3 (vii) $a = 8, a_n = 62, S_n = 210$

$n = ?, d = ?$

$S_n = 210$

$\frac{n}{2}[a + a_n] = 210$

$\frac{n}{2}[8 + 62] = 210$

$\frac{n}{2} \times 70 = 210$ (6)

$\Rightarrow n = 6$

$a_n = 62$

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

$8 + (6-1)d = 62$

$8 + 5d = 62$

$\Rightarrow 5d = 62 - 8$

$\Rightarrow d = \frac{54}{5}$

3 (viii) $a_n = 4, d = 2, S_n = -14$

$n = ?, a = ?$

$a_n = 4$

$\Rightarrow a + (n-1)d = 4 \quad \cdots (1)$

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

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

$\Rightarrow a = 4 - 2n + 2$

$a = 6 - 2n \quad \cdots (1)$

$S_n = -14$

$\frac{n}{2}[a + a_n] = -14$

$n[6 - 2n + 4] = -28$

$\Rightarrow n(10 - 2n) = -28$

$\Rightarrow 2n^2 - 10n - 28 = 0$

$(\div 2) \quad n^2 - 5n - 14 = 0$

$\Rightarrow n^2 - 7n + 2n - 14 = 0$

$\Rightarrow n(n-7) + 2(n-7) = 0$

$\Rightarrow (n-7)(n+2) = 0$

$\Rightarrow n - 7 = 0, n + 2 = 0$

$\Rightarrow n = 7, \quad n = -2$ rejected

Sub (1)

$a = 6 - 2 \times 7$

$= 6 - 14$

$= -8$

$\therefore a = -8, n = 7$

(ix) $a = 3, n = 8, S_n = 192$

$S_n = 192$

$\frac{n}{2}[2a + (n-1)d] = 192$

$4[2 \times 3 + 7d] = 192$

$4[6 + 7d] = 192$

$\Rightarrow 7d + 6 = \frac{192}{4}$ (48)

$\Rightarrow 7d = 42$

$\Rightarrow d = \frac{42}{7}$ (6)

$\Rightarrow d = 6$