Question:1

Ashish studies for 4 hours, 5 hours and 3 hours on three consecutive days. How many hours does he study daily on an average?

Solution:

Average number of study hours = $4 + 5 + 3 \div 3$

$= 12 \div 3$

$= 4$ hours

Thus, Ashish studies for 4 hours on an average.

Question:2

A cricketer scores the following runs in 8 innings: 58, 76, 40, 35, 48, 45, 0, 100. Find the mean score.

Solution:

We have:

The mean score = $\frac{(58 + 76 + 40 + 35 + 48 + 45 + 0 + 100)}{8} = \frac{402}{8} = 50.25$ runs.

Thus, the mean score of the cricketer is 50.25 runs.

Question:3

The marks $out of 100$ obtained by a group of students in science test are 85, 76, 90, 84, 39, 48, 56, 95, 81 and 75. Find the

i highest and the lowest marks obtained by the students.

ii range of marks obtained.

iii mean marks obtained by the group.

Solution:

In order to find the highest and lowest marks, let us arrange the marks in ascending order as follows:

39, 48, 56, 75, 76, 81, 84, 85, 90, 95

i Clearly, the highest mark is 95 and the lowest is 39.

ii The range of the marks obtained is: $95 - 39 = 56$.

iii We have:

Mean marks = Sum of the marks ÷ Total number of students

$\Rightarrow$ Mean marks = $\frac{(39 + 48 + 56 + 75 + 76 + 81 + 84 + 85 + 90 + 95)}{10} = \frac{729}{10} = 72.9$.

Hence, the mean marks of the students is 72.9.

Question:4

The enrolment of a school during six consecutive years was as follows:

1555, 1670, 1750, 2019, 2540, 2820

Find the mean enrollment of the school for this period.

Solution:

The mean enrolment = Sum of the enrolments in each year ÷ Total number of years

The mean enrolment = $\frac{(1555 + 1670 + 1750 + 2019 + 2540 + 2820)}{6} = \frac{12354}{6} = 2059$.

Thus, the mean enrolment of the school for the given period is 2059.

Question:5

The rainfall $in mm$ in a city on 7 days of a certain week was recorded as follows:

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Rainfall $in mm$	0.0	12.2	2.1	0.0	20.5	5.3	1.0

i Find the range of the rainfall from the above data.

ii Find the mean rainfall for the week.

iii On how many days was the rainfall less than the mean rainfall.

Solution:

i The range of the rainfall = Maximum rainfall - Minimum rainfall

$= 20.5 - 0.0$

$= 20.5$ mm .

ii The mean rainfall = $\frac{(0.0 + 12.2 + 2.1 + 0.0 + 20.5 + 5.3 + 1.0)}{7} = \frac{41.1}{7} = 5.87$ mm .

iii Clearly, there are 5 days $Mon, Wed, Thu, Sat, and Sun$, when the rainfall was less than the mean, i.e., 5.87 mm.

Question:6

If the heights of 5 persons are 140 cm, 150 cm, 152 cm, 158 cm and 161 cm respectively, find the mean height.

Solution:

The mean height = Sum of the heights ÷ Total number of persons

$$= \frac{(140 + 150 + 152 + 158 + 161)}{5} = \frac{761}{5} = 152.2 \text{ cm}$$

Thus, the mean height of 5 persons is 152.2 cm.

Question:7

Find the mean of 994, 996, 998, 1002 and 1000.

Solution:

Mean = Sum of the observations ÷ Total number of observations

$$\text{Mean} = \frac{(994 + 996 + 998 + 1002 + 1000)}{5} = \frac{4990}{5} = 998.$$

Question:8

Find the mean of first five natural numbers.

Solution:

The first five natural numbers are 1, 2, 3, 4 and 5. Let $\overline{X}$ denote their arithmetic mean. Then,

$$\overline{X} = \frac{1+2+3+4+5}{5} = \frac{15}{5} = 3.$$

Question:9

Find the mean of all factors of 10.

Solution:

The factors of 10 are 1, 2, 5 and 10 itself. Let $\overline{X}$ denote their arithmetic mean. Then,

$$\overline{X} = \frac{1+2+5+10}{4} = \frac{18}{4} = 4.5.$$

Question:10

Find the mean of first 10 even natural numbers.

Solution:

The first 10 even natural numbers are 2,4, 6, 8,10,12,14,16,18 and 20. Let $\overline{X}$ denote their arithmetic mean. Then,

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

Question:11

Find the mean of x, $x + 2$, $x + 4$, $x + 6$, $x + 8$.

Solution:

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

$$\Rightarrow \text{Mean} = \frac{x + x + 2 + x + 4 + x + 6 + x + 8}{5} \Rightarrow \text{Mean} = \frac{5x + 20}{5} = \frac{5(x+4)}{5} \Rightarrow \text{Mean} = x + 4.$$

Question:12

Find the mean of first five multiples of 3.

Solution:

The first five multiples of 3 are 3,6,9,12 and 15. Let $\overline{X}$ denote their arithmetic mean. Then,

$$\overline{X} = \frac{3+6+9+12+15}{5} = \frac{45}{5} = 9.$$

Question:13

Following are the weights $in kg$ of 10 new born babies in a hospital on a particular day:

3.4, 3.6, 4.2, 4.5, 3.9, 4.1, 3.8, 4.5, 4.4, 3.6. Find the mean $\overline{X}$.

Solution:

We have:

$$\overline{X} = \frac{\text{Sum of the observations}}{\text{Number of observations}} \Rightarrow \overline{X} = \frac{3.4+3.6+4.2+4.5+3.9+4.1+3.8+4.5+4.4+3.6}{10} \Rightarrow \overline{X} = \frac{40}{10} = 4 \text{ kg}.$$

Question:14

The percentage of marks obtained by students of a class in mathematics are:

64, 36, 47, 23, 0, 19, 81, 93, 72, 35, 3, 1. Find their mean.

Solution:

We have :

$$\text{Mean} = \frac{\text{Sum of the marks obtained by students}}{\text{Total number of students.}} \Rightarrow \text{Mean} = \frac{64+36+47+23+19+81+93+72+35+3+1}{12} \Rightarrow \text{Mean} = \frac{474}{12} = 39.5 \%.$$

Question:15

The numbers of children in 10 families of a locality are:

2, 4, 3, 4, 2, 3, 5, 1, 1, 5. Find the mean number of children per family.

Solution:

The mean number of children per family $= \frac{\text{Sum of the total number of children}}{\text{Total number of families}}$

Mean $= \frac{2+4+3+4+2+3+5+1+1+5}{10} = \frac{30}{10} = 3$.

Thus, on an average there are 3 children per family in the locality.

Question:16

The mean of marks scored by 100 students was found to be 40. Later on it was discovered that a score of 53 was misread as 83. Find the correct mean.

Solution:

We have:

n = The number of observations = 100, Mean = 40

$$\text{Mean} = \frac{\text{Sum of the observations}}{\text{Total number of observations}} \Rightarrow 40 = \frac{\text{Sum of the observations}}{100} \Rightarrow 40 \times 100 = \text{Sum of the observations}$$

Thus, the incorrect sum of the observations = 40 x 100 = 4000.

Now,

The correct sum of the observations = Incorrect sum of the observations - Incorrect observation + Correct observation

⇒ The correct sum of the observations = 4000 - 83 + 53
⇒ The correct sum of the observations = 4000 - 30 = 3970

$$\therefore \text{Correct mean} = \frac{\text{Correct sum of observations}}{\text{Number of observations}} = \frac{3970}{100} = 39.7$$

Question:17

The mean of five numbers is 27. If one number is excluded, their mean is 25. Find the excluded number.

Solution:

We have:

$$\text{Mean} = \frac{\text{Sum of the five numbers}}{5} = 27 \text{ So, sum of the five numbers} = 5 \times 27 = 135. \text{ Now, The mean of four numbers} = \frac{\text{Sum of the four numbers}}{4} = 2$$

Therefore, the excluded number = Sum of the five numbers - sum of the four numbers

⇒ The excluded number = 135 - 100 = 35.

Question:18

The mean weight per student in a group of 7 students is 55 kg. The individual weights of 6 of them $in kg$ are 52, 54, 55, 53, 56 and 54. Find the weight of the seventh student.

Solution:

We have:

Mean $= \frac{\text{Sum of the weight}s \text{ of the students}}{\text{Number of students}}$

Let the weight of the seventh student be x kg.

$$\text{Mean} = \frac{52+54+55+53+56+54+x}{7} = 55 \Rightarrow \frac{324+x}{7} = 55 \Rightarrow 324 + x = 385 \Rightarrow x = 385 - 324 \Rightarrow x = 61 \text{ kg}.$$

Thus, the weight of the seventh student is 61 kg.

Question:19

The mean weight of 8 numbers is 15 kg. If each number is multiplied by 2, what will be the new mean?

Solution:

Let $x_1, x_2, x_3 \ldots x_8$ be the eight numbers whose mean is 15 kg. Then,

$$15 = \frac{x_1 + x_2 + x_3 + \ldots + x_8}{8}$$

$x_1 + x_2 + x_3 + \ldots + x_8 = 15 \times 8$

$\Rightarrow x_1 + x_2 + x_3 + \ldots + x_8 = 120.$

Let the new numbers be $2x_1$, $2x_2$, $2x_3$, ...$2x_8$. Let M be the arithmetic mean of the new numbers.
Then,

$$M = \frac{2x_1 + 2x_2 + 2x_3 + \ldots + 2x_8}{8} \Rightarrow M = \frac{2(x_1 + x_2 + x_3 + \ldots x_8)}{8} \Rightarrow M = \frac{2 \times 120}{8} \Rightarrow M = 30$$

Question:20

The mean of 5 numbers is 18. If one number is excluded, their mean is 16. Find the excluded number.

Solution:

Let x_1, x_2, x_3, x_4 & x_5 be five numbers whose mean is 18. Then,
18 = Sum of five numbers ÷ 5
∴ Sum of five numbers = 18 × 5 = 90.

Now, if one number is excluded, then their mean is 16.
So,
16 = Sum of four numbers ÷ 4
∴ Sum of four numbers = 16 × 4 = 64.

The excluded number = Sum of the five observations - Sum of the four observations
∴ The excluded number = 90 - 64
∴ The excluded number = 26.

Question:21

The mean of 200 items was 50. Later on, it was discovered that the two items were misread as 92 and 8 instead of 192 and 88. Find the correct mean.

Solution:

n = Number of observations = 200

$$\text{Mean} = \frac{\text{Sum of the observations}}{\text{Number of observations}} \Rightarrow 50 = \frac{\text{Sum of the observations}}{200} \Rightarrow \text{Sum of the observations} = 50 \times 200 = 10,000.$$

Thus, the incorrect sum of the observations = 50 x 200
Now,
The correct sum of the observations = Incorrect sum of the observations - Incorrect observations + Correct observations
⇒ Correct sum of the observations = 10,000 - 92 + 8 + 192 + 88
⇒ Correct sum of the observations = 10,000 - 100 + 280
⇒ Correct sum of the observations = 9900 + 280
⇒ Correct sum of the observations = 10180.

∴ Correct Mean = $\frac{\text{Correct sum of the observations}}{\text{Number of observations}} = \frac{10180}{200} = 50.9$

Question:22

The mean of 5 numbers is 27. If one more number is included, then the mean is 25. Find the included number.

Solution:

We have:
Mean = Sum of five numbers ÷ 5
⇒ Sum of the five numbers = 27 x 5 = 135.

Now, New mean = 25

25 = Sum of six numbers ÷ 6

⇒ Sum of the six numbers = 25 x 6 = 150.

The included number = Sum of the six numbers - Sum of the five numbers

⇒The included number = 150 - 135

⇒The included number = 15.

Question:23

The mean of 75 numbers is 35. If each number is multiplied by 4, find the new mean.

Solution:

Let $x_1, x_2, x_3, \ldots x_{75}$ be 75 numbers with their mean equal to 35. Then,

$$\Rightarrow 35 = \frac{x_1 + x_2 + x_3 + \ldots + x_{75}}{75}$$

$x_1 + x_2 + x_3 + \ldots + x_{75} = 35 \times 75$

$$\Rightarrow x_1 + x_2 + x_3 + \ldots + x_{75} = 2625$$

The new numbers are $4x_1, 4x_2, 4x_3, \ldots 4x_{75}$. Let M be the arithmetic mean of the new numbers. Then,

$$\Rightarrow M = \frac{4x_1 + 4x_2 + 4x_3 + \ldots + 4x_{75}}{75} \Rightarrow M = \frac{4(x_1 + x_2 + x_3 + \ldots + x_{75})}{75} \Rightarrow M = \frac{4 \times 2625}{75} \Rightarrow M = 35 \times 4 \Rightarrow M = 140.$$

Question:24

A die was thrown 20 times and the following scores were recorded:

5, 2, 1, 3, 4, 4, 5, 6, 2, 2, 4, 5, 5, 6, 2, 2, 4, 5, 5, 1

Prepare the frequency table of the scores on the upper face of the die and find the mean score.

Solution:

The frequency table for the given data is as follows:

x: 1   2   3   4   5   6

f: 2   5   1   4   6   2

In order to compute the arithmetic mean, we prepare the following table:

Computation of Arithmetic Mean

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

We have, $\sum f_i = 20$ and $\sum f_i x_i = 73$

$\therefore$ The mean score = $\frac{\sum f_i x_i}{\sum f_i} = \frac{73}{20} = 3.65$.

Question:25

The daily wages $in Rs$ of 15 workers in a factory are given below:

200, 180, 150, 150, 130, 180, 180, 200, 150, 130, 180, 180, 200, 150, 180

Prepare the frequency table and find the mean wage.

Solution:

The frequency table for the given data is as follows:

Wages (x_i) :   130   150   180   200

Number of workers (f_i):   2   4   6   3

In order to compute the mean wage, we prepare the following table:

Mean wages of the workers

x_i	f_i	$f_i\,x_i$
130	2	260
150	4	600
180	6	1080
200	3	600
Total	$\sum f_i = N = 15$	$\sum f_i\,x_i = 2540$

$$\text{Mean} = \frac{\sum f_i\,x_i}{\sum f_i} = \frac{2540}{15} = \text{Rs. } 169.33 .$$

Question:26
The following table shows the weights $in\,kg$ of 15 workers in a factory:

Weight $in\,kg$:	60	63	66	72	75
Numbers of workers:	4	5	3	1	2

Calculate the mean weight.

Solution:

Calculation of Mean

x_i	f_i	$f_i\,x_i$
60	4	240
63	5	315
66	3	198
72	1	72
75	2	150
Total	$\sum f_i = 15$	$\sum f_i x_i = 975$

$$\therefore \text{Mean weight} = \frac{\sum f_i x_i}{\sum f_i} = \frac{975}{15} = 65 \text{ kg} .$$

Question:27
The ages $in\,years$ of 50 students of a class in a school are given below:

Age $in\,years$:	14	15	16	17	18
Numbers of students:	15	14	10	8	3

Find the mean age.

Solution:

Calculation of Mean

x_i	f_i	$f_i\,x_i$
14	15	210
15	14	210
16	10	160
17	8	136
18	3	54
Total	$\sum f_i = 50$	$\sum f_i x_i = 770$

$$\therefore \text{Mean age} = \frac{\sum f_i x_i}{\sum f_i} = \frac{770}{50} = 15.4 \text{ yrs} .$$

Question:28
Calculate the mean for the following distribution:

x:	5	6	7	8	9
f:	4	8	14	11	3

Solution:

Calculation of Mean

x_i	f_i	$f_i\,x_i$
5	4	20
6	8	48
7	14	98

8	11	88
9	3	27
Total	$\sum f_i = 40$	$\sum f_i x_i = 281$

$\therefore$ Mean $= \frac{\sum f_i x_i}{\sum f_i} = \frac{281}{40} = 7.025$.

Question:29

Find the mean of the following data:

x:	19	21	23	25	27	29	31
f:	13	15	16	18	16	15	13

Solution:

Calculation of Mean

x_i	f_i	$f_i x_i$
19	13	247
21	15	315
23	16	368
25	18	450
27	16	432
29	15	435
31	13	403
Total	$\sum f_i = N = 106$	$\sum f_i x_i = 2650$

$\therefore$ Mean $= \frac{\sum f_i x_i}{\sum f_i} = \frac{2650}{106} = 25$.

Question:30

The mean of the following data is 20.6. Find the value of p.

x:	10	15	p	25	35
f:	3	10	25	7	5

Solution:

Calculation of Mean

x_i	f_i	$f_i x_i$
10	3	30
15	10	150
p	25	25p
25	7	175
35	5	175
Total	$\sum f_i = 50$	$\sum f_i x_i = 530 + 25p$

We have:

$\sum f_i = 50, \sum f_i x_i = 530 + 25p$

$\therefore$ Mean $= \frac{\sum f_i x_i}{\sum f_i}$

$\Rightarrow 20.6 = \frac{530 + 25p}{50} \Rightarrow 20.6 \times 50 = 530 + 25p \Rightarrow 1030 = 530 + 25p \Rightarrow 1030 - 530 = 25p \Rightarrow 500 = 25p \Rightarrow p = \frac{500}{25} \Rightarrow p = 20$

Question:31

If the mean of the following data is 15, find p.

x:	5	10	15	20	25
f:	6	p	6	10	5

Solution:

Calculation of Mean

x_i	f_i	$f_i x_i$
5	6	30
10	p	10p
15	6	90

20	10	200
25	5	125
Total	$\sum f_i = 27 + p$	$\sum f_i x_i = 445 + 10p$

We have:

$\sum f_i = 27 + p, \ \sum f_i x_i = 445 + 10p$

$\therefore$ Mean $= \frac{\sum f_i x_i}{\sum f_i}$

$\Rightarrow 15 = \frac{445 + 10p}{27 + p} \Rightarrow 15 \left(27 + p \right) = 445 + 10p \Rightarrow 405 + 15p = 445 + 10p \Rightarrow 15p - 10p = 445 - 405 \Rightarrow 5p = 40 \Rightarrow p = 40 \div 5$

Therefore, $p = 8$.

Question:32

Find the value of p for the following distribution whose mean is 16.6

x:	8	12	15	p	20	25	30
f:	12	16	20	24	16	8	4

Solution:

Calculation of Mean

x_i	f_i	$f_i x_i$
8	12	96
12	16	192
15	20	300
p	24	24p
20	16	320
25	8	200
30	4	120
Total	$\sum f_i = N = 100$	$\sum f_i x_i = 1228 + 24p$

We have:

$\sum f_i = 100, \sum f_i x_i = 1228 + 24p$

$\therefore$ Mean $= \frac{\sum f_i x_i}{\sum f_i}$

$\Rightarrow 16.6 = \frac{1228 + 24p}{100} \Rightarrow 16.6 \times 100 = 1228 + 24p \Rightarrow 1660 = 1228 + 24p \Rightarrow 1660 - 1228 = 24p \Rightarrow 432 = 24p \Rightarrow p = \frac{432}{24} \Rightarrow p = 18.$

Question:33

Find the missing value of *p* for the following distribution whose mean is 12.58

x:	5	8	10	12	p	20	25
f:	2	5	8	22	7	4	2

Solution:

Calculation of Mean

x_i	f_i	$f_i x_i$
5	2	10
8	5	40
10	8	80
12	22	264
p	7	7p
20	4	80
25	2	50
Total	$\sum f_i = N = 50$	$\sum f_i x_i = 524 + 7p$

We have:

$\sum f_i = 50, \sum f_i x_i = 524 + 7p$

$\therefore$ Mean $= \frac{\sum f_i x_i}{\sum f_i}$

$\Rightarrow 12.58 = \frac{524 + 7p}{50} \Rightarrow 12.58 \times 50 = 524 + 7p \Rightarrow 629 = 524 + 7p \Rightarrow 629 - 524 = 7p \Rightarrow 105 = 7p \Rightarrow p = \frac{105}{7} \Rightarrow p = 15.$

Question:34

Find the missing frequency (*p*) for the following distribution whose mean is 7.68

x:	3	5	7	9	11	13
f:	6	8	15	p	8	4

Solution:

Calculation of Mean

x_i	f_i	$f_i x_i$
3	6	18
5	8	40
7	15	105
9	p	9p
11	8	88
13	4	52
Total	$\sum f_i = 41 + p$	$\sum f_i x_i = 303 + 9p$

We have:

$\sum f_i = 41 + p, \ \sum f_i x_i = 303 + 9p$

$\therefore$ Mean $= \frac{\sum f_i x_i}{\sum f_i}$

Question:35

Find the value of *p*, if the mean of the following distribution is 20

x:	15	17	19	20 + p	23
f:	2	3	4	5 p	6

Solution:

Calculation of Mean

x_i	f_i	$f_i x_i$
15	2	30
17	3	51
19	4	76
20 + p	5p	20+p5p
23	6	138
Total	= 15 + 5p	= 295 + 20 + p 5p

We have:

= 15 + 5p, = 295 + (20 + p) 5p.

$\therefore$ Mean =

$\Rightarrow 300 - 295 + 100p - 100p = 5p^2$
$\Rightarrow 5 = 5p^2$
$\Rightarrow p^2 = 1$
$\Rightarrow p = 1.$

Question:36

Find the median of the following data 1-8

83, 37, 70, 29, 45, 63, 41, 70, 34, 54

Solution:

Arranging the data in ascending order, we have:

29, 34, 37, 41, 45, 54, 63, 70, 70, 83

Here, the number of observations, n = 10 Even.

Hence, the median of the given data is 49.5.

Question:37
Find the median of the following data 1-8
133, 73, 89, 108, 94, 104, 94, 85, 100, 120
Solution:
Arranging the data in ascending order, we have:
73, 85, 89, 94, 94, 100, 104, 108, 120, 133.

Here, the number of observations n = 10 Even.

Hence, the median of the given data is 97.

Question:38
Find the median of the following data 1-8
31, 38, 27, 28, 36, 25, 35, 40
Solution:
Arranging the data in ascending order, we have:
25, 27, 28, 31, 35, 36, 38, 40

Here, the number of observations n = 8 Even.

Hence, the median of the given data is 33.

Question:39
Find the median of the following data 1-8
15, 6, 16, 8, 22, 21, 9, 18, 25
Solution:
Arranging the data in ascending order, we have:
6, 8, 9, 15, 16, 18, 21, 22, 25

Here, the number of observations n = 9 Odd.

th observation, i.e., value of the 5th observation =16.
Hence, the median of the given data is 16.

Question:40
Find the median of the following data 1-8
41, 43, 127, 99, 71, 92, 71, 58, 57
Solution:
Arranging the given data in ascending order, we have:

41, 43, 57, 58, 71, 71, 92, 99, 127
Here, n = 9, which is odd.

∴ Median = Value of observation, i.e., the 5th observation = 71.

Question:41
Find the median of the following data 1-8
25, 34, 31, 23, 22, 26, 35, 29, 20, 32
Solution:

Arranging the given data in ascending order, we have:

20, 22, 23, 25, 26, 29, 31, 32, 34, 35

Here, $n = 10$, which is even.

Hence, the median is 27.5 for the given data.

Question:42
Find the median of the following data 1-8
12, 17, 3, 14, 5, 8, 7, 15
Solution:
Arranging the given data in ascending order, we have:

3,5,7,8,12,14,15,17

Here, $n = 8$, which is even.

Hence, the median of the given data is 10.

Question:43
Find the median of the following data 1-8
92, 35, 67, 85, 72, 81, 56, 51, 42, 69
Solution:
Arranging the given data in ascending order, we have:

35, 42, 51, 56, 67, 69, 72, 81, 85, 92

Here, $n = 10$, which is even.

Hence, the median of the given data is 68.

Question:44
Numbers 50, 42, 35, $2x + 10$, $2x - 8$, 12, 11, 8, 6 are written in descending order and their median is 25, find x.
Solution:
Here, the number of observations n is 9. Since n is odd , the median is the observation, i.e. the 5th observation.
As the numbers are arranged in the descending order, we therefore observe from the last.
Median = 5th observation.
$25 = 2x - 8$
$2x = 25 + 8$
$2x = 33$
$x =$
$x = 16.5$
Hence, $x = 16.5$.

Question:45
Find the median of the following observations : 46, 64, 87, 41, 58, 77, 35, 90, 55, 92, 33. If 92 is replaced by 99 and 41 by 43 in the above data, find the new median?
Solution:
Arranging the given data in ascending order, we have:

33, 35, 41, 46, 55, 58, 64, 77, 87, 90, 92

Here, the number of observations n is 11 odd.

Since the number of observations is odd, therefore,

Median = Value of observation = Value of the 6th observation = 58.

Hence, median = 58.

If 92 is replaced by 99 and 41 by 43, then the new observations arranged in ascending order are:

33, 35, 43, 46, 55, 58, 64, 77, 87, 90, 99.

∴ New median = Value of the 6th observation = 58.

Question:46
Find the median of the following data : 41, 43, 127, 99, 61, 92, 71, 58, 57, If 58 is replaced by 85, what will be the new median?
Solution:
Arranging the given data in ascending order, we have:

41, 43, 57, 58, 61, 71, 92, 99,127

Here, the number of observations, *n,* is 9odd.

∴ Median = Value of observation = Value of the 5th observation = 61.
Hence, the median = 61.
If 58 is replaced by 85 , then the new observations arranged in ascending order are:
41, 43, 57, 61, 71, 85, 92, 99,12 .
∴ New median = Value of the 5th observation = 71.

Question:47
The weights in kg of 15 students are : 31, 35, 27, 29, 32, 43, 37, 41, 34, 28, 36, 44, 45, 42, 30. Find the median. If the weight 44 kg is replaced by 46 kg and 27 kg by 25 kg, find the new median.
Solution:
Arranging the given data in ascending order, we have:

27, 28, 29, 30, 31, 32, 34, 35, 36, 37, 41, 42, 43, 44, 45.

Here, the number of observations *n* is 15odd.

Since the number of observations is odd, therefore,
Median = Value of observation = Value of the 8th observation = 35.
Hence, median = 35 kg.

If 44 kg is replaced by 46 kg and 27 kg by 25 kg , then the new observations arranged in ascending order are:
25, 28, 29, 30, 31, 32, 34, 35, 36, 37, 41, 42, 43, 45, 46.
∴ New median = Value of the 8th observation = 35 kg.

Question:48
The following observations have been arranged in ascending order. If the median of the data is 63, find the value of *x* :
29, 32, 48, 50, *x*, *x* + 2, 72, 78, 84, 95
Solution:
Here, the number of observations *n* is 10. Since *n* is even,

Hence, *x* = 62.

Question:49
Find the mode and median of the data: 13, 16, 12, 14, 19, 12, 14, 13, 14
By using the empirical relation also find the mean.
Solution:
Arranging the data in ascending order such that same numbers are put together, we get:

12,12,13,13, 14,14,14, 16, 19
Here*, n* = 9.
∴ Median = Value of observation = Value of the 5th observation = 14.
Here, 14 occurs the maximum number of times, i.e., three times. Therefore, 14 is the mode of the data.

Now,
Mode = 3 Median - 2 Mean
14 = 3 x 14 - 2 Mean
2 Mean = 42 - 14 = 28
Mean = 28 2 = 14.

Question:50
Find the median and mode of the data: 35, 32, 35, 42, 38, 32, 34
Solution:
Arranging the data in ascending order such that same numbers are put together, we get:
32, 32, 34,35,35, 38,42.

Here, $n = 7$
∴ Median = Value of observation = Value of the 4th observation = 35.
Here, 32 and 35, both occur twice. Therefore, 32 and 35 are the two modes.

Question:51
Find the mode of the data: 2, 6, 5, 3, 0, 3, 4, 3, 2, 4, 5, 2, 4
Solution:
Arranging the data in ascending order such that same values are put together, we get:
0, 2, 2, 2, 3, 3,3,4,4,4,5,5,6.

Here, 2,3 and 4 occur three times each. Therefore, 2 ,3 and 4 are the three modes.

Alternate Solution
Arranging the data in the form of a frequency table, we have:

Values	Tally Bars	Frequency
0	|	1
2	|||	3
3	|||	3
4	|||	3
5	||	2
6	|	1
Total		13

Clearly, the values 2,3 and 4 occur the maximum number of times, i.e., three times.
Hence, the mode is 2,3 and 4.

Question:52
The runs scored in a cricket match by 11 players are as follows:
6, 15, 120, 50, 100, 80, 10, 15, 8, 10, 10
Find the mean, mode and median of this data.
Solution:
Arranging the data in ascending order such that same values are put together, we get:
6,8,10,10,10,15,15,50,80,100,120.

Here, $n = 11$
∴ Median = Value of observation = Value of the 6th observation = 15.
Here, 10 occurs three times. Therefore, 10 is the mode of the given data.
Now,
Mode = 3 Median - 2 Mean
⇒ 10 = 3 x 15 - 2 Mean
⇒2 Mean = 45 - 10 = 35
⇒ Mean = 35 2 = 17.5.

Question:53
Find the mode of the following data:

12, 14, 16, 12, 14, 14, 16, 14, 10, 14, 18, 14

Solution:

Arranging the data in ascending order such that same values are put together, we get:

10,12,12,14,14,14,14,14,14, 16, 16, 18.

Here, clearly, 14 occurs the most number of times.

Therefore, 14 is the mode of the given data.

Alternate solution:

Arranging the data in the form of a frequency table, we get:

Values	Tally Bars	Frequency
10	|	1
12	||	2
14	⊞⊞I	6
16	||	2
18	|	1
Total		12

Clearly, 14 has maximum frequency. So, the mode of the given data is 14.

Question:54

Heights of 25 children in cm in a school are as given below:

168, 165, 163, 160, 163, 161, 162, 164, 163, 162, 164, 163, 160, 163, 163, 165, 163, 162, 163, 164, 163, 160, 165, 163, 162

What is the mode of heights?

Also, find the mean and median.

Solution:

Arranging the data in tabular form, we get:

Height of Children cm	Tally Bars	Frequency
160	|||	3
161	|	1
162	||||	4
163	⊞⊞I ⊞⊞I	10
164	|||	3
165	|||	3
168	|	1
Total		25

Here, $n = 25$

$\therefore$ Median = Value of observation = Value of the 13th observation = 163 cm.

Here, clearly, 163 cm occurs the most number of times. Therefore, the mode of the given data is 163 cm.

Now,

Mode = 3 Median - 2 Mean

163 = 3 x 163 - 2 Mean

2 Mean = 326

Mean = 326 2 = 163 cm.

Question:55

The scores in mathematics test out of 25 of 15 students are as follows:

19, 25, 23, 20, 9, 20, 15, 10, 5, 16, 25, 20, 24, 12, 20

Find the mode and median of this data. Are they same?

Solution:

Arranging the data in ascending order such that same values are put together, we get:

5,9,10,12,15,16, 19, 20, 20, 20, 20, 23, 24, 25, 25.

Here, $n = 15$

$\therefore$ Median = Value of observation = Value of the 8th observation = 20.

Here, clearly, 20 occurs the most number of times, i.e., 4 times. Therefore, the mode of the given data is 20.

Yes, the median and mode of the given data are the same.

Question:56

Calculate the mean and median for the folllowing data:

Marks	:	10	11	12	13	14	16	19	20
Number of students	:	3	5	4	5	2	3	2	1

Using empirical formula, find its mode.

Solution:

Calculation of Mean

Marks (x_i)	10	11	12	13	14	16	19	20	Total
Number of Students (f_i)	3	5	4	5	2	3	2	1	= 25
$f_i x_i$	30	55	48	65	28	48	38	20	= 332

Mean =

Here, n = 25, which is an odd number. Therefore,

Median = Value of observation = the 13th observation = 13.

Now,

Mode = 3 Median - 2 Mean

Mode = 3 x 13 - 2 x 13.28

Mode = 39 - 26.56

Mode = 12.44.

Question:57

The following table shows the weights of 12 persons.

Weight in kg:	48	50	52	54	58
Number of persons:	4	3	2	2	1

Find the median and mean weights. Using empirical relation, calculate its mode.

Solution:

Calculation of Mean

Weight (x_i)	48	50	52	54	58	Total
Number of Persons (f_i)	4	3	2	2	1	=12
$f_i x_i$	192	150	104	108	58	= 612

Mean = .

Here, n = 12

Now,

Mode = 3 Median - 2 Mean

⇒ Mode = 3 x 50 - 2 x 51

⇒Mode = 150 - 102

⇒ Mode = 48 kg.

Thus, Mean = 51 kg, Median = 50 kg and Mode = 48 kg.

Question:58

If the mean of observations 7, 8, 9, 11 and x is 10, then x =

a 10   b 15   c 12   d 13

Solution:

Given : the mean of the observations 7, 8, 9, 11 and x is 10.

Thus, the value of x is 15.

Hence, the correct option is b.

Question:59

If the mean of observations 20, 42, 35, 45 and x is 37, then x =

a 43   b 42   c 44   d 45

Solution:

Given : the mean of the observations 20, 42, 35, 45 and x.

Thus, the value of *x* is 43.
Hence, the correct option is a.

Question:60
The mean of first five natural numbers is

a 5　　　　　　　b 4　　　　　　　c 3　　　　　　　d 6
Solution:
The first five natural numbers are: 1, 2, 3, 4, 5.

Thus, the mean of first five natural number is 3.
Hence, the correct option is c.

Question:61
The mean of first five prime numbers is

a 5.6　　　　　　b 5.5　　　　　　c 5.4　　　　　　d 5.2
Solution:
The first five prime numbers are: 2, 3, 5, 7, 11.

Thus, the mean of first five prime numbers is 5.6.
Hence, the correct option is a.

Question:62
The mean of first seven even natural numbers is

a 7　　　　　　　b 8　　　　　　　c 9　　　　　　　d 6
Solution:
The first seven even natural numbers are: 2, 4, 6, 8, 10, 12, 14.

Thus, the mean of first seven even natural numbers is 8.
Hence, the correct option is b.

Question:63
The mean of first six multiples of 5 is

a 3.5　　　　　　b 18.5　　　　　　c 17.5　　　　　　d 30
Solution:
The first six multiples of 5 are: 5, 10, 15, 20, 25, 30.

Thus, the mean of first six multiples of 5 is 17.5.
Hence, the correct option is c.

Question:64
The mean of five numbers is 4. If 1 is added to each other, then the new mean is

a 4　　　　　　　b 5　　　　　　　c 3　　　　　　　d 5.5
Solution:
Mean of five numbers = 4
Sum of five numbers = 5 4 = 20

Thus, the new mean is 5.
Hence, the correct option is b.

Question:65
If the sum of 10 observations is 95, then their mean is

a 9.5　　　　　　b 10　　　　　　c 950　　　　　　d 95
Solution:

Sum of 10 observations = 95

Thus, the mean is 9.5.
Hence, the correct option is a.

Question:66
If the mean of *n* observations is 12 and the sum of the observations is 132, then the value of *n* is

a 9   b 10   c 11   d 12
Solution:
Mean of *n* observations = 12
Sum of observations = 132

Thus, the value of *n* is 11.
Hence, the correct option is c.

Question:67
The median of the data 9, 12, 11, 10, 8, 9, 11 is

a 10   b 11   c 9   d None of these
Solution:
Arranging the given data in increasing order, we get
8, 9, 9, 10, 11, 11, 12
As the number of observations is odd 7, the median is the middle term which is 10.
Hence, the correct option is a.

Question:68
The median of the data 5, 7, 9, 10, 11 is

a 7   b 9   c 11   d 10
Solution:
The data in arranging order is : 5, 7, 9, 10, 11
As the number of observations is odd 5, the median is the middle term which is 9.
Hence, the correct option is b.

Question:69
The mean of a data is 15 and the sum of the observations is 195. The number of observations is

a 13   b 19   c 16   d 17
Solution:
Mean of data = 15
Sum of observations = 195

Thus, the number of observations is 13.
Hence, the correct option is a.

Question:70
The median of 11 observations is 10. The number of possible observations in the data which are less than 10 is

a 5   b 6   c 3   d 10
Solution:
Median divides the data into two equal parts. Since, the number of observations is 11, so
after arranging in increasing or decreasing order, the number of observations to the left
of the median is five.
Thus, the required number of observations is 5.
Hence, the correct option is a.

Question:71
If the mode of 22, 21, 23, 24, 21, 20, 23, 26, *x* and 26 is 23, then *x* =

a 20   b 21   c 23   d 24

Solution:

Arranging the numbers 22, 21, 23, 24, 21, 20, 23, 26 and 26 in increasing order, we get

20, 21, 21, 22, 23, 23, 24, 26, 26

Here, the frequencies 21, 23 and 24 is 2.

So, for 23 to be the mode of the data, the value of x should be 23.

Hence, the correct option is c.

Question:72

If the mean of 5, 7, x, 10, 5 and 7 is 7, then x =

a 6   b 7   c 8   d 9

Solution:

Here, the observations are 5, 7, x, 10, 5 and 7.

Hence, the correct option is c.

Question:73

The mean of p, q and r is same as the mean of q, 2r and s. Then which of the following is correct?

a $p = q = r$ b $q = r = s$ c $q = r$ d $p = r + s$

Solution:

Mean of p, q and r = Mean of q, 2r and s

Hence, the correct option is d.

Question:74

The mean of 10, 15, 19, 30, 43, 69 and x is x. Then the median is

a 19   b 43   c 30   d None of these

Solution:

The mean of 10, 15, 19, 30, 43, 69 and x is x.

Thus, the observations are 10, 15, 19, 30, 43, 69 and 31.

Arranging the numbers 10, 15, 19, 30, 43, 69 and 31 in increasing order, we get

10, 15, 19, 30, 31, 43, 69

Thus, the median is 30.

Hence, the correct option is c.

Question:75

If the mean of 9, 10, 15, x, 6, 8 and 12 is 11. The median of the observations is

a 4   b 10   c 13   d 5

Solution:

The mean of 9, 10, 15, x, 6, 8 and 12 is 11.

So, the observations are 9, 10, 15, 17, 6, 8 and 12.

Arranging the the observations in increasing order, we get

9, 10, 15, 17, 6, 8, 12   or   6, 8, 9, 10, 12, 15, 17

Thus, the median is 10.

Hence, the correct option is b.

Question:76

The mode of the unimodular data 7, 8, 9, 8, 9, 10, 9, 10, 11, 10, 11, 12 and x is 10.

The value of x is

a 10   b 9   c 8   d 11

Solution:

Arranging the data in ascending order, we get
7, 8, 8, 9, 9, 9, 10, 10, 10, 10, 11, 11, 12
Here, 10 has the maximum frequency 4.
Hence, the correct option is a.

Question:77
The mean weight of 21 students is 21 kg. If a student weighing 21 kg is removed from the group, then the mean of of the remaining students is

a 20 kg   b 21 kg   c 19 kg   d 18 kg
Solution:
Mean weight = 21 kg
Number of students = 21
Sum of weights of 21 students = 21 21 = 441
Sum of weights of 20 students left = 441 − 21 = 420
Mean of remaining students =
Hence, the correct option is b.

Question:78
There are 7 observations in the data and their mean is 11. If each observation is multiplied by 2, then the mean of new observations is

a 11   b 13   c 22   d 55
Solution:
Mean = 11
Number of observations = 7
Sum of observations = 11 7 = 77
Sum of new observations = 2 77 = 154
Mean of new observations =
Hence, the correct option is c.

Question:79
The mean of 10 observations is 15. If one observation 15 is added, then the new mean is

a 16   b 11   c 10   d 15
Solution:
Sum of 10 observations = 10 15 = 150
Sum of 11 observations = 150 + 15 = 165
Number observations = 11
Mean of 11 observations =
Thus, the new mean is 15.
Hence, the correct option is d.

Question:80
If the median of 10, 12, x, 6, 18 is 10, then which of the following is correct?

a   b $x < 6$ c $x > 18$ d Either a or b
Solution:
Arranging the numbers 10, 12, 6, 18 in ascending order, we get
6, 10, 12, 18
Thus, for 10 to be the median of the data, $x < 6$ or .
Hence, the correct option is d.

Question:81
The mode of the data 9, x, 6, 3, 4, 9, 8, 6, 4, 6 is 6. Which of the following cannot be the value of x
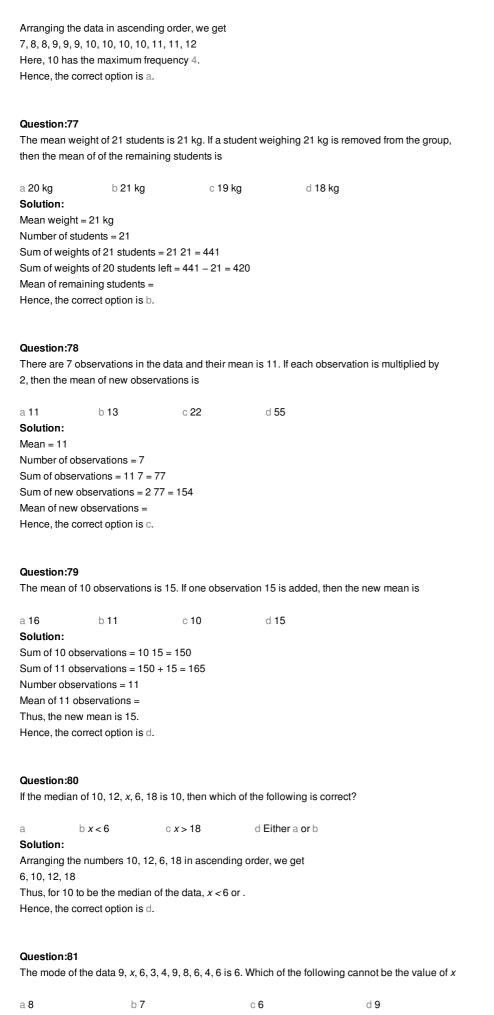
a 8   b 7   c 6   d 9
Solution:
Arranging the data 9, 6, 3, 4, 9, 8, 6, 4, 6 in ascending order, we get
3, 4, 4, 6, 6, 6, 8, 9, 9

Since the mode of the data is 6, so the value of *x* cannot be 4 or 9.

Hence, the correct option is d.

Question:82

Which of the following is correct?

a Mode = 2 Median – 3 Mean

b Mode = 3 Median – Mean

c Mode – Mean = 3Median – Mean

d Mode – Median = Median – Mean

Solution:

The relation between Mean, Median and Mode is Mode – Mean = 3Median – Mean.

Hence, the correct option is d.

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