

⑦ $d = 7, a_{22} = 149$

$$a_{22} = 149$$

$$a + 21d = 149$$

$$a + 21 \times 7 = 149$$

$$\Rightarrow a = 149 - 147$$

$$\Rightarrow a = 2$$

$$S_{22} = \frac{22}{2} [2 \times 2 + 21 \times 7]$$

$$= 11 (4 + 147)$$

$$= 11 \times 151$$

$$= 1661$$

⑧ $a_2 = 14, a_3 = 18$

$$a_3 - a_2 = 18 - 14$$

$$\Rightarrow \cancel{a} + 2d - \cancel{a} - d = 4$$

$$\Rightarrow d = 4$$

$$a_2 = 14$$

$$a + d = 14$$

$$a + 4 = 14$$

$$\Rightarrow a = 10$$

$$S_{51} = \frac{51}{2} [2 \times 10 + 50 \times 4]$$

$$= \frac{51}{2} (20 + 200)$$

$$= \frac{51}{2} \times 220$$

$$= 5610$$

⑨ $S_7 = 49, S_{17} = 289, S_n = ?$

$$S_7 = 49$$

$$\frac{7}{2} [2a + 6d] = 49$$

$$\Rightarrow \frac{7}{2} \times 2 (a + 3d) = 49$$

$$\Rightarrow a + 3d = 7 \dots \textcircled{i}$$

$$S_{17} = 289$$

$$\frac{17}{2} [2a + 16d] = 289$$

$$\Rightarrow \frac{17}{2} (a + 8d) = 17$$

$$\Rightarrow a + 8d = 17 \dots \textcircled{ii}$$

$$\textcircled{ii} - \textcircled{i}$$

$$a + 8d = 17$$

$$a + 3d = 7$$

$$5d = 10$$

$$\Rightarrow d = 2$$

$$\text{Sub. in } \textcircled{i}$$

$$a + 6 = 7$$

$$\Rightarrow a = 1$$

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

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

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

$$= n^2$$