



# MATHS

## BOOKS - MBD

### ARITHMETIC PROGRESSION

#### Example

1. In which of the following situations, does the list of numbers involved make an arithmetic progression, and why ? :- The taxi

fare after each km when the fare is \$ 15 for the first km and \$ 8 for each additional km.



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2. In which of the following situations, does the list of numbers involved make an arithmetic progression, and why ? :- The amount of air present in a cylinder when a vacuum pump removes  $\frac{1}{4}$  of the air remaining in the cylinder at a time.



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3. In which of the following situations, does the list of numbers involved make an arithmetic progression, and why? :-The cost of digging a well after every metre of digging, when it costs \$150 for the first metre and rises by \$50 for each subsequent metre.



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4. In which of the following situations, does the list of numbers involved make an

arithmetic progression, and why ? :- The amount of money in the account every year when ? 10000 is deposited at compound interest at 8% per annum.



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5. Write first four terms of the AP, when the first term  $a$  and the common difference  $d$  are given as follows :-  $a=10, d=10$  .



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6. Write first four terms of the AP, when the first term  $a$  and the common difference  $d$  are given as follows :-  $a=-2$  ,  $d=0$  .



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7. Write first four terms of the AP, when the first term  $a$  and the common difference  $d$  are given as follows :-  $a=4$ ,  $d= -3$ .



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8. Write first four terms of the AP, when the first term  $a$  and the common difference  $d$  are given as follows :-  $a=-1$  ,  $d\frac{1}{2}$  .



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9. Write first four terms of the AP, when the first term  $a$  and the common difference  $d$  are given as follows :-  $a=-1.25$  ,  $d=-0.25$  .



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**10.** For the following A.P.s, write the first term and the common difference :- 3,1,-1,-3.... .



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**11.** For the following A.P.s, write the first term and the common difference :- -5,-1,3,7,... .



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**12.** For the following A.P.s, write the first term and the common difference :-

$$\frac{1}{3}, \frac{5}{3}, \frac{9}{3}, \frac{13}{3}, \dots$$



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**13.** For the following A.P.s, write the first term and the common difference :- 0.6, 1.7, 2.8, 3.9... .



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14. Which of the following are APs ? If they form an AP, find the common difference  $d$  and write three more terms. :- 2,4,8,16 .



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15. Which of the following are APs ? If they form an AP, find the common difference  $d$  and write three more terms. :-  $2, 5/2, 3, 7/2, \dots$  .



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**16.** Which of the following are APs ? If they form an AP, find the common difference  $d$  and write three more terms. :-  $-1.2, -3.2, -5.2, -7.2, \dots$  .



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**17.** Which of the following are APs ? If they form an AP, find the common difference  $d$  and write three more terms. :-  $-10, -6, -2, 2, \dots$



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**18.** Which of the following are APs ? If they form an AP, find the common difference  $d$  and write three more terms. :-

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



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**19.** Which of the following are APs ? If they form an AP, find the common difference  $d$  and write three more terms. :- 0.2, 0.22, 0.222, 0.2222, ...



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20. Which of the following are APs ? If they form an AP, find the common difference  $d$  and write three more terms. :- 0, -4, -8, -12, ...



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21. Which of the following are APs ? If they form an AP, find the common difference  $d$  and write three more terms. :-

$$-\frac{1}{2}, -\frac{1}{2}, -\frac{1}{2}, -\frac{1}{2}, \dots$$



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22. Which of the following are APs ? If they form an AP, find the common difference  $d$  and write three more terms. :- 1,3,9,27, ...



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23. Which of the following are APs ? If they form an AP, find the common difference  $d$  and write three more terms. :-  $a, 2a, 3a, 4a, \dots$



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24. Which of the following are APs ? If they form an AP, find the common difference  $d$  and write three more terms. :-  $a, a^2, a^3, a^4, \dots$



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25. Which of the following are APs ? If they form an AP, find the common difference  $d$  and write three more terms. :-  $\sqrt{2}, \sqrt{8}, \sqrt{18}, \sqrt{32}, \dots$





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26. Which of the following are APs ? If they form an AP, find the common difference  $d$  and write three more terms. :-  $\sqrt{3}, \sqrt{6}, \sqrt{9}, \sqrt{12}, \dots$



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27. Which of the following are APs ? If they form an AP, find the common difference  $d$  and write three more terms. :-  $1^2, 3^2, 5^2, 7^2, \dots$



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**28.** Which of the following are APs ? If they form an AP, find the common difference  $d$  and write three more terms. :-  $1^2, 5^2, 7^2, 73, \dots$



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**29.** Fill in the blanks in the following table, given that  $a$  is the first term,  $d$  the common



difference and  $a_n$  the  $n$ th term of the AP:

| $a$   | $d$ | $n$ | $a_n$ |
|-------|-----|-----|-------|
| 7     | 3   | 8   | ...   |
| -18   | ... | 10  | 0     |
| ...   | -3  | 18  | -5    |
| -18.9 | 2.5 | ... | 3.6   |
| 3.5   | 0   | 105 | ...   |



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**30.** Choose the correct choice in the following and justify :- 30th term of the AP : 10, 7, 4..... Is

A. 97

B. 77

C. -77

D. -87

**Answer:**



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**31.** Choose the correct choice in the following and justify :- 11th term of the AP :  $-3, -\frac{1}{2}, 2, \dots$  is

A. 28

B. 22

C. -38

D.  $-48\frac{1}{2}$

**Answer:**



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**32.** Which term of the A.P. 3, 8, 13, 18,..... is 78?



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**33.** In the following APs, find the missing terms in the boxes :- 2,  $\square$ , 26 .



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**34.** In the following APs, find the missing terms in the boxes :-  $\square$ , 13,  $\square$ , 3 .



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**35.** In the following APs, find the missing terms

in the boxes :-  $5, \square, \square, 9\frac{1}{2}$ .



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**36.** In the following APs, find the missing terms

in the boxes :-  $-4, \square, \square, \square, \square 6$ .



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**37.** In the following APs, find the missing terms in the boxes :-  $\square$ , 38,  $\square$ ,  $\square$ ,  $\square$ , - 22 .



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**38.** Find the number of terms in each of the following APs :- 7, 13, 19, ..., 205 .



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**39.** Find the number of terms in each of the following APs :-  $18, 15\frac{1}{2}, 13, \dots, -47$  .



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**40.** Find the 31st term of an AP whose 11<sup>th</sup> term is 38 and 16<sup>th</sup> term is 73.



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**41.** An AP consists of 50 terms of which 3rd term is 12 and the last term is 106. Find the  $29^{th}$  term.



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**42.** If the 3rd and  $9^{th}$  terms of an A.P. are 4 and - 8 respectively, which term of this A.P. is zero.



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**43.** Which term of the A.P. 3, 15, 27, 39, ... will be 132 more than its  $54^{th}$  term?



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**44.** Two APs have the same common difference. The difference between their  $100^{th}$  terms is 100, what is the difference between their  $1000^{th}$  terms ?



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**45.** How many three-digits numbers are divisible by 7 ?



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**46.** How many multiples of 4 lie between 10 and 250 ?



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**47.** For what value of  $n$ , are the  $n^{\text{th}}$  terms of two A.P.s 63, 65, 67... and 3, 10, 17... equal?



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**48.** Determine the A.P. whose third term is 16 and  $7^{\text{th}}$  term exceeds the  $5^{\text{th}}$  term by 12.



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**49.** Find the  $20^{th}$  term from the last term of the AP : 3, 8, 13,.....,253.



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**50.** The sum of the  $4^{th}$  and  $8^{th}$  term of an AP is 24 and the sum of the  $6^{th}$  and  $10^{th}$  terms is 44. Find the first three terms of the A.P



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51. Subba Rao started work in 1995 at an annual salary of \$5000 and received an increment of \$ 200 each year. In which year did his income reach \$ 7000 ?



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52. Ramkali saved \$ 5 in the first week of a year and then increased her weekly saving by \$1.75. If in the  $n^{th}$  week, her weekly saving becomes \$20.75, find  $n$ .





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**53.** Find the sum of the following APs :- 2, 7, 12,  
... to 10 terms.



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**54.** Find the sum of the following APs :- - 37, -  
33, - 29,... to 12 terms



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**55.** Find the sum of the following APs :- 0.6, 1.7, 2.8, ... to 100 terms.



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**56.** Find the sum of the following APs :-

$\frac{1}{15}, \frac{1}{12}, \frac{1}{10}, \dots$  To 11 terms .



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**57.** Find the sums given below :-  $7+10\frac{1}{2}$

$+14+\dots+84$  .



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**58.** Find the sums given below :-  $34 + 32 + 30 + \dots + 10$  .



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**59.** Find the sums given below :-  $-5 + (-8) + (-11) + \dots + (-230)$ .



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**60.** In an AP :- given  $a = 5$ ,  $d = 3$ ,  $a_n = 50$  find  $n$  and  $S_n$ .



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**61.** In an AP :- given  $a = 7$ ,  $a_{13} = 35$  find  $d$  and  $S_{13}$ .



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**62.** In an AP :- given  $a_{12} = 37$ ,  $d = 3$ , find  $a$  and  $S_{12}$ .



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**63.** In an AP :- given  $a_3 = 15$ ,  $S_{10}=125$  find  $d$  and  $a_{10}$ .



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**64.** In an AP :- given  $d = 5$ ,  $S_9=75$ , find  $a$  and  $a_9$ .



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**65.** In an AP :- given  $a = 2$ ,  $d = 8$ ,  $S_n = 90$  find  $n$  and  $a_n$ .



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**66.** In an AP :- given  $a = 8$ ,  $a_n = 62$ .  $S_n = 210$ , find  $n$  and  $d$ .



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**67.** In an AP :- given  $a_n = 4$ ,  $d=2$ ,  $S_n=-14$ , find  $n$  and  $a$  .



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**68.** In an AP :- given  $a = 3$ ,  $n = 8$ ,  $S = 192$ , find  $d$ .



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**69.** In an AP :- given  $l = 28$ ,  $S = 144$ , and there are total 9 terms. Find  $a$ .





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**70.** How many terms of the A.P : 9, 17, 25... must be taken to give a sum of 636 ?



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**71.** The first term of an AP is 5, the last term is 45 and the sum is 400. Find the number of terms and the common difference.



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**72.** The first and last terms of an AP are 17 and 350 respectively. If the common difference is 9, how many terms are there and what is their sum ?



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**73.** Find the sum of first 51 terms of an AP whose second and third terms are 14 and 18 respectively.



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**74.** If the sum of first 7 terms of an AP is 49 and that of 17, terms is 289, find the sum of first n terms.



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**75.** Show that  $a_1, a_2, \dots, a_n, \dots$  form an AP where  $a_n$  is defined as below,  $a_n = 3 + 4n$   
Also find the sum of the first 15 terms in each case.



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**76.** Show that  $a_1, a_2, \dots, a_n, \dots$  form an AP where  $a_n$  is defined as below,  $a_n = 9 - 5n$ . Also find the sum of the first 15 terms in each case.



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**77.** If the sum of the first  $n$  terms of an AP is  $4n - n^2$ , what is the first term (that is  $S_1$ )? What is the sum of two terms? What is the



second term ? Similarly, find the 3rd, the 10th and the  $n$ th terms.



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**78.** Find the sum of the first 40 positive integers divisible by 6.



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**79.** Find the sum of first 15 multiples of 8.



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**80.** Find the sum of the odd numbers between 0 and 50.



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**81.** A contract on construction job specifies a penalty for delay of completion beyond a certain date as follows : \$200 for the first day, \$250 for the second day, \$ 300 for the third day, etc., the penalty for each succeeding day

being \$50 more than for the preceding day,  
How much money the contractor has to pay as  
penalty, if he has delayed the work by 30 days  
?



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**82.** A sum of \$ 700 is to be used to give seven cash prizes to students of a school for their overall academic performance. If each prize is \$20 less than its preceding prize, find the value of each of the prizes.



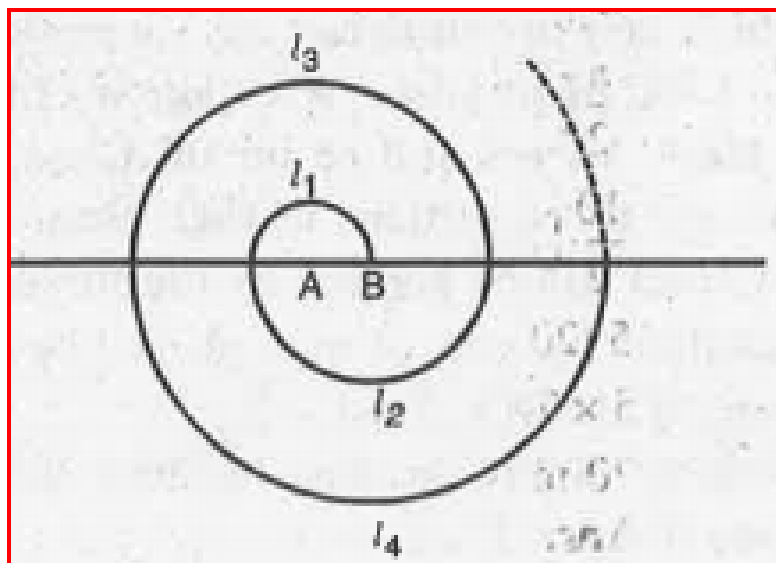
**83.** In a school, student thought of planting trees in and around the school to reduce air pollution. It was decided that number of trees, that each section of each class will plant, will be the same as the class, in which they are studying, e.g, - a section of Class I will plant 1 tree, a section of Class II will plant 2 trees and so on till Class XII. There are three sections of each class. How many trees will be planted by the students ?



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**84.** A spiral is made up of successive semicircles, with centres alternately at A and B, starting with centre at A, of radii 0.5 cm, 1.0 cm, 1.5 cm, 2.0 cm, .... as shown in Fig. What is the total length of such a spiral made up of

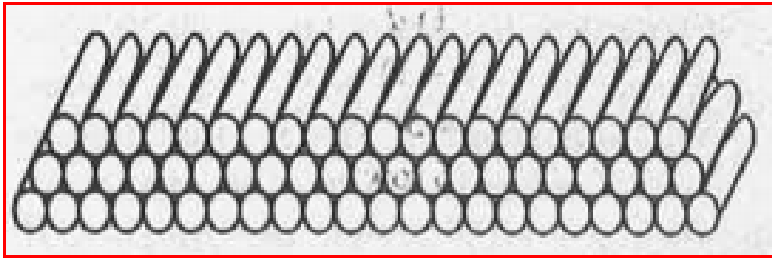
thirteen consecutive semicircles ?



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**85.** 200 logs are stacked in the following manner : 20 logs in the bottom row, 19 in the next row, 18 in the row next to it and so on

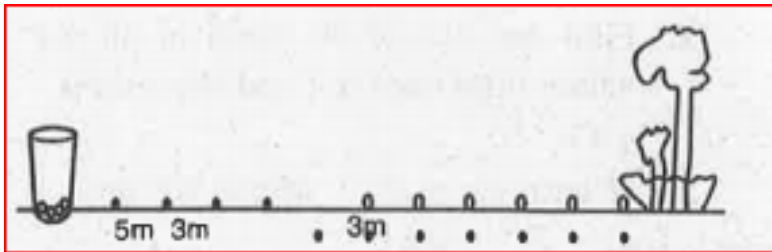
(see Fig), in how many rows are the,200 logs placed and how many logs are in the top row ?



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**86.** In a potato race a bucket is placed at the starting point, which is 5 m from the first potato, and the other potatoes are placed 3 m apart in a straight line. There are ten potatoes in the line (see Fig.) Each competitor starts

from the bucket, picks up the nearest potato, runs back with it, drops it in the bucket, runs back to pick up the next potato, runs to the bucket to drop it in, and then continues in the same way until all the potatoes are in the bucket. What is the total distance the competitor has to run ?



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**87.** Which term of the A.P. 121, 117, 113, ... is its first negative term ?



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



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**89.** A ladder has rungs 25 cm apart (see fig.)

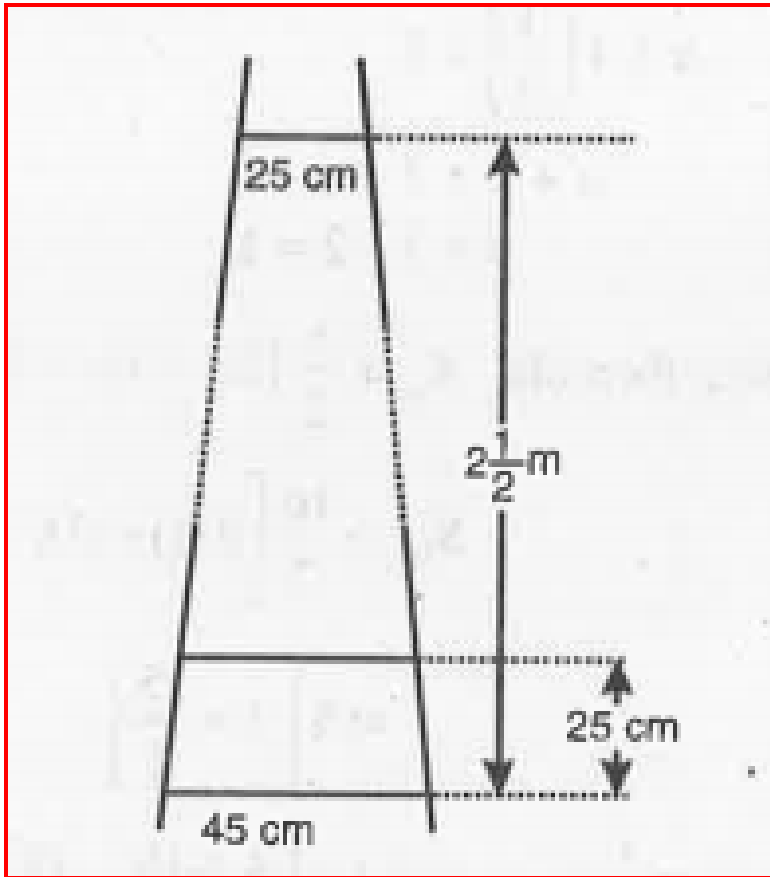
The rungs decrease uniformly in length from

45 cm at the bottom to 25 cm at the top. If the

top and bottom rungs are  $2\frac{1}{2}$  m apart, what is

the length of the wood required for the rungs

?



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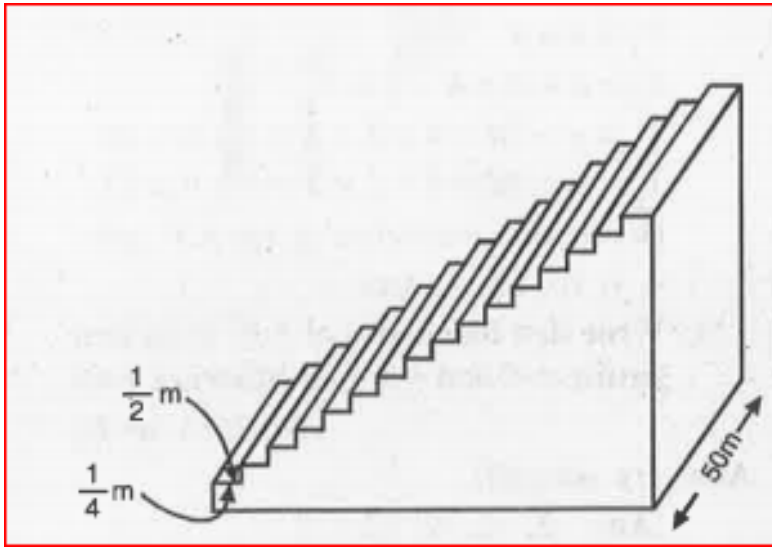
**90.** The houses of a row are numbered consecutively from 1 to 49. Show that there is a value of  $x$  such that the sum of the numbers of the houses preceding the house numbered  $x$  is equal to the sum of the numbers of the houses following it and find this value of  $x$ .



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**91.** A small terrace at a football ground comprises of 15 steps each of which is 50m long

and built of solid concrete. Each step has a rise of  $\frac{1}{4}$  m and a tread of  $\frac{1}{2}$  m (see fig.) Calculate the total volume of concrete required to build the terrace.



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**92.** Write first four terms of the A.P. when the first term  $a = 4$  and common difference  $d = - 3$ .



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**93.** Find the common difference of the A.P . —  
 $5, - 3, - 1, 1, 3, \dots$



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**94.** Write the common difference of A.P. -5,-1, 3,  
7,.....



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**95.** Find the common difference of A.P. 3, 1, - 1,-  
3,.....



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**96.** Fill in the blank of A.P. -5, -1, ....., 7.



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97. Fill in the blank of A.P. 18, 13, ..... 3.



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98. For A.P. :  $\frac{3}{2}, \frac{1}{2}, \frac{-1}{2}, \frac{-3}{2}$ , write the first term 'a' and common difference 'd' .



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**99.** For A.P. : 6, 9, 12, 15, ..... write the first term 'a' and common difference 'd' .



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**100.** For A.P. -5, -1, 3, 7, write first term 'a' and common difference 'd' .



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**101.** Write first four terms of A.P. when first term  $a = 4$  and common difference  $d = 3$ .



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**102.** Write first four terms of A.P. when first term  $a = -2$  and common difference  $d = 0$ .



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**103.** Write first four terms of A.P. when first term  $a = 3$  and common difference  $d = 2$ .



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**104.** Write the common difference of Arithmetic Progression (A.P.) : 3, 1, -1, -3,..... .



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**105.** Write the common difference of Arithmetic Progression (A.P.) : 4, 2, 0,-2,..... .



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**106.** Write the common difference of Arithmetic Progression (A.P.) : 2, 0,- 2, - 4, .... .



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**107.** Write first four terms of the A.P., when  $a = 10$  and  $d = 10$ .

A. 10, 30, 50, 60

B. 10, 20, 30, 40

C. 10, 15, 20, 25

D. 10, 18, 20, 30

**Answer: B**



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## Exercise

1. Find out which of the following sequences are arithmetic progressions. For those which are arithmetic progressions, find out the common difference. :- 3,6,12,24,....



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2. Find out which of the following sequences are arithmetic progressions. For those which

are arithmetic progressions, find out the common difference. :- 0,-4,-8,-12.....



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**3.** Find out which of the following sequences are arithmetic progressions. For those which are arithmetic progressions, find out the common difference. :-  $\frac{1}{2}, \frac{1}{4}, \frac{1}{6}, \frac{1}{8}, \dots$



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4. Find out which of the following sequences are arithmetic progressions. For those which are arithmetic progressions, find out the common difference. :- 12, 2,-8,-18,.....



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5. Find out which of the following sequences are arithmetic progressions. For those which are arithmetic progressions, find out the common difference. :- 3, 3, 3, 3, .....







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6. If it is an arithmetic progressions, find out the common difference. :-  $p, p + 90, p + 180, p + 270, \dots$ . Where  $p = (999)^{999}$ .



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7. Find out which of the following sequences are arithmetic progressions. For those which are arithmetic progressions, find out the common difference. :-  $1.0, 1.7, 2.4, 3.1, \dots$



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8. Find out which of the following sequences are arithmetic progressions. For those which are arithmetic progressions, find out the common difference. :-  $-225, -425, -625, -825, \dots$



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9. Find out which of the following sequences are arithmetic progressions. For those which

are arithmetic progressions, find out the common difference. :-

$$10, 10 + 2^5, 10 + 2^6, 10 + 2^7, \dots$$



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**10.** Find out which of the following sequences are arithmetic progressions. For those which are arithmetic progressions, find out the common difference. :-  $a + b, (a + 1) + b, (a + 1) + (b + 1), (a + 2) + (b + 1), (a + 2) + (b + 2), \dots$



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**11.** Find the common difference of the AP and write the next two terms :- 51,59,67,75.....



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**12.** Find the common difference of the AP and write the next two terms :- 75,67,59,51.....



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**13.** Find the common difference of the AP and write the next two terms :-  $0, \frac{1}{4}, \frac{1}{2}, \frac{3}{4}, \dots$



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**14.** Find the common difference of the AP and write the next two terms :-  $119, 136, 153, 170, \dots$



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15. The  $n^{\text{th}}$  term of a sequence is given by  $T_n = 2n + 7$ . Show that it is an A.P. Also, find its 7<sup>th</sup> term.

A.

B.

C.

D.

**Answer:**



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**16.** Show that the sequence defined by  $T_n = 4n + 7$  is an A.P. Also, find its common difference.



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**17.** Show that the sequence whose  $n^{\text{th}}$  term is  $2n^2 + n + 1$  is not an A.P.



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**18.** Find out which of the following sequences are A.P. for those which are A.P., find out the common difference. , - 0 2,4,8,16....



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**19.** Find out which of the following sequences are A.P. for those which are A.P., find out the common difference. , - 0,-5,-10,-15, .....



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20. Find out which of the following sequences are A.P. for those which are A.P., find out the common difference. , -  $\frac{1}{3}$ ,  $\frac{1}{6}$ ,  $\frac{1}{9}$ ,  $\frac{1}{12}$ , .....



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21. Find out which of the following sequences are A.P. for those which are A.P., find out the common difference. , - 225, - 425, - 625, - 825,...



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22. Find out which of the following sequences are A.P. for those which are A.P., find out the common difference. , -  $a + b$ ,  $(a + 1) + b$ ,  $(a + 1) + (b + 1)$ ,  $(a + 2) + (b + 1)$ ,  $(a + 2) + (b + 2)$ , ...



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23. If third term of an A.P. is 18 and seventh term is 30, find the series



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**24.** The third term of an A.P. is 25 and tenth term is - 3. Find the first term and common difference.



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**25.** The 6th term of an A.P. is 12 and the 8th term is 22, Find the 10th term.



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**26.** In an A.P. fourth term is  $-\frac{13}{2}$ , seventeenth zero and last one is 21. Find the first term.



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**27.** How many terms are there in A.P. 5, 11, 17, ...299 ? Also find 16th term.



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**28.** How many numbers between 100 and 500 are exactly divisible by 7 ?



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**29.** For what value of  $n$ , the  $n$ th term of the series 9, 7, 5...and 15, 12, 9... is the same ?



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**30.** The 7th term of an A.P. is zero. Prove that 25th term is twice the 16th term.



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**31.** Find the 20th term from the end of the following arithmetic progressions,- 3, 8, 13,.....,253 .



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**32.** Find the 20th term from the end of the following arithmetic progressions.,- 1, 4, 7, 10, ..... 88.



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**33.** How many numbers of two digits are divisible by 6 ?



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**34.** Which term of the sequence  $24, 23 \frac{1}{4}, 22 \frac{1}{2}, 21 \frac{3}{4}, \dots$  is the first negative term ?



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**35.** How many terms are there in the A.P.  $3, 7, 11, \dots, 407$  ? Also find its 20th term from the end.



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**36.** Find the  $12^{th}$  term from the end of the following A.P. , - 3, 8, 13,....., 253.



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**37.** Find the  $12^{th}$  term from the end of the following A.P. , - 1, 4, 7, 10,....., 88.



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**38.** The third term of an A.P. is 25 and the tenth term is -3. Find the first term and the common difference.



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**39.** Determine the 2nd term of an A.P. whose  $6^{th}$  term is 12 and  $8^{th}$  term is 22.



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**40.** The 4th term of an A.P. is equal to 3 times the first term and  $7^{th}$  term exceeds twice the 3rd term by 1. Find the first term and common difference.



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**41.** How many number of two digits are divisible by 7 ?



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**42.** How many numbers between 10 and 200 are exactly divisible by 7 ?



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**43.** Prove that  $a - 5b$ ,  $a - b$  and  $a + 3b$  are consecutive term of an A.P.



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**44.** Which term of the A.P. 3, 5, 7, ... is 43?





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**45.** Which term of the A.P 2, 8, 14, .... will be 126 more than its 15th term ?



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**46.** Find the common difference of the A.P. for which  $18^{th}$  term is 3 more than  $15^{th}$  term.



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47. If six times the sixth term of an A.P. is equal to nine times the ninth term, then show that its 15<sup>th</sup> term is zero ?



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48. Which term of the sequence  $17, 16\frac{1}{5}, 15\frac{2}{5}, \dots$  is the first negative term ?



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**49.** In an A.P. the  $24^{th}$  term is twice the  $10^{th}$  term. Prove that 72nd term is twice the 34th term.



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**50.** The ratio of  $12^{th}$  to the  $15^{th}$  term of an A.P. in  $19 : 24$ . Find the ratio of  $7^{th}$  to  $17^{th}$  term of the A.P.



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51. The third term of an A.P. is 10 and seventh term is 22. Find the A.P.



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52. How many terms are there in the A.P.

$$-1, \frac{-5}{6}, \frac{-2}{3}, \frac{-1}{2}, \dots, \frac{10}{3}?$$



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**53.** If 9th term of an A.P. is zero, prove that its 29th term is double the 19th term.



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**54.** If  $(m + l)$ th term of an A.P. is twice the  $(n + l)$ th term, prove that  $(3m + l)$ th term is twice the  $(m + n + l)$ th term.



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**55.** The first term of an A.P. is 5, the common difference is 3 and the last term is 80, find the number of terms.



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**56.** If the  $n$ th term of the A.P. 9, 7, 5, ... is same as the  $n$ th term of A.P. 15, 12, 9, ... find  $n$ .



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**57.** Find the second term and  $n$ th term of an A.P. whose 6th term is 12 and 8th term is 22.



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**58.** The first term of an A.P. is 5 and its 100th term is - 292. Find the 50th term of this A.P.



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**59.** How many terms are there in the A.P.  $-7, -4, -1, 2, \dots, 101$  ?



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**60.** Which term of sequence  $36, 31, 26, 21, 16\dots$  is the first negative term ?



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**61.** If 5 times the  $5^{\text{th}}$  term of an A.P. is equal to 7 times the  $7^{\text{th}}$  term, find its  $12^{\text{th}}$  term.



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**62.** How many terms of the A.P. 9, 6, 3, 0, -3, ... will be needed to give the sum -216 ?



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**63.** How many terms of the A.P.-  $6, \frac{-11}{2}, -5, \frac{-9}{2} \dots$  are needed to give the sum zero ?



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**64.** The sum of  $n$  terms of an A.P. is 136, the common difference is 4 and the last term is 31, find the number of terms.



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**65.** Find the sum of 40 terms of an A.P. whose third term is 1 and 6th term is - 11.



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**66.** Determine an A.P. whose  $n$ th term is

$$a_n = 3n^2 + 5n .$$



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**67.** Find last term of an A.P. whose sum is 148  
and A.P. is 1,6, 11, 16, ...



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**68.** Find the sum of all the four digit numbers  
which are divisible by 29.



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**69.** How many three digit numbers leave remainder 2 when divided by 9. Also find their sum.



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**70.** The first term of an A.P. is 5 and 100th term is - 292. Find the 50th term of the A.P.



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71. The sum of  $n$  terms of an A.P. whose first term is 5 and common difference is 36 is equal to the sum of  $2n$  terms of another A.P. whose first term is 36 and common difference is 5. Find  $n$ .



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72. How many numbers between 10 and 200 are exactly divisible by 7 ? Find their sum.



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**73.** If the sum of  $n$  terms of two A.P.s are in the ratio  $7n + 1 : 4n + 27$ . Find the ratio of their  $11^{th}$  terms.



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**74.** A man borrows \$ 1,000 and agrees to repay with a total interest of \$ 140 in 12 instalments, each instalment being less than the preceding by \$ 10. What should be his first instalment ?



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**75.** The rate at which monthly salary of a person increases annually is in A.P. If he was drawing \$4500 p.m. in his 11th year of service and \$ 6900 p.m. in his 27th year of service, find salary at start and annual increment. Also find monthly salary after 30 years.



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**76.** Aman arranges to pay a debt of \$90000 in 40 monthly instalments which are in A.P. when 30 instalments are paid, he dies leaving one third of the debt unpaid. Find the value of the first three instalments.



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**77.** A sum of \$1000 is invested at 8% simple interest per annum. Calculate the interest at the end of 1, 2, 3, ... years. Is the sequence of

interests an A.P. ? Find the interest at the end of 30 years.



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**78.** Find the sum of all even integers between 101 and 999.



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**79.** After being set up, a company manufactured 6000 scooters in the 3rd year

and 8000 scooters in the 7th year. Assuming that the production increases uniformly by a fixed number every year, find :- the production in the 1st year.



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**80.** After being set up, a company manufactured 6000 scooters in the 3rd year and 8000 scooters in the 7th year. Assuming that the production increases uniformly by a

fixed number every year, find :- the total production in 7 years .



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81. After being set up, a company manufactured 6000 scooters in the 3rd year and 8000 scooters in the 7th year. Assuming that the production increases uniformly by a fixed number every year, find :- the production in the 10th year.



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**82.** Find the sum of the series :  
 $3+6+9+12\cdots$  to 40 terms .



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**83.** Find the sum of the series :  $4+2+0-2-4\cdots$   
To 20 terms.



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**84.** Find the sum of the series :  $1 + \frac{2}{3} + \frac{1}{3} + 0$   
+..... To 19 terms.



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**85.** Sum up the following series :-  $101 + 99 + 97$   
+.....+47 .



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**86.** Sum up the following series :-  $7 + 12 + 17 + \dots + 77$ .



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**87.** Sum up the following series :-  $-15 - 11 - 7 \dots + 17$ .



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**88.** Sum up the following series :-  $21 + 18 + 15 +$   
.....  $-9 -12$ .



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**89.** Find the sum of an A.P. of :- 26 terms whose  
nth term is  $2n + 5$ .



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**90.** Find the sum of an A.P. of :- 26 terms whose  
nth term is  $\frac{2n + 1}{3}$  .



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**91.** In each of the following, determine the  
missing out of a, n, d, l and  $S_n$ . :- a = 15 , d= -2 ,  
n=11.



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**92.** In each of the following, determine the missing out of  $a$ ,  $n$ ,  $d$ , and  $S_n$ . :-  $a = -2$ ,  $d = 5$ ,  $S_n = 568$ .



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**93.** In each of the following, determine the missing out of  $a$ ,  $n$ ,  $d$ ,  $l$  and  $S_n$ . :-  $l = 8$ ,  $n = 8$ ,  $S_8 = -20$ .



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**94.** Aman saves \$320 during the first year, \$ 360 in the second year, \$ 400 in the third year and so on. In how many years will he save \$ 20,000 ?



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**95.** Nisha buys an old car for \$44,000. She pays \$16,000 cash and promises to pay the balance in 28 annual instalments of \$ 1000 each along with interest due on unpaid. If the interest is charged at 10%, what will the car cost her ?



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**96.** A manufacturer of PC's produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production uniformly increases by a fixed number every year, find:- the production in the first year.



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**97.** A manufacturer of PC's produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production uniformly increases by a fixed number every year, find:- total production in 7 years.



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**98.** Find the sum of first 10 terms an A.P. if  $T_1 = -14$  and  $T_5 = 20$ .



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**99.** In an A.P. third term is 14 and 8th term is 34. Find  $S_n$  and  $S_{20}$  .



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**100.** Find the sum of all natural numbers below 500 which are divisible by 8.



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**101.** Find the sum of all natural numbers between 99 and 1001 which are multiples of 5.



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**102.** Find the sum of all natural numbers between 1 and 100 which are multiples of 3.

A. 1680

B. 1683

C. 1681

D. 1682





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**103.** Find the sum of first hundred even natural numbers divisible by 5.



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**104.** Find the sum of all odd numbers of four digits which are divisible by 9.



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**105.** Find the sum of all natural numbers from 1 to 1000 which are not divisible by 5.



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**106.** Find the sum of all 3-digit numbers which leave remainder 2, when divided by 5.



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**107.** The sum of three consecutive numbers of an A.P. is 27 and their product is 504. Find the

numbers.



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**108.** The sum of four numbers in an A.P. is 16 and sum of their squares is 84. Find the numbers.



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**109.** The sum of  $n$  terms of an A.P. is  $3n^2 + 4n$ . Find the A.P.



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**110.** If the sum of  $n$  terms of an A.P. is  $3n^2 + 2n$

: Find the  $r$ th term.



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**111.** Determine an A.P. whose sum of  $n$  terms is

$n(n + 2)$ . Find also the 21st term.



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**112.** In a sequence, the sum of first  $n$  terms is

$$S_n = 2n^2 + 3n + 1, \text{ for all values of } n.$$

Find, the series and its 50th term.



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**113.** If the sum of  $n$  terms of a series is  $a + bn +$

$cn^2$ . Find the  $n$ th term and nature of the

series.



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**114.** If  $S_n$  denotes the sum of  $n$  terms of an A.P. whose first term is  $a$ , and the common difference is  $d$  Find:  $S_n - 2S_{2n} + S_{(n+2)}$ .



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**115.** For an A.P., show that

$$T_p + T_{p+2q} = 2T_{p+q}.$$



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**116.** The first and last terms of an A.P. are  $a$  and  $l$  respectively. Show that the sum of  $n$ th term from the beginning and  $n$ th term from the end is  $a + l$ .



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**117.** Find the arithmetic series of  $n$  terms whose first term is  $a$  and last term is  $l$ .



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**118.** If the sum of  $n$  terms of two arithmetic series are in the ratio,  $-(2 + 3n) : (3 + 2n)$ . Find the ratio of their 7th term.



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**119.** If the sum of  $n$  terms of two arithmetic series are in the ratio,  $-(6n + 1) : (4n + 21)$ . Find the ratio of their 8th term.



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120. if  $\frac{3 + 5 + 7 \dots n \text{ terms}}{5 + 8 + 11 + \dots 10 \text{ terms}} = 7$  find n.



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121. If the ratio of sum of m terms of an A.P. to the sum of n terms is  $(2m + 1) : (3n + 1)$ , find the ratio of 7th to 10th term



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122. If the ratio of the sum of m terms of an A.P. to the sum of n terms is  $m^2 : n^2$ . Show that

the ratio of the 5th to 11th term is 3 : 7.



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**123.** A ball rolling up an incline covers 36 metres during first second, 32 metres during second, 28 metres during next and so on. How much distance will it cover during the 9th second ?



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**124.** A man gets employment of \$ 250 per month with annual increment of \$ 20. What does he earn in 15 years ?



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**125.** If you save 1 paise today, 2 paise next day and 3 paise succeeding day and so on, what will be your saving in 365 days ?



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**126.** A student purchased a pen for \$ 100. At the end of 8 months, it was valued at \$ 60. Assuming the monthly depreciation is of constant amount, find the monthly depreciation.



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**127.** A manufacturer installs a machine at a cost of \$ 3,000. At the end of 9 years, the machine has a value of \$ 1200. Assuming the yearly

depreciation to be a constant amount, find its price after 13 years



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**128.** On 1st January every year, a person buys National saving certificates of value exceeding of his last year's purchase by Rs. 100. After 10 years he finds that the total value of the certificates' purchased by him is \$5000. Find the value of certificates purchased by him :-in the first year .





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**129.** On 1st January every year, a person buys National saving certificates of value exceeding of his last year's purchase by Rs. 100. After 10 years he finds that the total value of the certificates' purchased by him is \$5000. Find the value of certificates purchased by him :- in the 9th year.



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**130.** Two cars start together in the same direction at the same place. The first goes with the speed of 10km/hr. The second goes at the speed of 8 km/hr in the first hour and increases the speed by  $\frac{1}{2}$  km each succeeding hour. After how many hours will the second car overtake the first if both cars go non-stop ?



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