STATISTICS

WORKSHEET-1

I. Explain **MEDIAN**, **MODE**, **MEAN**

To find the median, mode and mean of the following values:

3,1,4,6,12,9,4

Step 1: Arrange the values in ascending order

1,3,4,4,6,9,12

Step 2: Find the value of the middle term

1,3,4, **4**, 6,9,12

4 is the median

Step 3: The value, which occurs most of the time, is the mode.

1,3,**4**, **4**, 6,9,12

4 occurs maximum number of time, which is twice in this case. Therefore 4 is the mode

Step 4: Now add all the values.

1+3+4+4+6+9+12=39

Therefore Mean=$\dfrac{39}{number\ of\ the\ values}$

Total number of the values=7

Mean =$\dfrac{39}{7} = 5.57$

Questions:

1. Find the median.

8,9,10,6,7

2. Find the median.

8,11,9,5,7

3. Find the mode of the following numbers

   3,7,9,8,3

4. Find the mean.

   2,5,6,8,4

5. Find the median, mean

   1,5,12,10,12,2,3

6. Find the median, mode and mean

   1,4,5,12,15,12,10,10,12

7. Find the median.   **(TBSE-2008)**

   8,9,10,6,7,8,10,6,9,5,7

8. Find the mode of the following numbers

   4,2,5,4,2,7,4,3,6,3,4   **(TBSE-2009)**

9. Write the median of 9, 4, 12, 7, 2   **(TBSE-2011)**

10. Find the median of the following numbers

   5,6,3,7,4,9,6,4,8,3,5   **(TBSE-2014)**

WORKSHEET-2

II. Explain **median** for **even** number of terms.

e.g. the following values are given 3,1,4,8,6,11,9,12

Step1: Arrange the values in ascending order

1,3,4,6,8,9,11,12

Step2: Find the middle value

1,3,4, **6,8**, 9,11,12

As there are two middle values. Median would be the average of **6 & 8**

$$Median = \frac{6+8}{2} = 7$$

Questions:

1. Find the median of the following numbers
   5,2,9,8,4,12

2. Find the median of the following numbers
   12,7,15,12,10,8,3,4

III. To find the missing value when mean is given.

e.g.Find the value of x when the mean of the following numbers 1,2,4,5,x and 7 is 4.

Mean $(\bar{x}) = \frac{1+2+4+5+x+7}{6}$

$\Rightarrow \qquad 4 = \frac{19+x}{6}$

$\Rightarrow \qquad 24 = 19 + x$

$\Rightarrow 24 - 19 = x$

$\Rightarrow x = 5$

Questions:

1. If the arithmetic mean of 1,2,5,6,x & 8 is 5. Find the value of x.
2. If the arithmetic mean of 4,8,3,x & 11 is 7. Find the value of x.
3. If the arithmetic mean of 6,4,7, p & 8 is 5. Find the value of p.
4. If the arithmetic mean of 6,8,9, p & 13 is 10. Find the value of p.
5. If the arithmetic mean of 3,6,8,4, x & 2 is 4. Find the value of x.

IV. If the arithmetic mean of 1,2,4,5,5 & 7 is 4. Find the value of
(1-4)+(2-4)+(5-4)+(5-4)+(7-4).

If the arithmetic mean of 3,4,8,9 & 11 is 7. Find the value of
(3-7)+(4-7)+(8-7)+(9-7)+(11-7).

Questions:

1. If the arithmetic mean of $x_1, x_2, x_3 \ldots x_n$ is $\bar{x}$. Find the value of
$$(x_1 - \bar{x}) + (x_2 - \bar{x}) + (x_3 - \bar{x}) + \cdots \ldots \ldots + (x_n - \bar{x})$$

2. The arithmetic mean of $x_1, x_2, x_3 \ldots x_n$ is $\bar{x}$. If a is added to each of these numbers. What will be the mean of the new numbers?

V.   Empirical formula.
   Mode = 3Median – 2Mean

Question:

1. The arithmetic mean and median of a frequency distribution are 42.3 and 41.9 respectively. From the empirical relation of AM, median, mode, find the mode.
2. The arithmetic mean and median of a frequency distribution are 8 and 7.8 respectively. Find the mode.
3. The mode and median of a frequency distribution are 10 and 10.5 respectively. Find the arithmetic mean
4. The arithmetic mean and mode of a frequency distribution are 6 and 6.1 respectively. Find the median.
5. The arithmetic mean and mode of a frequency distribution are 42.3 and 41.1 respectively. Find the median.

VI. Grouped data.

i) Arithmetic mean of grouped data.

Find the arithmetic mean of the following data.

Class interval	0-50	50-100	100-150	150-200	200-250
Frequency	15	20	35	20	10

Solution:

Class interval	Mid point(x)	Frequency(f)	fx
0-50	25	15	375
50-100	75	20	1500
100-150	125	35	4375
150-200	175	20	3500
200-250	225	10	2250

$$\Sigma f = 100 \quad \Sigma fx = 12000$$

$$\therefore Arithmetic\ mean = \frac{\Sigma fx}{\Sigma f}$$

$$= \frac{12000}{100}$$

$$= 120$$

$$\therefore Arithmetic\ mean = 120$$

Questions:

1. Find the arithmetic mean of the following frequency distribution.

Marks obtained	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of students	3	8	12	14	10	6	5	2

2. Find the arithmetic mean of the following frequency distribution.

Class interval	0-20	20-40	40-60	60-80	80-100	100-120	120-140
frequency	12	18	15	25	26	15	9

3. Find the arithmetic mean of the following frequency distribution.

Class interval	130-135	135-140	140-145	145-150	150-155	155-160	160-165
frequency	7	16	30	26	18	13	5

4. Find the arithmetic mean of the following frequency distribution.

Class interval	300-309	310-319	320-329	330-339	340-349	350-359	360-369	370-379
Frequency	8	21	26	41	49	28	19	8

WORKSHEET-5

ii) The arithmetic mean of the following frequency is 25. Find the value of P.

Class interval	0-10	10-20	20-30	30-40	40-50
Frequency	5	8	15	P	6

Solution:

Class interval	Mid point(x)	Frequency(f)	fx
0-10	5	5	25
10-20	15	8	120
20-30	25	15	375
30-40	35	P	35P
40-50	45	6	270

$$\sum f = 34 + P \qquad \sum fx = 790 + 35P$$

$$\therefore Arithmetic\ mean = \frac{\sum fx}{\sum f}$$

$$=> 25 = \frac{790 + 35P}{34 + P}$$

$$=> 25(34 + P) = 790 + 35P$$

$$=> 850 + 25P = 790 + 35P$$

$$=> 850 - 790 = 35P - 25P$$

$$=> 60 = 10P$$

$$=> P = \frac{60}{10}$$

$$=> P = 6$$

Questions:

1. The arithmetic mean of the following frequency is 28. Find the value of f_1

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of students	12	18	27	f_1	17	6

2. The arithmetic mean of the following frequency is 27. Find the value of p.

Marks	0-10	10-20	20-30	30-40	40-50
No. of students	2	4	p	7	3