Chapter 9 Arithmetic and Geometric Progressions Ex 9.2

Question 1.
Find the A.P. whose nth term is 7 – 3K. Also, find the 20th term.
Solution:

$T_n = 7 - 3n$

Giving values 1, 2, 3, 4, ... to n, we get

$T_1 = 7 - 3 \times 1 = 7 - 3 = 4$

$T_2 = 7 - 3 \times 2 = 7 - 6 = 1$

$T_3 = 7 - 3 \times 3 = 7 - 9 = -2$

$T_4 = 7 - 3 \times 4 = 7 - 12 = -5$

$T_{20} = 7 - 3 \times 20 = 7 - 60 = -53$

A.P. is 4, 1, -2, -5, ...

20th term = -53

Question 2.
Find the indicated terms in each of following A.P.s:
(i) 1, 6, 11, 16, …; a_{20}
(ii) -4, -7, -10, -13, …, a_{25}, a_n
Solution:

(i) 1, 6, 11, 16, ...

Here, a = 1, d = 6 – 1 – 5

$a_{20} = a + (n - 1)d$

$= 1 + (20 - 1) \times 5$

$= 1 + 19 \times 5$

$= 1 + 95$

$= 96$

(ii) $-4, -7, -10, -13, ..., a_{25}, a_n$

Here, $a = -4$, $d = -7 - (-4) = -7 + 4 = -3$

$a_{25} = a + (n - 1)d = -4 + (25 - 1) \times -3$

$= -4 + 24 \times (-3) = -4 - 72 = -76$

and $a_n = a + (n - 1)d = -4 + (n - 1)(-3)$

$= -4 - 3n + 3 = -1 - 3n = -3n - 1$

Question 3.
Find the nth term and the 12th term of the list of numbers: 5, 2, -1, -4, …
Solution:

5, 2, -1, -4, ...

Here, a = 5 d = 2 − 5 = -3

(i) $T_n = a + (n - 1)d$

$= 5 + (n - 1)(-3)$

$= 5 - 3n + 3$

$= 8 - 3n$

(ii) $T_{12} = a + 11d$

$= 5 + 11(-3)$

$= 5 - 33$

$= -28$

Question 4.
Find the 8th term of the A.P. whose first term is 7 and the common difference is 3.
Solution:

First term (a) = 7

and common difference (d) = 3

A.P. = 7, 10, 13, 16, 19, ...

$T_8 = a + (n - 1)d$

$= 7 + (8 - 1) \times 3$

$= 7 + 7 \times 3$

$= 7 + 21$

$= 28$

Question 5.
(i) If the common difference of an A.P. is -3 and the 18th term is -5, then find its first term.
(ii) If the first term of an A.P. is -18 and its 10th term is zero, then find its common difference.

Solution:

(i) Common difference (d) = -3

$T_{18} = -5$

$a + (n - 1)d = Tn$

$a + (18 - 1)(-3) = -5$

$\Rightarrow a + 17(-3) = -5 \Rightarrow a - 51 = -5$

$\Rightarrow a = -5 + 51 = 46$

$\therefore$ First term = 46

(*ii*) First term (a) = –18

$T_{10} = 0$

$a + (n - 1)d = T_n$

$-18 + (10 - 1)d = 0$

$-18 + 9d = 0 \Rightarrow 9d = 18$

$$\Rightarrow d = \frac{18}{9} = 2$$

$\therefore$ Common difference = 2

Question 6.

Which term of the A.P.

(i) 3, 8, 13, 18, … is 78?

(ii) 7, 13, 19, … is 205 ?

(iii) 18, 1512, 13, … is -47 ?

Solution:

(i) 3, 8, 13, 18, ... is 78

Let 78 is nth term

Here, a = 3, d = 8 − 3 = 5

$\therefore\ 78 = a + (n-1)d$

$\Rightarrow 78 = 3 + (n-1)5$

$\Rightarrow 78 = 3 + 5n - 5$

$\Rightarrow 78 + 5 - 3 = 5n \Rightarrow 5n = 80$

$$\Rightarrow n = \frac{80}{5} = 16$$

$\therefore$ 78 is 16th term

(*ii*) 7, 13, 19, ... is 205

Let nth term is 205

Here, $a = 7$, $d = 13 - 7 = 6$

$205 = a + (n-1)d$

$\Rightarrow 205 = 7 + (n-1) \times 6$

$\Rightarrow 205 = 7 + 6n - 6$

$\Rightarrow 6n = 205 - 7 + 6 = 204$

$$n = \frac{204}{6} = 34$$

$\therefore$ 205 is 34th term.

(iii) $18, 15\frac{1}{2}, 13, \ldots$ is -47

Let nth term is -47

$$a = 18, d = 15\frac{1}{2} - 18 = -2\frac{1}{2} = \frac{-5}{2}$$

$$\therefore -47 = a + (n-1)d$$

$$\Rightarrow -47 = 18 + (n-1)\left(\frac{-5}{2}\right)$$

$$\Rightarrow -47 - 18 = \frac{-5}{2}n + \frac{5}{2}$$

$$\Rightarrow -65 - \frac{5}{2} = \frac{-5}{2}n \Rightarrow \frac{-135}{2} = \frac{-5}{2}n$$

$$\therefore n = \frac{-135}{2} \times \frac{2}{-5} = 27$$

$\therefore$ -47 is 27th term.

Question 7.

(i) Check whether -150 is a term of the A.P. 11, 8, 5, 2, …

(ii) Find whether 55 is a term of the A.P. 7, 10, 13, … or not. If yes, find which term is it.

(iii) Is 0 a term of the A.P. 31, 28, 25,…? Justify your answer.

Solution:

(i) A.P. is 11, 8, 5, 2, ...

Here, a = 11, d = 8 − 11 = -3

Let -150 = n, then

$T_n = a + (n-1)d$

$\Rightarrow -150 = 11 + (n-1)(-3)$

$\Rightarrow -150 = 3 - 3n + 11$

$\Rightarrow 3n = 3 + 150 + 11 = 153 + 11 = 164$

$$n = \frac{164}{3} = 54\frac{2}{3}$$

No, −150 is not any terms of the A.P.

(*ii*) A.P. 7, 10, 13, ...

Here, $a = 7$, $d = 10 - 7 = 3$

Let 55 is the nth term, then

$T_n = a + (n-1)d$

$\Rightarrow 55 = 7 + (n-1) \times 3$

$\Rightarrow 55 = 7 + 3n - 3 \Rightarrow 3n = 55 - 7 + 3 = 51$

$$\therefore n = \frac{51}{3} = 17$$

$\therefore$ 55 is a term of the given A.P. and it is 17th term.

(*iii*) A.P. 31, 28, 25, ...

Here, $a = 31$, $d = 28 - 31 = -3$

Let 0 be the nth term, then

$T_n = a + (n-1)d$

$0 = 31 + (n-1)(-3)$

$0 = 31 - 3n + 3 \Rightarrow 3n = 34$

$$n = \frac{34}{3} = 11\frac{1}{3}$$

Hence 0 is not any term of the A.P.

Question 8.

(i) Find the 20th term from the last term of the A.P. 3, 8, 13, …, 253.

(ii) Find the 12th from the end of the A.P. -2, -4, -6, …; -100.

Solution:

(i) A.P. is 3, 8, 13, ..., 253

12th term from the end

Last term = 253

Here, a = 3, d = 8 − 3 = 5

$\therefore$ Last term $(n) = a + (n-1)d$

$253 = 3 + (n-1) \times 5$

$\Rightarrow 253 = 3 + 5n - 5$

$\Rightarrow 253 - 3 + 5 = 5n$

$$\Rightarrow 5n = 255 \Rightarrow n = \frac{255}{5} = 51$$

$\therefore$ 253 is 51th term

Let m be the 20th term from the last term

Then m be the 20th term from the last term

Then $m = l - (n-1)d = 253 - (20-1) \times 5$

$= 253 - 19 \times 5$

$= 253 - 95 = 158$

$\therefore$ 20th term from the end = 158

(*ii*) A.P. = –2, –4, –6, ..., –100

$a = -2, d = -4 - (-2) = -4 + 2 = -2$

$l = -100$

$\therefore T_n = a + (n-1)d$

$\Rightarrow -100 = -2 + (n-1) \times (-2)$

$-100 = -2 - 2n + 2$

$$\Rightarrow +2n = 100 \Rightarrow n = \frac{100}{2} = 50$$

Let mth term is the 12th term from the end

Then $m = l - (n-1)d$

$= -100 - (12-1) \times (-2) = -100 + 22 = -78$

Question 9.

Find the sum of the two middle most terms of the A.P. $-\frac{4}{3}, -1, -\frac{2}{3}, \ldots, 4\frac{1}{3}$

Solution:

Given

A.P. is $-\frac{4}{3}, -1, -\frac{2}{3}, \ldots, 4\frac{1}{3}$

$$\text{Here, } a = -\frac{4}{3}, d = -1 - \left(\frac{-4}{3}\right) - 1 + \frac{4}{3} = \frac{1}{3}$$

$$l = 4\frac{1}{3}$$

$$\therefore T_n = l = 4\frac{1}{3} = a + (n-1)d$$

$$\Rightarrow 4\frac{1}{3} = \frac{-4}{3} + (n-1) \times \frac{1}{3}$$

$$\therefore \frac{13}{3} + \frac{4}{3} = \frac{1}{3}(n-1) \Rightarrow \frac{17}{3} \times \frac{3}{1} = (n-1)$$

$$n - 1 = 17 \Rightarrow n = 17 + 1 = 18$$

$$\therefore \text{Two middle term are } \frac{18}{2} \text{ and } \frac{18}{2} + 1$$

$$= 9\text{th and } 10\text{th term}$$

$$\therefore a_9 + a_{10} = a + 8d + a + 9d$$

$$= 2a + 17d$$

$$= 2 \times \left(\frac{-4}{3}\right) + 17 \times \frac{1}{3}$$

$$= \frac{-8}{3} + \frac{17}{3} = \frac{9}{3} = 3$$

Question 10.

Which term of the A.P. 53, 48, 43,… is the first negative term?

Solution:

Let nth term is the first negative term of the A.P. 53, 48, 43, ...

Here, a = 53, d = 48 − 53 = -5

$\therefore T_n = a + (n - 1)d$

$= 53 + (n - 1) \times (-5)$

$= 53 - 5n + 5$

$= 58 - 5n$

$5n = 58$

$n = \frac{58}{5}$

$= 11\frac{3}{5}$

∴ 12th term will be negative.

Question 11.

Determine the A.P. whose fifth term is 19 and the difference of the eighth term from the thirteenth term is 20.

Solution:

In an A.P.,

$T_5 = 19$

$T_{13} - T_8 = 20$

Let a be the first term and d be the common difference

$\therefore T_5 = a + 4d = 19 \quad ...(i)$

$T_{13} - T_8 = (a + 12d) - (a + 7d)$

$\Rightarrow 20 = a + 12d - a - 7d$

$\Rightarrow 20 = 5d \Rightarrow d = \frac{20}{5} = 4$

Substitute the value of d in eq. (i), we get

$\therefore a + 4 \times 4 = 19 \Rightarrow a + 16 = 19$

$\Rightarrow a = 19 - 16 = 3$

∴ A.P. is 3, 7, 11, 15, ...

Question 12.

Determine the A.P. whose third term is 16 and the 7th term exceeds the 5th term by 12

Solution:

$T_3 = 16$

$T_7 - T_5 = 12$

Let a be the first term and d be the common difference

$$T_3 = a + 2d = 16 \quad \ldots(i)$$

$$T_7 - T_5 = (a + 6d) - (a + 4d) = 12$$

$$\Rightarrow a + 6d - a - 4d = 12$$

$$\Rightarrow 2d = 12 \Rightarrow d = \frac{12}{2} = 6$$

Substitute the value of d in eq. (i), we get

$$\therefore a + 2 \times 6 = 16 \Rightarrow a + 12 = 16$$

$$\Rightarrow a = 16 - 12 = 4$$

$\therefore$ A.P. is 4, 10, 16, 22, 28, ...

Question 13.

Find the 20th term of the A.P. whose 7th term is 24 less than the 11th term, the first term is 12.

Solution:

$T_{11} - T_7 = 24$

a= 12

Let a be the first term and d be the common difference, then

(a + 10d) − (a + 6d) = 24

$$a + 10d - a - 6d = 24 \Rightarrow 4d = 24$$

$$\Rightarrow d = \frac{24}{4} = 6$$

$$a = 12$$

$$\therefore T_{20} = a + 19d = 12 + 19 \times 6$$

$$= 12 + 114 = 126$$

Question 14.

Find the 31st term of an A.P. whose 11th term is 38 and 6th term is 73.

Solution:

$T_{11} = 38, T_6 = 73$

Let a be the first term and d be the common difference, then

$a + 10d = 38$..(i)

$a + 5d = 73$...(ii)

Subtracting, $5d = 35$

$$d = \frac{35}{5} = 7$$

Substitute the value of d in eq. (i), we get

$a + 10d = 38$

$a + 70 = 38 \Rightarrow a = 38 - 70 = -32$

$\therefore T_{31} = a + 30d$

$= -32 + 30 \times 7 = -32 + 210 = 178$

$\therefore$ **31th term = 178**

Question 15.

If the seventh term of an A.P. is 19 and its ninth term is 17, find its 63rd term.

Solution:

$a_7 = \frac{1}{9}$

$\Rightarrow a + 6d = \frac{1}{9}$ ....(i)

$a_9 = \frac{1}{7}$

$\Rightarrow a + 8d = \frac{1}{7}$.....(ii)

$$a_7 = \frac{1}{9} \Rightarrow a + 6d = \frac{1}{9} \qquad ....(i)$$

$$a_9 = \frac{1}{7} \Rightarrow +a + 8d = +\frac{1}{7} \qquad ....(ii)$$

$$- \quad - \quad -$$

On subtracting, $-2d = \frac{1}{9} - \frac{1}{7}$

$$-2d = \frac{7-9}{63}$$

$$-2d = \frac{-2}{63}$$

$$\therefore d = \frac{1}{63}$$

Now, substitute the value of d in eq. (i), we get

$$a + 6\left(\frac{1}{63}\right) = \frac{1}{9}$$

$$a = \frac{1}{9} - \frac{6}{63} = \frac{7-6}{63} = \frac{1}{63}$$

$\therefore a_{63} = a + 62d$

$$= \frac{1}{63} + 62\left(\frac{1}{63}\right) = \frac{1+62}{63} = \frac{63}{63} = 1$$

Question 16.

(i) The 15th term of an A.P. is 3 more than twice its 7th term. If the 10th term of the A.P. is 41, find its nth term.

(ii) The sum of 5th and 7th terms of an A.P. is 52 and the 10th term is 46. Find A.P.

(iii) The sum of 2nd and 7th terms of an A.P. is 30. If its 15th term is 1 less than twice its 8th term, find the A.P.

Solution:

(i) Let a be the first term and d be a common difference.

We have,

$a_{10} = 41$

$\Rightarrow a + 9d = 41$ ...(i)

and $a_{15} = 2a_7 + 3$

$\Rightarrow a + 14d = 2(a + 6d) + 3$

$\Rightarrow a + 14d = 2a + 12d + 3$

$\Rightarrow a - 2d = -3$ ...(ii)

Subtracting (ii) from (i), we get

$9d + 2d = 41 + 3$

$\Rightarrow 11d = 44$

$\Rightarrow d = 4$

Now, from (i), we get

$a + 9 \times 4 = 41$

$\Rightarrow a + 36 = 41$

$\Rightarrow a = 5$

Now,

nth term $= a_n = a + (n - 1)d = 5 + (n - 1)4 =$

$4n + 1$

(*ii*) Let a be the first term and d be the common difference, then

$a_5 = a + (5 - 1)d = a + 4d$

$a_7 = a + (7 - 1)d = a + 6d$

$\therefore\ a_5 + a_7 = a + 4d + a + 6d = 52$

$\Rightarrow\ 2a + 10d = 52$

$\Rightarrow\ a + 5d = 26$ ...(*i*)

Similarly,

$a_{10} = a + (10 - 1)d = a + 9d$

$\Rightarrow\ a + 9d = 46$ ...(*ii*)

Subtracting (*i*) from (*ii*),

$4d = 20$

$\Rightarrow\ d = \frac{20}{4} = 5 \Rightarrow d = 5$

Now, put the value of d in eq. (*i*)

$a + 5 \times 5 = 26$

$\Rightarrow\ a = 26 - 25 \Rightarrow a = 1$

Hence, $a_2 = a_1 + d$

$= 1 + 5 = 6$

$a_3 = a_2 + d$

$= 6 + 5 = 11$

$a_4 = a_3 + d$

$= 11 + 5 = 16$

∴ The A.P formed is 1, 6, 11, 16,....

Question 17.

If the 8th term of an A.P. is zero, prove that its 38th term is triple of its 18th term.

Solution:

$T_8 = 0$

To prove that $T_{38} = 3 \times T_{18}$

Let a be the first term and d be the common difference

$\therefore\ T_8 = a + 7d = 0 \Rightarrow a = -7d$

Now $T_{38} = a + 37d$

$= -7d + 37d = 30d$

and $T_{18} = a + 17d = -7d + 17d = 10d$

It is clear that T_{38} is triple of T_{18}

Question 18.

Which term of the A.P. 3, 10, 17,… will be 84 more than its 13th term?

Solution:

A.P. is 3, 10, 17, ...

Here, a = 3, d – 10 – 3 = 7

$T_{13} = a + 12d$

$= 3 + 12 \times 7$

$= 3 + 84$

$= 87$

Let nth term is 84 more then its 13th term

$\therefore\ T_n = 84 + 87 = 171$

$\Rightarrow a + (n - 1)d = 171$

$\Rightarrow 3 + (n - 1) \times 7 = 171$

$(n - 1) \times 7 = 171 - 3 = 168$

$$n - 1 = \frac{168}{7} = 24$$

$n = 24 + 1 = 25$

$\therefore$ 25th term is the required term.

Question 19.

If the nth terms of the two A.P.s 9, 7, 5, … and 24, 21, 18, … are the same, find the value of n. Also, find that term

Solution:

nth term of two A.P.s 9, 7, 5,... and 24, 21, 18, ... are same

In the first A.P. 9, 7, 5, ...

a = 9 and d = 7 – 9 = -2

$T_n = a + (n - 1)d$

$= 9 + (n - 1)(-2)$

$= 9 - 2n + 2 = 11 - 2n$

and in second A.P. 24, 21, 18, ...

$a_1 = 24, d_1 = 21 - 24 = -3$

$T_n = 24 + (n - 1)(-3)$

$= 24 - 3n + 3 = 27 - 3n$

$\because$ The nth terms of both A.P.s is same

$\therefore \ 11 - 2n = 27 - 3n$

$-2n + 3n = 27 - 11 \Rightarrow n = 16$

and $T_{16} = a + (n - 1)d$

$= 9 + 15 \times (-2) = 9 - 30 = -21$

Question 20.

(i) How many two digit numbers are divisible by 3?

(ii) Find the number of natural numbers between 101 and 999 which are divisible by both 2 and 5.

(iii) How many numbers lie between 10 and 300, which when divided by 4 leave a remainder 3?

Solution:

(i) Two digits numbers divisible by 3 are

12, 15, 18, 21, ..., 99

Here, a = 13, d = 15 – 12 = 3 and l = 99

Let number divisible by 3 and n

$\therefore\ T_n = l = a + (n-1)d$

$99 = 12 + (n-1) \times 3 \Rightarrow 99 - 12 = 3(n-1)$

$$\Rightarrow 3(n-1) = 87 \Rightarrow n - 1 = \frac{87}{3} = 29$$

$\therefore\ n = 29 + 1 = 30$

(*ii*) Numbers divisible by both 2 and 5 are 110, 120, 130, ..., 990

Here $a = 110,\ d = 120 - 110 = 10$

$a_n = 990$

$\Rightarrow a + (n-1)\,d = 990$

$\Rightarrow 110 + (n-1)\,(10) = 990$

$\Rightarrow (n-1)\,(10) = 990 - 110 = 880$

$$\Rightarrow (n-1) = \frac{880}{10} = 88$$

$\therefore$ $n = 88 + 1 = 89$

Hence, number between 101 and 999 which are divisible by both 2 and 5 are 89.

(*iii*) Numbers between 10 and 300, which when divided by 4 leave a remainder 3 will be

11, 15, 19, 23, ... 299

Here, $a = 11, d = 15 - 11 = 4, l = 299$

$\therefore$ $T_n = l = a + (n - 1)d$

$299 = 11 + (n - 1) \times 4$

$\Rightarrow 299 - 11 = (n - 1)4$

$$4(n - 1) = 288 \Rightarrow n - 1 = \frac{288}{4} = 72$$

$\therefore$ $n = 72 + 1 = 73$

Question 21.

If the numbers n – 2, 4n – 1 and 5n + 2 are in A.P., find the value of n.

Solution:

n – 2, 4n – 1 and 5n + 2 are in A.P.

$\therefore$ 2(4n – 1) = n – 2 + 5n + 2

8n – 2 = 6n

$\Rightarrow$ 8n – 6n = 2

$\Rightarrow$ 2n = 1

$\Rightarrow n\frac{2}{2} = 1$

$\therefore$ n = 1

Question 22.

The sum of three numbers in A.P. is 3 and their product is -35. Find the numbers.

Solution:

Sum of three numbers which are in A.P. = 3

Their product = -35

Let three numbers which are in A.P.

a – d, a, a + d

a – d + a + a + d = 3

$\Rightarrow 3a = 3$,

$\Rightarrow a = \frac{3}{3} = 1$

and $(a - d) \times a \times (a + d) = -35$

$(1 - d) \times 1 \times (1 + d) = -35$

$1^2 - d^2 = -35$

$1 - d^2 = -35 \Rightarrow d^2 = 35 + 1 = 36$

$\therefore d = \pm 6$

If $d = 6$

$\therefore$ Numbers are $1 - 6, 1, 1 + 6$

$= -5, 1, 7$

If $d = -6$

$1 + 6, 1, 1 - 6 \Rightarrow 7, 1, -5$

Hence numbers in A.P. are

–5, 1, 7 or 7, 1, –5

Question 23.

The sum of three numbers in A.P. is 30 and the ratio of the first number to the third number is 3 : 7. Find the numbers.

Solution:

Sum of three numbers in A.P. = 30

Ratio between first and the third number = 3 : 7

Let numbers be

a − d, a, a + d, then

a − d + a + a + d = 30

$$\Rightarrow 3a = 30 \Rightarrow a = \frac{30}{3} = 10$$

$$\text{and } \frac{a-d}{a+d} = \frac{3}{7} \Rightarrow 7a - 7d = 3a + 3d$$

$$\Rightarrow 7a - 3a = 3d + 7d \Rightarrow 4a = 10d$$

$$\Rightarrow 10d = 4 \times 10 = 40 \Rightarrow d = \frac{40}{10} = 4$$

$\therefore$ **Numbers are $10 - 4, 10, 10 + 4 \Rightarrow 6, 10, 14$**

Question 24.

The sum of the first three terms of an A.P.is 33. If the product of the first and the third terms exceeds the second term by 29, find the A.P.

Solution:

Let the three numbers in A.P. are

a − d, a, a + d

Now, a − d + a + a + d = 33

⇒ 3a = 33

⇒ a = $\frac{33}{3}$ = 11

and $(a - d)(a + d) = a + 29$

$a^2 - d^2 = a + 29$

$(11)^2 - d^2 = 11 + 29 \Rightarrow 121 - d^2 = 40$

$d^2 = 121 - 40 = 81 = (\pm 9)^2$

$\therefore d = \pm 9$

If $d = 9$, then

∴ Numbers are 11 − 9, 11, 11 + 9

⇒ 2, 11, 20

If $d = -9$, then

11 + 9, 11, 11 − 9

⇒ 20, 11, 2

Hence numbers are 2, 11, 20 or 20, 11, 2

Question 25.

A man starts repaying a loan as the first instalment of Rs 500. If he increases the instalment by Rs 25 every month, what, the amount will he pay in the 30th instalment?

Solution:

First instalment of loan = Rs 500

Increases Rs 25 every month

Here, a = 500, d = 25

Total instalments (n) = 30

We have to find T_{30}

T_{30} = a + (n − 1)d = a + 29d

= 500 + 29 x 25

= 500 + 725

= Rs 1225

Question 26.
Ramkali saved Rs 5 in the first week of a year and then increased her savings by Rs 1.75. If in the right week, her weekly savings become Rs 20.75, find n.
Solution:

Savings in the first week = Rs 5

Increase every week = Rs 1.75

No. of weeks = n

and last savings = ₹20.75

Here, $a = 5$ and $d = 1.75$

$\therefore\ l = 20.75$

$\therefore\ T_n(l) = a + (n - 1)d$

$20.75 = 5 + (n - 1)1.75$

$\Rightarrow\ 20.75 - 5.00 = 1.75(n - 1)$

$15.75 = 1.75(n - 1)$

$$\frac{15.75}{1.75} = n - 1 \Rightarrow n - 1 = 9$$

$\therefore\ n = 9 + 1 = 10$

$\therefore\ n = 10$

Question 27.
Justify whether it is true to say that the following are the nth terms of an A.P.
(i) 2n – 3
(ii) $n^2 + 1$

Solution:

(i) 2n – 3

Giving the some difference values to n such as 1, 2, 3, 4, ... then

2 x 1 – 3 = 2 – 3 = -1

2 x 2 – 3 = 4 – 3 = 1

2 x 3 – 3 = 6 – 3 = 3

2 x 4 – 3 = 8 – 3 = 5

We see that –1, 1, 3, 5, ... are in A.P. whose first term = –1 and $d = 1 - (-1) = 1 + 1 = 2$

(*ii*) $n^2 + 1$

Giving some difference values to n such as 1, 2, 3, 4, ...

$(1)^2 + 1 = 1 + 1 = 2$

$(2)^2 + 1 = 4 + 1 = 5$

$(3)^2 + 1 = 9 + 1 = 10$

$(4)^2 + 1 = 16 + 1 = 17$

We see that $a = 2$,

$d = 5 - 2 = 3$

$= 10 - 5 = 5$

$= 17 - 10 = 7$

The common difference is not same.

$\therefore$ No. It is not an A.P.