



Exercise 14.1

5. In a retail market, fruit vendors were selling mangoes kept in packing boxes. These boxes contained varying number mangoes. The following was the distribution of mangoes according to the number of boxes.

Number of mangoes	50 - 52	53 - 55	56 - 58	59 - 61	62 - 64
Number of boxes	12	14	8	6	10

Find the mean number of mangoes kept in a packing box. Which method of finding the mean did you choose?

Ans. Since value of number of mangoes and number of boxes are large numerically. So we use step-deviation method.

No. of mangoes	No. of boxes (f_i)	Class Marks (x_i)	$u_i = \frac{x_i - a}{h}$	$f_i u_i$
50 - 52	15	51	- 2	- 30
53 - 55	110	54	- 1	- 110
56 - 58	135	57	0	0
59 - 61	115	60	1	115
62 - 64	25	63	2	50
	$\sum f_i = 400$			$\sum f_i u_i = 25$

From given data, Assume mean (a) = 57, Width of the class (h) = 3

$$\therefore \bar{u} = \frac{\sum f_i u_i}{\sum f_i} = \frac{25}{400} = 0.0625 \text{ (approx.)}$$

Using formula, Mean $(\bar{x}) = a + h\bar{u} = 57 + 3 (0.0625)$
 $= 57 + 0.1875 = 57.1875 = 57.19$ (approx.)

Hence mean number of mangoes kept in a packing box is 57.19.

6. The table below shows the daily expenditure on food of 25 households in a locality:

Daily expenditure (in Rs.)	100 - 150	150 - 200	200 - 250	250 - 300	300 - 350
Number of households	4	5	12	2	2

Find the mean daily expenditure on food by a suitable method.

Ans.

Daily expenditure	No. of households (f_i)	Class Marks (x_i)	$u_i = \frac{x_i - a}{h}$	$f_i u_i$
100 - 150	4	125	-2	-8
150 - 200	5	175	-1	-5
200 - 250	12	225	0	0
250 - 300	2	275	1	2
300 - 350	2	325	2	4
	$\sum f_i = 25$			$\sum f_i u_i = -7$

From given data, Assume mean $(a) = 225$, Width of the class $(h) = 50$

$$\therefore \bar{u} = \frac{\sum f_i u_i}{\sum f_i} = \frac{-7}{25} = -0.28$$

Using formula, Mean $(\bar{x}) = a + h\bar{u} = 225 + 50 (-0.28) = 225 - 14 = 211$

Hence mean daily expenditure on food is Rs. 211.

7. To find out the concentration of SO^2 in the air (in parts per million, i.e., ppm), the data was collected for 30 localities in a certain city and is presented below:

Concentration of SO^2 (in ppm)	0.00 - 0.04	0.04 - 0.08	0.08 - 0.12	0.12 - 0.16	0.16 - 0.20	0.20 - 0.24
Frequency	4	9	9	2	4	2

Find the mean concentration of SO^2 in the air.

Ans.

Concentration of SO^2 (in ppm)	Frequency (f_i)	Class Marks (x_i)	$u_i = \frac{x_i - a}{h}$	$f_i u_i$
0.00 - 0.04	4	0.02	-2	-8
0.04 - 0.08	9	0.06	-1	-9
0.08 - 0.12	9	0.10	0	0
0.12 - 0.16	2	0.14	1	2
0.16 - 0.20	4	0.18	2	8
0.20 - 0.24	2	0.20	3	6
	$\sum f_i = 30$			$\sum f_i u_i = -1$

From given data, Assume mean (a) = 0.10, Width of the class (h) = 0.04

$$\therefore \bar{u} = \frac{\sum f_i u_i}{\sum f_i} = \frac{-1}{30} = -0.033 \text{ (approx.)}$$

Using formula, Mean $(\bar{x}) = a + h\bar{u} = 0.10 + 0.04 (-0.033) = 0.10 - 0.0013 = 0.0987$ (approx.)

Hence mean concentration of SO^2 in air is 0.0987 ppm.

8. A class teacher has the following absentee record of 40 students of a class for the whole term. Find the mean number of days a student was absent.

Number of days	0-6	6-10	10-14	14-20	20-28	28-38	38-40
Number of students	11	10	7	4	4	3	1

Ans.

Number of days	No. of students (f_i)	Class Marks (x_i)	$d_i = x_i - a$	$f_i d_i$
0-6	11	3	-14	-154
6-10	10	8	-9	-90
10-14	7	12	-5	-35
14-20	4	17	0	0
20-28	4	24	7	28
28-38	3	33	16	48
38-40	1	39	22	22
	$\sum f_i = 40$			$\sum f_i d_i = -181$

From given data, Assume mean (a) = 17

$$\therefore (\bar{x}) = a + \frac{\sum f_i d_i}{\sum f_i} = 17 + \frac{(-181)}{40} = 17 - 4.52 = 12.48$$

Hence mean 12.48 number of days a student was absent.

9. The following table gives the literacy rate (in percentage) of 35 cities. Find the mean literacy rate.

Literacy rate (in percentage)	45 - 55	55 - 65	65 - 75	75 - 85	85 - 95
Number of cities	3	10	11	8	3

Ans.

Literacy rate (in %)	No. of cities (f_i)	Class Marks (x_i)	$u_i = \frac{x_i - a}{h}$	$f_i u_i$
45 - 55	3	50	- 2	- 6
55 - 65	10	60	- 1	- 10
65 - 75	11	70	0	0
75 - 85	8	80	1	8
85 - 95	3	90	2	6
	$\sum f_i = 35$			$\sum f_i u_i = -2$

From given data, Assume mean (a) = 70, Width of the class (h) = 10

$$\therefore \bar{u} = \frac{\sum f_i u_i}{\sum f_i} = \frac{-2}{35} = -0.057$$

Using formula, Mean (\bar{x}) = $a + h\bar{u} = 70 + 10(-0.057) = 70 - 0.57 = 69.43$

Hence mean literacy rate is 69.43%.

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