

CBSE Class 10 Maths

Chapter 14 - Statistics

Important Questions and Answers:

MULTIPLE CHOICE QUESTIONS and OBJECTIVE TYPE QUESTIONS (1 MARK)

Q1. Which is the empirical relation between Mean, Median and Mode

(a) $3 \text{ Mean} = \text{Mode} + 2 \text{ Median}$

(b) $3 \text{ Median} = \text{Mode} + 2 \text{ Mean}$

(c) $2 \text{ Median} = \text{Mode} + 3 \text{ Mean}$

(d) $3 \text{ Median} = \text{Mode} - 2 \text{ Mean}$

Q2. If the Arithmetic Mean of x , $x+2$, $x+4$ and $x+6$ is 5. Then find the value of x is

(a) 3

(b) 2

(c) 1

(d) 5

Q3. If Median of data 16, 18, 20, $24-x$, $20+2x$, 28, 30, 32 is 24 then x is

(a) 4

(b) 18

(c) 16

(d) 20

Q4. If Mode of data 64, 60, 48, x , 43, 48, 43, 34 is 43 then $x+3$ is

(a) 44

(b) 45

(c) 46

(d) 48

Q5. The algebraic sum of deviation of frequency distribution from its mean is

(a) 0

(b) 1

(c) -1

(d) 2

Q6. Find the class mark of the class 10 - 25.

Ans: Class mark= $\frac{1}{2}(10+25) = 17.5$

Q7. If the difference of mode and median of the data is 24, then find the difference of median and mean.

Ans: Mode-Median=24

Mode=24+Median

3 Median-2 Mean=Mode

3 Median-2 Mean=24+Median

3 Median-Median=24+2 Mean

Median-Mean=24/2=12

Q8. The mean and median of the data are 14 and 15. Find the value of mode.

Ans: 3 Median=Mode +2 Mean

Mode= 3x15 – 2x14 = 17

Q9. Find the mean of first n odd natural numbers.

Ans: Mean = $\frac{(1+3+5+\dots+(2n-1))}{n} = n$

Q10. Find the median of the first 9 prime numbers.

Ans: Median of 2, 3, 5, 7, 11, 13, 17, 19, 23 = 11

SHORT ANSWER TYPE QUESTION (2 MARKS)

Q1. Find the mode of the following data:

CI	1-3	3-5	5-7	7-9	9-11
F	7	8	2	2	1

ANS: Mode=3.28

Q2. From the following distribution, find the lower limit of the median Class:

CI	85-89	90-94	95-99	100-104	105-109
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F	10	12	11	5	30
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ANS: lower limit of median class- 99.50

Q3. Find the value of p, if the arithmetic mean of the following distribution is 25:

CI	0-10	10-20	20-30	30-40	40-50
F	5	8	15	p	6

ANS: p=6

Q4. Find the value of x, if the mode of following distribution is 45.

CI	0-20	20-40	40-60	60-80	80-100
F	5	10	x	6	3

ANS: x=12

Q5. Calculate the median from the following data:

CI	0-10	10-20	20-30	30-40	40-50
F	5	15	30	8	2

ANS: Median=23.33

SHORT ANSWER TYPE QUESTION (3 MARKS)

Q1.The table below shows data of saved pocket money by students of class VIII. Find the median for this data.

MONEY SAVED IN RUPEES	5-7	7-9	9-11	11-13	13-15
NO OF STUDENS	6	3	9	5	7

ANS:

MONEY SAVED IN RUPEES	NO OF STUDENTS	Cf
5-7	6	6
7-9	3	9
9-11	9	18
11-13	5	23
13-15	7	30

$$N=30 \quad \frac{N}{2}=15, \text{ Median} = l + \frac{\frac{N}{2}-cf}{f} \times h = 9 + \frac{15-9}{9} \times 2 = 9 + \frac{6}{9} \times 2 = 9 + 1.33 = 10.33$$

Q2. Heights of students of class X are given in the following frequency distribution. Find the modal height.

HEIGHTS (CM)	170-175	165-170	160-165	155-160	150-155
NO OF STUDENTS	15	8	20	12	5

ANS:

HEIGHTS (CM)	NUMBER OF STUDENTS
150-155	15
155-160	8 f_0
160-165	20 f_1
165-170	12 f_2
170-175	5

Model class 160-165

$$\text{Mode} = l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) xh = 160 + \frac{20-8}{40-8-12} \times 5 = 160 + \frac{12}{20} \times 5 = 160 + 3 = 163$$

Q3. Find the mean of the following data.

Class	Less than 20	Less than 40	Less than 60	Less than 80	Less than 100
Frequency	15	37	74	99	120

ANS:

class	frequency	x_i	$d_i = \frac{x_i - 50}{20}$	$f_i d_i$
0-20	15	10	-2	-30
20-40	22	30	-1	-22
40-60	37	50	0	0
60-80	25	70	1	25
80-100	21	90	2	42

$\sum f_i = 120$	$\sum f_i d_i = 15$
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$$\text{Mean} = A + \frac{\sum f_i d_i}{\sum f_i} \times h = 50 + \frac{15}{120} \times 20 = 50 + 2.5 = 52.5$$

Q4. Data regarding the height of students of class X is given Find the average height of students of the class

HEIGHTS (CM)	150-156	156-162	162-168	168-174	174-180
NO OF STUDENTS	4	7	15	8	6

ANS:

$$\sum f_i = 40 \quad \text{Mean} = 165 + \left(\frac{5}{40} \times 6 \right) = 165.75$$

Q5. The median of the distribution given below is 14.4. Find the values of 'x' and 'y', if the sum of frequency is 20.

Class interval	0-6	6-12	12-18	18-24	24-30
Frequency	4	x	5	y	1

ANS:
$$\text{Median} = \frac{\text{Mode} + 2 \text{ mean}}{3} = \frac{45 + 2 \times 42.2}{3} = 99.4$$

LONG ANSWER TYPE QUESTIONS (4 MARKS)

1) If mode of the following distribution is 55, then find the value of x.

Class	0-15	15-30	30-45	45-60	60-75	75-90
Frequency	10	7	x	15	10	12

2) If the median of the distribution is 28.5, find the values of x and y

Class	0-10	10-20	20-30	30-40	40-50	50-60	Total
Frequency	5	x	20	15	y	5	60

3) The daily wages of 110 workers obtained in a survey are tabulated below. Compute the mean daily wages and modal daily wages of these workers.

Daily wages (Rs)	100-120	120-140	140-160	160-180	180-200	200-220	220-240
No. of workers	10	15	20	22	18	12	13

4) The mean of the following distribution is 53. Find the missing frequencies f1 and f2

Classes	0-20	20-40	40-60	60-80	80-100	Total
Frequency	15	f1	21	f2	17	100

ANSWERS:

1) mode = 55, modal class 45-60, l=45, h=15, fo=15, f1=x, f2=10

$$55 = 45 + \frac{15-x}{30-x-10} \times 15 \quad \text{we get } x=5$$

2) median= 28.5 n=60, median class 20-30, l=20, h=10, f=20, cf=5+x

$$28.5 = 20 + \frac{30-(5+x)}{20} \times 10 \quad x=8, \text{ also } x+y+45=60, \quad y=7$$

3)

Daily wages	No. of workers (fi)	xi	xi-A	ui = $\frac{xi-170}{20}$	fui
100-120	10	110	-60	-3	-30
120-140	15	130	-40	-2	-30
140-160	20	150	-20	-1	-20
160-180	22	170	0	0	0
180-200	18	190	20	1	18
200-220	12	210	40	2	24
220-240	13	230	60	3	39
	$\Sigma f = 110$				$\Sigma fui = 1$

$$\text{Mean} = a + \frac{\Sigma fui}{\Sigma fi} \times h \quad \text{Mean} = 170 + \frac{1}{110} \times 20 = 170.18, \text{ mean daily wages} = 170.18$$

Modal class 160-180, $f=22$, $l=160$, $h=20$, $f_1=20$, $f_2=18$

$$\text{Mode} = 160 + \frac{22-20}{44-20-18} \times 20 = 166.67, \text{ modal daily wages} = 166.67$$

$$4) \quad 53 + f_1 + f_2 = 100$$

$$f_1 + f_2 = 47 \dots \dots \dots (A)$$

$$\text{mean} = 53$$

$$\frac{2730 + 30f_1 + 70f_2}{100} = 53 \dots \dots \dots (B)$$

Solving A and B $f_1 = 18$, $f_2 = 29$

CASE STUDY QUESTIONS

1. Municipality is installing playground equipment at various parks. They have to study the age group of children playing in a park of a specific colony. The classification of children according to their ages, playing in a park is shown in the following table.

Age group of children (in years)	6-8	8-10	10-12	12-14	14-16
Number of children	43	58	70	42	27

- i. In which age group, will the maximum number of children belong?
- ii. Find the mode of the ages of children playing in the park

ANSWER:

- i. 10-12

- ii. Mode = 10.6

$$\text{Mode} = l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) \times h$$

Here,

l = lower limit of the modal class

h = size of the class interval

f_1 = frequency of the modal class

f_0 = frequency of the class preceding the modal class

f_2 = frequency of the class succeeding the modal class

2. A group of 71 people visited the local healthcare center on free blood sugar test day. The following table shows their ages

Age (in years)	Less than 10	Less than 20	Less than 30	Less than 40	Less than 50	Less than 60
Number of people	3	10	22	40	54	71

Based on the above information answer the following:

- Find the median age of the persons visited the museum
- If the price of the ticket for the age group 30-40 is ₹30 .then the total amount spent by this age group is

ANSWER:

i. Median = 37.5

ii. Rs 540

Age (Years)	Class	No. of persons (frequency)	Cumulative frequency less than
Less than 10	0-10	3	3
Less than 20	10-20	$10-3 = 7$	10
Less than 30	20-30	$22-10 = 12$	$22 \rightarrow cf$
Less than 40	30-40	$40-22 = 18 \rightarrow F$	40
Less than 50	40-50	$54-40 = 14$	54
Less than 60	50-60	$71-54 = 17$	71

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

Substituting the values, median = 37.5

And since number of people in 30-40 age group is 18, amount = Rs 30 x 18