



MATHS

NCERT - NCERT

MATHEMATICS(ENGLISH)

ARITHMETIC PROGRESSIONS

Solved Examples

1. Find the 11th from the last term (towards the first term) of the AP : 10, 7, 4, ..., 62.



[Watch Video Solution](#)

2. A sum of Rs 1000 is invested at 8% simple interest per year. Calculate the interest at the end of each year. Do these interests form an AP? If so, find the interest at the end of 30 years making use of this fact.



[Watch Video Solution](#)

3. Which of the following list of numbers does form an AP? If they form an AP. write the next two terms : (i) 4, 10, 16, 22, ... (ii) 1, -1, -3, -5, ... (iii) -2, 2, -2, 2, ... (iv) 1, 1, 1, 2, 2, 2, 3, 3, 3, ...



[Watch Video Solution](#)

4. Find the 10^{th} term of the AP : 2, 7, 12, ...



[Watch Video Solution](#)

5. For the AP : $\frac{3}{2}, \frac{1}{2}, -\frac{1}{2}, -\frac{3}{2}, \dots$; write the first term a and the common difference d .



Watch Video Solution

6. Check whether 301 is a term of the list of numbers 5, 11, 17, 23, ...



Watch Video Solution

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



[Watch Video Solution](#)

8. Which term of the AP : 21, 18, 15,... is -81 ?

Also, is any term 0? Give reason for your answer.



[Watch Video Solution](#)

9. Determine the AP whose 3rd term is 5 and the 7th term is 9.



[Watch Video Solution](#)

10. Find the sum of first 24 terms of the list of numbers whose n th term is given by

$$a_n = 3 + 2n$$


[Watch Video Solution](#)

11. A manufacturer of TV sets produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production increases uniformly by a fixed number every year, find :
(i) the production in the 1st year
(ii) the production in the 10th year
(iii) the total production in first 7 years



Watch Video Solution

12. Find the sum of the first 22 terms of the AP
: 8,3,-2,



Watch Video Solution

13. In a flower bed, there are 23 rose plants in the first row, 21 in the second, 19 in the third, and so on. There are 5 rose plants in the last row. How many rows are there in the flower bed?



Watch Video Solution

14. How many terms of the AP : 24, 21,18,... must be taken so that their sum is 78?



Watch Video Solution

15. If the sum of the first 14 terms of an AP is 1050 and its first term is 10, find the 20th term.



Watch Video Solution

16. Find the sum of : (i) the first 1000 positive integers (ii) the first n positive integers



[Watch Video Solution](#)

Exercise 5 2

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



[Watch Video Solution](#)

2. How many three-digit numbers are divisible by 7?



[Watch Video Solution](#)

3. 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?



[Watch Video Solution](#)

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



Watch Video Solution

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



Watch Video Solution

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



[Watch Video Solution](#)

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



[Watch Video Solution](#)

8. For what value of n , are the n th terms of two APs: $63, 65, 67, \dots$ and $3, 10, 17, \dots$ equal?



[Watch Video Solution](#)

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



[Watch Video Solution](#)

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



Watch Video Solution

11. The sum of the 4th and 8th terms of an AP is 24 and the sum of the 6th and 10th terms is 44. Find the first three terms of the AP.



Watch Video Solution

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



Watch Video Solution

13. 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 .



Watch Video Solution

14. 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
(i)	7	3	8	...
(ii)	-18	...	10	0
(iii)	...	-3	18	-5
(iv)	-18.9	2.5	...	3.6
(v)	3.5	0	105	...



Watch Video Solution

15. Choose the correct choice in the following and justify

(i) 30th term of the AP: 10, 7, 4, ... is (A) 97 (B)

77 (C) – 77 (D) 87

(ii) 11th term of the AP: $-3, -\frac{1}{2}, 2, \dots$ is (A)

28 (B) 22 (C) – 38 (D) – $48\frac{1}{2}$



[Watch Video Solution](#)

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



[Watch Video Solution](#)

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



Watch Video Solution

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

(i) 2, \square , 26

(ii) \square , 13, \square , 3

(iii) 5, \square , \square , $\frac{1}{2}$

(iv) $-4, \square, \square, \square, \square, 6$

(v) $\square, 38, \square, \square, \square, -22$



[Watch Video Solution](#)

19. Which term of the AP : $3, 8, 13, 18, \dots$, is 78?



[Watch Video Solution](#)

20. Find the number of terms in each of the following APs : (i) $7, 13, 19, \dots, 205$ (ii)

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

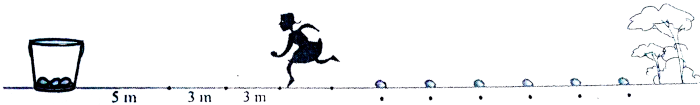


Watch Video Solution

Exercise 5 3

1. 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 Figure). 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 $2 \times 5 + 2 \times (5 + 3)$]



Watch Video Solution

2. 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.



[Watch Video Solution](#)

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



[Watch Video Solution](#)

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



[Watch Video Solution](#)

5. Find the sums given below :

(i) $7 + 10\frac{1}{2} + 14 + \dots + 84$

(ii) $34 + 32 + 30 + \dots + 10$

(iii)

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



[Watch Video Solution](#)

6. Find the sum of the following APs : (i) 2, 7, 12, ..., to 10 terms.



[Watch Video Solution](#)

7. Find the sum of first 22 terms of an AP in which $d=1$ and 22nd term is 149.



[Watch Video Solution](#)

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



[Watch Video Solution](#)

9. 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.



[Watch Video Solution](#)

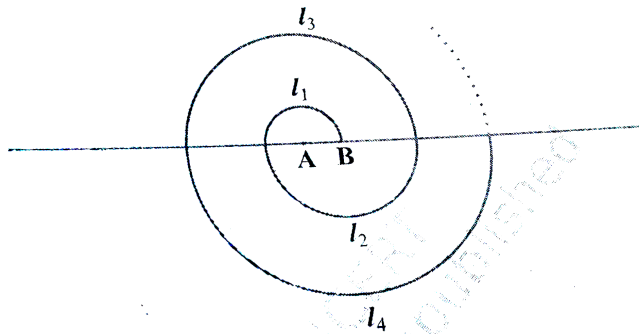
10. How many terms of the AP: 9, 17, 25, . . . must be taken to give a sum of 636?



[Watch Video Solution](#)

11. 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 Figure. What is the total length of such a spiral made up of thirteen consecutive semicircles? (Take

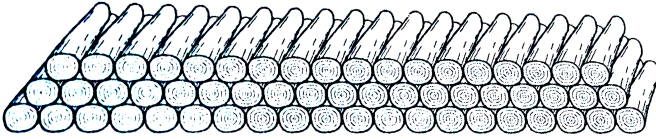
$$\pi = \frac{22}{7}$$



Watch Video Solution

12. 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 Figure). In how many rows are the 200 logs

placed and how many logs are in the top row?



[Watch Video Solution](#)

13. Show that $a_1, a_2, \dots, a_n, \dots$ form an AP

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.



[Watch Video Solution](#)

14. 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 first two terms? What is the second term? Similarly, find the 3rd, the 10th and the n th terms.



Watch Video Solution

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



[Watch Video Solution](#)

16. Find the sum of the first 15 multiples of 8.



[Watch Video Solution](#)

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



[Watch Video Solution](#)

18. A contract on construction job specifies 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?



Watch Video Solution

19. A sum of Rs 700 is 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.



Watch Video Solution

20. In a school students thought of planting trees in and around the school to reduce air pollution. It was decided that the number of

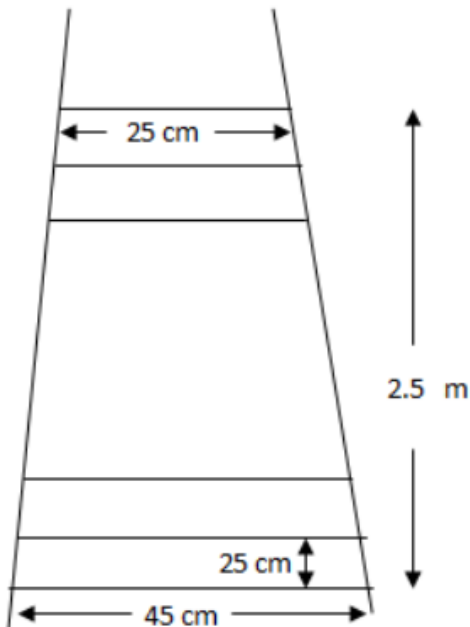
trees, that each section of each class will plant, will be the same as the class, in which they are studying, e.g., a section of Class I will plant 1 tree, a section of Class II will plant 2 trees and so on till Class XII. There are three sections of each class. How many trees will be planted by the students?



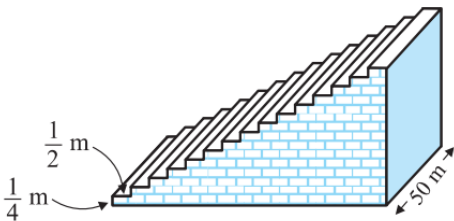
[Watch Video Solution](#)

Exercise 5 4

1. A ladder has rungs 25 cm apart, (see Figure). The rungs decrease uniformly in length from 45 cm at the bottom to 25 cm at the top. If the top and the bottom rungs are $2\frac{1}{2}$ m apart, what is the length of the wood required for the rungs?



2. A small terrace at a football ground comprises of 15 steps each of which is 50 m long and built of solid concrete. Each step has a rise of $\frac{1}{4}$ m and a tread of $\frac{1}{2}$ m. Calculate the total volume of concrete required to build the terrace.



3. The sum of the third and the seventh terms of an AP is 6 and their product is 8. Find the sum of first sixteen terms of the AP.



[Watch Video Solution](#)

4. Which term of the AP : 121, 117, 113, . . . , is its first negative term?[Hint : Find n for $a_n < 0$]



[Watch Video Solution](#)

5. 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. Find this value of x .



[Watch Video Solution](#)

Exercise 5 1

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

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

(ii) 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.

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

subsequent metre.

(iv) The amount of money in the account every year, when ₹ 10000 is deposited at compound interest at 8 % per annum.



[Watch Video Solution](#)

2. For the following AP's, write the first term and the common difference:

(i) 3, 1, - 1, - 3, ...

(ii) - 5, - 1, 3, 7, ...

(iii) $\frac{1}{3}, \frac{5}{3}, \frac{9}{3}, \frac{11}{3}, \dots$

(iv) $0.6, 1.7, 2.8, 3.9, \dots$



[Watch Video Solution](#)

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

(ii) $a = -2, d = 0$

(iii) $a = 4, d = -3$

(iv) $a = -1, d = 1/2$

(v) $a = -1.25, d = -0.25$



4. Which of the following are AP's ? If they form an AP, find the common difference d and write three more terms.

(i) $2, 4, 8, 16, \dots$

(ii) $2, \frac{5}{2}, 3, \frac{7}{2}, \dots$

(iii) $-1.2, -3.2, -5.2, -7.2, \dots$

(iv) $-10, -6, -2, 2, \dots$

(v) $3, 3 + \sqrt{2}, 3 + 2\sqrt{2}, 3 + 3\sqrt{2}, \dots$

(vi) $0.2, 0.22, 0.222, 0.2222, \dots$

(vii) $0, -4, -8, -12, \dots$

(viii) $-\frac{1}{2}, -\frac{1}{2}, -\frac{1}{2}, -\frac{1}{2}, \dots$

(ix) $1, 3, 9, 27, \dots$

(x) $a, 2a, 3a, 4a, \dots$

(xi) a, a^2, a^3, a^4, \dots

(xii) $\sqrt{2}, \sqrt{8}, \sqrt{18}, \sqrt{32}, \dots$

(xiii) $\sqrt{3}, \sqrt{6}, \sqrt{9}, \sqrt{12}, \dots$

(xiv) $1^2, 3^2, 5^2, 7^2, \dots$

(xv) $1^2, 5^2, 7^2, 73, \dots$



Watch Video Solution