ECONOMICS

BOOKS - VK GLOBAL PUBLICATION ECONOMICS (HINGLISH)

MEASURES OF CENTRAL TENDENCY MEDIAN AND MODE

Illustration

1. The following series show marks in economics of 11 students of Class XI

. Find the median marks.

Marks	17	32	35	33	15	21	41	32	11	10	20

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2. Find the median of the following series :

Size	2	3	4	5	6	7	8	9	10
Frequency	2	3	8	10	12	16	10	8	6

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3. Find out median value of the following distribution:

Wege Rate (Rs.)	$0-10$	$10-20$	$20-30$	$30-40$	$40-50$
Number of Workers	22	38	46	35	20

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4. The following table gives distributionn of marks secured by some stidents :

Wege Rate (Rs.)	$10-20$	$20-30$	$30-40$	$40-50$	$50-60$	$60-$
Number of Students	42	38	120	84	48	36

Calculate the median marks secured by the students.

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5. Calculate median of the following series :

Wage Rate (Rs.) (less than)	10	20	30	40	50	60	70	80
Number of Waorkers		15	35	60	84	96	127	198	250

6. Calculate median of the following data :

Marks	46 − 50	41 − 45	36 − 40	31 − 35	36 − 30	21 −
Number of Students	5	11	22	35	26	13

7. Calculate median of the following of data :

Class Interval	0 − 5	5 − 10	10 − 20	20 − 30	30 − 50	50 − 70
Number of Students	12	15	25	40	42	14

8. Find the missing frequency in the following distribution if N=100 and

M=30.

Marks	0 — 10	10 — 20	20 — 30	30 — 40	40 — 50	50 — 0
Number of Students	10	?	25	30	?	10

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9. Find the missing frequency in the following distribution if N is 60 and median is 40.

Marks	0–10	10–30	30–60	60–80	80–90
Frequency	5	f_1	f_2	8	2

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10. Determine median value of the following series using graphic method :

Marks	0 — 5	5 — 10	10 — 15	15 — 20	20 — 25	25 — 30
Number of students	4	6	10	10	22	25

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11. From the following data , calculate Q_1, Q_3, D_5 and P_{25}.

S.No.	21	15	40	30	26	45	50	54	60	65	70

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12. Calcilation Q_1, Q_3, D_6 and P_{85} from the following data :

Size	10	11	12	13	14	15	16	17	18
Frequency	3	4	5	12	10	7	5	2	1

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13. Calculate the values of Q_1, Q_3, D_8 and P_{85} - from the following data :

Wages (Rs.)	0 − 10	10 − 20	20 − 30	30 − 40	40 − 50
Number of Workers	22	38	46	35	19

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14. Age of 15 students of a class is reported below find the model age.

Age (Years)	22	24	17	18	17	19	18	21	20	21	23	22	22	22

15. The table below presents death rate of population across different

coun tries . Find the mode.

Death Rate	11.1	10.9	10.7	11.1	10.6	11.3	106
(Per thousand)	10.7	10.6	10.9	10.6	10.5	10.4	10.6

16. Find out mode of the following series :

Income (Rs.)	110	120	130	140	150	160
Nunber of Persons	2	4	8	10	5	4

17. Given the following data , calculate mode using the grouping

technique .

Size	2	3	4	5	6	7	8	9	10	11	12	13
Frequency	3	8	10	12	16	14	10	8	17	5	4	1

18. Calculate mode from the following data :

Class Interval	0 − 10	10 − 20	20 − 30	30 − 40	40 − 50
Frequency	2	5	7	5	2

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19. Calculate mode of the following sercies :

Class Interval	0 − 5	5 − 10	10 − 15	15 − 20	20 − 25	25 − 30	30 −
Frequency	1	2	10	4	10	9	2

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20.

Class Interval	0 − 4	4 − 8	8 − 12	12 − 14	14 − 16	16 − 20	20 − 2
Frequency	2	4	7	5	8	3	2

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21. Caculate mode of the following data :

Marks	0 − 5	5 − 10	10 − 20	20 − 40	40 − 60	60 − 80
Number of Students	5	7	9	25	30	24

22. Calculate mode of the following sercies:

Class Interval	10 − 19	20 − 29	30 − 39	40 − 49	50 − 59	60 − 69	7
Frequency	10	12	18	30	16	6	

23. Calculate mode , given the following data set :

Mid - value	15	25	35	45	55	65	75	85
Frequency	5	8	12	16	28	15	3	2

24. Find out mode of the following series :

Wages (Rs.) less than	200	300	400	500	600	700	800	900
Number of Workers	5	18	38	70	90	95	98	100

25. Calculate mode of a series , the mean and median values of which are 16 cm and 20 cm respectively.

26. Calculate mode of the following series , using the Graphic Technique :

Expenditure	Number of Families
0–10	14
10–20	23
20–30	27
30–40	21
40–50	15

27. If in an asymmetrical distribution , median is 280 and mean is 310 , what will be the mode ?

1. The following sercies show marks in Statistics of 9 students in Class XI .

Find the median marks.

Marks   22   16   18   13   15   19   17   20   23

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2. Calculate median from the following data :

200   217   316   264   296   282   317   299

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3. Following are the marks obtained by a batch of 10 students in a certain

class test in Statistics (X) and Accountancy (Y) :

Roll Number	1	2	3	4	5	6	7	8	9	10
Statistics (X)	63	64	62	32	30	60	47	46	35	28
Accountancy(Y)	68	66	35	42	26	85	44	80	33	72

In which subject is level of Knowledge of students higher ?

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4. Calculate the median from the following data :

Size	10	12	14	16	18	20	22
Frequency	2	5	12	20	10	7	3

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5. The following table gives the marks obtained by some students.

Calculate the median marks obtained by the students.

Marks	$0-5$	$5-10$	$10-15$	$15-20$	$20-25$	$25-30$
Number of Students	6	12	17	30	10	10

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6. Calculate median from the following data :

Marks	Number of Students
Less than 10	4
Less than 20	16
Less than 30	40
Less than 40	76
Less than 50	96
Less than 60	112
Less than 70	120
Less than 80	125

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7. Caculate median of the following distribution of data :

Class Interval	$1 - 10$	$11 - 20$	$21 - 30$	$31 - 40$	$41 - 50$
Frequency	4	12	20	9	5

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8. Calculate the median from the following data - set :

Size	$10 - 15$	$15 - 17.5$	$17.5 - 20$	$20 - 30$	$30 - 35$	$35 - 40$	4
Frequency	10	15	17	25	28	30	

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9. Compute median from the following data :

Mid - value	5	15	25	35	45	55	65	75
Frequency	15	7	11	10	13	8	20	16

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10. Find the missing frequency of the group 20-30 when the median is 28.

Class Interval	$0 - 10$	$10 - 20$	$20 - 30$	$30 - 40$	$40 - 50$
Frequency	5	8	?	16	6

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11. Caculate Q_1, Q_3, D_9 and P_{70} from the following data :

120 187 170 180 192 150 190 181 200 210

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12. Calculate median , quartiles , 6th decile and 70 th percentile from the following data :

Marks (less than)	80	70	60	50	40	30	20	10
Number of Students	100	90	80	60	32	20	13	5

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13. Following is the distribution of marks in Economics obtained by 50

students :

Marks (more than)	0	10	20	30	40	50
Number of Students	50	46	40	20	10	3

Calculate the median marks . If 60% of the students pass this test , find

the minimum marks obtained by a pass candidate.

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14. Find the mode from the following data :

8,10,5,8,12,7,8,9,11,7

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15. From the following data , determine the mode by grouping method :

Size	7	8	9	10	11	12	13	14	15	16	17
Frequency	2	3	6	12	20	24	25	7	5	3	1

16. Caculate the mode from the following data :

Wages (Rs.)	$0-5$	$5-10$	$10-15$	$15-20$	$20-25$	$25-30$
Number of Workers	3	7	15	30	20	10

17. Calculate the mode from the following data :

Class Interval	$20-24$	$25-29$	$30-34$	$35-39$	$40-44$	$45-49$	5
Frequency	3	5	10	20	12	6	

18. The mode and mean are 26.6 and 28.1 respectively in an asymmetrical distribution . Find out the value of median .

19. Calculate the median of the following items :

15,23,20,20,23,35,26,27,25,40

20. Find out median marks from the following data :

Marks	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Number of Students	8	30	40	12	10

21. Following is the distribution of marks in Statistics obtained by 32 students :

Mid - value	5	15	25	35	45	55
Frequency	4	6	10	7	3	2

Caculate the median marks.

22. Find the missing frequency of the group 20-30 when the median is 24.

Size	$0-10$	$10-20$	$20-30$	$30-40$	$40-50$
Frequency	5	25	—	18	7

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23. Locate the median graphically from the following data :

Marks	$0-10$	$10-20$	$20-30$	$30-40$	$40-50$
Number of Students	10	20	30	20	10

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24. Calculate Q_1, Q_3, D_7 and P_{89} from the following data :

Size	1	2	3	4	5	6	7	8	9	10	11
Frequency	5	8	15	22	36	44	28	17	12	9	3

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25. The marks obtained by 100 students of a school are given below.

Marks	$0-5$	$5-10$	$10-15$	$15-20$	$20-25$	$25-30$	30
No . of Students	4	6	10	10	25	22	

Find out Q_1, Q_3, D_6 and P_{95}.

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26. Find the mode from the following data :

5,8,4,5,5,8,4,7,8,5

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27. Calculate mode from the following data :

Class Interval	$30-40$	$40-50$	$50-60$	$60-70$	$70-80$	$80-90$	9
Frequency	3	4	6	10	6	4	

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28. Calculate mean in an asymmetrical distribution if mode is 16 and median is 15.73.

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29. The arithmetic mean , the mode and the median of a group of 75 observations were calculate to be 27, 34 and 29 respectively. It was later discovered that one observation was wrongly read as 43 instead of the correct value 53. Examine to what extent the calculate values of the averages will be affected by the error.

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30. Calculate mean , median and mode from the following data :

Class Interval	$30 - 40$	$40 - 50$	$50 - 60$	$60 - 70$	$70 - 80$	$80 - 90$
Frequency	18	37	45	27	15	8

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1. Median divides a series into how many parts ?

    A. Two

    B. Three

    C. Four

    D. All of these.

Answer: A

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2. Which of the following is a kind of partition value ?

    A. Arithmetic mean

    B. Median

    C. Quartile

D. all of these

Answer: D

3. Which of the following formulae is used to find out median ?

A. $M = l_1 + \dfrac{\frac{N}{4} - c.\,f.}{f} \times i$

B. $M = l_2 + \dfrac{\frac{N}{4} - c.\,f.}{f} \times i$

C. $M = l_1 + \dfrac{N - c.\,f.}{f} \times i$

D. None of these

Answer: D

4. Dividing a series into equal is called :

A. decile

B. quartile

C. percentile

D. None of these

Answer: A

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5. For calculating median , all items of the series are arranged in

A. descending order

B. ascending order

C. asceneding or descending order

D. None of these

Answer: C

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6. Quartile is a type of :

A. mathematical average

B. statistical average

C. partition value

D. None of these

Answer: C

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7. Mode refers to that value of a series occurs _____ times in the series.

A. zero

B. infinite

C. maximum

D. minimum

Answer: C

8. what is the relationship between mode , mean and median

A. $Z = 3M + \overline{2X}$

B. $Z = 3M - \overline{2X}$

C. $\overline{X} = \dfrac{3M - Z}{2}$

D. Both (b) and (c)

Answer: D

9. Out of the following , by which method mode can be calculated?

A. Inspection method

B. Grouping method

C. Both (a) and (b)

D. None of these

Answer: C

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10. Which of the following formulae is used to find out $P(77)$ in frequency distribution ?

A. $l_1 - \dfrac{77\left(\frac{N}{10}\right) - c.\ f.}{f} \times i$

B. $l_1 + \dfrac{77\left(\frac{N}{10}\right) - c.\ f.}{f} \times i$

C. $l_1 - \dfrac{77\left(\frac{N}{100}\right) - c.\ f.}{f} \times i$

D. $l_1 + \dfrac{77\left(\frac{N}{100}\right) - c.\ f.}{f} \times i$

Answer: D

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11. Median of these numbers : 3,5,7,9,12 is

A. 3

B. 6

C. 7

D. 12

Answer: C

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12. Formula of D_7 in individula series is :

A. Size of $\left(\dfrac{N+1}{100} \right)$ th item

B. Size of $7\left(\dfrac{N+1}{10}\right)$ th item

C. Size of $7\left(\dfrac{N}{100}\right)$

D. None of these

Answer: B

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13. Median is that value of divides the group into two _____ Parts.

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14. If a statistical series is divided into four equal parts , the end value of each part is called a _____.

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15. Percentilies divide the series into _____ equal parts.

16. Inspection method to find out mode is possible only when there is

_____ in the seres.

17. Median of a series : 3,5,7,9,12, is_____.

18. In case of _____ distribution , frequency curve will be bell - shaped.

19. _____ is based on all the items of the distribution.
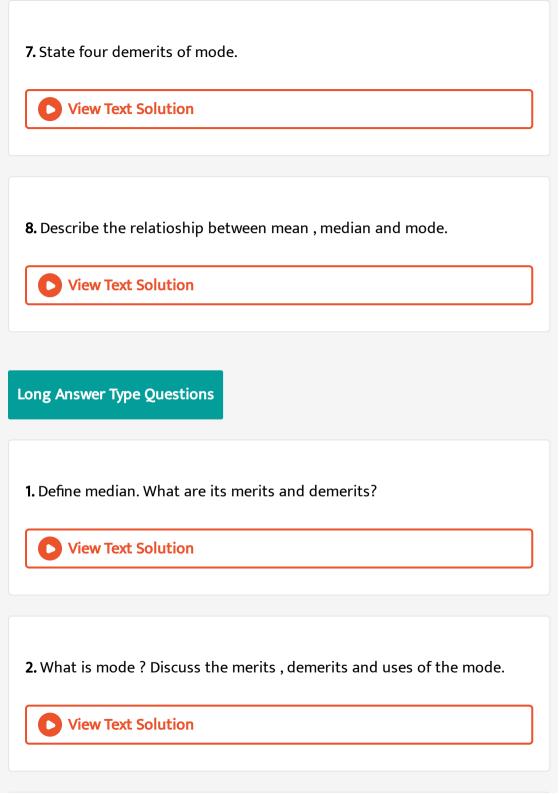
20. Quartile divides a series into three equal parts.

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21. Cumulative frequency indicates ' less than' or more than' value of the series.

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22. Mode of 3,4,3,5,5,3,2 numbers is 5.

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23. Q_1 is known as upper quartile of the series.

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24. In percentilies , series is divided in hundred equal parts.

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25. The point where ' less than ogive' and more than ogive ' intersect each other determines median .

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26. Median is free from the effect of extreme values.

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Concept Based Objective Questions

1. Define median.

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2. Define mode.

3. Define partition value.

4. Define quartile.

5. What is positional average ?

6. Give the formula for finding out median of a continuous series.

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7. Give the formula for estimating mode in case of continuous series.

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Short Answer Type Questions

1. What are the main differences between mode and median?

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2. What are the uses of mode ? How are quartiles calculated?

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3. Arthmetic mean is affected by very large and very small values , but median and mode are not affected by them ' Explain.

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4. State four merits of median.

> ▶ **View Text Solution**

5. State four demerits of median.

> ▶ **View Text Solution**

6. State four merits of mode.

> ▶ **View Text Solution**

7. State four demerits of mode.

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8. Describe the relatioship between mean , median and mode.

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Long Answer Type Questions

1. Define median. What are its merits and demerits?

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2. What is mode ? Discuss the merits , demerits and uses of the mode.

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3. Define an average and describe its chief properties .

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4. How is median class interval located in case of continuous series ? Explain taking an imaginary set of data.

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5. Compare the arithmetic mean , median and mode as measures of central tendency . Describe situations where one is more suitable than the others.

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Essential Practiclas

1. Given below is the data of the age of 9 children of a street . Find the median .

5,8,7,3,4,6,2,9,1

2. Find the median of the following values :

30,20,15,10,25,35,18,21,28,40,36

3. Find out median of the series of the following table :

Items	3	4	5	6	7	8
Frequency	6	9	11	14	23	10

4. Data relating to wages of some workers are given below . Find out median wage .

Wages(Rs.)	20 − 30	30 − 40	40 − 50	50 − 60	60 − 70
Number of Workers	25	12	15	13	5

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5. The following table expresses the age of eight students . Find the median age.

S. No.	1	2	3	4	5	6	7	8
Age (Years)	18	16	14	11	13	10	9	2

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6. Number of persons living in a house is reported to be as under for 500 houses in a village. Find the median number of persons in a house in the village.

Number of Persons in a House	1	2	3	4	5	6	7	8	9	10
Number of Houses		26	113	120	95	60	42	21	14	5	4

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7. Find out median of the following series :

Size	15	20	25	30	35	40
Frequency	10	15	25	5	5	20

8. Distribution of marks obtained by 100 student of a class is given below .

Find out the median marks

Marks	0	5	10	15	20	25	30	35	40	45
Number of Students	4	6	15	5	8	12	28	14	3	5

9. Find out median wage rate from the following data - set :

Wage Rate (Rs.)	5 − 15	15 − 25	25 − 35	35 − 45	45 − 55	55 −
Number of Workers	4	6	10	5	3	2

10. Find out median of the following series :

Wage Rate (Rs.)	25 – 30	20 – 25	15 – 20	10 – 15	5 – 10	0 – 5
Number of Workers	5	10	20	5	8	2

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11. Calculate the median from the following series :

Age (Years)	55 – 60	50 – 55	45 – 50	40 – 45	35 – 40	30 –
Number of Students	7	13	10	15	30	3

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12. 50 students of economics , secured the following marks in an examination :

Marks	20 – 25	25 – 30	30 – 35	35 – 40	40 – 45	45 – 50	50 – 5
Students	6	3	7	4	6	4	2

Caculate median.

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13. Given the following data , find out median :

Age	20 − 25	25 − 30	30 − 35	35 − 40	40 − 45	45 −
Number of Students	50	70	100	180	150	12

14. Find out median , with the help of the following data :

Price Level	10 − 20	20 − 30	30 − 40	40 − 50	50 − 60	6
Number of Commodity	2	5	8	4	6	

15. Caculate median , given the following data :

Mid - value	20	30	40	50	60	70
Male (c.f.)	12	25	42	46	48	50

c.f. = Cumulative Frequency

[Note : Before solving the question , the student should first convert

cumulative frequency into class frequency .]

16. Calculate mode of the following series using the graphic technique .

Counter check the modal value with formula.

Wage	$0-10$	$10-20$	$20-30$	$30-40$	$40-50$
Number of Workers	28	46	54	42	30

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17. Calculate mode from the following data :

`{:("Wages",25,50,75,80,85,90),("Number of Workers",4,6,9,3,2,1):}`

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18. Find out mode from the following data :

Class Interval	$5-10$	$10-15$	$15-20$	$20-25$	$25-30$	$30-$
Number of Childern	4	5	3	2	6	7

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19. Caculate mode of the following series , using grouping method :

Size	40	44	48	52	56	60	64	68	72	76
Frequency	10	12	14	20	15	20	18	10	8	4

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20. Caculate mode of the following distribution :

Marks	$10 - 19$	$20 - 29$	$30 - 39$	$40 - 49$	$50 - 59$	$60 -$
Number of Students	29	87	181	247	263	13

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21. Find out mode , given the following information :

Size	$6 - 10$	$11 - 15$	$16 - 20$	$21 - 25$	$26 - 30$
Frequency	20	30	50	40	10

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22. Calculate mode from the following data :

Wages (Rs.)	Number of Workers
Less than 10	15
Less than 20	35
Less than 30	60
Less than 40	84
Less than 50	96
Less than 60	127
Less than 70	198
Less than 80	250

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23. Calculate mode from the following series :

Size	1	2	3	4	5	6	7	8	9	10
Frequency	8	6	10	12	20	12	5	3	2	4

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24. Calculate the median and mode of the number of persons per house in a village with the help of the following information :

Number of Persons per House	1	2	3	4	5	6	7	8	9	10
Number of House		26	133	120	95	60	42	21	14	5	4

25. Caculate the median and mode from the following data :

Marks	0 − 10	10 − 20	20 − 30	30 − 40	40 − 50	50 −
Number of Students	2	18	30	45	35	20

26. Calculate the median value , given the following statistical information :

Age	20 − 25	25 − 30	30 − 35	35 − 40	40 − 45	45 −
Number of Students	50	70	100	180	150	12

27. Obtain the mean , median and mode of the following data :

Marks	0 − 10	10 − 20	20 − 30	30 − 40	40 − 50	50 −
Number of Students	5	7	15	25	20	15

28. Caculate median in an asymmetrical distribution if mode is 83 and arithmetic mean is 92.

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29. Calculate mode when arithmetic mean is 146 and median is 130.

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30. If mode is 63 and median is 77, calculate arithmetic mean.

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31. Calculate arithmetic mean , median and mode of the following series :

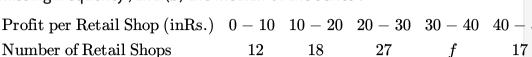| Marks	Number of Students
Less than 10	12
Less than 20	26
Less than 30	40
Less than 40	58
Less than 50	80
Less than 60	110
Less than 70	138
Less than 80	150

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Ncert Questions With Hints To Answers

1. (i) The sum whether the following statements are true or false :

(ii) An average alone is not enough to compare series.

(iii) Arithmetic mean is a positional value.

(iv) Upper quartile is the lowest value of top 25% of items.

(v) Median is unduly affected by extreme observations.

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2. If the arithmetic mean of the data given below is 28 , find (a) the missing frequency , and (b) the median of the series :

Profit per Retail Shop (inRs.)	0 – 10	10 – 20	20 – 30	30 – 40	40 –
Number of Retail Shops	12	18	27	f	17

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3. The size of land holdings of 380 families in a village is given below . Find the median size of land holdings.

Size of Land Holidings (in acres)	Less than 100	100 – 200	200 – 300	3
Number of Families	40	89	148	

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4. The following series relates to the daily income of workers employed in a firm . Compute (a) highest income of lowest 50% workers , (b) minimum income earned by the top 25% workers , and (c) maximum income earned by lowesr 25% worlers.

Daily Income (in Rs.)	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35
Number of Workers	5	10	15	20	10	

5. The following table production yield in kg per hectare of wheat of 150

farms in a village . Culculate the mean , median and mode of the

production yeild.

Production Yield (kg per hectare)	$50 - 53$	$53 - 56$	$56 - 59$	$59 - 62$	(
Number of Farms	3	8	14	30	