MATHS

NCERT - NCERT Maths(Tamil)

PROGRESSIONS

Examples

---

1. For ths A.P. $\frac{1}{4}, -\frac{1}{4}, -\frac{3}{4}, -\frac{5}{4}$.............., write the first term a and the common difference d. And find the 7th term.

2. Which of the following lies of numbers form an AP? If they form an AP, write the next two terms:

4, 10, 16, 22,...

3. find the 10th term of the AP : 5,1,-3,7,......

4. Which term of the AP: 21,18,15,........ Is -81?

▶ **Watch Video Solution**

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

▶ **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. Find the 11th term from the last of the AP series given below:

AP: $10, 7, 4, ..., -62$

9. A sum of 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.

10. 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?

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

12. How many terms of the A.P.: 24, 21, 28, ...`

must be taken so that their sum is 78?

13. Find the sum of:

(i) the first 1000 natural numbers, (ii) the first

n natural numbers.

14. Find the sum of first 24 terms of the list of numbers whose nth term is given by $a_n = 3 + 2n.$

15. 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 yea

(ii) the production in the 10th year

(iii) the total production in first 7 years

Solution :

▶ **Watch Video Solution**

16. Write the GP if the first term a=3, and the common ratio r=2.

▶ **Watch Video Solution**

17. Write GP. If a=256, $r = -\dfrac{1}{2}$

▶ **Watch Video Solution**

18. Find the common ratio of the GP 25, $-5, 1, -\dfrac{1}{5}, \ldots\ldots\ldots$

▶ **Watch Video Solution**

19. Which of the following lists of numbers form GP?

(i) 3,6,12,........

(ii) $64, -32, 16,$

(iii) $\dfrac{1}{64}, \dfrac{1}{32}, \dfrac{1}{8}$,.........

▶ **Watch Video Solution**

20. Find the 20th and nth term of the GP.

$\dfrac{5}{2}, \dfrac{5}{4}, \dfrac{5}{8}$ ....

▶ **Watch Video Solution**

21. Which terms of the GP: $2, 2\sqrt{2}, 4, \ldots\ldots$ Is 128 ?

▶ **Watch Video Solution**

22. In a GP the 3rd term is 24 and 6th term is 192. Find the 10th term.

▶ **Watch Video Solution**

Try This

1. Which of these are Arithmetic Progressions and why?

(a) 2,3,5,7,8,10,15,........

(ii) 2,5,7,10,12,15,........

(c) $-1, \ -3, \ -5, \ -7,$..........

▶ **Watch Video Solution**

2. Write 3 more Arithemic Progressions.

▶ **Watch Video Solution**

1. Write three examples for finite AP and three for infinite AP.

▶ **Watch Video Solution**

2. Take any Arithmetic Progression.

▶ **Watch Video Solution**

3. Add a fixed number to each and every term of AP. Write the resulting numbers as a list.

4. Similarly subtract a fixed number from each and every term ofAP. Write the resulting numbers as a list.

5. Multiply or divide each term of AP by a fixed number and write the resulting numbers as a list.

> ▶ **Watch Video Solution**

6. Check whether the resulting lists are AP in each case.

> ▶ **Watch Video Solution**

7. What is your conclusion?

8. Find the sum of indicated number of terms in each of the following Aps

(i) 16, 11,6,....., 23 terms

(ii) $-0.5, \ -1.0, \ -1.5,.........,$10 terms

(iii) $-1, \ \dfrac{1}{4}, \ \dfrac{3}{2},.....$10 terms

9. Find which of the following are not GPs

6,12,24,48,.....

▶ **Watch Video Solution**

10. Find which of the following are not GPs

1,4,9,16,......

▶ **Watch Video Solution**

11. Find whether the following is GP or not

$1, \; -1, 1, \; -1,........$

12. Find which of the following are not GPs

$-4, \; -20, \; -100, \; -500,...........$

Exercise 6 1

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

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

(ii) The amount of air present in a cylinder when a vacuum pump removes 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 150 for the first metre and rises by 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.

2. 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) $a = -1, d = \dfrac{1}{2}$

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

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

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

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

(iii) $\dfrac{1}{3}, \dfrac{5}{3}, \dfrac{9}{3}, \dfrac{13}{3}, ...$

(iv) $0.6, 1.7, 2.8, 3.9, ...$

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

-10, -6, -2, 2,...

Exercise 6 2

1. Find the

(i) 30th term of the AP 10,7,4,....

(ii) 11th term fo the AP: $-3, \quad -\dfrac{1}{2}, \quad 2$.......

2. Find the respective terms for the following

Aps:

(i) $a_1 = 2, a_3 = 26$ find a_2

(ii) $a_2 = 13, a_4 = 3$ find a_1, a_3

(iii) $a_1 = 5, a_4 = -22$ find a_1, a_3, a_4, a_5

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

4. Find the number of terms in each of the following APs,

(i) 7,13,19,........ 205

(ii) $18, 15\left(\dfrac{1}{2}\right), 13, \ldots\ldots -47.$

5. Check whether , -150 is a term fo the AP:

11,8,5,2,.....

6. Find the 31th term of an AP whose 11th term

is 38 and the 16th term is 73.

> ▶ **Watch Video Solution**

7. 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**

8. The 17th term of an AP exceeds its 10 th term by 7. Find the common difference.

▶ **Watch Video Solution**

9. Two A.Ps have the same common difference . The difference between their 100th term is 100 what is the difference between their 1000th term ?

▶ **Watch Video Solution**

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

▶ **Watch Video Solution**

11. How many multiples of 4 lies between 10 and 250 ?

▶ **Watch Video Solution**

12. For what value of n, are the nth terms of two APs: 63, 65, 67, ... and 3, 10, 17, ... equal?

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

14. Find the 20th term from the end of the AP:3, 8, 13, ..., 253.

15. 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.

16. Subba Rao started his job in 1995 at a monthly salary of 5000 and received an increment of 200 each year. In which year did his salary reach 7000?

▶ **Watch Video Solution**

Exercise 6 3

1. Find the sum of the following Aps,

(i) 2,7,12,.....to 10 terms.

(ii) $-37, \ -33, \ -29,$ to 12 terms

(iii) 0.6, 1.7, 2.8,...... to 100 terms

(iv) $\dfrac{1}{15}, \ \dfrac{1}{12}, \ \dfrac{1}{10}, \ ....$ To 11 terms.

> ▶ **Watch Video Solution**

2. Find the sum given below:

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

> ▶ **Watch Video Solution**

3. In an AP:

(i) Given a=5, d=3, $a_n = 50$, find n

▶ Watch Video Solution

4. 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 their sum?

▶ Watch Video Solution

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

6. 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.

7. Show that $a_1, a_2, \ldots, a_n \ldots$ 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**

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

terms? What is the second term? Similarly, find the 3rd, the 10th and the nth terms

▶ **Watch Video Solution**

9. Find the sum ofthe first 40 positive integers divisible by 6.

▶ **Watch Video Solution**

10. 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

11. 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?

12. A pen stand is made of wood in the shape of cuboid with three conical depressions to hold the pens. The dimensions of the cuboid are 15 cm by 10 cm by 3.5 cm. The radius of each of the depression is 0.5 cm and the depth
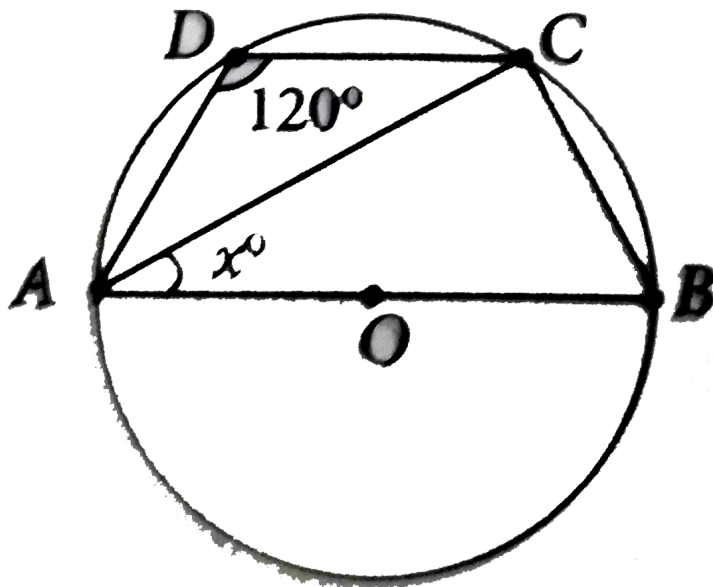
is 1.4 cm n the entire stand.

13. 200 logs of wood 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 200 logs are placed and how many logs are there in the top row ?

14. Find the value of x in the given figure.

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

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

(ii) The amount of air present in a cylinder when a vacuum pump removes 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 150 for the

first metre and rises by 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.

2. Write three terms of the GP when the first term 'a' and the common ratio 'r' are given?

(i) a=4, r=3

(ii) $a = \sqrt{5}, r = \dfrac{1}{5}$

(iii) $a = 81, r = -\dfrac{1}{3}$,

(iv) $a = \dfrac{1}{64}, r = 2$

3. Which of the following are Aps? If they form an AP, find the common difference d and write the next three terms.

(i) 24m8m16,......

(ii) $2, \dfrac{5}{2}, 3, \dfrac{7}{2}$,......

(iii) $-1.2, -3.2, -5.2, -7.2$,........

(iv) $-10, -6, -2, 2$,............

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

(vi) $0.2, 0.22, 0.222, 0.2222,.....$

(vii) $0, -4, -8, -12,..........$

(viii) $-\dfrac{1}{2}, -\dfrac{1}{2}, -\dfrac{1}{2}, -\dfrac{1}{2},...........$

(ix) $1,3,9,27,.......$

(x) $a, 2a, 3a, 4a,.......$

(xi) $a, a^2, a^3, a^4,..........$

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

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

▶ Watch Video Solution

4. Find x so that x, x+2,x+6 are consecutive terms of a geometric progression.

Exercise 6 5

1. For each geometric progressions find the common ratio 'r'. And then find a_n.

(i) $3, \dfrac{3}{2}, \dfrac{3}{4}, \dfrac{3}{8}, \ldots\ldots$

(ii) $2, -6, 18, -54$

(iii) $-1, \quad -3, \quad -9, \quad -27, \ldots$

(iv) $5, \, 2, \, \dfrac{4}{5}, \, \dfrac{8}{25}, \ldots$

2. Find the 10th and nth term of GP: 5,25, 125,......

3. Find the the indicated term of each Geometric, Progression

(i) $a_1 = 9, r = \dfrac{1}{3}$, find a_7,

(ii) $a_1 = -12, r = \dfrac{1}{3}$, find a_6

 Watch Video Solution

4. Which terms of the GP:

(i) 2,8,32,...... is 512?

(ii) $\sqrt{3}, 3, 3\sqrt{3}$,............... is 729?

(iii) $\dfrac{1}{3}, \dfrac{1}{9}, \dfrac{1}{27}$,............ Is $\dfrac{1}{2187}$?

 Watch Video Solution

5. Find the 12th term of a G.P. whose 8th term is 192, and the common ratio is 2.

6. The 4th term of a geometic progression is $\frac{2}{3}$ and the seventh term is $\frac{16}{81}$. Find the geometic series.

7. If the geometic progressions 162, 54, 18,.....

And $\dfrac{2}{81}, \dfrac{2}{27}, \dfrac{2}{9}$,....... Have there nth term

equal. Find the value of n.

▶ **Watch Video Solution**

Optional Exercise For Extensive Learning

1. Which term of the AP: 121, 117, 113,.......... is the first negative term?

[Hint:Find n for $a_n < 0$]

2. 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 term of the AP.

3. A ladder has rungs 25 cm apart. 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 $2\left(\dfrac{1}{2}\right)$ m apart, what is

the length of the wood required for the rungs?

[Hint: Number of rungs $= \left[\dfrac{250}{25} + 1\right]$

4. The houses of a row are numbered consecutively 45 cm 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.

[Hint: $S_{x-1} = S_{49} - S_x$]

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

[Hint: Volume of the first step

$$= \frac{1}{4} \times \frac{1}{2} \times 50m^3]$$

6. 150 workers were engaged to finish a piece of work in a certain number of days. Four workers dropped from the work on the second day. Four workers dropped on third day and so on. It took 8 more days to finish the work. Find the number of days in which the work was completed. [Let the no.of days to finish the

work is 'r' then

$$150x = \frac{x+8}{2}[2 \times 150 + (x + 8 - 1)(- 4)]$$

7. 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 yea

(ii) the production in the 10th year

(iii) the total production in first 7 years

Solution :

Watch Video Solution