Chapter - 5. Arithmetic Progressions.

→ Each number in the list is called "Term".

Q : $a = -2$, $d = \frac{1}{2}$.

$= -2, -1\frac{1}{2}, -1, -\frac{1}{2}, 0, \frac{1}{2}$ (AP)

Q $a = -5$, $d = 2$.

$= -5, -3, -1, 1, 3, 5$. (AP)

Q. $a = -1.25$ $d = -0.25$

$= -1.25, -1.50, -1.75, -2$ (AP)

HW Do exercise 5.1 Q 1, 2.

Q $\frac{1}{3}, \frac{5}{3}, \frac{9}{3}, \frac{13}{3}$

$= a = \frac{1}{3}$, $d = \frac{5}{3} - \frac{1}{3} = \frac{4}{3}$ $[t_2 - t_2]$

Exercise 5.1.

Q1. i) let a_n be taxi fare for n km.

$a_1 = 15$, $a_2 = 15 + 8 = 23$, $a_3 = 23 + 8 = 31$.

$d = 23 - 15 = 8$.

∴ forms an AP.

ii) let the first term be x unit

$a_1 = x$

$a_2 = x - \frac{1}{4}x = \frac{3}{4}x$ ~~$= \frac{9}{15}x$ unit~~

$a_2 = \frac{3}{4}x - \frac{1}{4}\left(\frac{3}{4}x\right) = \frac{9}{16}x$ units.

$a = x, \frac{3}{4}x, \frac{9}{16}x, \frac{27}{64}x \ldots$

∴ forms an AP

iii) $a = ₹150$

$d = ₹50$

$a = 150$

$a_1 = 200$

$a_2 = 250$

$a_4 = 300$.

∴ forms an AP.

iv) $a = 10,000$

$a_2 = 10,000 + 10000 \times \frac{8}{100}$

$a_3 = 10,800 + 10,800 \times \frac{8}{100}$

$= 10,800 + 864 = 11,664.$

$a_4 = 11,664 + 11,664 \times \frac{8}{10}$

$= 11,664 + 932.12 = 12,597.12.$

∴ doesn't form an AP.

2. i) $a = 10$, $d = 10$.

$a_1 = 10$

$a_2 = 10 + 10 = 20$

$a_3 = 20 + 10 = 30$

$a_4 = 30 + 10 = 40$

AP = 10, 20, 30, 40.

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

AP = $-2, -2, -2, -2$.

iii) $a_1 = 4$, $d = -3$.

$a_2 = a_1 + d = 4 - 3 = 1$.

$a_3 = a_2 + d = 1 - 3 = -2$

$a_4 = a_3 + d = -2 - 3 = -5$.

AP = $4, 1, -2, -5$.

iv) $a_1 = -1$, $d = \frac{1}{2}$.

$a_2 = a_1 + d = \frac{-1}{1} + \frac{1}{2} = \frac{-1}{2}$.

$a_3 = a_2 + d = \frac{-1}{2} + \frac{1}{2} = 0$.

$a_4 = a_3 + d = 0 + \frac{1}{2} = \frac{1}{2}$.

∴ forms an AP.

v) $a_1 = -1.25$, $d = -0.25$.

$a_2 = a_1 + d = -1.25 - 0.25 = -1.50$.

$a_3 = a_2 + d = -1.50 - 0.25 = -1.75$

$a_4 = a_3 + d = -1.75 - 0.25 = -2$.

3. i) $a = 3$, $d = -2$.

ii) $a = -5$, $d = 4$

iii) $a = \frac{1}{3}$, $d = \frac{4}{3}$

iv)

v) $a = 0.6$, $d = 1.1$. $(1.7 - 0.6)$

⇒ General Term ⇒ $a_n = a + (n-1)d$.

4. iii) $a_2 - a_1 = -3.2 - (-1.2) = -3.2 + 1.2 = -2$

$a_3 - a_2 = -5.2 - (-3.2) = -5.2 + 3.2 = -2$.

forms an AP:

i) 2, 4, 8, 16 . . . .

$a_1 = 2$. , $a_2 = 4$, $a_3 = 8$, $a_4 = 16$

$d = a_2 - a_1 = 4 - 2 = 2$.

$a_3 - a_2 = 8 - 4 = 4$.

$a_4 - a_3 = 16 - 8 = 8$.

∴ does not forms an AP.

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

$a_1 = 2$, $a_2 = \frac{5}{2}$, $a_3 = 3$, $a_4 = \frac{7}{2}$.

$d = a_2 - a_1 = \frac{5}{2} - \frac{2}{1} = \frac{1}{2}$

$= a_3 - a_2 = \frac{3}{1} - \frac{5}{2} = \frac{1}{2}$

$a_4 - a_3 = \frac{7}{2} - \frac{3}{1} = \frac{1}{2}$

$d = \frac{1}{2}$, three more terms are :

$\frac{7}{2} + \frac{1}{2} = \frac{8}{2} = 4.$

$\frac{4}{1} + \frac{1}{2} = \frac{9}{2}$

$\frac{9}{2} + \frac{1}{2} = \frac{10}{2} = 5.$

$-10, -6, -2, 2, \ldots$

$a_1 = -10, \; a_2 = -6, \; a_3 = -2, \; a_4 = 2$

$d = a_2 - a_1 = -6 - (-10) = -6 + 10 = 4.$

$= a_3 - a_2 = -2 + 6 = 4.$

$= a_4 - a_3 = 2 + 2 = 4.$

forms an AP. with $d = 4.$, 3 more terms are -

$2 + 4 = 6.$

$6 + 4 = 10$

$10 + 4 = 14$

$3, 3+\sqrt{2}, 3+2\sqrt{2}, 3+3\sqrt{2} \ldots$

$a_1 = 3, \; a_2 = 3+\sqrt{2}, \; a_3 = 3+2\sqrt{2}, \; a_4 = 3+3\sqrt{2}$

$d = a_2 - a_1 = 3+\sqrt{2} - 3 = \sqrt{2}.$

$a_3 - a_2 = 3+2\sqrt{2} - 3+\sqrt{2} = \sqrt{2}$

$a_4 - a_3 = 3+3\sqrt{2} - 3+2\sqrt{2} = \sqrt{2}$

$d = \sqrt{2}$ and forms an AP

$3+3\sqrt{2} + \sqrt{2} = 3+4\sqrt{2}$

$3+4\sqrt{2} + \sqrt{2} = 3+5\sqrt{2}$

$3+5\sqrt{2} + \sqrt{2} = 3+6\sqrt{2}$