, -6, -2, 2, \dots$

A. is an A.P., reasons  $d = -16$

B. is an A.P., reasons  $d = 4$

C. is an A.P., reasons  $d = -4$

D. is not an A.P.

**Answer: B**



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**8.** The first four terms of an Ap 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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**9.** What is the sum of the first 30 natural numbers?

A. 464

B. 465

C. 462

D. 461

**Answer: B**



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**10.** For an A.P. if  $t_7 = 4$ ,  $d = -4$ . then

$a = \dots$

A. 6

B. 7

C. 20

D. 28

**Answer: D**



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**11.** For an A.P. if  $a = 3.5$ ,  $d = 0$ ,  $n = 101$ , then

$$t_n = \dots$$

A. 0

B. 3.5

C. 103.5

D. 104.5

**Answer: B**



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

A. -143

B. 143

C. 137

D. 17

**Answer: C**



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**13.** If for an A.P.,  $d = 5$ , then  $t_{18} - t_{13} = \dots$

A. 5

B. 20

C. 25

D. 30



**Answer: C**



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**14.** The sum of first five multiples of 3 is

A. 45

B. 55

C. 15

D. 75

**Answer: A**



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15. The sum of the first ten terms of the A.P.  $15, 10, 5, \dots$  is.....

A. -75

B. -125

C. 75

D. 125

**Answer: A**



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16. The sum of an A.P. is 1 and the  $n$ th term is 20.

If  $S_n = 399$ , then  $n = \dots$

A. 42

B. 38

C. 21

D. 19

**Answer: B**



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



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**18.** 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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**19.** Find the sum of the first ten terms of the A.P. whose 4th term is  $-15$  and 9th term is  $-30$



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**20.** Two A.P's are given 9,7,5..and 24,21,18,....If  $n^{th}$  term of both the progressions are equal then find the value of  $n$  and  $n^{th}$  term



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**21.** 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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**22.** In an A.P., first term is  $-5$  and last term is  $45$ . If sum of all the numbers in the A.P. is  $120$ , then how many terms are there? What is the common difference.



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**23.** Sum of  $1$  to  $n$  natural numbers is  $36$ , then find the value of  $n$ .



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**24.** Split 207 into three parts such that these are in A.P. and the product of the two smaller parts is 4623.



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**25.** 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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26. 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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27. The sum of first  $p$ - terms terms of an A.P. is  $q$  and the sum of first  $q$  terms is  $p$ , find the sum of first  $(p + q)$



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**28.** If  $m$  times the  $m$ th term of an AP is equal to  $n$  times its  $n$ th term, then show that  $(m + n)$ th term of an AP is zero.



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**29.** Rs. 1000 is deposited at 10 per cent simple interest. Check if the interest amount at the end of every year is in A.P. If this is A.P. then find amount of the interest after 20 years. For this complete the following activity.



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