

chapter-23 Data Handling-II

Exercise-23.1

Solution-01:-

Ashish studies on three consecutive days are
4 hours, 5 hours, 3 hours.

$$\begin{aligned}\text{he study daily on average} &= \frac{4\text{ hours} + 5\text{ hours} + 3\text{ hours}}{3} \\ &= \frac{12\text{ hours}}{3} \quad \left[\text{Mean} = \frac{\text{Sum of the observations}}{\text{No. of observations}} \right] \\ &= 4\text{ hours.}\end{aligned}$$

∴ Ashish studies 4 hours daily on an average.

Solution-02:-

We have,

$$\begin{aligned}\text{mean runs scored} &= \frac{58 + 76 + 40 + 35 + 48 + 45 + 0 + 100}{8} \\ &= 50.25\text{ Runs.}\end{aligned}$$

Thus, the mean runs scored in an innings is 50.25 Runs

Solution-04:-

We have,

$$\begin{aligned}\text{mean enrollment} &= \frac{1555 + 1670 + 1750 + 2019 + 2540 + 2820}{6} \\ &= 2059.\end{aligned}$$

Thus, mean enrollment of the school for this period is 2059.

Solution-05:-

$$\begin{aligned}\text{(i) Range of Rainfall} &= 20.5 - 0 \\ &= 20.5.\end{aligned}$$

$$\begin{aligned}\text{(ii) mean Rainfall} &= \frac{0 + 12.2 + 2.1 + 0 + 20.5 + 5.3 + 1.0}{7} \\ &= 5.87\text{ mm.}\end{aligned}$$

(iii) 5 days was the rainfall less than mean rainfall

Solution-06:-

The heights of 5 persons are 140cm, 150cm, 152cm, 158cm and 161cm.

$$\begin{aligned}\text{mean height} &= \frac{140\text{cm} + 150\text{cm} + 152\text{cm} + 158\text{cm} + 161\text{cm}}{5} \\ &= 152.2\text{cm}.\end{aligned}$$

Solution-07:-

we have,

$$\begin{aligned}\text{mean} &= \frac{994 + 996 + 998 + 1002 + 1000}{5} \\ &= 998.\end{aligned}$$

Thus, mean is 998.

Solution-08:-

First five natural numbers are 1, 2, 3, 4, 5.

Let \bar{x} denote their arithmetic mean.

$$\text{Then, } \bar{x} = \frac{1+2+3+4+5}{5} = \frac{15}{5} = 3.$$

Thus, Mean = 3.

Solution-09:-

All factors of 10 are 1, 2, 5 and 10.

Let \bar{x} be the arithmetic mean.

$$\text{Then } \bar{x} = \frac{1+2+5+10}{4} = \frac{18}{4} = 4.5.$$

Solution-10:-

first 10 even natural numbers are 2, 4, 6, 8, 10, 12, 14, 16, 18, 20.

$$\text{mean} = \frac{2+4+6+8+10+12+14+16+18+20}{10} = \frac{110}{10} = 11.$$

\therefore Mean = \bar{x} = 11.

Solution-11:-

we have,

$$\begin{aligned}\text{mean} &= \frac{x+x+2+x+4+x+6+x+8}{5} \\ &= \frac{5x+20}{5} \\ &= \frac{5(x+4)}{5} \\ &= x+4.\end{aligned}$$

Thus, Mean is $x+4$.

Solution -12:-

first five multiples of '3' are. 3, 6, 9, 12, 15.

Let \bar{x} be the Mean.

$$\bar{x} = \frac{3+6+9+12+15}{5}$$

$$\bar{x} = \frac{45}{5}$$

$$\bar{x} = 9.$$

Thus, Mean is '9'

Solution -13:-

we have,

$$\begin{aligned}\text{Mean } (\bar{x}) &= \frac{3.4+3.6+4.2+4.5+3.9+4.1+3.8+4.5+4.4+3.6}{10} \\ &= \frac{40}{10} \text{ kg} = 4 \text{ kg}.\end{aligned}$$

Solution -14:-

we have,

$$\begin{aligned}\text{Mean } (\bar{x}) &= \frac{84+36+47+23+0+19+81+93+72+35+37+1}{12} \\ &= 39.5.\end{aligned}$$

Thus, Mean is 39.5.

Solution -15:-

We have,

$$\begin{aligned}\text{Mean Number of Children Per family} &= \frac{2+4+3+5+4+2+3+1+1+5}{10} \\ &= \frac{30}{10} \\ &= 3.\end{aligned}$$

∴ 3 children per family

Solution-16:-

We have,

$$n = \text{Number of observations} = 100$$

$$\text{Mean} = 40.$$

$$\therefore \text{Mean} = \frac{\text{Sum of the observations}}{\text{Number of observations}}$$

$$\Rightarrow \text{Mean} \times \text{No of observations} = \overset{\text{Sum}}{\text{No of observations}}$$

$$\Rightarrow 100 \times 40 = \text{Sum of observations}$$

$$\text{Thus, incorrect sum of observations} = 100 \times 40. \\ = 4,000.$$

Correct sum of the observations = Incorrect sum of the observations - Incorrect observation + Correct observation.

$$\Rightarrow \text{correct sum of the observations} = 4000 - 83 + 53 \\ = 3970.$$

$$\therefore \text{correct mean} = \frac{\text{correct sum of the observations}}{\text{Number of observations}}$$

$$= \frac{3970}{100}$$

$$= 39.7.$$

\therefore correct mean is 39.7.

Solution-17:-

We have,

$$n = \text{Number of observations} = 5, \text{ Mean} = 27.$$

$$\text{Mean} = \frac{\text{Sum of the observations}}{\text{Number of observations}}$$

$$n = 5, \bar{x} = 27.$$

$$27 \times 5 = \text{sum of the observations}$$

$$135 = \text{sum of the observations}.$$

When one number excluded

$$n = 4, \bar{x} = 25.$$

$$\bar{x} = \frac{\text{Sum of the observations}}{n} \Rightarrow \text{sum} = 25 \times 4 \\ = 100.$$

$$\therefore \text{excluded number} = \frac{\text{sum}}{\text{mean of 5 numbers}} - \frac{\text{sum}}{\text{mean of 4 numbers}} \\ = 135 - 100 = 35.$$

Solution-18:-

It is given that,

$$\text{Number of students} = 7.$$

$$\text{Mean} (\bar{x}) = 55 \text{ kg.}$$

The given numbers are 52, 54, 55, 53, 56 & 54.

Let the seventh weight be 'k' then.

$$\text{Mean} = \frac{52 + 54 + 55 + 53 + 56 + 54 + k}{7}$$

$$\Rightarrow 55 \times 7 = 324 + k$$

$$\Rightarrow k = 385 - 324$$

$$\Rightarrow k = 61 \text{ kg.}$$

Seventh weight be 61 kg.

Solution-19:-

We have, Number of observations = 8.

Mean = 15kg

We know that, Mean = $\frac{\text{Sum of the observations}}{\text{No. of observations}}$

$$\Rightarrow 15 \text{ kg (8)} = \text{sum of the observations}$$

$$\Rightarrow \text{sum of the observations} = 120 \text{ kg.}$$

If each number is multiplied by '2'

Then, sum of the observations = 2(120kg)
= 240kg.

$$\text{NEW Mean} = \frac{\text{Sum of observations}}{\text{No. of observations}} = \frac{240 \text{ kg}}{8}$$

$$\therefore \text{Mean } (\bar{x}) = 30 \text{ kg}$$

Solution-20:-

We have,

number of observations = 5; Mean (\bar{x}) = 18.

We know that.

$$\text{Mean} = \frac{\text{sum of observations}}{\text{No. of observations}}$$

$$18 = \frac{\text{sum of observations}}{5}$$

$$\Rightarrow \text{sum of observations} = 90.$$

If one number is excluded.

Mean (\bar{x}) = 16, number of observations = 4.

$$16 = \frac{\text{sum of observations}}{4}$$

$$\Rightarrow \text{sum of observations} = 64.$$

$$\begin{aligned} \therefore \text{excluded number} &= \frac{\text{sum of five numbers}}{\text{Mean of five numbers}} - \frac{\text{sum of four numbers}}{\text{Mean of four numbers}} \\ &= 90 - 64 \\ &= 26. \end{aligned}$$

∴ excluded number is '26'.

Solution-21:-

Number of observations = 200.

Mean = 50.

$$\therefore \text{Mean} = \frac{\text{Sum of the observations}}{\text{Number of observations}}$$

$$\Rightarrow \text{Sum of observations} = 50 \times 200 \\ = 10000$$

Thus, Incorrect sum of observations = 10000

Correct sum of the observations = Incorrect sum of the observations - Incorrect observations + correct observations.

$$= 10000 - (92+8) + 192+88$$

$$= 10000 - 100 + 280$$

$$\Rightarrow 10180$$

$$\therefore \text{Mean} = \frac{\text{Correct sum of the observations}}{\text{Number of observations}}$$

$$= \frac{10180}{200} = \frac{10180}{200}$$

$$= 50.9$$

$$\therefore \text{Mean } (\bar{x}) = 50.9.$$

Solution-22:-

We have,

Mean = 27, Number of observations = 5.

We know that

$$\text{Mean} = \frac{\text{Sum of observations}}{\text{Number of observations}}$$

$$\Rightarrow \text{Number of observations} \times \text{Mean} = \text{Sum of observations}$$

$$\Rightarrow \text{Sum of observations} = 27 \times 5 = 135$$

$$\therefore \text{Sum of observations} = 135.$$

\(\therefore\) If one number is included

Mean = 25, Number of observations = 6.

$$\Rightarrow 25 = \frac{\text{Sum of observations}}{6}$$

$$\Rightarrow 150 = \text{Sum of observations}$$

$$\therefore \text{Sum of observations} = 150.$$

Included number = Sum of observation of 6 numbers
- Sum of observation of 5 numbers

$$= 150 - 135$$

$$= 15.$$

\(\therefore\) included number is '15'.

solution -23:-

We have, Number of observation = 75.
mean = 35kg.

We know that, mean = $\frac{\text{sum of observations}}{\text{No. of observations}}$

$$\Rightarrow 75 \times 35 = \text{sum of observations}$$

$$\Rightarrow \text{sum of observations} = 2625.$$

If each number is multiplied by '4'

$$\begin{aligned} \text{Then sum of observations} &= 4(2625) \\ &= 10500. \end{aligned}$$

\therefore New mean = $\frac{\text{sum of observations}}{\text{No. of observations}}$

$$= \frac{10500}{75}$$

$$= 140.$$

\therefore New mean is '140'

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Exercise-23.2

Exercise-23.2.

Solution-01:-

Score(x_i)	Frequency(f_i)	$f_i x_i$
1	2	2
2	5	10
3	1	3
4	4	16
5	6	30
6	2	12
	$20 = N$	$73 = \sum f_i x_i$

We have,

$$\begin{aligned} \text{Mean} &= \frac{\sum f_i x_i}{\sum f_i} \\ &= \frac{73}{20} \end{aligned}$$

$$\text{Mean Score} = 3.65$$

Solution-02:-

Wages(x_i)	No. of workers(f_i)	$f_i x_i$
130	2	260
150	4	600
180	6	1080
200	3	600
	15	2540

We have,

$$\text{Mean Wage} = \frac{2540}{15} = 169.33 \quad [\because \text{Mean} = \frac{\sum f_i x_i}{\sum f_i}]$$

Solution-03:-

Weight(x_i)	Number of Workers (f_i)	$f_i x_i$
60	4	240
63	5	315
66	3	198
72	1	72
75	2	150
	$15 = \sum f_i$	$975 = \sum f_i x_i$

$$\begin{aligned} \text{we have, Mean weight} &= \frac{\sum f_i x_i}{\sum f_i} = \frac{975}{15} \\ &= 65 \text{ kg} \end{aligned}$$

$$\therefore \text{Mean weight} = 65 \text{ kg.}$$

Solution-04:-

Age in years	Number of Students (f_i)	$f_i x_i$
14	15	186 210
15	14	210
16	10	160
17	8	126 136
18	3	54
	50	770

$$\begin{aligned}\text{Mean Age} &= \frac{\sum f_i x_i}{\sum f_i} = \frac{770}{50} \\ &= 15.4 \text{ years}\end{aligned}$$

Solution-05:-

x	f	$f x$
5	4	20
6	8	48
7	14	98
8	11	88
9	3	27
	40	281

$$\begin{aligned}\text{Mean} &= \frac{\sum f_i x_i}{\sum f_i} = \frac{281}{40} \\ &= 7.025 \\ \therefore \text{Mean} &= 7.025.\end{aligned}$$

Solution-06:-

The heights of 5 persons are 140cm, 150cm, 152cm, 158cm and 161cm.

$$\begin{aligned}\text{mean height} &= \frac{140\text{cm} + 150\text{cm} + 152\text{cm} + 158\text{cm} + 161\text{cm}}{5} \\ &= 152.2\text{cm}.\end{aligned}$$

Solution-07:-

we have,

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Solution-08:-

First five natural numbers are 1, 2, 3, 4, 5.

Let \bar{x} denote their arithmetic mean.

$$\text{Then, } \bar{x} = \frac{1+2+3+4+5}{5} = \frac{15}{5} = 3.$$

Thus, Mean = 3.

Solution-9:-

me. All factors of 10 are 1, 2, 5 and 10.

Let \bar{x} be the arithmetic mean.

$$\text{Then } \bar{x} = \frac{1+2+5+10}{4} = \frac{18}{4} = 4.5.$$

Solution-10:-

x	f	fx
5	2	10
8	5	40
10	8	80
12	22	264
P	7	7P
20	4	80
25	2	50
	$\Sigma f_i = 50$	524+7P

It is given that,

$$\text{Mean} = 12.58.$$

$$\Sigma f_i = 50$$

$$\Sigma f_i x_i = 524 + 7P$$

We know that,

$$\text{Mean} = \frac{\Sigma f_i x_i}{\Sigma f_i}$$

$$\Rightarrow 12.58 = \frac{524 + 7P}{50}$$

$$\Rightarrow 629 - 524 = 7P$$

$$\Rightarrow 7P = 105$$

$$\Rightarrow P = \frac{105}{7}$$

$$\Rightarrow \boxed{P = 15}$$

Solution-12:-

x	f	fx
15	2	30
19	3	51
19	4	76
$20+P$	$5P$	$100P+5P^2$
23	6	138
	$15+5P$	$295+100P+5P^2$

It is given that,

$$\text{Mean} = 20,$$

$$\Sigma f_i = 15 + 5P$$

$$\Sigma f_i x_i = 295 + 100P + 5P^2$$

$$\text{Mean} = \frac{\Sigma f_i x_i}{\Sigma f_i}$$

$$\Rightarrow 20 = \frac{295 + 100P + 5P^2}{15 + 5P}$$

$$\Rightarrow 100P + 300 = 295 + 100P + 5P^2$$

$$\Rightarrow 5P^2 + 100P - 100P = 300 - 295$$

$$\Rightarrow 5P^2 = 5$$

$$\Rightarrow P^2 = 1$$

$$\Rightarrow P = \pm 1$$

$$\Rightarrow P = 1.$$