

13. Three digit numbers which are divisible by 7 are 105, 112, 119, ..., 994.

$$a = 105, d = 7, a_n = 994$$

$$a + (n-1)d = 994$$

$$105 + (n-1)7 = 994$$

$$7(n-1) = 994 - 105 = 889$$

$$n-1 = \frac{889}{7} = 127$$

$$n = 127 + 1 = \underline{128}$$

14 Multiples are 12, 16, 20, 24, ..., 248

$$a = 12, d = 4, a_n = 248$$

$$248 = 12 + (n-1)4$$

$$248 - 12 = (n-1)4$$

$$\frac{236}{4} = (n-1)$$

$$4$$

$$59 = n - 1$$

$$n = 59 + 1 = \underline{60}$$

15 First AP - 63, 65, 67

$$a = 63, d = 2$$

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

$$= 63 + (n-1)2$$

$$= 63 + 2n - 2 = \underline{61 + 2n}$$

Second AP - 3, 10, 17

$$a = 3, d = 7$$

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

$$= 3 + (n-1)7$$

$$= 3 + 7n - 7 = 7n - 4$$

Now,  $a_n$  of first AP =  $a_n$  of second AP.

$$= 61 + 2n = 7n - 4$$

$$61 + 4 = 7n - 2n$$

$$65 = 5n$$

$$n = 65 / 5 = \underline{13}$$

16  $a_3 = 16$

$$a + 2d = 16$$

$$a_7 - a_5 = 12$$

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

$$2d = 12$$

$$\therefore d = 12 / 2 = 6$$

$$a + 2d = 16$$

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

$$\therefore a = 16 - 12 = 4$$

The required AP is 4, 4+6, 10+6, 16+6,  
= 4, 10, 16, 22, ...

$$17. \quad a = 3, \quad d = -5$$

First term from the last = 253 and  $d = -5$

$$a_{20} = a + 19d$$

$$a_{20} = 253 + 19(-5)$$

$$a_{20} = 253 - 95 = \underline{\underline{158}}$$

$$18. \quad a_4 + a_8 = 24 \quad \text{and} \quad a_6 + a_{10} = 44$$

$$a + 3d + a + 7d = 24 \quad \text{and} \quad a + 5d + a + 9d = 44$$

$$2a + 10d = 24 \quad \text{and} \quad 2a + 14d = 44$$

$$2a + 14d - 2a - 10d = 44 - 24$$

$$4d = 20$$

$$\therefore d = 20/4 = \underline{\underline{5}}$$

$$\text{Now, } 2a + 10d = 24$$

$$2a + 10(5) = 24$$

$$a = \frac{-26}{2} = -13$$

$\therefore$  The first three terms are -13, -8, -3.

$$19. \quad a = ₹5000, \quad d = ₹200, \quad a_n = ₹7000$$

$$a + (n-1)d = 7000$$

$$5000 + (n-1)200 = 7000$$

$$(n-1)200 = 2000$$

$$n-1 = \frac{2000}{200} = 10$$

$$n = 10 + 1 = \underline{\underline{11}}$$

$$\therefore 1995 + 11 = \underline{\underline{2006}}$$

$$20. \quad a = ₹5, \quad d = ₹1.75, \quad a_n = ₹20.75$$

$$a + (n-1)d = 20.75$$

$$5 + (n-1)1.75 = 20.75$$

$$(n-1)1.75 = 20.75 - 5 = 15.75$$

$$(n-1) = \frac{15.75}{1.75} = 9$$

$$\therefore n = 9 + 1 = \underline{10}$$