

$$= 40.5 + 9.41 = 49.91.$$

$$Q_3 = 120.5 + \frac{\frac{3 \times 2010}{4} - 1246}{334} \times 40$$

$$= 120.5 + 31.32 = 151.82.$$

Therefore,

$$\begin{aligned} \text{Quartile Deviation} &= \frac{1}{2}(Q_3 - Q_1) \\ &= \frac{151.82 - 49.91}{2} = 50.96(\text{acre}) \end{aligned}$$

Question: (Do yourself)

Calculate quartile deviation for the following data:

Weights (kg):	40-45	45-50	50-55	55-60	60-65	65-70
No. of men:	10	22	28	20	10	8

Ans) Quartile Deviation = 5.18 kg

Question: (Do yourself)

Calculate quartile deviation for the following data:

Class interval:	10-15	15-20	20-25	25-30	30-40	40-50	50-60	60-70
Frequency:	4	12	16	22	10	8	6	4

Ans) Quartile Deviation = 8.05.

Absolute Mean Deviation (or Mean Deviation):

- a) Case of Simple Samples:** Let $x_1, x_2, x_3, \dots, x_n$ be a set of n simple sample values and let A be any other value, not being necessarily equal to any of the observed values. Then $|x_1 - A|$, $|x_2 - A|, \dots, |x_n - A|$ are respectively known as the deviations of $x_1, x_2, x_3, \dots, x_n$ about A and the Absolute Mean Deviation about A or generally known as Mean Deviation about A is defined as,

$$\text{Mean Deviation about } A = \frac{\sum_{i=1}^n |x_i - A|}{n}, \quad i = 1, 2, 3, \dots, n$$

From the table, mean $(\bar{x}) = \frac{\sum xf}{\sum f} = \frac{112}{27} = 4.15$

Also, mode = variate value with maximum frequency = 4

Thus, the Mean Deviation from the mean = $\frac{\sum |x-4.15| \times f}{\sum f} = \frac{32.75}{27} = 1.21$

and the Mean Deviation from the mode = $\frac{\sum |x-4| \times f}{\sum f} = \frac{32}{27} = 1.19$

Question:

Calculate the mean deviation about mean of the following distribution:

Class:	0-10	10-20	20-30	30-40	40-50
Frequency:	5	8	15	16	6

Ans) To find the mean, we construct the following table:

Class interval	Class Mark (x)	Frequency (f)	$y = \frac{x - 25}{10}$	$y \times f$	$ x - 27 $	$ x - 27 \times f$
0-10	5	5	-2	-10	22	110
10-20	15	8	-1	-8	12	96
20-30	25	15	0	0	2	30
30-40	35	16	1	16	8	128
40-50	45	6	2	12	18	108
Total		50		10		472

$$\bar{y} = \frac{\sum yf}{\sum f} = \frac{10}{50} = 0.20$$

Therefore, $\bar{x} = c + d \cdot \bar{y} = 25 + 10 \times 0.20 = 27$

$$\begin{aligned} \text{The Mean Deviation from the mean} &= \frac{\sum |x - \bar{x}| \times f}{\sum f} \\ &= \frac{472}{50} = 9.44 \end{aligned}$$

Question:

Calculate the mean deviation about median of the following distribution:

Class:	0-10	10-20	20-30	30-40	40-50
Frequency:	5	7	4	3	2

Question: (Do yourself)

Find mean and standard deviation of the following data.

Class interval:	0-9	10-19	20-29	30-39	40-49	50-59
Frequency:	15	20	25	24	12	34

Ans) Mean = $\bar{x} = 32.19$

Standard Deviation $S_x = 1.71$

Question: (Do yourself)

Find the standard deviation of the following data.

Class interval:	120-124	125-129	130-134	135-139	140-144	145-149
Frequency:	12	25	28	15	12	8

Ans) Standard Deviation = 7.18

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