STATICTICS

(i) **Assumed Mean method or Shortcut method**

Mean = $\bar{X} = a + \frac{\sum_{i=1}^{n} fidi}{\sum_{i=1}^{n} fi}$

Where a = assumed mean

And $d_i = X_i - a$

(ii) **Step deviation method**.

Mean = $\bar{X} = a + \frac{\sum_{i=1}^{n} fiui}{\sum_{i=1}^{n} fi} \; x \; h$

Where a = assumed mean

h = class size

And $u_i = (X_i - a)/h$

- Median of a grouped frequency distribution can be calculated by

  Median = $l + \left(\frac{\frac{n}{2} - cf}{f}\right) x \; h$

  Where

  l = lower limit of median class

  n = number of observations

  cf = cumulative frequency of class preceding the median class

  f = frequency of median class

  h = class size of the median class.

- Mode of grouped data can be calculated by the following formula.

  Mode = $l + \left(\frac{f1 - fo}{2f1 - fo - f2}\right) x \; h$

  Where

  l = lower limit of modal class

  h = size of class interval

  f1 = Frequency of the modal class

  fo = frequency of class preceding the modal class

  f2= frequency of class succeeding the modal class

- Empirical relationship between the three measures of central tendency.

  3 Median = Mode + 2 Mean

  Or, Mode = 3 Median – 2 Mean

- Ogive

  Ogive is the graphical representation of the cumulative frequency distribution. It is of two types:

  (i) Less than type ogive.

  (ii) More than type ogive

- Median by graphical method
  The x-coordinated of the point of intersection of 'less than ogive' and 'more than ogive' gives the median.

LEVEL – I

Slno	Question
1	What is the mean of 1st ten prime numbers?
2	What measure of central tendency is represented by the abscissa of the point where less than ogive and more than ogive intersect?
3	If the mode of a data is 45 and mean is 27, then median is _____.
4	Find the mode of the following X_i | 35 | 38 | 40 | 42 | 44 | f_i | 5 | 9 | 10 | 7 | 2 |
5	Write the median class of the following distribution. Class | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 Frequency | 4 | 4 | 8 | 10 | 12 | 8 | 4
6	The wickets taken by a bowler in 10 cricket matches are as follows: 2, 6 ,4 ,5, 0, 2, 1, 3, 2, 3 Find the mode of the data
7.	How one can find median of a frequency distribution graphically
8.	What important information one can get by the abscissa of the point of intersection of the less than type and the more than type commulative frequency curve of a group data

LEVEL – II

Slno	Question	Ans
1	Find the median of the following frequency distribution Height in cm | 160-162 | 163-165 | 166-168 | 169-171 | 172-174 Frequency | 15 | 117 | 136 | 118 | 14	167
2	Given below is the distribution of IQ of the 100 students. Find the median IQ IQ | 75-84 | 85-94 | 95-104 | 105-114 | 115-124 | 125-134 | 135-144 Frequency | 8 | 11 | 26 | 31 | 18 | 4 | 2	106.1
3	Find the median of the following distribution Class interval | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 Frequency | 5 | 8 | 20 | 15 | 7 | 5	28.5
4	A class teacher has the following absentee record of 40 students of a class for the whole	

	term. No. of days: 0-6 | 6-10 | 10-14 | 14-20 | 20-28 | 28-38 | 38-40 No. of students: 11 | 10 | 7 | 4 | 4 | 3 | 1 Write the above distribution as less than type cumulative frequency distribution.	
5	Using the assumed mean method find the mean of the following data. Class interval: 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | | frequency: 7 | 8 | 12 | 13 | 10 | |	Ans 27.2
6	Name the keyword used for central tendency	Mean , median , mode

LEVEL – III

SN	Question	Ans
1	If the mean distribution is 25 Class: 0-10 | 10-20 | 20-30 | 30-40 | 40-50 Frequency: 5 | 18 | 15 | P | 6 Then find p.	P=16
2	Find the mean of the following frequency distribution using step deviation method Class: 0-10 | 10-20 | 20-30 | 30-40 | 40-50 Frequency: 7 | 12 | 13 | 10 | 8	25
3	Find the value of p if the median of the following frequency distribution is 50 Class: 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 Frequency: 25 | 15 | P | 6 | 24 | 12 | 8	P=10
4	Find the median of the following data Marks: Less Than 10 | Less Than 30 | Less Than 50 | Less Than 70 | Less Than 90 | Less Than 110 | Less Than 130 | Less than 150 Frequency: 0 | 10 | 25 | 43 | 65 | 87 | 96 | 100 .	76.36
5	Compare the modal ages of two groups of students appearing for entrance examination. Age in yrs: 16-18 | 18-20 | 20-22 | 22-24 | 24-26 Group A: 50 | 78 | 46 | 28 | 23	

	Group B	54	89	40	25	17	

6 The mean of the following frequency distribution is 57.6 and the sum of the observations is 50. Find the missing frequencies f_1 and f_2. — f_1 =8 and f_2 =10

Class	0-20	20-40	40-60	60-80	80-100	100-120	Total
Frequency	7	f_1	12	f_2	8	5	50

7 The following distribution give the daily income of 65 workers of a factory

Daily income (in Rs)	100-120	120-140	140-160	160-180	180-200
No. of workers	14	16	10	16	9

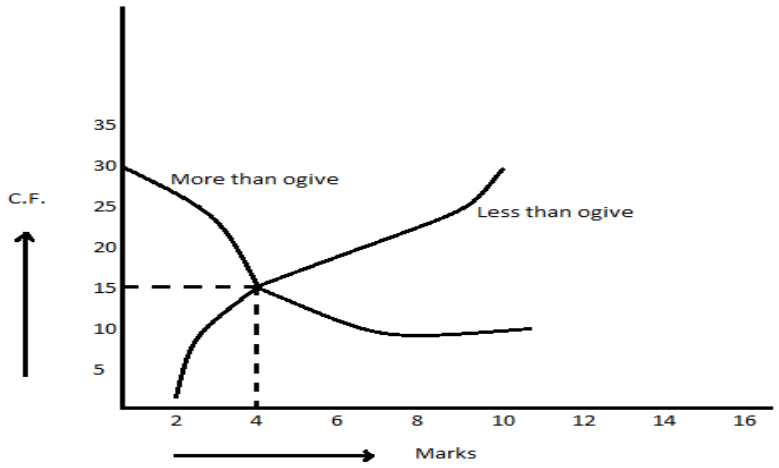
Convert the above to a more than type cumulative frequency distribution and draw its ogive.

8 Draw a less than type and more than type ogives for the following distribution on the same graph. Also find the median from the graph.

Marks	30-39	40-49	50-59	60-69	70-79	80-89	90-99
No. of students	14	6	10	20	30	8	12

SELF – EVALUATION

1. What is the value of the median of the data using the graph in figure of less than ogive and more than ogive?



2. If mean =60 and median =50, then find mode using empirical relationship.
3. Find the value of p, if the mean of the following distribution is 18.

Variate (x_i)	13	15	17	19	20+p	23
Frequency (f_i)	8	2	3	4	5p	6

4. Find the mean, mode and median for the following data.

Classes	0-10	10-20	20-30	30-40	40-50	50-60	60-70
frequency	5	8	15	20	14	8	5

5. The median of the following data is 52.5. find the value of x and y, if the total frequency is 100.

Class Interval	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
frequency	2	5	X	12	17	20	Y	9	7	4

6. Draw 'less than ogive' and 'more than ogive' for the following distribution and hence find its median.

Classes	20-30	30-40	40-50	50-60	60-70	70-80	80-90
frequency	10	8	12	24	6	25	15

7. Find the mean marks for the following data.

Marks	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60	Below 70	Below 80	Below 90	Below 100
No. of students	5	9	17	29	45	60	70	78	83	85

8. The following table shows age distribution of persons in a particular region. Calculate the median age.

Age in years	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60	Below 70	Below 80
No. of persons	200	500	900	1200	1400	1500	1550	1560

9. If the median of the following data is 32.5. Find the value of x and y.

Class Interval	0-10	10-20	20-30	30-40	40-50	50-60	60-70	Total
frequency	x	5	9	12	y	3	2	40

10. The following are ages of 300 patients getting medical treatment in a hospital on a particular day.

Age(in years)	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
Number of patients	60	42	55	70	53	20

Draw:

1. Less than type cumulative frequency distribution
2. More than type cumulative frequency distribution

Value Based Question

Q1. The following frequency distribution gives the monthly consumption of electricity of 68 consumers of a locality.

Monthly consumption (in units)	65 – 85	85 – 105	105 – 125	125- 145	145- 165	165 – 185	185 – 205
Number of consumers	4	5	13	20	14	8	4

Mr. Sharma always saves electricity by switching of all the electrical equipment just immediately after their uses. So , his family belongs to the group 65- 85 .

(i) Find the median of the above data

(ii) How many families consumed 125 or more units of electricity during a month?

(iii) What moral values of Mr. Sharma have been depicted in this situation?

Q2. The mileage (km per litre) of 50 cars of the same models is tested by manufacturers and details are tabulated as given below:-

Mileage (km per litre)	10 – 12	12 – 14	14 - 16	16- 18
No. of cars	7	12	18	13

i. Find the mean mileage.

ii. The manufacturer claims that the mileage of the model is 16km/litre. Do you agree with this claim?

iii. Which values do you think the manufacturer should imbibe in his life?

ANSWER

1. 12.9
2. MEDIAN
3. 33
4. MODE = 40
5. MEDIAN = 30-40
6. 2
7. OGIVE
8. Median

Level II

Q1 167

Q2 106.1

Q3 28.5l

Q4

No. of days	**Less Than 6**	**Less Than 10**	**Less Than 14**	**Less Than 20**	**Less Than 28**	**Less Than 38**	**Less Than 40**
No. of students	**11**	**21**	**28**	**32**	**36**	**39**	**40**

Q5 27.2

Q6 Mean, median, mode