Ex 5.3

1. (i) 2, 7, 12, ... to 10th term

$a = 2 \quad d = 5$

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

$S_{10} = \frac{10}{2}\{4 + 9 \times 5\}$

$S_{10} = 5\{4 + 45\}$

$S_{10} = 5 \times 49$

$S_{10} = 245$

(ii) $-37, -33, -29 \ldots$ to 12 terms

$a = -37 \quad d = 4$

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

$S_{12} = \frac{12}{2}\{-74 + 44\}$

$= 6\{-30\}$

$= 6 \times -30$

$= -180$

(iii) 0.6, 1.7, 2.8 .... to 100 terms

$a = 0.6 \quad d = 1.1$

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

$S_{100} = \frac{100}{2}\{1.2 + 108.9\}$

$S_{100} = 50\{110.1\}$

$S_{100} = 5505$

(iv) $\frac{1}{15}, \frac{1}{12}, \frac{1}{10} \ldots$ to 11 terms

$a = \frac{1}{15} \quad d = \frac{1}{60}$

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

$S_{11} = \frac{11}{2}\{\frac{2}{15} + 10 \times \frac{1}{60}\}$

$S_{11} = \frac{11}{2}\{\frac{4+1}{30} = \frac{49}{30}\}$

$S_{11} = \frac{11}{2} \times \frac{9}{30} = \frac{99}{60} = \frac{33}{20}$

2. (i) $7, \frac{20}{2}, 14 + \ldots 84$

$a = 7 \quad d = 7/2$

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

$= \frac{84}{2}\{14 +$

2. (i) $7, \frac{20}{2}, 14 \ldots 84$

$a = 7 \quad d = 7/2$

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

$84 = 7 + (n-1)\frac{7}{2}$

$77 = (n-1)\frac{7}{2}$

$(n-1) = 11 \times 2$

$n - 1 = 22$

$n = 23$

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

$= \frac{23}{2}\{14 + 22 \times \frac{7}{2}\}$

$= \frac{23}{2}\{14 + 77\}$

$= \frac{23}{2} \times 91$

$= \frac{2093}{2}$

(ii) $34+32+30 \ldots +10$

$a = 34 \quad d = -2$

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

$10 = 34+(n-1)-2$

$-24 = (n-1)-2$

$12 = n-1$

$n = 13$

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

$= \frac{13}{2}\{68+12\times-2\}$

$= \frac{13}{2}\{68-24\}$

$= \frac{13}{2}\{44\}^{22}$

$= 286$

(iii) $(-5), (-8), (-11) \ldots (-230)$

$a = -5 \quad d = -3$

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

$-230 = -5+(n-1)-3$

$\frac{-225}{-3} = n-1$

$75 = n-1$

$n = 76$

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

$= \frac{76}{2}\{-10+(75)\times-3\}$

$= 38\{-10-225\}$

$= 38\times-230$

$= -8930$

3. (i) $a = 5 \quad d = 3$

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

$50 = 5+(n-1)3$

$15 = n-1$

$n = 16$

$S_4 = \frac{4}{2}\{2a+(n-1)d\}$

$= 8\{10+15\times3\}$

$= 8\times55$

$= 440$

(ii) $a = 7 \quad a_{13} = 35$

$a_{13} = a+(n-1)d$

$a_{13} = 7+12\times d$

$35 = 7+12d$

$28 = 12d$

$d = \frac{28}{12} = \frac{7}{3}$

$S_{13} = \frac{n}{2}\{2a+(n-1)d\}$

$= \frac{13}{2}\{14+12\times\frac{7}{3}\}$

$= \frac{13}{2}\{14+28\}$

$= \frac{13}{2}\{42\}$

$= 273$

(iii) $a_{12} = 37$ $d = 3$

$a = 4$ $d = 3$

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

$37 = a + 33$

$4 = a$

$S_{12} = \frac{12}{2}\{8 + 11 \times 3\}$

$= 6\{8 + 33\}$

$= 246$

(iv) $a_3 = 15$ $S_{10} = 125$

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

$15 = a + 2d$

$S_{10} = \frac{10}{2}\{2a + 9d\}$

$125 = 5\{2a + 9d\}$

$125 = 10a + 45d$

$25 = 2a + 9d$

$2a + 4d = 30$

$2a + 9d = 25$

$-5d = +5$

$d = -1$

$a + 2d = 15$

$a + 2 = 15$

$a = 13$

$S_{10} = \frac{10}{2}\{34 + 9 \times -1\}$

$= 5\{34 - 9\}$

$= 5 \times 25$

$= 125$

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

$= 17 + 9 \times -1$

$= 17 - 9$

$= 8$

(v) $d = 5$ $S_9 = 75$

$S_9 = \frac{9}{2}\{2a + (n-1)d\}$

$75 = \frac{9}{2}\{2a + 40\}$

$150 = 18a + 360$

$-210 = 18a$

$\frac{-210}{18} = a$

$a = \frac{-70}{6} = -\frac{35}{3}$

$a_9 = a + (n-1)d$

$= \frac{-35}{3} + \frac{40}{1}$

$= \frac{-35 + 120}{3}$

$= \frac{85}{3}$

(vi) $a = 2 \quad d = 8$

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

$= 2 + (n-1)8$

$= 8n - 6$

$=$

$n = 5,$?

$\Rightarrow 8n - 6$

$\Rightarrow 8(5) - 6$

$\Rightarrow 40 - 6$

$\Rightarrow 34$

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

$90 = \frac{n}{2}\{4 + (n-1)8\}$

$= \frac{n}{2}\{8n - 4\}$

$180 = 8n^2 - 4n$

$8n^2 - 4n - 180 = 0$

$2n^2 - n - 45 = 0$

$2n^2 - 10n + 9n - 45$

$2n(n-5) + 9(n-5)$

$n = 5$

360
330
10

$$S_n = \frac{n}{2}\{a+l\}$$

8 (viii) $a = 8 \quad a_n = 62 \quad S_n = 210$

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

$62 = 8 + (n-1)d$

$54 = (n-1)d$

$a + (n-1)d = 62$

$8 + 5d = 62$

$5d = 54$

$d = 54/5$

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

$210 = \frac{n}{2}\{16 + (n-1)d\}$

$420 = n\{16 + 54\}$

$420 = n \times 70$

$6 = n$

(viii) $a_n = 4 \quad d = 2 \quad S_n = -4$

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

$4 = a + (n-1)2$

$4 = a + 2n - 2$

$6 = a + 2n$

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

$-14 = \frac{n}{2}\{2a + (n-1)2\}$

$-28 = n\{2a + (n-1)2\}$

(ix) $a = 3 \quad n = 8 \quad S = 192$

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

$a_n = 3 + 7d$

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

$S_8 = \frac{8}{2}\{6 + 7d\}$

$192 = 4\{6 + 7d\}$

$192 = 24 + 28d$

$168 = 28d$

$6 = d$

(x)

(x) $S_9 = \frac{n}{2}\{a+28\}$

$144 = \frac{9}{2}\{a+28\}$

$288 = 9a + 252$

$36 = 9a$

$4 = a$