

CBSE Board Class 10 Maths Chapter 14- Statistics Objective Questions

Introduction to Statistics

1. Class mark of a class is obtained by using

- (A) $(\text{upper limit} - \text{lower limit}) / 2$
- (B) $(\text{upper limit} + \text{lower limit}) / 2$
- (C) $\text{upper limit} - \text{lower limit}$
- (D) $\text{Upper limit} + \text{lower limit}$

Answer: (B) $(\text{upper limit} + \text{lower limit}) / 2$

Solution: Class mark is the midpoint of a class interval. Therefore, its formula is given by $(\text{upper limit} + \text{lower limit}) / 2$

2. Look at the following table below.

<i>Classinterval</i>	<i>Classmark</i>
0 – 5	<i>A</i>
5 – 10	<i>B</i>
10 – 15	12.5
15 – 20	17.5

The value of A & B respectively are:

- (A) 3, 8
- (B) 2, 7
- (C) 3, 7
- (D) 2.5, 7.5

Answer: (D) 2.5, 7.5

Solution: Class mark for a class interval = $(\text{Upper-class limit} + \text{Lower-class limit}) / 2$

For first class upper class limit is 5 and lower is 0. Thus class mark for it is 2.5 using formula.

For 2nd class upper class limit is 10 and lower limit is 5. Thus class mark for it is 7.5.

3. If the sum of all the frequencies is 24, then the value of z is:

<i>Variable (x)</i>	1	2	3	4	5
<i>Frequency</i>	z	5	6	1	2

- (A) 4
- (B) 6
- (C) 8
- (D) 10

Answer: (D) 10

Solution: Here, $n = \sum f_i = z + 5 + 6 + 1 + 2 = 14 + z$

Given: $\sum f_i = 24$

$\therefore n = \sum f_i = 14 + z = 24$

$\Rightarrow z = 24 - 14 = 10$.

Mean

4. The value of $\sum_{i=1}^n x_i$ is

- (A) $\frac{\bar{x}}{2}$
- (B) $2\bar{X}$
- (C) $n\bar{X}$
- (D) $\frac{\bar{X}}{n}$

Answer: (C) $n\bar{X}$

$$\bar{X} = \frac{\sum_{i=1}^n x_i}{n}$$

Solution:

Therefore, $\sum_{i=1}^n x_i = n\bar{X}$

5. The mean of the following distribution is

x_i	10	13	16	19
f_i	2	5	7	6

- (A) 15.2
- (B) 16
- (C) 15.55
- (D) 15.35

Answer: (C) 15.55

Solution:

x_i	f_i	$f_i x_i$
10	2	20
13	5	65
16	7	112
19	6	114
	$\sum f_i = 20$	$\sum f_i x_i = 311$

$$\begin{aligned} \text{Mean} &= \frac{\sum f_i x_i}{\sum f_i} \\ &= 311/20 \\ &= 15.55 \end{aligned}$$

6.

x_i	f_i	$f_i x_i$
4	10	A-.....
8	11	B-.....
12	9	C-.....
16	13	D-.....
		$\sum f_i x_i = \dots\dots\dots$

Find the value of $\sum f_i x_i$

- (A) 208
- (B) 444
- (C) 88
- (D) 40

Answer: (B) 444

Solution: Each term on right most column is the product of corresponding 2 terms on 1st 2 columns. 1st column is class marks list. 2nd column is frequencies for these columns. The 3rd column is the product of these 2 columns.

For first row, class mark (x_i) = 4, frequency (f_i) = 10. Product ($f_i x_i$) = 40. Similarly the products of other class marks can also be found.

The sum of these products ($\sum f_i x_i$) = 40 + 88 + 108 + 208 = 444

7. Consider the following distribution of SO₂ concentration in the air (in ppm = parts per million) in 30 localities. Find the mean SO₂ concentration using assumed mean method. Also find the values of A, B and C.

<i>Class Interval</i>	<i>Frequency(f_i)</i>	<i>Class mark(x_i)</i>	<i>$d_i = x_i - a$</i>
0.00 – 0.04	4	0.02	–0.08
0.04 – 0.08	9	0.06	A.....
0.08 – 0.12	9	0.10	B.....
0.12 – 0.16	2	0.14	0.04
0.16 – 0.20	4	0.18	C.....
0.20 – 0.24	2	0.22	0.12
<i>Total</i>	$\sum f_i = 30$		

- (A) -0.04, 0, 0.04, 0.5
- (B) -0.04, 0, 0.04, 0.6
- (C) -0.04, 0, 0.04, 0.2
- (D) -0.04, 0, 0.04, 0.098

Answer: (D) -0.04, 0, 0.04, 0.098

Solution: The 4th column in table shown in question is a table of values of 'd'.
 $d_i = x_i - a$

Here

d_i = value of 'd' for i^{th} class mark-row.

x_i = i^{th} class mark

a = assumed mean value

Applying given formula for 1st class interval (0-0.04),

$$-0.08 = 0.02 - a$$

$$a = 0.1$$

$$\text{Thus } P = 0.1$$

Applying given formula for 2nd class interval (0.04-0.08)

$$A = 0.06 - 0.1$$

$$A = -0.04$$

Similarly for 3rd and 5th classes d values are-

$$B = 0$$

$$C = 0.04$$

$$\text{Mean} = 0.098$$

8. There is a grouped data distribution for which mean is to be found by step deviation method.

Class Interval	Number of Frequency(f_i)	Class mark(x_i)	$d_i = x_i - a$	$u_i = \frac{d_i}{h}$
0 – 100	40	50	-200	D.....
100 – 200	39	150	B.....	E.....
200 – 300	34	250	0	0
300 – 400	30	350	100	1
400 – 500	45	450	C.....	F.....
<i>Total</i>	$A = \sum f_i = \dots\dots$			

Find the value of A, B, C, D, E and F respectively.

- (A) 186 , -100, -200, -2 , -1 and 2
- (B) 188 , -100, 200, -2 , -1 and 2
- (C) 188 , 100, -200, 2 , -1 and -2
- (D) 186 , 100, -200, -2 , -1 and 2

Answer: (B) 188, -100, 200, -2, -1 and 2

Solution: $\sum f_i$ = sum of frequencies of each class = 40 + 39 + 34 + 30 + 45 = 188

$$d_i = x_i - a$$

where x_i = i^{th} class mark

a = assumed mean

Using above formula for 1st class (0-100) we get-

$$-200 = 50 - a$$

$$a = 250$$

Using above formula for 2nd class (100-200) we get-

$$B = 150 - 250$$

$$B = -100$$

Similarly, $C = 200$.

$$u_i = (d_i) / h$$

Here h = class interval = 100. h is constant.

For 1st class (0-100),

$$u_i = (d_i) / h = - (200/100) = -2$$

Thus, D = -2

Similarly E = -1, F = 2

A, B, C, D, E and F are 188, -100, 200, -2, -1 and 2 respectively.

9. The formula for finding mean by direct method is $\frac{\sum(A \times B)}{\sum A}$ Where B and A are respectively

- (A) Class mark, frequency of the class
- (B) Average frequency, class size
- (C) Class size, average frequency
- (D) Frequency of the class, class mark

Answer: (A) Class mark, frequency of the class

Solution:
$$\bar{x} = \frac{\sum fx}{\sum f} = \frac{\sum(A \times B)}{\sum A}$$

Where B is the class mark.

Class mark = $1/2$ (upper limit of class + lower limit of class)

And A is the frequency of the class.

10. The average weight of a group of 25 men was calculated to be 78.4 kg. It was discovered later that one weight was wrongly entered as 69 kg instead of 96 kg. What is the correct average?

- (A) 75.76
- (B) 77.56
- (C) 79.48

(B) 80.30

Answer: (C) 79.48

Solution: Total weight of 25 men = $25 \times 78.4 = 1960$

Due to the error in one entry, 96 has become 69

Difference = 27 kg

\therefore Correct total = $1960 + 27 = 1987$

\therefore Correct total = $1987 / 25 = 79.48$

Median

11. (For an arranged data) The median is the

- (A) Most common observation
- (B) Middle most observation
- (C) Least common observation
- (D) Average of the two most common observations

Answer: (B) Middle most observation

Solution: The median is the middle most observation. If there is even number of observations, median is the average of the two middle observations. If there is odd number of observations, median is the middle observation itself.

Mode

12. The mode of the following data is:

x_i	10	14	18	21	25
f_i	10	15	7	9	9

(A) 16

(B) 14

(C) 12

(D) 10

Answer: (B) 14

Solution: The mode is the most frequent observation. Here, the mode is 14 with a frequency of 15.

13. Find the mode of the following data.

<i>Class interval</i>	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
<i>Frequency</i>	7	13	14	5	11

- (A) Between 20 and 22.5
- (B) Between 27.5 and 30
- (C) Equal to 25
- (D) Between 22.5 and 27.5 but not equal to 25

Answer: (A) Between 20 and 22.5

Solution:

<i>Class interval</i>	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
<i>Frequency</i>	7	13	14	5	11

Modal Class is 20-30

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

$$= 20 + (14 - 13) / (28 - 13 - 5) \times 10 = 21$$

Hence, the mode will be between 20 and 22.5

15. There are lottery tickets labelled numbers from 1 to 500. I want to find the number which is most common in the lottery tickets. What quantity do I need to use?

- (A) None of the above
- (B) Mode
- (C) Mean
- (D) Median

Answer: (B) Mode

Solution: In a distribution, mode gives the data whose frequency is highest. This means that for an ungrouped distribution the mode is the value of the data that repeats maximum number of times. For the lottery tickets I want to find the most repeated number. Mode will serve this purpose.

16. Which of the following is not a measure of central tendency?

- (A) Mode
- (B) Range
- (C) Median
- (D) Mean

Answer: (B) Range

Solution: Three measures of central tendency are mean, median, mode. Range is a measure of variability or spread of the data.

Ogives and Questions relating to the relation between mean, mode and median

17. The mode of a frequency distribution can be determined graphically from:

- (A) Frequency curve
- (B) Ogive
- (C) Frequency polygon
- (D) Histogram

Answer: (B) Ogive

Solution: The mode of a frequency distribution can be determined graphically from ogive

18. For 'more than ogive' the x-axis represents:

- (A) frequency
- (B) lower limits of class intervals

(C) mid-values of class-intervals

(D) upper limits of class-intervals

Answer: (B) lower limits of class intervals

Solution: For 'more than ogive' the x-axis represents lower limits of class intervals

