unit - II

ARITHMETIC PROGRESSION

A series in which the difference of any term and its preciding term is constant is called a arithmetic progression. This constant quantity is called a common different

The generall format AP $a, a+d, a+2d, a+3d \ldots, a+n(-1)d$

formula for n^{th} term.

$$t_1 = a + 0d$$

$$t_2 = a + d$$

$$t_3 = a + 2d$$

$$t_4 = a + 3d$$

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

formula for

sum to n terms

$$S_n = \frac{n}{2}\left[2a + (n-1)d\right]$$

1) Find the 10^{th} term of in whos 2, 4, 6, 8...

Sol Given A.P

2, 4, 6, 8, 10 ...

$t_1 = a = 2$

$t_2 = a+d - 4$

$= 2 + d = 4$

$d = 4 - 2$

$\boxed{d = 2}$

formula for n^{th} term

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

$t_{10} = 2 + (10-1)2$

$= 2 + 9(2)$

$= 2 + 18$

$\boxed{t_{10} = 20}$

2) Find the 7^{th} term of an entity whos

3, 6, 9, 12 ...

Sol Given A.P

We known the general term of A & B

a, a+d, a+2d, a+3d ....

$t_1 = a = 3$

$t_2 = a+d = 6$

$a + d = 6$

$3 + d = 6$

$d = 6 - 3$

$\boxed{d = 3}$

Formula for n^{th} term

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

$t_7 = 3 + [7-1]3$

$= 3 + (6)3$

$= 3 + 18$

$\boxed{t_7 = 21}$

3) Find the 12^{th} term of in whos

4, 8, 12, 16...

Sol Given A.P

We known the general term of A & P

$a, a+d, a+2d, a+3d \ldots$

$t_1 = a = 4$

$t_2 = a + d = 8$

$= a + d = 8$

$= 4 + d = 8$

$d = 4 - 8 \quad (8-4)$

$\boxed{d = 4}$

Formula for n^{th} term

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

$t_{12} = 4 + (12-1)4$

$= 4 + 11(4)$

$= 4 + 44$

$\boxed{t_{12} = 48}$

4) Find the 40^{th} term of an A.P

Sol Given A.P

9^{th} term $t_9 = 465$

20^{th} term $t_{20} = 388$

Formula for the n^{th} term

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

$t_9 = a + 8d = 465$

$t_{20} = a + 19d = 388$

$a + 8d = 465$

$(-)\ a + 19d = 388$

$(-)$

$-11d = 77$

$d = 77/-11$

$\boxed{d = -7}$

put $d = -7$

ii) 1st

$a + 8(-7) = 465$

$a - 56 = 465$

$a = 465 + 56$

$a = 521$

40^{th} term $t_n = a + (n-1)d$

$t_{40} = a + (40-1)d$

$= a + (39 \times -7)$

$= 521 + (39 \times -7)$

$= 521 - 273$

$t_{40} = 248$

$\boxed{40^{th} \text{ term is } 248}$

5) find 52^{th} of A.P whose 9^{th} term is 465 and 20^{th} term is 388.

Sol

Given 9^{th} term is 465

20^{th} term is 388

formula for n^{th} term

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

$t_9 = a + 8d = 465$

$t_{20} = a + 9d = 388$

$a + 8d = 465$

$a + 19d = 388$

$(-) \quad (-) \qquad (-)$

$-11d = 77$ $\boxed{d = -7}$

Put $d = -7$ in equation — ①

$a + 8(-7) = 465$

$a - 56 = 465$

$a = 465 + 56$

$\boxed{a = 521}$

52^{th} term

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

$t_{52} = a + (52-1)d$

$= a + 51d$

$= 521 + (51) \times -7)$

$= 521 - 357$

$\boxed{t_{52} = 164}$

6) The 7^{th} term of A.P is = 39^{th} and 17^{th} term is 69 find the series

Sol Given

6 marks

$t_7 = a + 6d = 39$

$t_{17} = a + 16d = 69$

$$\begin{array}{r} \cancel{a} + 6d = 39 \\ \cancel{a} + 16d = 69 \\ (-) \quad (-) \quad\quad (-) \\ \hline -10d = -30 \end{array}$$

$d = \frac{-30}{-10}$ 3

$d = 3$

Put $d = 3$ in t_7

$a + 6(3) = 39$

$a + 18 = 39$

$a = 21$

The General terms of A.P

$a, a+d, a+2d, a+3d \ldots$

$21, 21+3, 21+2(3), \cancel{21}\ 21+3(3) + \ldots$

Then series

$21, 24, 27, 30 \ldots$

7) The 10^{th} term of A.P is 184 and 16^{th} term of an A.P is 160 find the 45^{th} term

Sol Given

10^{th} term $t_{10} = 184$ $(a + 9d = 184)$

16^{th} term $t_{16} = 160$ $(a + 1\ d = 160)$

Formula for the n^{th} term

$t_{10} = a + 9d = 184$

$t_{16} = a + 16d = 160$

$$\begin{aligned} \cancel{a} + 9d &= 184 \\ \cancel{a} + 16d &= 160 \\ (-) \quad (-) \quad &\ (-) \\ \hline -6d &= 24 \end{aligned}$$

$$d = \frac{2\cancel{4}}{-\cancel{6}}$$

$$\boxed{d = -4}$$

Put $d = -4$ in to

$a + 9d = 184$

$a + 9(-4) = 184$

$a - 36 = 184$

$a = 184 + 36$

$a = 220$

For 45^{th}

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

$t_{45} = a + 44d$

$= 220 + 44(-4)$

$= 220 - 176$

$$\boxed{t_{45} = 44}$$

For 35^{th}

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

$t_{35} = 220 + 34(-4)$

$= 220 - 136$

$$\boxed{t_{35} = 84}$$

8) then 7^{th} term of A.P is 39 and 17^{th} term is 69 find the 25^{th} term

Sol

$t_7 = a + 6d = 39$

$t_{17} = a + 16d = 69$

$\boxed{a = 21}$ $\boxed{d = 3}$.

t_{25} term

$t_{25} = a + 24d$

$= 21 + 24(3)$

$= 21 + 72$

$\boxed{t_{25} = 93}$

9) The n^{th} term of the series is $7n-3$ so that the series is an A.P and find the first term and common difference

Sol Given

n^{th} term $t_n = 7n - 3$

$(n-1)^{th}$ term $t_{n-1} = 7(n+1) - 3$

$d = t_n - t_{n-1}$

$= 7n - 3 - (\cancel{n} - 1) - 3)$

$= 7n - 3 - (7n - 7 - 3)$

$= 7n - 3 - (7n - 10)$

$= 7\cancel{n} - 3 - \cancel{7}n + 10$

$\boxed{d = 7}$

(or)

$a = t_1$ put $t = 1$

$t_1 = 7(1) - 3$

$= 7 - 3$

$\boxed{t_1 = 4}$

$\boxed{a = 4}$

$\boxed{d = 7}$

$n = 1$ t_1

$t_1 = 7(1) - 3$

$= 7 - 3$

$t_1 = 4$

$\boxed{a = 4}$

$n = 2$

$t_2 = 7(2) - 3$

$= 14 - 3 = 11$

$d = t_2 - t_1$

$= 11 - 4$

$\boxed{d = 7}$

10) The 10^{th} term of an AP is

Find the sum of all integers between 200 and 500 which are divisible by 7

Sol

The first number between 200 and 700 divisable by 7 is 203 and the Last number divisable by 7 is 497

203, 210, 217 .... 490, 497

To find the number of term in the series we use formula $T_n = a + (n-1)d$

$a = 203$ $d = 7$

$497 - 203 + (n-1)7$

$497 - 203 = 7n - 7$

$294 = 7n - 7$

$294 + 7 = 7n$

$301 = 7n$

$\frac{301}{7} = n$ $\boxed{n = 43}$

sum to n terms

$$S_n = \frac{n}{2}[2a + (n-1)d]$$

$$= \frac{43}{2}[2(203) + (43-1)(7)]$$

$$= \frac{43}{2}[406 + 42 \times 7]$$

$$= \frac{43}{2}[406 + 294]$$

$$= \frac{43}{2}[\overset{350}{\cancel{700}}]$$

$$= 43 \times 350$$

$$S_n = 15050 \qquad \boxed{S_n = 15050}$$

iii) Find the sum of all integers between 200 and 500 which are divisible by 6

solution Given The first number between 200 and 500 divisible by 6 is 204 and the cost number divisible by 6 is 498 ∴ the series is..

204, 210, 216 . . . . . 492, 498

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

$$a = 204 \qquad d = 6$$

$$498 = 204 + (n-1)6$$

$$498 - 204 = 6n - 6$$

$$294 + 6 = 6n$$

$$300 = 6n$$

$$n = \frac{300}{6}$$

$$\boxed{n = 50}$$

Sum to n terms

$$S_n = \frac{n}{2}[2a + (n-1)d]$$

$$= \frac{50}{2}[2(204) + (50-1)(6)]$$

$$= \frac{50}{2}[408 + 49 \times 6] \text{ same } [408 + 49 \times 6]$$

$$= \frac{50}{2}[408 + 294]$$

$$= \frac{50}{2}[702]$$

$$= 25(702)$$

$$\boxed{S_n = 17550}$$

12) Find the sum to first 10 terms of the series 3, 6, 9, 12 ....

Sol

Given A P

3, 6, 9, 12 ...

The general term of A P

$a, a+d, a+2d \ldots$

$t_1 = a = 3$

$t_2 = a + d = 6$

put $a = 3$ in t_2

$a + d = 6$

$3 + d = 6$

$d = 6 - 3$

$$\boxed{d = 3}$$

Sum to n - terms

$$S_n = \frac{n}{2}[2a+(n-1)d]$$

$n = 10$

$$= \frac{10}{2}[2(3)+(10-1)3]$$

$$= 5(6+9(3))$$

$$= 5(6+27)$$

$$= 5.(33)$$

$$\boxed{S_{10} = 165}$$

13) I propose to take 30 constutive terms of the series 100+99+98+97... at what term must I begiging so that the sum of the series is **1155**

100+99+98, Last term(-) 1st term

99 - 100 = -1

Sol Given $n = 30$, $d = -1$, $S_n = 1155$

Formula for sum to n term

$$S_n = \frac{n}{2}[2a+(n-1)d]$$

$$1155 = \frac{30}{2}[2(a)+(30-1)(-1)]$$

$$1155 = 15[2a+(29)(-1)]$$

$$1155 = 15[2a-29]$$

$$1155 = 30a - 15\times29$$

$$1155 = 30a - 435$$

$$1155 + 435 = 30a$$

$$1590 = 30a$$

$$a = \frac{1590}{30}$$

$$\boxed{a = 53}$$

14) The rate of monthly salary of the person increases annualy in A.P it is know that he was to get ₹ 200 for monthly during 11^{th} year of service and ₹ 380 during the 29^{th} year find the starting salary and rate of annual increament

Sol Given n^{th} term formula

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

Salary of 11^{th} year

$$t_{11}\ a + 10d = 200$$

Salary of 29^{th} year

$$t_{29} = a + 28d = 380$$

$$\cancel{a} + 10d = 200$$
$$\cancel{a} + 28d = 380$$
$$(-) \qquad (-)$$
$$-18d = 180$$

$$d = \frac{-18\cancel{0}}{-\cancel{18}\cancel{0}}\ 10$$

$$d = 10$$

Put $d = 10$ in t_{11}

$$a + 10(10) = 200$$

$$a + 100 = 200$$
$$a = 200 - 100$$
$$\boxed{a = 100}$$

$$t_1 - a = 100$$
$$\boxed{d = 10}$$

The first month salem in ₹ 100/- and the annual increament is ₹ 10//

15] The sum to enters of the series is

6 $3n^2+2n$ show that the series is an

m A.P. find the 1^{st} term and the common

a difference

r

k Sol Given For sum to n-term

$(a-b)^2 = a^2+b^2-2ab$

$(n-1)^2 = n^2+1^2-2n.1$

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

$$Sn = 3n^2 + 2n$$

For sum to $(n-1)$ term

$$= 3(n-1)^2 + 2(n-1)$$

$$= 3(n^2+1^2-2n) + 2n-2$$

$$= 3n^2 + 3 - 6n + 2n - 2$$

$$Sn-1 = 3n^2 - 4n + 1$$

$$Tn = Sn - Sn-1$$

$$= 3n^2 + 2n - (3n^2 - 4n + 1)$$

$$= 3n^2 + 2n - 3n^2 + 4n - 1$$

$$Tn = 6 - 1$$

Put $n = 1$

$$t_1 = a = 6(1) - 1$$

$$= 6 - 1$$

$$\boxed{t_1 A = a = 5}$$

Put $n = 2$

$$t_2 = 6(2) - 1$$

$$= 12 - 1$$

$$\boxed{t_2 = 11}$$

$$d = t_2 - t_1$$

$$= 11 - 5$$

$$\boxed{d = 6}$$

16) A series in which a ratio of any term to its preceving term a constant is called geomentric ratio progession the constant quantity is called common ratio. 'R' is a common ratio

Sol Given

The general term of G.P

$a, ar, ar^2 \ldots ar^{n-1}$

The n^{th} term of G.P

$T = a \quad T_2 = ar \quad T_3 = ar^2 \quad T_4 = ar^3 \ldots \; T_n \; ar^{n-1}$

Sum of n - term of G.P

$$S_n = \frac{a(1-r^n)}{1-r} \text{ if } (r<1)$$

$$S_n = \frac{a(r^n-1)}{r-1} \text{ if } (r>1)$$

17) Find the ~~2~~5th term of G.P 4, 12, 36, 108...

Sol Given G.P is 4, 12, 36, 108..... here

$r = 3 \quad a = 4$

for find r

$$r = \frac{t_2}{t_1} \text{ or } \frac{t_3}{t_2} \text{ or } \frac{t_4}{t_3}$$

$$r = \frac{\cancel{12}^{3}}{\cancel{4}} \text{ (or) } \frac{\cancel{36}^{3}}{\cancel{12}}$$

$r = 3$

formula for n^{th} term

$t_n = ar^{n-1}$

5^{th} term

$t_5 = 4(3)^{5-1}$

$= 4(3)^4$

$= 4(81)$

$\boxed{t_5 = 324}$

18) Sum

6^{th} term of G.P

$t_6 = 4(3)^{6-1}$

$= 4(3)^5$

$= 4(243)$

$\boxed{t_6 = 972}$

19) Find the sum to n-terms of G.P

4, 12, 36, 108 ...

Sol Given

G.P is 4, 12, 36, 108 ...

For find r

$$r = \frac{t_2}{t_1}$$

$$= \frac{12}{4}$$

$r = 3$ $a = 4$

Sum to n-term in G.P

if $r > 1$

$$S_n = \frac{a(r^n - 1)}{r - 1}$$

here: $r = 3$ $(3 > 1)$ $a = 4$

$$S_n = \frac{4(3^n - 1)}{3 - 1}$$

$$S_n = \frac{\cancel{4}^2(3^n - 1)}{\cancel{2}}$$

$S_n = 2(3^n - 1)$ or $S_n = 6^n - 2$

20) Find the sum to 5-term of G.P

4, 12, 36, 108 ...

Sol Given G.P is

4, 12, 36, 108 ...

For find r

$$r = \frac{t_2}{t_1}$$

$$= \frac{12}{4}$$

$r = 3$, $a = 4$

Sum to n-term in G.P

if $r > 1$

$$S_n = \frac{a(r^n - 1)}{r - 1}$$

here $r = 3$ $(3 > 1)$

$a = 4$ $n = 5$

$$S_5 = \frac{4(3^5 - 1)}{3 - 1}$$

$$= \frac{4(243 - 1)}{3 - 1}$$

$$= \frac{\cancel{4}^2(242)}{2}$$

$S_5 = 484$

21) Find the sum of n term of the series

$3, 2, \frac{4}{3}, \frac{8}{9} : \ldots$

Sol

Given G.P is

$3, 2, \frac{4}{3}, \frac{8}{9} \ldots$

we know the general form G.P is

$a, ar, ar^2, ar^3 \ldots ar^{n+}$

From the given G.P

$a = 3$

For finding r

$r = \frac{t_2}{t_1}$ or $\frac{t_3}{t_2}$

$r = \frac{2}{3}$ or $\frac{\cancel{4}^2 / 3}{\cancel{2}}$

$r = 2/3$

Sum to n terms formula is

if $r < 1$ $S_n = \frac{a(1-r^n)}{1-r}$

here $a = 3$ $r = 2/3$

$$S_n = \frac{3(1-(2/3)^n)}{1-\frac{2}{3}}$$

$$\frac{3(1-(2/3)^n)}{3-2/3}$$

$$= \frac{3(1-(2/3)^n)}{1/3}$$

$S_n = 9(1-(2/3)^n)$

22) Find the 6^{th} term of the series $3, 2, \frac{4}{3}, \frac{8}{9}$

Sol

Given G.P is

$3, 2, \frac{4}{3}, \frac{8}{9} \ldots$

we known the general term of G.P is

$a, ar, ar^2, ar^3 \ldots ar^{n-1}$

from the given G.P

$\boxed{a = 3}$

for finding r

$$r = \frac{t_2}{t_1} \text{ or } \frac{t_3}{t_2}$$

$$r = \frac{2}{3} \text{ or } \frac{4/3}{2}$$

$$\boxed{r = \frac{2}{3}}$$

Formula for n^{th} term

$$t_n = ar^{n-1}$$

here $a = 3$ $r = 2/3$ $n = 6$

$$t_6 = 3 (2/3)^{6-1}$$

$$= 3 (2/3)^5$$

$$= \cancel{3}\left(2^5/3^{\cancel{5}4}\right)$$

$$= (2^5/3^4)$$

$$\boxed{t_6 = \frac{32}{81}}$$

Q31) Find the 10^{th} term of the series

$4, 12, 36, 108 \ldots$

Sol

Given G.P is

$4, 12, 36, 108 \ldots$

we know the general term of G.P is

$a, ar, ar^2, ar^3 \ldots, ar^{n-1}$

from the given G.P

$$\boxed{a = 4}$$

for finding r

$$r = \frac{t_2}{t_1} \text{ or } \frac{t_3}{t_2}$$

$$r = \cancel{t_2}\ \frac{12}{4} \text{ or } \frac{36}{12}$$

$$\boxed{r = 3}$$

formula for n^{th} term

$$t_n = ar^{n-1}$$

here $a = 4 \quad r = 3 \quad n = 10$

$$t_{10} = 4(3)^{10-1}$$

$$= 4(3)^9$$

$$= 4 \times (19683)$$

$$\boxed{t_{10} = 78732}$$

24) Find the three number in G.P whose sum is 21 and product is 216.

Sol

Given of 3 number is 21
product of 3 number is 216
Let us consider the three like

$$\frac{a}{r},\ a,\ ar$$

$$\frac{a}{r} + a \times ar = 216$$

$$\frac{a r^3}{r} = 216$$

$$a^3 = 216$$

$$a = 3\sqrt{216}$$

$$a = \sqrt{6\times6\times6}$$

$$\boxed{a = 6}$$

Put $a = 6$

$$\frac{6}{r} + 6 + 6r = 21$$

$$\frac{6}{r} + 6 + 6r - 21 = 0$$

$$\frac{6}{r} - 15 + 6r = 0$$

$$\frac{6 - 15r + 6r^2}{r}$$

$$6r^2 - 15r + 6 = 0 \times r$$

$$6r^2 - 15r + 6 = 0$$

$$6r^2 - 12r - 3r + 6 = 0$$

$$6r(r-2) - 3(r-2) = 0$$

$$(r-2)(6r-3) = 0$$

$r - 2 = 0$

$\boxed{r = 2}$

$6r - 3 = 0$

$6r = 3$

$r = 3/6$

$\boxed{r = 2}$

$\frac{a}{r}, a, ar$ put $a = 6, r = 2$

$\frac{6}{2}, 6, 6 \times 2$

$\boxed{= 3, 6, 12}$

10 Mark sums

25) A company producers 1000 sets of TV during the first year the total sales produce. at end of 5 years is 7000 estimate the annual rate of increase in production if the increase in each year in uniform

Sol

Given

1st year production $a = 1000$

5 year of production $S_5 = 7000$

$n = 5$

We know the formula

$$S_n = \frac{n}{2}\left[2a + (n-1)d\right]$$

$$7000 = \frac{5}{2}\left[2(1000) + (5-1)d\right]$$

$$7000 = \frac{5}{2}\left[2000 + 4d\right]$$

$$7000 \times 2 = 5 [2000 + 4d]$$

$$14000 = 10,000 + 20d$$

$$14000 - 10000 = 20d$$

$$d = \frac{4000}{20}$$

$$\boxed{d = 20 \text{ units}}$$

∴ the annual rate of increase in 20units//

26) A company producers 1000 sets of TV during the first year the total sale produce at end of 5 years is 12000 estimate the annual rate of increase in production if the increases in each year in uniform

Sol

Given

1^{st} year production $a = 1000$

5 year of production $S_5 = 12000$

$n = 5$

we know the formula

$$S_n = \frac{n}{2} [2a + (n-1)d]$$

$$12000 = \frac{5}{2} [2(1000) + (5-1)d]$$

$$12000 = \frac{5}{2} [2000 + 4d]$$

$$12000 \times 2 = 5 \ [2000 + 4d]$$

$$24000 = 10,000 + 20d]$$

$$24000 - 10000 = 20d$$

$$14000 = 20d$$

$$d = \frac{\cancel{14000}^{7}}{2\cancel{0}}$$

$$\boxed{d = 700} \text{ units}$$

∴ the annual rate of increase in production is 700 units//

27) A company producers 1000 sets of TV during the first year the total sales produce at end of 5 years is 8000 estimates the annual rate of increase in production if the increase in production if the increase in each year in uniform

Sol

Given

1^{st} year production $a = 1000$

5 year of production $S_5 = 8000$

$n = 5$

we know the formula

$$S_n = \frac{n}{2} [2a + (n-1)d]$$

$$8000 = \frac{5}{2}\left[2(1000) + (5-1)d\right].$$

$$8000 = \frac{5}{2}\left[2000 + 4d\right]$$

$$8000 \times 2 = 5\left[2000 + 4d\right]$$

$$16000 = 10,000 + 20d]$$

$$6000 = 20d$$

$$d = \frac{\overset{3}{\cancel{6}}00\cancel{0}}{2\cancel{0}}$$

$$\boxed{d = 300}$$

∴ the annual rate of increase in production is 300 units.

28) A man repay the loan is 3250 Rs by paying ₹ 20 in 1st month and then increases the payment by ₹ 15. every month long when take to clear this loan

Sol

Given amount of loan $S_n = 3250$

first payment $a = 20$

Sum to n term formula

$$S_n = \frac{n}{2}\left[2a + (n-1)d\right]$$

$$3250 = \frac{n}{2}\left[2(20) + (n-1)15\right]$$

$$3250 \times 2 = n\left[40 + 15n - 15\right]$$

$$6500 = n\left[25 + 15n\right]$$

$$650\cancel{0} = 25n + 15n^2$$

$$0 = 25n + 15n^2 - 6500$$

$$15n^2 + 25n - 6500 = 0$$

$\div 5$

$$3n^2 + 5n - 1300 = 0$$

$$3n^2 + 5n - 1300 = 0$$

$$3n^2 - 60n + 65n - 1300 = 0$$

$$3n(n-20) + 65(n-20) = 0$$

$$(n-20)(3n+65) = 0$$

$$n - 20 = 0 \quad (or) \quad 3n + 65 = 0$$

$$n = 20 \qquad 3n = 65$$

$$n = \frac{65}{5} = 21$$

∴ He pay the loan in 20 payments //

10m 25. The person is appointed on a basic salary of ₹ 1000 a month and gets an increment of ₹ 50 every year. He contributes 10 % of his salary to providend fund. what will be the total contribution to providend fund during this 25 yrs of services.

Sol: Given

Basic salary is ₹ 1000.

yearly Increment ₹ 50.

Period of service is 25 yrs.

Total salaries for 25 year is

$S_{25} = [(1000 \times 12) + (1050 \times 12) + (1100 \times 12) + \ldots]$

$12 [1000 + 1050 + 1100 + \ldots]$

we know the general term of A.P

$a, a+d, a+2d, a+3d, \ldots a+(n-1)d$

Here $a = 1000, n = 25, d = 50$

Sum to n- term formula

$$S_n = \frac{n}{2}[2a + (n-1)d]$$

$$S_{25} = \cancel{12}^{6}\left[\frac{25}{\cancel{2}}[2(1000) + (25-1)(50)]\right]$$

$$= 6[25[2000 + 1200]]$$

$$= 6[25(3200)]$$

$= 150 \times 3200$

$S_{25} = 4,80,000$ // Rs

A person contribute providend fund 10% on his salary.

$= 4,80,000 \times \frac{10}{100}$

$= 48000$ //

48,000Rs he provided for PF.

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26. A man prepaid the loan of ₹ 3,250 by paying ₹ 20 in 1st month and they increases the payment by 15 every month. How long when to take clear this loan.

Sol:

Given,

Amount of the loan $S_n = 3250$

1st payment $a = 20$

month increment $d = 15$

$n = ?$

formula for sum to n- terms

$$S_n = \frac{n}{2}\left[2a + (n-1)d\right]$$

$$3250 = \frac{n}{2}\left[2(20) + (n-1)15\right]$$

$$3250 \times 2 = n\left[40 + (n-1)15\right]$$

$$6500 = n\left[40 + 15n - 15\right]$$

$$6500 = 40n + 15n^2 - 15n$$

$$6500 = 15n^2 + 25n$$

$$3\cancel{15}n^2 + \overset{5}{\cancel{25}}n - 6500 = 0$$

Divided by $\cancel{5}$

$$3n^2 + 5n - 1300 = 0$$

$$3n^2 - 60n + 65n - 1300 = 0$$

$$3n(n-20) + 65(n-20) = 0$$

$$(n-20)(3n+65) = 0$$

$n - 20 = 0$ or $3n + 65 = 0$

$n = 20$ $\qquad 3n = -65$ //

$\qquad n = -\frac{65}{3}$

or

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$ax^2 + bx + c$

$3n^2 + 5n - 1300$ //.

He will repay the loan in 20.