Exercise 9B

Question 9:

Let f_1 and f_2 be the frequencies of class intervals 0 - 10 and 40 - 50

$f_1 + 5 + 9 + 12 + f_2 + 3 + 2 = 40$
$\Rightarrow f_1 + f_2 = 9$

Median is 32.5 which lies in 30 - 40, so the median class is 30 - 40

$l = 30, h = 10, f = 12, N = 40$ and $c = f_1 + 5 + 9 = (f_1 + 14)$

Now, median $= l + \left[h \times \dfrac{\left(\dfrac{N}{2} - c\right)}{f} \right]$

$\Rightarrow \quad 32.5 = \left[30 + \left(10 \times \dfrac{20 - f_1 - 14}{12} \right) \right]$

$\Rightarrow \qquad\qquad = \left[30 + \left(10 \times \dfrac{6 - f_1}{12} \right) \right]$

$\Rightarrow \qquad\qquad = \left[30 + \left(\dfrac{30 - 5f_1}{6} \right) \right]$

$\dfrac{30 - 5f_1}{6} = 2.5$

$30 - 5f_1 = 15$

$5f_1 = 15 \Rightarrow f_1 = 3$

$f_1 = 3$ and $f_2 = (9 - 3) = 6$

Question 10: The given series is of inclusive form. Converting it into exclusive form and preparing the cumulative frequency table, we get

Class	Frequency f_i	C.F
18.5 - 25.5	35	35
25.5 - 32.5	96	131
32.5 - 39.5	68	199
39.5 - 46.5	102	301
46.5 - 53.5	35	336
53.5 - 60.5	4	340
	$\sum f_i = N = 340$	

$N = 340 \Rightarrow \dfrac{N}{2} = 170$

The cumulative frequency just greater than 170 is 199 and the corresponding class is 32.5 - 39.5.

∴ Median class is 32.5 - 39.5

∴ l = 32.5, h = 7, f = 68, c = C.F. of preceding median class = 131

$$\text{Median } m_e = l + \left[h \times \frac{\left(\frac{N}{2} - c \right)}{f} \right] = 32.5 + \left[7 \times \frac{(170 - 131)}{68} \right]$$

$$= 32.5 + 4 = 36.5$$

Hence median is 36.5 years

********** END *********