

### Exercise 5.2

13) Here,  $a = 105$ ,  $d = 112 - 105 = 7$ ,  
 $t_n = 994$ .  
 $\therefore t_n = a + (n-1)d$   
 $\Rightarrow 994 = 105 + (n-1) \times 7$   
 $\Rightarrow 889 = (n-1) \times 7 \Rightarrow 127 = n-1$   
 $\Rightarrow n = 128$ .

14) Here,  $a = 12$ ,  $d = 16 - 12 = 4$   
 $a_n = 248$ .  
 $a_n = a + (n-1)d$   
 $\Rightarrow 248 = 12 + (n-1) \times 4$   
 $\Rightarrow 248 - 12 = (n-1) \times 4$   
 $\Rightarrow 236 = (n-1) \times 4$   
 $\Rightarrow 59 = n-1$   
 $\Rightarrow n = 59 + 1 = 60$ .

15) The given APs are :-

- 63, 65, 67, ... .. (i)
- and 3, 10, 17, ... .. (ii)

From AP (i), we have :

The 1st term,  $a = 63$   
 $d = 2$ .

$$\therefore t_n = 63 + (n-1) \times 2 = 2n + 61$$

$$\therefore t_n = 3 + (n-1) \times 7 = 7n - 4$$

At 19/  
 $7n - 4 = 2n + 61$

$$\Rightarrow 5n = 65 \Rightarrow n = 13$$

$$16) a_3 = 16$$

$$\Rightarrow a + (3-1)d = 16$$

$$\Rightarrow a + 2d = 16$$

$$\Rightarrow \text{and } a_7 - a_5 = 12$$

$$\Rightarrow [a + (7-1)d] - [a + (5-1)d] = 12$$

$$\Rightarrow a + 6d - a - 4d = 12$$

$$\Rightarrow 2d = 12$$

$$\Rightarrow d = 6.$$

$$\text{since } a + 2d = 16$$

$$\Rightarrow a + 2(6) = 16$$

$$\Rightarrow a + 12 = 16$$

$$\Rightarrow a = 16 - 12 = 4.$$

$$a_1 = a = 4.$$

$$a_2 = a_1 + d = a + d = 4 + 6 = 10.$$

$$a_3 = a_2 + d = 10 + 6 = 16$$

$$a_4 = a_3 + d = 16 + 6 = 22.$$

$$17) a = 253$$

$$d = 248 - 253 = -5.$$

$$\therefore t_{20} = a + (n-1)d = 253 + (20-1)(-5)$$

$$= 253 + 19 \times (-5) = 158.$$

Hence, the 20th term from the last term is 158.