



INDIAN SCHOOL AL WADI AL KABIR

Class X, Mathematics

Worksheet- STATISTICS

Q1. The sum of lower limit of median class and upper limit of modal class.

Class	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 - 70
Frequency	1	3	5	9	7	3

A 85 B 90

C 80 D 95

Q2. The empirical relation between mean, median and mode is

A Mode = 2Median – 3 Mean B Mode = 3Median + 2Mean

C Mode = 2Median + 3 Mean D Mode = 3Median - 2Mean

Q3. The most commonly used measures of central tendency is

A Mean B Median C Mode D Range

Q4. The range of first 100 natural number is

A 100 B 99 C 0 D 50

Q5. The range of first 100 whole numbers is

A 100 B 99 C 98 D 50

Q6. The mean of first n natural numbers is

A n B $\frac{n+1}{2}$ C $n(n+1)$ D $\frac{n(n+1)}{2}$

Q7. The median of first n natural numbers is

A n B $\frac{n+1}{2}$ C Insufficient information D $\frac{n(n+1)}{2}$

Q8. The mode of first n-natural numbers is

A n B 0 C No mode D All numbers

Q9.	If the mean and mode of a data are 12 and 21 respectively, then its median is :														
	A	6			B	13.5			C	15		D	14		
Q10.	Mean and Median of a frequency distribution are 43 and 40 respectively. The value of mode is														
	A	34			B	43			C	38.5			D	41.5	
Q11.	While calculating mean of a grouped frequency distribution, step deviation method was used ($\frac{x-a}{h} = u$). It was found that $\bar{x} = 64, h = 5$ and $a = 62.5$. the value of $\frac{\sum fu}{\sum f}$:														
	A	0.5			B	1.1			C	0.3			D	7.5	
Q12.	Class		0-10		10-20		20-30		30-40		40-50				
	Frequency		3		5		7		9		11				
	The upper limit of the median class of the data is:														
	A	10			B	20			C	30			D	40	
Q13.	If for a data, median is 5 and mode is 4, then mean is equal to:														
	A	7			B	11			C	11/2			D	14/3	
Q14.	Assertion(A): Median of a data is the value of $N/2$, where N represents sum of all frequencies. Reason (R): Median divides the whole distribution into two equal parts.														
	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 and 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.					
Q15.	Assertion: If the value of mode and mean is 60 and 66 respectively, then the value of median is 64. Reason: Median = (mode + 2 mean)/2														
	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 and 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.					
Q16.	Assertion: The arithmetic mean of first n-natural numbers is $\frac{n+1}{2}$ Reason: The median of first n-natural numbers is $\frac{n+1}{2}$														

	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 and 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 (VSAQ-2M)

Q17. In the following data, find the values of p and q. Also find the median class and modal class.

Class	100-200	200-300	300-400	400-500	500-600	600-700
Frequency	11	12	10	q	20	14
Cumulative frequency	11	P	33	46	66	80

Q18. Find the missing frequency f for the following data if the mode for the data is 39.

Class	5-15	15-25	25-35	35-45	45-55	55-65	65-75
Frequency	2	3	f	7	4	2	2

Q19. Find the unknown entries a,b,c,d,e and f in the following distribution and hence find the mode.

Height (in cm)	150-155	155-160	160-165	165-170	170-175	175-180	Total
frequency	12	b	10	d	e	2	50
Cumulative frequency	a	25	c	43	48	f	

Q20. Compute the mode of the following data.

Class	0-20	20-40	40-60	60-80	80-100
Frequency	25	16	28	20	5

Q21. Find the mode of the following data.

Marks	Below 10	Below 20	Below 30	Below 40	Below 50
No. of students	8	20	45	58	70

Find the mean of the data using an empirical formula when it is given that mode is 50.5 and median is 45.5.

Q22. The mean and median of 100 observations are 50 and 52 respectively. The value of the largest observation is 100. It was later found that it is 110 not 100. Find the true mean and median.

Q23. The mean of the following frequency distribution is 35. Find the values of x and y, if the sum of frequencies is 25:

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	1	x	5	7	y	3	1

Age (in year)	Below 15	Below 25	Below 35	Below 45	Below 55	Below 65
No. of patients	6	17	38	61	75	80

Based on the above information, answer the following questions.

- (a) Find the modal class interval. [1]
- (b) Find the median class interval [1]
- (c) Find the modal age of the patients admitted in the hospital. [2]

OR

- (c) Find the median age of the patients admitted in the hospital. [2]

Q32.

A group of 71 people visited a museum on a certain 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 persons	3	10	22	40	54	71

Based on the above information, solve the following questions:

- a) If true class limits have been decided by making the classes of interval 10, then find the first class interval.
- b) Find the cumulative frequency table.
- c) Find the frequency of class preceding the median class.

OR

- d) If the price of a ticket for the age group 30-40 is Rs30, then find the total amount spent by this age group.

ANSWER KEY

1	B	2	D	3	A	4	B	
5	B	6	B	7	B	8	C	
9	C	10	A	11	C	12	C	
13	C	14	D	15	C	16	B	
17	Given Cumulative Frequencies: $p = 11 + 12 = 23$ $q = 46 - 33 = 13$ Total Frequency $N = 80 \Rightarrow N/2 = 40$ • Median Class: 400–500 (since $cf = 46$ covers $N/2 = 40$) • Modal Class: 500–600 (highest frequency = 20)						18	Given Mode = 39, which lies in the class interval 35–45. Modal Class = 35–45 $\Rightarrow l = 35, f_1 = 7, f_0 = f, f_2 = 4, h = 10$ Formula: $\text{Mode} = l + [(f_1 - f_0) / (2f_1 - f_0 - f_2)] \times h$ $39 = 35 + [(7 - f) / (14 - f - 4)] \times 10$ $4 = [(7 - f) / (10 - f)] \times 10$ $\Rightarrow 40 - 4f = 70 - 10f$ $6f = 30 \Rightarrow f = 5$
19	Unknown Entries: $a = 12, b = 25 - 12 = 13, c = 25 + 10 = 35, d = 43 - 35 = 8,$ $e = 48 - 43 = 5, f = 50$ Mode Calculation: Highest frequency is 13 (class 155–160) $\Rightarrow$ Modal Class = 155–160 $l = 155, f_1 = 13, f_0 = 12, f_2 = 10, h = 5$ $\text{Mode} = 155 + [(13 - 12) / (26 - 12 - 10)] \times 5 = 155 + 5/4 = 156.25 \text{ cm}$						20	Highest frequency = 28 $\Rightarrow$ Modal Class = 40–60 $l = 40, f_1 = 28, f_0 = 16, f_2 = 20, h = 20$ $\text{Mode} = l + [(f_1 - f_0) / (2f_1 - f_0 - f_2)] \times h$ $\text{Mode} = 40 + [(28 - 16) / (56 - 16 - 20)] \times 20 = 40 + (12/20) \times 20 = 46$
21	Part 1: Convert below to Class Intervals: Modal Class = 20–30 (highest $f = 25$) $l = 20, f_1 = 25, f_0 = 12, f_2 = 13, h = 10$ $\text{Mode} = 20 + [(25 - 12) / (50 - 12 - 13)] \times 10 = 20 + (13/25) \times 10 = 25.2$ Part 2: Empirical Formula: $\text{Mode} = 3\text{Median} - 2\text{Mean} \Rightarrow 50.5 = 3(45.5) - 2\text{Mean}$ $2\text{Mean} = 136.5 - 50.5 = 86 \Rightarrow \text{Mean} = 43$						22	Original Sum of 100 observations = $100 \times 50 = 5000$ Corrected Sum = $5000 - 100 + 110 = 5010$ • True Mean = $5010 / 100 = 50.1$ • True Median = 52 (Changing the extreme maximum value does not affect the middle position values).
23	Sum of frequencies: $1 + x + 5 + 7 + y + 3 + 1 = 25$ $\Rightarrow x + y = 8 \Rightarrow y = 8 - x$ Midpoints (x_i): 5, 15, 25, 35, 45, 55, 65 $\sum f_i x_i = 5(1) + 15x + 25(5) + 35(7) + 45y + 55(3) + 65(1)$ $= 605 + 15x + 45y$ $\text{Mean} = 35 \Rightarrow (605 + 15x + 45(8 - x)) / 25 = 35$ $605 + 360 - 30x = 875 \Rightarrow 30x = 90 \Rightarrow x = 3, y = 5$						24	Total Frequency $N = 60$ $\Rightarrow 5 + p + 20 + 15 + q + 5 = 60$ $\Rightarrow p + q = 15$ Median = 28.5 $\Rightarrow$ Median Class is 20–30 $l = 20, f = 20, cf = 5 + p, h = 10$ Median = $l + [(N/2 - cf) / f] \times h$ $28.5 = 20 + [(30 - (5 + p)) / 20] \times 10$ $8.5 = (25 - p) / 2 \Rightarrow 17 = 25 - p$ $\Rightarrow p = 8$ Since $p + q = 15 \Rightarrow q = 7$

25	Total families = 200 $\Rightarrow 24 + 40 + 33 + x + 30 + 22 + 16 + 7 = 200$ $172 + x = 200 \Rightarrow x = 28$ Mean Expenditure Calculation: Class Midpoints (x_i): 1250, 1750, 2250, 2750, 3250, 3750, 4250, 4750 $\sum f_i x_i = 24(1250) + 40(1750) + 33(2250) + 28(2750) + 30(3250) + 22(3750) + 16(4250) + 7(4750) = 532,000$ Mean = $\sum f_i x_i / N = 532,000 / 200 = \text{Rs. } 2,660$	26	Convert to Continuous Distribution Table, then $N = 70 \Rightarrow N/2 = 35$. Median Class = 30–40 (since cf = 41 covers 35) $l = 30, f = 12, cf = 29, h = 10$ Median = $30 + [(35 - 29) / 12] \times 10$ $= 30 + (6/12) \times 10 = 35$
27	Median = 240 $\Rightarrow$ Median Class is 200–300 $l = 200, f = f, cf = 15 + 17 = 32, h = 100$ Total Frequency $N = 60 + f \Rightarrow N/2 = 30 + 0.5f$ Median = $l + [(N/2 - cf) / f] \times h$ $240 = 200 + [(30 + 0.5f - 32) / f] \times 100$ $40 = [(0.5f - 2) / f] \times 100 \Rightarrow 40f = 50f - 200 \Rightarrow 10f = 200 \Rightarrow f = 20$	28	$f = 4, cf = 4$ $N = 50 \Rightarrow N/2 = 25$. Median Class = 145–150 $l = 145, f = 18, cf = 11, h = 5$ Median = $145 + [(25 - 11) / 18] \times 5$ $= 145 + 70/18 = 148.89 \text{ cm}$
29	Total frequency $N = 40 \Rightarrow 5 + x + 6 + y + 6 + 5 = 40 \Rightarrow x + y = 18$ Median = 31 $\Rightarrow$ Median Class is 30–40 $l = 30, f = y, cf = 11 + x, h = 10$ $31 = 30 + [(20 - (11 + x)) / y] \times 10$ $1 = [(9 - x) / y] \times 10 \Rightarrow y = 90 - 10x$ Since $x + y = 18 \Rightarrow 18 - x = 90 - 10x \Rightarrow 9x = 72 \Rightarrow x = 8$ $y = 18 - 8 = 10$	30	Total Frequency $N = 100$ $\Rightarrow 10 + f_1 + 25 + 30 + f_2 + 10 = 100$ $\Rightarrow f_1 + f_2 = 25$ Median = 32 $\Rightarrow$ Median Class is 30–40 $l = 30, f = 30, cf = 35 + f_1, h = 10$ $32 = 30 + [(50 - (35 + f_1)) / 30] \times 10$ $2 = (15 - f_1) / 3 \Rightarrow 6 = 15 - f_1 \Rightarrow f_1 = 9$ $f_2 = 25 - 9 = 16$
31	(a) Modal Class Interval: 35–45 (highest frequency = 23) (b) Median Class Interval: 35–45 (since $N/2 = 40$ lies in cf = 61) (c) Modal Age Calculation: $l = 35, f_1 = 23, f_0 = 21, f_2 = 14, h = 10$ Mode = $35 + [(23 - 21) / (46 - 21 - 14)] \times 10$ $= 35 + 20/11 = 36.82 \text{ years}$ OR (c) Median Age Calculation: $l = 35, N/2 = 40, cf = 38, f = 23, h = 10$ Median = $35 + [(40 - 38) / 23] \times 10 = 35 + 20/23 = 35.87 \text{ years}$	32	a) First Class Interval: Since age is always a positive quantity, the first class interval is 0–10. b Frequency & Cumulative Frequency Table: • 0–10: $f = 3, cf = 3$ • 10–20: $f = 7, cf = 10$ • 20–30: $f = 12, cf = 22$ • 30–40: $f = 18, cf = 40$ • 40–50: $f = 14, cf = 54$ • 50–60: $f = 17, cf = 71$ c) Frequency of Class Preceding the Median Class: $N = 71 \Rightarrow N/2 = 35.5 \Rightarrow$ Median Class is 30–40. Class preceding median class is 20–30, and its frequency is 12. OR d) Ticket Cost Calculation: Number of persons in age group 30–40 = 18 Ticket price = Rs. 30 $\Rightarrow$ Total Amount Spent = $18 \times \text{Rs. } 30 = \text{Rs. } 540$
