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Ex 15.1 Class 11 Maths Question 8.

x_i	15	21	27	30	35
f_i	3	5	6	7	8

Solution:

x_i	f_i	c.f.	$ x_i - 30 $	$f_i x_i - 30 $
15	3	3	15	45
21	5	8	9	45
27	6	14	3	18
30	7	21	0	0
35	8	29	5	40
	29			148

$$\text{Here, } \frac{N}{2} = \frac{29}{2} = 14.5$$

The c.f. just greater than 14.5 is 21 and the corresponding value of x is 30.

$$\therefore \text{Median } (M) = 30$$

$$\begin{aligned} \text{M.D. about median} &= \frac{1}{N} \sum_{i=1}^n f_i |x_i - M| \\ &= \frac{1}{29} \times 148 = 5.1 \end{aligned}$$

Find the mean deviation about the mean for the data in Exercises 9 and 10.

Ex 15.1 Class 11 Maths Question 9.

Income per day	Number of persons
0 – 100	4
100 – 200	8
200 – 300	9
300 – 400	10
400 – 500	7
500 – 600	5
600 – 700	4
700 – 800	3

Solution:

Income per day	Mid values x_i	f_i	$f_i x_i$	$ x_i - 358 $	$f_i x_i - 358 $
0 – 100	50	4	200	308	1232
100 – 200	150	8	1200	208	1664
200 – 300	250	9	2250	108	972
300 – 400	350	10	3500	8	80
400 – 500	450	7	3150	92	644
500 – 600	550	5	2750	192	960
600 – 700	650	4	2600	292	1168
700 – 800	750	3	2250	392	1176
		50	17900		7896

$$\text{Mean } (\bar{x}) = \frac{1}{N} \sum_{i=1}^n f_i x_i = \frac{1}{50} \times 17900 = 358$$

Mean deviation about mean

$$= \frac{1}{N} \sum_{i=1}^n f_i |x_i - \bar{x}| = \frac{1}{50} \times 7896 = 157.92$$