

CBSE TEST PAPER-01
Class – IX Mathematics (Statistics)

General Instruction: All questions are compulsory. Question No. 1 to 4 carry one mark each. No. 5 to 8 carry two marks each. Question No. 9 to 12 carry 3 marks each. Question number 13 carry 5 marks.

1. Find the range of the following data: 25, 20 30, 18, 16, 15
(a) 15 (b) 10 (c) 5 (d) 20
2. Find the median of the given data: 7, 8, 7, 7, 9, 10, 13.
(a) 7 (b) 9 (c) 8 (d) 10
3. Find the mode of the given data: 7, 9, 11, 13, 9, 13, 9, 9, 7, 8.
(a) 10 (b) 9 (c) 11 (d) 8
4. Find the mean of the first five multiples of 3?
(a) 9 (b) 12 (c) 14 (d) None of these
5. The mean of 7 observations is 20. If the mean of the first 4 observations is 12 & that of last 4 observations is 28, find the 4th observations?
6. If the mean of 5 observation $x, x + 4, x + 8, x + 12, x + 16$ is 13, find the mean of the observations?
7. The class marks of the observations are 17, 21, 25, 29, 33, 37, 41, 45. Find the class intervals.
8. The value of π upto 15 decimal places is : 3. 419078023195679
 - (i) List the digits from 0 to 9 & make frequency distributions of the digit after the decimal points.
 - (ii) What are the most * the least frequently occurring digits?
9. A random survey of the number of children of various age grout playing in the park was found:

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Age [in years]	1 – 2	2 – 3	3 – 5	5 – 7	7 – 10
No. of children	3	5	7	10	13

Draw a histogram to represent the data above?

10. (i) Find the mean of the following data: 25, 27, 19, 29, 21, 23, 25, 30, 28, 20.

Show that the sum of deviation of all the observations from the mean is zero.

(ii) Find the median of the data given above.

11. If the mean of the following data is 21. Find the value of P.

X	7	15	28	5	1
Y	8	20	P	3	2

12. In a mathematics test given to 10 students, the following marks [out of 100] are recorded as: 82, 41, 39, 52, 53, 45, 96, 47, 50, 60.

Find out the mean & median of the above marks.

13. Prove that the sum of the deviations of individuals observations from the mean is zero.

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[ANSWERS]

1. (A)

2. (C)

3. (B)

4. (A)

5. Since mean of 7 observations = 20

$$\therefore \text{Total of 7 observation} = 20 \times 7 = 140$$

$$\Rightarrow \text{Mean of first 4 observations} = 12$$

$$\therefore \text{Total of first 4 observation} = 12 \times 4 = 48$$

$$\Rightarrow \text{Mean of first 4 observations} = 28$$

$$\therefore \text{Total of first 4 observation} = 4 \times 28 = 92$$

$$\therefore \text{Total of 7 observation} + 4^{\text{th}} \text{ observation} = 48 + 92$$

$$140 + 4^{\text{th}} \text{ observation} = 140$$

$$\Rightarrow 4^{\text{th}} \text{ observation} = 140 - 140 = 0$$

$$6. \bar{x} = \frac{\sum x_i}{n}$$

$$\Rightarrow 13 = \frac{x + (x+4) + (x+8) + (x+12) + (x+16)}{5}$$

$$\Rightarrow 5 \times 13 = 5x + 40$$

$$\Rightarrow 13 = x + 8$$

$$\therefore x = 5$$

\therefore The given set of 5 observations are 5, 9, 13, 17, 21

$$\bar{x} = \frac{5 + 9 + 13 + 17 + 21}{5} = 12.8$$

7. Class marks are 17, 21, 25, 29, 33, 37, 41 and 45

Class size = $21 - 17 = 25 - 21 = 4$ and Half of class size = $\frac{4}{2} = 2$

So, Class intervals are:

$17 - 2 = 15$	&	$17 + 2 = 19$	i. e.	$15 - 19$
$21 - 2 = 19$	&	$21 + 2 = 23$	i. e.	$19 - 23$
$25 - 2 = 23$	&	$25 + 2 = 27$	i. e.	$23 - 27$
$29 - 2 = 27$	&	$29 + 2 = 31$	i. e.	$27 - 31$
$33 - 2 = 31$	&	$33 + 2 = 35$	i. e.	$31 - 35$
$37 - 2 = 35$	&	$37 + 2 = 39$	i. e.	$35 - 39$
$41 - 2 = 39$	&	$41 + 2 = 43$	i. e.	$39 - 43$
$45 - 2 = 43$	&	$45 + 2 = 47$	i. e.	$43 - 47$

8. (i) Frequency distribution table

Digits	Tally Marks	Frequency
0		2
1		2
2		1
3		1
4		1
5		1
6		1
7		2
8		1
9		3

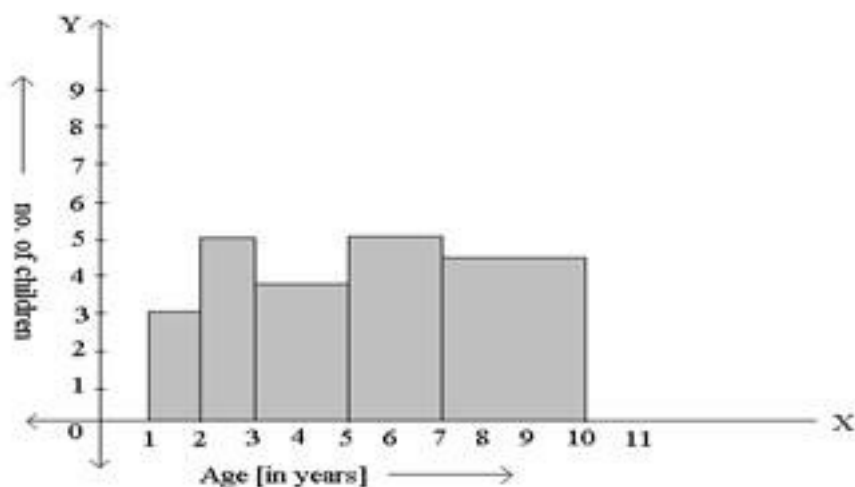
(ii) Most frequency occurring digits = 9 & least frequently occurring digits = 2, 3, 4, 5, 6, 8

9. Since the class intervals are not of equal width, we calculate the adjusted frequencies [AF] for histogram. Minimum class size [CS] = 1

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Age [in years]	Frequency	Class Size [CS]	$AF = \frac{\text{minimum CS}}{\text{CS of this class}} \times \text{Its frequency}$
1 - 2	3	1	$\frac{1}{1} \times 3 = 3$
2 - 3	5	1	$\frac{1}{1} \times 5 = 5$
3 - 5	7	2	$\frac{1}{2} \times 7 = 3.5$
5 - 7	10	2	$\frac{1}{2} \times 10 = 5$
7 - 10	13	3	$\frac{1}{3} \times 13 = 4.3$

Age (in years)	Frequency	Class Size	Adjusted Frequency
1-2	3	1	$1/1 * 3 = 3$
2-3	5	1	$1/1 * 5 = 5$
3-5	7	2	$1/2 * 7 = 3.5$
5-7	10	2	$1/2 * 10 = 5$
7-10	13	3	$1/3 * 13 = 4.3$



Now we draw rectangles with heights equal to the corresponding adjusted frequencies &

bases equal to the given class intervals, to get the required histogram, as shown below.

$$10.(i) \text{ Mean} = \bar{x} = \frac{25 + 27 + 19 + 29 + 21 + 23 + 25 + 30 + 28 + 20}{10} = \frac{247}{10} = 24.7$$

$$\begin{aligned} \text{Sum of the deviations of all the observations from the mean} &= \sum_{i=1}^{10} (x_i - \bar{x}) \\ &= (25 - 24.7) + (27 - 24.7) + (19 - 24.7) + (27 - 24.7) + \\ &(23 - 24.7) + (25 - 24.7) + (30 - 24.7) + (28 - 24.7) + (20 - 24.7) \\ &= 0.3 + 2.3 - 5.7 + 4.3 - 2.7 - 1.7 + 0.3 + 5.3 + 3.3 - 4.7 = 0 \end{aligned}$$

(ii) Arranging the data in ascending order: 19, 20, 21, 23, 25, 25, 27, 28, 29, 30

Here, $n = 10$ [even number]

$$\begin{aligned} \therefore \text{Median} &= \frac{\left[\frac{n}{2}\right]^{\text{th}} \text{ observation} + \left[\frac{n}{2} + 1\right]^{\text{th}} \text{ observation}}{2} \\ &= \frac{5^{\text{th}} \text{ observation} + 6^{\text{th}} \text{ observation}}{2} = \frac{25 + 25}{2} = 25 \end{aligned}$$

11.

x_i	f_i	$x_i f_i$
7	8	56
15	20	300
28	P	28P
5	3	15
1	2	2
Total	33+P	373+28P

$$\sum f_i = 33 + P \quad \sum x_i f_i = 373 + 28P$$

$$\bar{x} = \frac{\sum x_i f_i}{\sum f_i}$$

$$21 = \frac{373 + 28P}{33 + P}$$

$$21 \times 33 + 21P = 373 + 28P$$

$$693 + 21P = 373 + 28P$$

$$693 - 373 = 28P - 21P$$

$$320 = 7P$$

$$P = \frac{320}{7}$$

$$\therefore P = 45.7$$

12. The given observation are

82, 41, 39, 52, 53, 45, 96, 47, 50, 60

Sum of 10 observations = $82 + 41 + 39 + 52 + 53 + 45 + 96 + 47 + 50 + 60$

$$\Rightarrow \bar{x} = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n} \therefore \text{Mean} = \frac{\Sigma}{10} = \frac{565}{10} = 56.5$$

Arranging the given observation in ascending order:

39, 41, 45, 47, 50, 52, 53, 60, 82, 96

Here, $n = 10$ [even no.]

$$\begin{aligned} \therefore \text{Median} &= \frac{\left(\frac{n}{2}\right)^{\text{th}} \text{ observation} + \left(\frac{n}{2} + 1\right)^{\text{th}} \text{ observation}}{2} \\ &= \frac{5^{\text{th}} \text{ observation} + 6^{\text{th}} \text{ observation}}{2} \\ &= \frac{50 + 52}{2} = \frac{102}{2} = 51 \end{aligned}$$

13. Let $x_1, x_2, x_3, \dots, x_n$ be n individuals observations whose mean is \bar{x} . The sum of the deviations of these n observations from \bar{x} is given by

$$(x_1 - \bar{x}) + (x_2 - \bar{x}) + (x_3 - \bar{x}) + \dots + (x_n - \bar{x})$$

Since mean of n observation x_1, x_2, x_3, \dots, x is given as \bar{x}

$$\therefore \bar{x} = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n}$$

$$\Rightarrow n\bar{x} = x_1 + x_2 + x_3 + \dots + x_n \quad \text{---(1)}$$

$$\text{Now } (x_1 - \bar{x}) + (x_2 - \bar{x}) + (x_3 - \bar{x}) + \dots + (x_n - \bar{x})$$

$$= (x_1 + x_2 + x_3 + \dots + x_n) - (\bar{x} + \bar{x} + \bar{x} + \dots + n \text{ times})$$

$$= (x_1 + x_2 + x_3 + \dots + x_n) - n\bar{x}$$

$$= n\bar{x} - n\bar{x} \rightarrow \text{using (1)}$$

$$= 0$$

Hence proved