



MATHS

BOOKS - SUPER COMPANION MADE EASY

ARITHMETIC PROGRESSION

Exercise 1 1

1. In which of the following situations, does the list of numbers involved make arithmetic

progression, and why ?

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



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2. In which of the following situations, does the list of numbers involved make 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 arithmetic progression, and why ?

The cost of digging a well after every metre of digging, when it costs Rs. 150 for the first metre and rises Rs.50 for each subsequent metre.



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4. In which of the following situations, does the list of numbers involved make arithmetic progression, and why ?

The amount of money in the account every year, when Rs.10,000 is deposited at compound interest at 8% per annum.



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5. Write first four terms of the A.P, when the first term a and the common difference d are given as follows :

(i) $a = 10, d = 10$



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6. Write first four terms of the A.P, 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 A.P, when the first term a and the common difference d are given as follows :

$$a = 4, b = -3.$$



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8. Write first four terms of the A.P, 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 A.P, 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 APs, write the first term and the common difference :

3, 1, -1, -3,....



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11. For the following APs, write the first term and the common difference :

-5, -1, 3, 7,



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12. For the following APs, 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 APs, write the first term and the common difference :

$$0.6, 1.7, 2.8, 3.9, \dots$$



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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.

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



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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,...



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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, ...



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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.

$$1, 3, 9, 27, \dots$$





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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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Exercise 1 2

1. Fill in the blanks in the following table, given that a is the first term, d the common difference and a_n n^{th} term of the AP :

	a	d	n	a_n
(i)	7	3	8	...
(ii)	-18	...	10	0
(iii)	...	-3	18	-5
(iv)	-18.9	2.5	...	3.6
(v)	3.5	0	105	...



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2. Choose the correct choice in the following and justify :

30^{th} term of the AP : 10, 7, 4, ..., is

A. 97

B. 77

C. -77

D. -87

Answer: C



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3. Choose the correct choice in the following and justify :

11^{th} term of AP : $-3, -\frac{1}{2}, 2, \dots$ is

A. 28

B. 22

C. -38

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

Answer: B



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4. In the following APs, find the missing terms
in the boxes :

2, \square , 26



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5. In the following APs, find the missing terms
in the boxes :

\square , 13, \square , 3



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6. In the following APs, find the missing terms
in the boxes :

5, \square , \square , $9\frac{1}{2}$



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7. In the following APs, find the missing terms
in the boxes :

$$-4, \square, \square, \square, \square, 6$$



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8. In the following APs, find the missing terms
in the boxes :

$$\square, 38 \square, \square, \square, -22$$



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9. Which term of the AP : 3,8,13,18,... is 78 ?



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10. Find the number of terms in each of the following APs :

7,13,19,...205



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11. Find the number of terms in each of the following APs :

$$18, 15\frac{1}{2}, 13, \dots, -47$$



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12. Check whether -150 is a term of the AP : 11, 8, 5, 2



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13. Find the 31^{th} term of an AP whose 11^{th} term is 38 and the 16th term is 73.



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



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15. If the 3^{rd} and the 9^{th} terms of an AP are 4 and -8 respectively, which term of this AP is zero ?



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16. The 17^{th} term of an AP exceeds its 10^{th} term by 7. Find the common difference.



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17. Which term of the AP : 3, 15, 27, 39, Will be 132 more than its 54^{th} term ?



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18. 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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19. How many three digit numbers are divisible by 7?



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



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21. For what value of n , are the n^{th} terms of two APs : 63, 65, 67,... and 3, 10, 17,... equal ?



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22. Determine the AP whose third term is 16 and the 7^{th} term exceeds the 5^{th} term by 12.



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23. Find the 20^{th} term from end of the sequence 3,8,13 253.



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24. The sum of the 4^{th} and 8^{th} terms 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 AP.



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25. Subba Rao started work in 1995 at an annual salary of Rs.5000 and received an increment of Rs. 200 cash year. In which year did this income reach Rs. 7000 ?



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26. Ramkali saved Rs.5 in the first week of a year and then increased her weekly savings by Rs. 1.75. If in the n^{th} week, her weekly savings become Rs. 20.75, find n.





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Exercise 13

1. Find the sum of the following APs :

2,7,12,...to 10^{th} terms.



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2. Find the sum of the following APs :

$-37, -33, -29, \dots$ to 12 terms.



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3. Find the sum of the following APs :

0.6, 1.7, 2.8, . . . , to 100 terms



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4. Find the sum of the following APs :

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



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5. Find the sums given below :

$$7 + 10\frac{1}{2} + 14 + \dots + 84.$$



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6. Find the sums given below :

$$34+32+30 +\dots + 10$$



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7. Find the sums given below :

$$-5 + (-8) + (-11) + \dots + (-230).$$



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8. In an AP :

given $a = 5$, $d = 3$, $a_n = 50$, find n and S_n .



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9. In an AP :

given $a = 7$, $a_{13} = 35$, find d and S_{13} .



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10. In an AP :

given $a_{12} = 37$, $d = 3$, find a and S_{12} .



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11. In an AP :

given $a_3 = 15$, $S_{10} = 125$, find d and a_{10} .



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12. In an AP :

given $d = 5$, $S_9 = 75$, find a and a_9 .



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13. In an AP :

given $a = 2$, $d = 8$, $S_n = 90$, find a and a_n .



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14. In an AP :

given $a = 8$, $a_n = 62$, $S_n = 210$, find n and d .



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15. In an AP :

given $a_n = 4$, $d = 2$, $S_n = -14$, find n and a .



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16. In an AP :

given $a = 3$, $n = 8$, $S_n = 192$, find d .



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17. In an AP :

given $l = 28$, $s = 144$ and there are total 9 terms

find a .



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



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19. The first of an A.P 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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20. The first and the last terms of an A.P 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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21. Find the sum of first 22 terms of an A.P in which $d = 7$ and 22nd term is 149.



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22. Find the sum of first 51 terms of an A.P whose second and third terms are 14 and 18 respectively.



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



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24. Show that $a_1, a_2, \dots, a_n, \dots$ form an A.P where a_n is defined as below : (i) $a_n = 3 + 4n$
(ii) $a_n = 9 - 5n$.

Also find the sum of the first 15 terms in each case.



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25. Find the sum of the odd numbers between 0 and 50.



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26. A contract on construction job specific a penalty for delay of completion beyond a certain date as follows : Rs. 200 for the first day, Rs.250 for the second day, Rs. 300 for the third day, etc., the penalty for each succeeding day being Rs. 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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27. A sum of Rs. 700 to be used to give seven cash prizes to students of a school for their overall academic performance. If each prize is Rs. 20 less than its preceding prize, find the value of each of the prizes.



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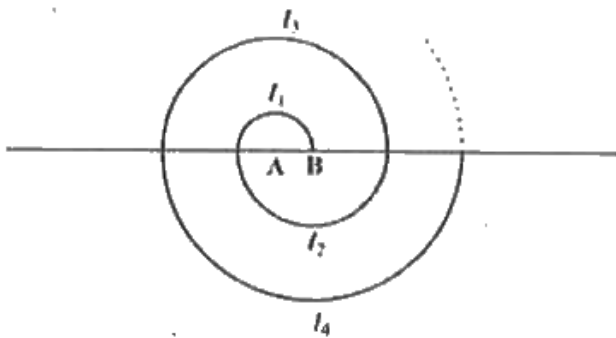
28. In a school students thought of planting trees in and around the school to reduce air pollution. It was decided that the number of trees, that each section of each class will plant, will be the same as the class, in which they are studying, e.g., a section of Class I will plant 1 tree, a section 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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29. 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. 54. What is the total length of such a spiral made up to thirteen consecutive semicircles ? (Take

$$\pi = \frac{22}{7})$$



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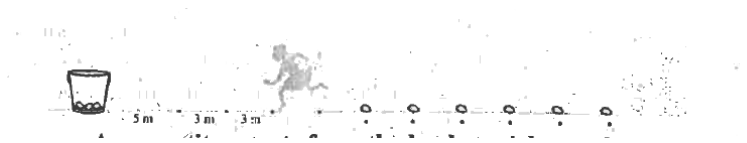
30. 200 logs are stacked in the following manner : 20 logs in the bottom row, 19 in the next row, 18 in the row next to it and so on. In how many rows are the 200 logs placed and how many logs are in the top row ?



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31. In a potato race, a bucket is placed at the starting point, which is 5m from the first

potato, and the other potatoes are placed 3m apart in a straight line. There are ten potatoes in the line (fig.).



A 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 she continues in the same way until all the potatoes are in the bucket. What is the total distance the competitor has to run ? [Hint : To pick up the first potato and the second potato,

the total distance (in metres) run by a competitor is $2 \times 5 + 2 \times (5 + 3)$]



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