Date
Page

Ex - 5.2

1 ii) $a = 7$

$d = 3$

$n = 8$

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

$a_8 = 7 + (8-1)3$

$= 7 + 7 \times 3$

$= 7 + 21$

$\therefore a_8 = 28$

iii) $a = -18$

$n = 10$

$a_n = 0$

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

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

$= -18 + 9d$

$18 = 9d$

$\therefore 2 = d$

iii) $d = -3$

$n = 18$

$a_n = -5$

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

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

$\Rightarrow -5 = a + 17 \times -3$

$\Rightarrow -5 = a - 51$

$\Rightarrow -5 + 51 = a$

$\therefore$ [illegible] $= a$

46

iv) $a = -18.9$

$d = 2.5$

$a_n = 3.6$

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

$\Rightarrow 3.6 = -18.9 + (n-1)2.5$

$\Rightarrow 3.6 + 18.9 = 2.5n - 2.5$

$\Rightarrow 22.5 + 2.5 = 2.5n$

$\Rightarrow 25.0 = 2.5n$

$\Rightarrow 10 = n$

$\therefore n = 10$

Date
Page

v) $a = 3.5$

$d = 0$

$n = 105$

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

$\Rightarrow a_n = 3.5 + (105-1)0$

$= 3.5 + 0$

$\therefore a_n = 3.5$

2 ii) $10, 7, 4 \ldots$

$d = a_2 - a_1 = 7 - 10 = -3$

$d = a_3 - a_2 = 4 - 7 = -3$

$a = 10$

$d = -3$

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

$a_{30} = 10 + (30-1)-3$

$a_{30} = 10 + (29) - 3$

$a_{30} = 10 + (-87)$

$a_{30} = -77$

$\therefore$ c)

$$\begin{array}{r} 29 \\ \times 3 \\ \hline 87 \end{array}$$

ii) $-3, -\frac{1}{2}, 2 \ldots$

$d = a_2 - a_1 = -\frac{1}{2} - (-3) = -\frac{1}{2} + 3 = \frac{-1+6}{2} = \frac{5}{2}$

$d = a_3 - a_2 = 2 + \frac{1}{2} = \frac{4+1}{2} = \frac{5}{2}$

$a = -3$

$d = \frac{5}{2}$

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

$\Rightarrow a_{11} = -3 + (11-1)\frac{5}{2}$

$\Rightarrow a_{11} = -3 + 10 \times \frac{5}{2}$

$\Rightarrow a_{11} = -3 + 25$

$\Rightarrow a_{11} = 22$

$\therefore$ b)

$\therefore 2, \_\_, 26$

$a_1 + d = a_2$ ——— (I)

$a_3 - d = a_2$ ——— (II)

$a_1 + a_3 = 2a_2$

$\Rightarrow 2+26 = 2a_2$

$\Rightarrow 28 = 2a_2$

$\Rightarrow 14 = a_2$

$\therefore 2, \boxed{14}, 26$

ii) $\_\_, 13, \_\_, 3$

$a_2 = a_1 + d$ ——— (i)

$a_4 = a_1 + 3d$ ——— (ii)

(i) − (ii)

$a_2 - a_4 = -2d$

$\Rightarrow 13 - 3 = -2d$

$\Rightarrow 10 = -2d$

$\Rightarrow -5 = d$

$a_1 = a_2 - d$

$= 13 - (-5)$

$= 18$

$a_3 = a_3 - d$

$= 3 - (-5)$

$= 8$

$\therefore \boxed{18}, 13, \boxed{8}, 3$

Date
Page

iii) $5, -, -, 9\frac{1}{2}$

$a_2 = a_1 + d$

$a_4 = a_3 + d$

$a_3 = a_1 + 2d$ ——— (I)

$a_3 = a_4 - d$ ——— (II)

(I) + (II)

$2a_3 = a_1 + a_4 + d$

$2a_3 = 5 + \frac{19}{2} + d$

$= \frac{29}{2} + d$

$a_4 = a_1 + (4-1)d$

$a_4 = a_1 + 3d$

$\Rightarrow 9\frac{1}{2} = 5 + 3d$

$\Rightarrow \frac{19}{2} - 5 = 3d$

$\Rightarrow \frac{9}{2} = 3d$

$\Rightarrow \frac{3}{2} = d$

$a_2 = a_1 + (2-1)d$

$= a_1 + d$

$= 5 + \frac{3}{2}$

$= \frac{13}{2}$ ~~$= 6\frac{1}{2}$~~

$a_3 = a_1 + (3-1)d$

$= 5 + 2 \times \frac{3}{2}$

$= 8$

∴ Series : $5, \boxed{6\frac{1}{2}}, \boxed{8}, a_{\frac{1}{2}}$

iii) $-4, \_\_, \_\_, \_\_, \ldots, 6$

$a_1 = -4$

$a_6 = a_1 + (6-1)d$

$\Rightarrow 6 = -4 + 5d$

$\Rightarrow 10 = 5d$

$\Rightarrow 2 = d$

$a_2 = a_1 + d$

$= -4 + 2 = -2$

$a_3 = a_1 + (3-1)d$

$= -4 + 2 \times 2 = 0$

$a_4 = a_1 + (4-1)d$

$= -4 + 3 \times 2$

$= -4 + 6$

$= 2$

$a_5 = a_1 + (5-1)d$

$= -4 + 4 \times 2$

$= -4 + 8$

$= 4$

iv) $-4, \boxed{-2}, \boxed{0}, \boxed{2}, \boxed{4}, 6$

v) $\_\_\_, 38, \_\_\_, \_\_\_, \_\_\_, -22$

$a_2 = a_1 + d$

$38 = a_1 + d$ ——— (1)

$a_6 = a_1 + 5d$

$-22 = a_1 + 5d$ ——— (11)

-22

Subtracting (11) from (1), we get

$38 = a_1 + d$

$\ominus \quad -22 = a_1 + 5d$

$60 = -4d$

$\Rightarrow \frac{60}{4} = -d$

$\Rightarrow (-15) = d$

Substitute replacing d with -15 in eq^n (1),

$a_2 = a_1 + d$

$\Rightarrow 38 = a_1 - 15$

$\Rightarrow 53 = a_1$

$\Rightarrow a_3 = a_1 + 2d$

$= 53 + 2 \times (-15)$

$= 53 - 30$

$= 23$

$\Rightarrow a_4 = a_1 + 3d$

$= 53 + 3 \times (-15)$

$= 53 - 45$

$= 8$

$\Rightarrow a_5 = a_1 + 4d$

$= 53 + 4 \times (-15)$

$= 53 - 60$

$= -7$

$\therefore$ 53, 38, 23, 8, -7, -22

4. AP : 3, 8, 13, 18 .... 78.

$a_1 = 3$

$d = a_2 - a_1$

$= 8 - 3$

$= 5$

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

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

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

$\Rightarrow 80 = 5n$

$\Rightarrow 16 = n$

$\therefore$ 16^{th} term $= 78$

5. i) 7, 13, 19 205

$a_1 = a = 7$

$d = a_2 - a_1$

$= 13 - 7 = 6$

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

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

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

$\Rightarrow 205 = 1 + 6n$

$\Rightarrow 204 = 6n$

$\Rightarrow 34 = n$

$\therefore$ 34^{th} term $= 205$

ii) $18, 15\frac{1}{2}, 13 \ldots -47$

$a_1 = a = 18$

$d = a_2 - a_1$

$= 15\frac{1}{2} - 18$

$= \frac{31 - 36}{2}, \frac{-5}{2}$

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

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

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

$\Rightarrow \frac{-65 \times 2}{5} = n - 1$

$\Rightarrow 26 = n - 1 \quad \Rightarrow 27 = n$

$\therefore$ 27^{th} term $= -47$