30/6/2020
TUESDAY

Assignment

• Write the answers of the problems in Text book (page no. 35)

1. Find the sum of the first 25 terms of each of the arithmetic sequences below.

i) 11, 22, 33, · · · ·

ii) 12, 23, 34, · · · · ·

iii) 21, 32, 43, · · · ·

iv) 19, 28, 37, · · · · ·

v) 1, 6, 11, · · · · · ·

Ans) i) 11, 22, 33, · · · · ·

$x_1 = 11$

$d = 22 - 11 = \underline{11}$

$x_{25} = x_1 + 24d$

$= 11 + 24 \times 11$

$= 11 + 264$

$= \underline{275}$

$\begin{array}{r} 24 \\ 11 \\ \hline 24 \\ 24 \\ \hline 264 \end{array}$

Sum $= S_{25} = \dfrac{n}{2}\left(x_1 + x_{25}\right)$

$= \dfrac{25}{2}\left(11 + 275\right)$

$= \dfrac{25}{2}\left(\overset{143}{286}\right)$

$\begin{array}{r} \overset{2'}{143} \\ 25 \\ \hline , 715 \\ 286 \\ \hline 3575 \end{array}$

Sum of 1st 25 terms $= \underline{3575}$

ii) 12, 23, 34, · · · ·

$x_1 = 12$

$d = 23 - 12 = \underline{11}$

$x_{25} = x_1 + 24d$

$= 12 + 24 \times 11$

$= 12 + 264$

$= \underline{276}$

$S_{25} = \dfrac{25}{2}\left(12 + 276\right)$

$= \dfrac{25}{2}\left(\overset{144}{288}\right)$

$= \underline{3580}$

$\begin{array}{r} \overset{22}{144} \times \\ 25 \\ \hline 1\ 700 \\ 288 \\ \hline 3580 \end{array}$

iii) $21, 32, 43, \ldots$

$$x_1 = 21$$
$$d = 32 - 21 = \underline{11}$$

$$x_{25} = 21 + 24 \times 11$$
$$= 21 + 264$$
$$= \underline{285}$$

$$S_{25} = \frac{25}{2}\left(21 + 285\right)$$
$$= \frac{25}{2}\left(\overset{153}{306}\right)$$
$$= \underline{3825}$$

$$\begin{array}{r} 21 \\ 153 \times \\ 25 \\ \hline 765 \\ 306 \\ \hline 3825 \\ \hline \end{array}$$

iv) $19, 28, 37, \ldots\ldots$

$$x_1 = 19$$
$$d = 28 - 19 = \underline{9}$$

$$x_{25} = 19 + 24 \times 9$$
$$= 19 + 216$$
$$= \underline{235}$$

$$S_{25} = \frac{25}{2}\left[19 + 235\right]$$
$$= \frac{25}{2}\left[\overset{127}{254}\right]$$
$$= \underline{3175}$$

$$\begin{array}{r} 13 \\ 127 \times \\ 25 \\ \hline 635 \\ 254 \\ \hline 3175 \\ \hline \end{array}$$

v) $1, 6, 11, \ldots\ldots$

$$x_1 = 1$$
$$d = 6 - 1 = \underline{5}$$

$$x_{25} = 1 + 24 \times 5$$
$$= 1 + 120$$
$$= \underline{121}$$

$$S_{25} = \frac{25}{2}\left[1 + 121\right]$$
$$= \frac{25}{2}\left[\overset{61}{122}\right]$$
$$= \underline{1525}$$

$$\begin{array}{r} 2 \\ 24 \times \\ 5 \\ \hline 120 \\ \end{array}$$

$$\begin{array}{r} 3 \\ 25 \times \\ 61 \\ \hline 25 \\ 150 \\ \hline 1525 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ 19 \times \\ 4 \\ \hline 76 \\ \hline \end{array}$$

$$\begin{array}{r} 86 + \\ 76 \\ \hline 162 \\ \end{array}$$

$$\begin{array}{r} 162 \\ 86 \\ \hline 248 \\ \hline \end{array}$$

2) What is the difference between the sum of the first 20 terms and the next 20 terms of the arithmetic sequence $6, 10, 14, \ldots$?

Ans)   sequence $= 6, 10, 14, \ldots$

$$x_1 = 6$$
$$d = 10 - 6 = \underline{4}$$
$$x_{20} = x_1 + 19d$$
$$= 6 + 19 \times 4$$
$$= 6 + 76$$
$$= \underline{82}$$

$$S_{20} = \frac{n}{2}\left[x_1 + x_{20}\right]$$
$$= \frac{20}{2}\left[6 + 82\right]$$
$$= 10\left[88\right]$$
$$= \underline{880}$$

Sequence of next 20 terms

$$= 86, 90, 94, \ldots$$
$$x_1 = 86$$
$$d = 4$$
$$x_{20} = 86 + 19 \times 4$$
$$= 86 + 76$$
$$= \underline{162}$$

$$S_{20} = \frac{20}{2}\left[86 + 162\right]$$
$$= 10\left[248\right]$$
$$= \underline{2480}$$

$$\begin{array}{r} \overset{3}{19} \times \\ \underline{4} \\ 76 \end{array}$$

$$\begin{array}{r} 86 + \\ \underline{76} \\ 162 \end{array}$$

$$\begin{array}{r} \overset{1}{162} \\ \underline{86} \\ 248 \end{array}$$

V

$$\begin{array}{r} 12 \\ 9\overline{)108} \\ \underline{108} \\ \overline{0} \end{array}$$

3) calculate the difference between the sums of
   the 20 terms of the arithmetic sequences
   6, 10, 14, ... and 15, 19, 23, ... ?

Ans)   first sequence $= 6, 10, 14, \ldots \ldots$

$$x_1 = 6$$
$$d = 4$$

$$x_{20} = 6 + 19 \times 4 \qquad\qquad S_{20} = \frac{20}{2}(6 + 82)$$
$$= 6 + 76 \qquad\qquad\qquad = 10(88)$$
$$= \underline{82} \qquad\qquad\qquad\qquad = \underline{880}$$

Second sequence $= 15, 19, 23, \ldots$

$$x_1 = 15$$
$$d = 4$$

$$x_{20} = 15 + 19 \times 4 \qquad\qquad S_{20} = \frac{20}{2}(15 + 91)$$
$$= 15 + 76 \qquad\qquad\qquad = 10(106)$$
$$= \underline{91} \qquad\qquad\qquad\qquad = \underline{1060}$$

$$\therefore \text{Difference} = 1060 - 880$$
$$= \underline{180}$$

4) Find the sum of all 3-digit numbers, which are
   multiples of 9.

Ans)　Sequence of 3-digit numbers =

$$100, 101, 102, \cdots . 999$$

∴ sequence of 3-digit numbers
which are multiples of 9

$$= 108, 117, 126, \cdots . 999$$

No. of terms, $n = \dfrac{999-108}{9} + 1$

$$= \dfrac{891}{9} + 1$$

$$= 99 + 1$$

$$n = 100$$

$$\text{Sum} = \dfrac{n}{2} \left[\text{first term} + \text{last term} \right]$$

$$= \dfrac{100}{2} \left(108 + 999 \right)$$

$$= 50 \left(1107 \right)$$

$$= 55350$$

$$\begin{array}{r} 12 \\ 9\overline{)108} \\ \underline{108} \\ 0 \end{array}$$

3)

Ans)

4)