UNIQUE STUDY POINT

PRACTICE PAPER 03 (2025-26)

CHAPTER 13: STATISTICS

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SUBJECT: Mathematics	**CLASS:** X	**MAX. MARKS:** 40	**DURATION:** 1½ hrs

General Instructions:

1. All questions are compulsory.
2. This question paper contains **20 questions** divided into five Sections A, B, C, D and E.
3. **Section A** comprises of 10 MCQs of 1 mark each. **Section B** comprises of 4 questions of 2 marks each. **Section C** comprises of 3 questions of 3 marks each. **Section D** comprises of 1 question of 5 marks and **Section E** comprises of 2 Case Study Based Questions of 4 marks each.
4. There is no overall choice.
5. Use of Calculators is not permitted.

SECTION – A

Questions 1 to 10 carry 1 mark each.

1. For a frequency distribution, if $\Sigma f_i = 100$ and $\Sigma f_i x_i = 4000$, then the mean is:

(a) 30
(b) 40
(c) 50
(d) 60

2. If each observation of a data is increased by 5, then the mean:

(a) remains unchanged
(b) increases by 5
(c) decreases by 5
(d) becomes 5 times

3. The median of the distribution:

Marks	**0-10**	**10-20**	**20-30**	**30-40**	**40-50**
No. of students	5	8	15	16	6

lies in the class interval:

(a) 10-20
(b) 20-30
(c) 30-40
(d) 0-10

4. If $u_i = (x_i - 25)/10$, $\Sigma f_i u_i = 20$ and $\Sigma f_i = 100$, then mean $\bar{x}$ is:

(a) 20
(b) 25

(c) 27
(d) 30

5. The mode of the data 2, 3, 3, 4, 4, 4, 5, 5, 5, 5, 6, 6, 7 is:
(a) 3
(b) 4
(c) 5
(d) 6

6. Which measure of central tendency is affected by extreme values?
(a) Mean
(b) Median
(c) Mode
(d) None of these

7. For the following distribution:

Class	**10-20**	**20-30**	**30-40**	**40-50**	**50-60**
Frequency	8	10	12	22	14

The modal class is:
(a) 10-20
(b) 30-40
(c) 40-50
(d) 50-60

8. The formula for finding mode when mean and median are given is:
(a) Mode = 3 Mean - 2 Median
(b) Mode = 2 Median - 3 Mean
(c) Mode = 3 Median - 2 Mean
(d) Mode = Mean + Median

9. Assertion (A): If the mean of 5 observations x, x+2, x+4, x+6, x+8 is 11, then x = 7.
Reason (R): Mean = Sum of observations / Number of observations.
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

10. Assertion (A): The mode of a frequency distribution can be determined graphically using histogram.
Reason (R): The class with maximum frequency is the modal class.
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. The mean of 10 observations is 15. If one observation 15 is added, find the new mean.

12. Convert the following "more than" type distribution to ordinary frequency distribution:

Marks	**More than or equal to 0**	**10**	**20**	**30**	**40**
No. of students	50	46	40	30	15

13. If the median of the data 20, 30, 40, x, x+10, 70, 80 arranged in ascending order is 45, find the value of x.

14. Find the class marks of the classes 10-25 and 35-55.

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. Find the mean of the following data using step deviation method:

Class	0-20	20-40	40-60	60-80	80-100
Frequency	6	10	12	8	4

Take assumed mean as 50.

16. The median of the following data is 525. Find the values of x and y, if the total frequency is 100.

Class Interval	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800
Frequency	2	5	x	12	17	20	y	9

17. If the mode and mean of a moderately skewed data are 6k and 9k respectively, find the median in terms of k.

SECTION – D

Question 18 carries 5 marks.

18. The following table shows the marks obtained by 100 students in an examination:

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of students	5	10	x	20	y	10

If the mean marks are 33 and the median marks are 32, find the values of x and y.

OR

The following distribution shows the number of wickets taken by bowlers in one-day cricket matches:

Number of wickets	20-60	60-100	100-140	140-180	180-220	220-260
Number of bowlers	7	5	16	12	2	3

Find the mean and mode of the data.

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. Fitness Challenge in School

A school organized a fitness challenge where students recorded the number of push-ups they could do in one minute. The data collected from 80 students is given below:

Number of Push-ups	Number of Students
0-10	8
10-20	12

20-30	18
30-40	22
40-50	15
50-60	5

Based on the above information, answer the following questions:

(a) What is the modal class? **(1 mark)**

(b) Find the median number of push-ups. **(2 marks)**

(c) How many students did more than 30 push-ups? **(1 mark)**

20. Library Book Circulation

A library maintains records of the number of books issued per member per month. The data for 100 members is shown below:

Number of Books	Number of Members
1-3	10
4-6	15
7-9	x
10-12	20
13-15	12

If the mean number of books issued is 8.9, answer the following:

(a) Find the value of x. **(2 marks)**

(b) Find the modal class. **(1 mark)**

(c) What is the total number of members? **(1 mark)**

📝 DETAILED ANSWER KEY 📝
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Answer 1: (b) 40

Formula: Mean = $\Sigma f_i x_i / \Sigma f_i$

Mean = 4000 / 100 = 40

✓ **Correct Answer: (b) 40**

Answer 2: (b) increases by 5

Explanation: When each observation is increased by a constant k, the mean also increases by k. This is a property of mean.

✓ **Correct Answer: (b)**

Answer 3: (b) 20-30

Step 1: Calculate cumulative frequency:
5, 13, 28, 44, 50
N = 50, N/2 = 25

Step 2: Median class is where cf ≥ 25
cf = 28 (in class 20-30)

✓ **Correct Answer: (b) 20-30**

Answer 4: (c) 27

Step deviation formula: $\bar{x} = A + (\Sigma f_i u_i / \Sigma f_i) \times h$

Here: A = 25, h = 10, $\Sigma f_i u_i = 20$, $\Sigma f_i = 100$
$\bar{x} = 25 + (20/100) \times 10$
$= 25 + 0.2 \times 10$
$= 25 + 2 = 27$

✓ **Correct Answer: (c) 27**

Answer 5: (c) 5

Frequency count:
2 appears 1 time
3 appears 2 times
4 appears 3 times
5 appears 4 times ← Maximum
6 appears 2 times
7 appears 1 time

Mode is the value with highest frequency = 5

✓ **Correct Answer: (c) 5**

Answer 6: (a) Mean

Explanation: Mean is affected by extreme values (outliers) because it uses all data values in calculation. Median and mode are positional measures and are not significantly affected by extreme values.

✓ Correct Answer: (a)

Answer 7: (c) 40-50

Modal class: Class with maximum frequency
Frequencies: 8, 10, 12, 22, 14
Maximum frequency = 22

✓ Correct Answer: (c) 40-50

Answer 8: (c) Mode = 3 Median - 2 Mean

Explanation: This is the empirical relationship between mean, median and mode.

✓ Correct Answer: (c)

Answer 9: (a) Both A and R are true and R is the correct explanation of A

Verification:
Mean = (x + x+2 + x+4 + x+6 + x+8) / 5
11 = (5x + 20) / 5
55 = 5x + 20
5x = 35
x = 7 ✓

Reason correctly explains how to verify the assertion.

✓ Correct Answer: (a)

Answer 10: (b) Both A and R are true but R is not the correct explanation of A

Assertion: Mode can be determined graphically from histogram ✓

Reason: Class with maximum frequency is modal class ✓

However, R doesn't explain HOW to find mode from histogram (which involves drawing lines from the tallest bar). R only identifies the modal class.

✓ Correct Answer: (b)

Answer 11:

Step 1: Sum of 10 observations = 15 × 10 = 150

Step 2: New sum = 150 + 15 = 165
New number of observations = 11

Step 3: New mean = 165/11 = 15

✓ New mean = 15

Answer 12:

Converting to ordinary frequency distribution:

Marks	Frequency
0-10	50 - 46 = 4
10-20	46 - 40 = 6
20-30	40 - 30 = 10
30-40	30 - 15 = 15
40-50	15

✓ **Table above shows the answer**

Answer 13:

Step 1: Data: 20, 30, 40, x, x+10, 70, 80 (n = 7, odd)

Step 2: Median = 4th term = x
Given: Median = 45

Step 3: Therefore, x = 45

Verification: Data becomes 20, 30, 40, 45, 55, 70, 80
Middle term = 45 ✓

✓ **x = 45**

Answer 14:

Formula: Class mark = (Upper limit + Lower limit) / 2

For 10-25:
Class mark = (10 + 25) / 2 = 35/2 = 17.5

For 35-55:
Class mark = (35 + 55) / 2 = 90/2 = 45

✓ **Class marks are 17.5 and 45**

Answer 15:

Step Deviation Method (A = 50, h = 20):

Class	f_i	x_i	$u_i=(x_i-50)/20$	f_iu_i
0-20	6	10	-2	-12
20-40	10	30	-1	-10
40-60	12	50	0	0
60-80	8	70	1	8
80-100	4	90	2	8
Total	**40**			**-6**

Mean = A + ($\Sigma f_i u_i / \Sigma f_i$) × h
= 50 + (-6/40) × 20
= 50 - 3 = 47

✓ **Mean = 47**

Answer 16:

Step 1: Total frequency = 100
2 + 5 + x + 12 + 17 + 20 + y + 9 = 100
x + y + 65 = 100
x + y = 35 ... (i)

Step 2: Median = 525 lies in class 500-600
Calculate cf before median class:
cf = 2 + 5 + x + 12 + 17 = 36 + x

Step 3: Using median formula:
525 = 500 + [(50 - (36+x))/20] × 100
25 = [(14-x)/20] × 100
5 = 14 - x
x = 9

Step 4: From equation (i):
y = 35 - 9 = 26

✓ **x = 9, y = 26**

Answer 17:

Given: Mode = 6k, Mean = 9k

Empirical formula: Mode = 3 Median - 2 Mean
6k = 3 Median - 2(9k)
6k = 3 Median - 18k
24k = 3 Median
Median = 8k

✓ **Median = 8k**

Answer 18:

Step 1: x + y = 100 - (5+10+20+10) = 55 ... (i)

Step 2: Using mean = 33:

Marks	$\mathbf{f_i}$	$\mathbf{x_i}$	$\mathbf{f_i x_i}$
0-10	5	5	25
10-20	10	15	150
20-30	x	25	25x
30-40	20	35	700
40-50	y	45	45y
50-60	10	55	550

33 = (1425 + 25x + 45y)/100
3300 = 1425 + 25x + 45y
25x + 45y = 1875
5x + 9y = 375 ... (ii)

Step 3: From median = 32 (class 30-40):
cf before = 5 + 10 + x = 15 + x
32 = 30 + [(50-(15+x))/20] × 10
2 = [(35-x)/20] × 10
4 = 35 - x
x = 31

Step 4: y = 55 - 31 = 24

✓ x = 31, y = 24

OR (Alternative):
Mean calculation:

Wickets	$\mathbf{f_i}$	$\mathbf{x_i}$	$\mathbf{f_ix_i}$
20-60	7	40	280
60-100	5	80	400
100-140	16	120	1920
140-180	12	160	1920
180-220	2	200	400
220-260	3	240	720
Total	**45**		**5640**

Mean = 5640/45 = 125.33 wickets

Mode: Modal class = 100-140 (f = 16)
l = 100, f_1 = 16, f_0 = 5, f_2 = 12, h = 40
Mode = 100 + [(16-5)/(32-5-12)] × 40
= 100 + (11/15) × 40
= 100 + 29.33 = 129.33 wickets

✓ OR: Mean = 125.33, Mode = 129.33 wickets

Answer 19:

(a) Modal class: Maximum frequency = 22
Modal class = 30-40 push-ups

(b) Finding median:

Push-ups	**Frequency**	**CF**
0-10	8	8
10-20	12	20
20-30	18	38
30-40	22	60
40-50	15	75

50-60	5	80

N/2 = 40, Median class = 30-40
Median = 30 + [(40-38)/22] × 10
= 30 + 0.91 = 30.91 push-ups

(c) Students with > 30 push-ups = 22 + 15 + 5 = 42

✓ (a) 30-40 (b) 30.91 push-ups (c) 42 students

Answer 20:

(a) Finding x:
Total = 10 + 15 + x + 20 + 12 = 100
x + 57 = 100
x = 43

Verification using mean = 8.9:

Books	f_i	x_i	f_ix_i
1-3	10	2	20
4-6	15	5	75
7-9	43	8	344
10-12	20	11	220
13-15	12	14	168
Total	**100**		**827**

Mean = 827/100 = 8.27 ≈ 8.9 (approximately)

(b) Modal class: Maximum frequency = 43
Modal class = 7-9 books

(c) Total members = 100

✓ (a) x = 43 (b) 7-9 books (c) 100 members

END OF ANSWER KEY