CBSE Test Paper 05

CH-14 Statistics

1. For which set of data does the median equal the mode?
   a. 3, 3, 4
   b. 3, 4, 5, 6, 6
   c. 3, 3, 4, 5, 6
   d. 3, 3, 4, 5
2. Let m be the mid-point and *I* be the upper-class limit of a class in a continuous frequency distribution. The lower class limit of the class is
   a. $2m + I$
   b. $m - I$
   c. $2I - m$
   d. $2m - I$
3. Find the median of the given data: 7, 8, 7, 7, 9, 10, 13.
   a. 7
   b. 8
   c. 9
   d. 10
4. The mean of 50 observations is 39. If one of the observations which was 23 was replaced by 43, the resulting mean will be
   a. 38.4
   b. 39

c. 40.3

d. 39.4

5. There are 50 numbers. Each number is subtracted from 53 and the difference between the mean of the numbers so obtained is found to be 3.5. The mean of the given number is

   a. 56.5

   b. 52.5

   c. 49.5

   d. 47.5

6. Fill in the blanks:

   The mean of first four prime numbers is _____.

7. Fill in the blanks:

   The data which are not collected directly but obtained from some other sources is known as _____ data.

8. Find the mean of first five multiples of 3.

9. If the mean of 2, 4, 6, 8, x, y is 5 then find the value of x+y.

10. Find the mode of the following data, in each case :
    (i) 14, 25, 14, 28, 18, 17, 18, 14, 23, 22, 14, 18
    (ii) 7, 9, 12, 13, 7, 12, 15, 7, 12, 7, 25, 18, 7.

11. The following are the population in hundreds of 80 town and villages in U.P. taken at random from a census report.
    11, 72, 15, 8, 15, 3, 23,
    26, 2, 319, 200, 6, 16, 6,
    131, 5, 18, 407, 99, 127, 31,
    72, 18, 30, 43, 2, 1, 52,

40, 3, 7, 13, 5, 142, 70
86, 31, 38, 70, 51, 11, 52,
18, 46, 89, 1, 30, 25, 4,
52, 15, 139, 12, 377, 24, 48,
5, 26, 39, 18, 17, 159, 30,
171, 30, 6, 160, 52, 222, 13,
55, 9, 3, 149, 3, 52, 12,
124, 120, 10
Construct a frequency distribution table.

12. The mean of 13 observations is 14. If then mean of the first 7 observations is 12 and that of the last 7 observations is 16, find the 7th observation.

13. The distance (in km) of 40 engineers from their residence to their place of work were found as follows:
5, 3, 10, 20, 25, 11, 13, 7, 12, 31
19, 10, 12, 17, 18, 11, 32, 17, 16, 2
7, 9, 7, 8, 3, 5, 12, 15, 18, 3
12, 14, 2, 9, 6, 15, 15, 7, 6, 12
Construct a grouped frequency distribution table with class size 5 for the data given above, taking the first interval as 0-5(5 not included). What main features do you observe from this tabular representation?

14. Draw a histogram for the marks of students given below:

Marks:	0-10	10-30	30-45	45-50	50-60
No. of Students:	8	32	18	10	6

15. The average score of girls in class examination in a school is 67 and that of boys is 63. The average score for the whole class is 64.5. Find the percentage of girls and boys in the class.

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Solution

1. (a) 3, 3, 4

   Explanation: The median is the middle score for a set of data that has been arranged in ascending or descending order of magnitude.

   mode in a list of numbers refers to the integers that occurs most number of times.

   for the above list of observations

   both median and mode is 3

2. (d) $2m - l$

   Explanation: Let the lower limit = k

   Midpoint = m
   Upper limit = l
   Midpoint = (upper limit + lower limit)/2
   m = (k + l)/2
   2m = k + l
   k = 2m - l
   Therefore, lower limit = 2m - l

3. (b) 8

   Explanation: Median is the value separating the higher half of the data sample from the lower half.

   Arrange the given data in ascending order.

   Value of the middle term is the median of the given data sample.

   7, 7, 7, 8, 9, 10, 13

   Since 8 is in the centre so 8 is the median.

4. (d) 39.4

   Explanation: The mean of 50 observations is 39.

   so sum of these 50 observations is $50 \times 39 = 1950$

   after replacing the observation value 23 by 43,

   sum becomes 1970

   so the mean is $\frac{1970}{50} = 39.4$

5. (a) 56.5

   Explanation: Let the mean of the initial sequence is x.

   Given that, after subtracting 53 from each number, the difference between the means is 3.5

   So, $x - 53 = 3.5$

   mean of the number is $x = 53 + 3.5 = 56.5$

6. 4.25

7. secondary

8. First five multiples of 3:

   3, 6, 9, 12, 15

   $\therefore$ Mean = $\frac{\text{Sum of numbers}}{\text{Total number}}$

   = $\frac{3+6+9+12+15}{5}$

   = $\frac{45}{5}$

   = 9

9. Mean = $\frac{Sum\ of\ all\ values}{Total\ number\ of\ value}$ Mean = $\frac{2+4+6+8+x+y}{6}$ 5= $\frac{20+x+y}{6}$ $5 * 6 = 20 + x + y$ 30 = $20 + x + y$ $30 - 20 = x + y$ 10 = x+y

10. (i) Since the item value 14 occurs the maximum number of items (4 times) ∴Mode=14

    (ii) Since the item value 7 occurs the maximum number of times (5 times.) ∴ Mode = 7

11. **Frequency Distribution Table**

Poplulation in hundreds	Tally Marks	Frequency
0 - 29	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 IIII	39
30 - 59	𝍸 𝍸 𝍸 IIII	19
60 - 89	𝍸 I	6
90 - 119	I	1
120 - 149	𝍸 II	7
150 - 179	III	3
180 - 209	I	1
210 - 239	I	1
240 - 269	-	-
270 - 299	-	-
300 - 329	I	1
330 - 359	-	-
360 - 389	I	1
390 - 419	I	1

12. Sum of 13 observations = 14 × 13 = 182
    Sum of first 7 observations = 12 × 7 = 84
    Sum of last 7 observations = 16 × 7 = 112
    7th observation = 84 + 112 – 182 = 14.
13.

Distance (in km)	Tally Marks	Number of engineers (frequency)
0-5	𝍸	5
5-10	𝍸 𝍸 I	11
10-15	𝍸 𝍸 I	11
15-20	𝍸 IIII	9
20-25	I	1

25-30	I	1
30-35	II	2
Total		**40**

We observe the following main features from this tabular representation :

i. The distances (in km) from their residence to their work place of the maximum number of engineers are in the third interval, i.e., 10-15.

ii. The distances (in km) from their residence to their work place of the minimum number of engineers are in the intervals 20-25 and 25-30 each.

iii. The frequencies of the intervals 20-25 and 25-30 are the same. (Each = 1)

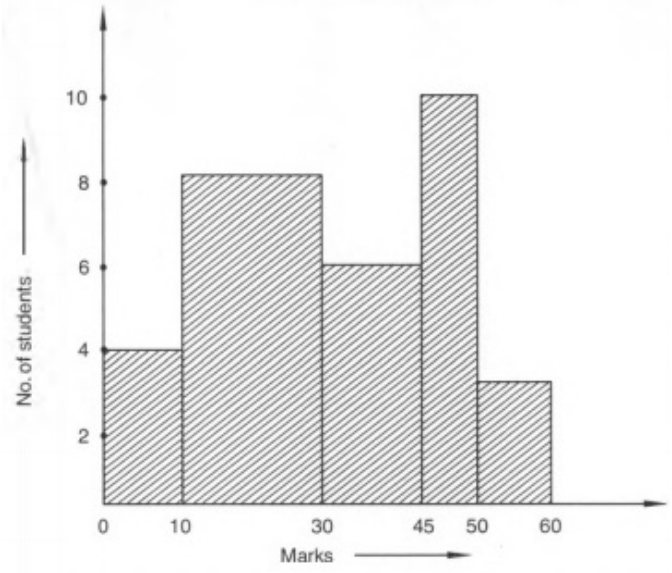
14. Here, minimum class-size = 5. So, we adjust the frequencies by using the following formula:

Adjusted frequency of a class = $\frac{\text{Minimum class size}}{\text{Class size}} \times$ Frequency of the class

The adjusted frequencies are computed as follows:

Class intervals (Marks)	No. of students (Frequency)	Adjusted Frequency
0-10	8	$\frac{5}{10} \times 8 = 4$
10-30	32	$\frac{5}{20} \times 32 = 8$
30-45	18	$\frac{5}{15} \times 18 = 6$
45-50	10	$\frac{5}{5} \times 10 = 10$
50-60	6	$\frac{5}{10} \times 6 = 3$

The histogram is shown below:



15. Let the number of girls and boys be n1 and n2 respectively.

We have:

$\bar{X}_1$ Average score of girls =67

$\bar{X}_2$ Average score of boys =63

$\bar{X}$ Average score of the whole class=64.5

$\bar{X} = \frac{n_1\bar{X}_1+n_2\bar{X}_2}{n_1+n_2}$

$\Rightarrow 64.5 = \frac{67n_1+63n_2}{n_1+n_2}$

$\Rightarrow 64.5\mathrm{n}_1 + 64.5n_2 = 67\mathrm{n}_1 + 63n_2$

$\Rightarrow 64.5\mathrm{n}_1 - 67n_1 = 63\mathrm{n}_2 - 64.5n_2$

$\Rightarrow$ -$2.5\mathrm{n}_1 =$ -$1.5\mathrm{n}_2 \Rightarrow 2.5\mathrm{n}_1 = 1.5\mathrm{n}_2 \Rightarrow 25\mathrm{n}_1 = 15\mathrm{n}_2$

$\Rightarrow 5\mathrm{n}_1 = 3\mathrm{n}_2$

Total number of students in the class $= \mathrm{n}_1 + n_2$

$\therefore$ percentage of girls $= \frac{n_1}{n_1+n_2} \times 100$

$= \frac{n_1}{n_1+\frac{5n_1}{3}} \times 100 [\because 5\mathrm{n}_1 = 3n_2]$

$= \frac{3n_1}{3n_1+5n_1} \times 100$

$= \frac{3}{8} \times 100 = 37.5$

And percentage of boys,

$= \frac{n_2}{n_1+n_2} \times 100$

$= \frac{n_2}{\frac{3n_2}{5}+n_2} \times 100 = \frac{5n_2}{3n_2+5n_2} \times 100 = \frac{5}{8} \times 100 = 62.5$

Percentage of girls and boys are 37.5% and 62.5%