

# 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,

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

Thus, mean enrolment of the school for this period  
2059.

Solution-05:-

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

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

(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,

$$\begin{aligned}\text{Mean}(\bar{x}) &= \frac{3 \cdot 4 + 3 \cdot 6 + 4 \cdot 2 + 4 \cdot 5 + 3 \cdot 9 + 4 \cdot 1 + 3 \cdot 8 + 4 \cdot 5 + 4 \cdot 4 + 3 \cdot 6}{10} \\ &= \frac{40}{10} \text{ kg} = 4 \text{ kg}.\end{aligned}$$

Solution -14:-

we have,

$$\begin{aligned}\text{Mean}(\bar{x}) &= \frac{84+36+47+23+0+19+81+93+72+35+3+1}{12} \\ &= 39.5.\end{aligned}$$

Thus, Mean is 39.5.

Solution -15:-

We have,

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

$\therefore$  '3' children Per family

Solution-16:-

we have,

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

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

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

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

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

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

$$\begin{aligned} \text{Correct sum of the observations} &= \text{Incorrect sum} \\ &\text{of the observations} - \text{Incorrect} \\ &\text{observation} + \text{Correct observation.} \end{aligned}$$

$$\begin{aligned} \Rightarrow \text{correct sum of the observations} &= 4000 - 83 \\ &\quad + 53 \\ &= 3970. \end{aligned}$$

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

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

$$= 39.7.$$

$\therefore$  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

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

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

$$\begin{aligned} \therefore \text{excluded number} &= \overset{\text{sum}}{\text{mean of 5 numbers}} - \overset{\text{sum}}{\text{mean of 4 numbers}} \\ &= 135 - 100 = 35. \end{aligned}$$

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 = 15 kg

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

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

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

If each number is multiplied by '2'

$$\begin{aligned} \text{Then, sum of the observations} &= 2(120 \text{ kg}) \\ &= 240 \text{ kg.} \end{aligned}$$

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

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

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.

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

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

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

$\therefore$  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.

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

$$= 10000 - 100 + 280$$

$$\Rightarrow 10180$$

$$\therefore \text{Mean} = \frac{\text{correct sum of the observations}}{\text{number of observations}}$$

$$= \frac{10180}{200} = 50.9$$

$$= 50.9$$

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

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.

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

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

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

$$\text{Included number} = \text{Sum of observation of numbers} \\ - \text{Sum of observation of numbers}$$

$$= 150 - 135$$

$$= 15$$

$\therefore$  included number is '15'.

Solution - 23:-

We have, Number of observation = 75.

mean = 35 kg.

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

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

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

If each number is multiplied by '4'

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

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

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

$$= 140.$$

$\therefore$  New mean is '140'

# chapter-23 Data Handling-II

## 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 | $fix_i$            |
|--------------|--------------------|--------------------|
| 14           | 15                 | <del>186</del> 210 |
| 15           | 14                 | 210                |
| 16           | 10                 | 160                |
| 17           | 8                  | <del>126</del> 136 |
| 18           | 3                  | 54                 |
|              | 50                 | 770                |

$$\text{Mean Age} = \frac{\sum fix_i}{\sum f_i} = \frac{770}{50} = 15.4 \text{ years}$$

Solution-05:-

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

$$\text{Mean} = \frac{\sum fix_i}{\sum f_i} = \frac{281}{40} = 7.025$$

$\therefore \text{Mean} = 7.025$

Solution-06:-

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

$$\text{mean height} = \frac{140\text{cm} + 150\text{cm} + 152\text{cm} + 158\text{cm} + 161\text{cm}}{5} = 152.2\text{cm}$$

Solution-07:-

We have,

$$\text{mean} = \frac{994 + 996 + 998 + 1002 + 1000}{5} = 998$$

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-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                  |
| 17     | 3         | 51                  |
| 19     | 4         | 76                  |
| $20+P$ | $5P$      | $100P + 5P^2$       |
| 23     | 6         | 138                 |
|        | $15 + 5P$ | $295 + 100P + 5P^2$ |

It is Given that,

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

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

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

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

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

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

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

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

$$\Rightarrow P^2 = 1$$

$$\Rightarrow P = \pm 1$$

$$\Rightarrow P = 1.$$