STATISTICS

MCQs & A and R WORK SHEET

Test / Exam Name: Statistics **Standard: 10th** **Subject: Mathematics**

Student Name: ..... **Section:** ..... **Roll No.:** .....

Questions: 45 **Time: 01:00 hh:mm** **Negative Marks: 0** **Marks: 45**

Instructions

1. MULTIPLE CHOICE QUESTIONS.

Q1. The relation between mean, mode and median is: **1 Mark**

A Mode = (3 × mean) - (2 × median) **B** Mode = (3 × median) - (2 × mean) **C** Mode = (3 × mean) - (2 × mode)
D Mode = (3 × median) - (2 × mode)

Ans: B Mode = (3 × median) - (2 × mean)

2. Mode = (3 × median) − (2 × mean)

Q2. If the mean of a data is 27 and its median is 33. Then, the mode is: **1 Mark**

A 30 **B** 43 **C** 45 **D** 47

Ans: C 45

Solution:
Mean = 27
Median = 33
Mode = 3median - 2Mean
= 3 × 33 - 2 × 27
= 99 - 54
= 45

Q3. The arithmetic mean and mode of a data are 24 and 12 respectively, then its median is: **1 Mark**

A 25 **B** 18 **C** 20 **D** 22

Ans: C 20

Solution:
Arithmetic mean = 24
Mode = 12
∴ But mode = 3 median – 2 mean
? 12 = 3 median – 2 × 24
? 12 = 3 median - 48
? 12 + 48 = 3 median
? 3 median = 60
\text{Median}=\frac{60}{3}=20

Q4. If the difference of mode and median of a data is 24, then the difference of median and mean is: **1 Mark**

A 12 **B** 24 **C** 8 **D** 36

Ans: A 12

Solution:
Difference of mode and median = 24
Mode = 3 median – 2 mean
? Mode – median = 2 median – 2 mean
? 24 = 2 (median – mean)
? Median – mean =\frac{24}{2}=12

Q5. The arithmetic mean of 1, 2, 3, ..., n is: **1 Mark**

A \frac{\text{n}+1}{2} **B** \frac{\text{n}-1}{2} **C** \frac{\text{n}}{2} **D** \frac{\text{n}}{2}+1

Ans: A \frac{\text{n}+1}{2}

Solution:
Arithmetic mean of 1, 2, 3, ..., n
=\frac{1+2+3+.....+\text{n}}{\text{n}}
=\frac{\frac{\text{n}(\text{n}+1)}{2}}{\text{n}}
=\frac{\text{n}+1}{2}
Hence, the correct option is (a)

Q6. The mean of first n odd natural number is: **1 Mark**

A \frac{\text{n}+1}{2} **B** \frac{\text{n}}{2} **C** \text{n} **D** \text{n}^2

Ans: C \text{n}

Solution:

Mean of first n odd numbers Sum of first n odd number

=\frac{\text{n}}{2}[2\text{a}+(\text{n}+1)\text{d}]

i.e. 1 + 3 + 5 + 7 + ... n term

=\frac{\text{n}}{2}[2\times1+(\text{n}+1)\times2]

(Here a = 1, d = 2)

=\frac{\text{n}}{2}[2+2\text{n}-2]=\frac{\text{n}}{2}\times2\text{n}=\text{n}^2

\therefore\text{Mean}=\frac{\text{Sum of n terms}}{\text{n}}=\frac{\text{n}^2}{\text{n}}=\text{n}

Q7. To represent the more than type graphically, we plot the _____ on the x-axis. **1 Mark**

A Class marks **B** Lower limits **C** Upper limits **D** Class size

Ans: B Lower limits

Solution:

The lower limit for every class is the smallest value in that class on the other hand the upper limit for every class is the greatest value in that class. To represent 'the more than type' graphically, we plot the lower limits on the x-axis and cumulative frequency on the y-axis to find the median.

Q8. The mean of first n odd natural numbers is \frac{\text{n}^2}{81}, then n = **1 Mark**

A 9 **B** 81 **C** 27 **D** 18

Ans: B 81

Solution:

The first n odd natural numbers are 1, 3, 5, ..., (2n - 1).

\therefore Mean of first n odd natural numbers

=\frac{1+3+5+.....+(2\text{n}-1)}{\text{n}}

=\frac{\frac{\text{n}}{2}(1+2\text{n}-1)}{\text{n}}\ [\text{S}_\text{n}=\frac{\text{n}}{2}(\text{a}+\text{l})]

=\frac{2\text{n}}{\text{n}}

=\text{n}

Now,

Mean of first n natural numbers =\frac{\text{n}^2}{81} (Given)

\therefore\text{n}=\frac{\text{n}^2}{81}

\Rightarrow\text{n}=81

Hence, the correct option is (b).

Q9. The middle most value of the data is: **1 Mark**

A Mean **B** Mode **C** Median **D** None of these

Ans: C Median

Solution:

The median of a set of data values is the middle most value when the data has been arranged in ascending order i.e. from smallest value to the largest value.

Q10. \frac{\text{Upper class limit+Lower class limit}}{2} **1 Mark**

A class size **B** Class mark **C** Frequency **D** None of these

Ans: B Class mark

Solution:

In each class interval of grouped data, there are two limits or boundaries (upper limit and lower limit) while the mid-value is equal to \frac{\text{Upper class limit+Lower class limit}}{2}.

These mid-values are also known as Class mark.

Q11. If \sum\text{f}_\text{i}\text{x}_\text{i}=625\text{ and } \sum{\text{f}_\text{i}}=25 then the value of \bar{\text{x}} is: **1 Mark**

A 26 **B** 63 **C** 64 **D** 25

Ans: D 25

Solution:

\sum\text{f}_\text{i}\text{x}_\text{i}=625\text{ and } \sum{\text{f}_\text{i}}=25

Q12. Choose the correct answer from the given four options: **1 Mark**

Consider the following frequency distribution:

Class	0-5	6-11	12-27	18-23	24-29
Frequency	13	10	15	8	11

The upper limit of the median class is:

A 17 **B** 17.5 **C** 18 **D** 18.5

Ans: B 17.5

Solution:

Here,

Class	**Frequency**	**Cumulative frequency**
-0.5-5.5	13	13
5.5-11.5	10	23
11.5-17.5	15	38
17.5-23.5	8	46
23.5-29.5	11	57

Q13. In the formula \bar{\text{x}}=\text{a}+\frac{\sum\text{f}_\text{i}\text{d}_\text{i}}{\sum\text{f}_\text{i}},\text{d}_\text{i} represents: **1 Mark**

A \text{a}+\text{x}_\text{i} **B** \text{d}_\text{i}=\text{x}_\text{i}-\text{a} **C** \text{a}-\text{x}_\text{i}
D \text{x}_1+\text{a}

Ans: B \text{d}_\text{i}=\text{x}_\text{i}-\text{a}

Solution:

represents\text{x}_\text{i}-\text{a}.\text{ d}_\text{i} is the deviation from each mid value"\text{x}"_\text{i} by an assumed mean value"\text{a}"_\text{i}.

Q14. In the formula \bar{\text{x}}=\text{a}+\text{h}\Big(\frac{1}{\text{N}}\sum\text{f}_\text{i}\text{u}_\text{i}\Big), for finding the mean of grouped frequency distribution \text{u}_\text{i}= **1 Mark**

A \frac{\text{x}_\text{i}+\text{a}}{\text{h}} **B** \text{h}(\text{x}_\text{i}-\text{a})
C \frac{\text{x}_\text{i}-\text{a}}{\text{h}} **D** \frac{\text{a}-\text{x}_\text{i}}{\text{h}}

Ans: C \frac{\text{x}_\text{i}-\text{a}}{\text{h}}

Solution:

Given \bar{\text{x}}=\text{a}+\text{h}\Big(\frac{1}{\text{N}}\sum\text{f}_\text{i}\text{u}_\text{i}\Big)
Above formula is a step deviation formula.
\text{u}_\text{i}=\frac{\text{x}_\text{i}-\text{a}}{\text{h}}

Q15. In formula \bar{\text{x}}=\text{a}+\text{h}\big(\frac{\sum\text{f}_1\text{u}_\text{i}}{\sum\text{f}_\text{i}}\big),\text{h}^, stands for: **1 Mark**

A Class size **B** Class mark **C** Mean **D** None of these

Ans: A Class size

Solution:

In formula \bar{\text{x}}=\text{a}+\text{h}\big(\frac{\sum\text{f}_1\text{u}_\text{i}}{\sum\text{f}_\text{i}}\big)\text{,h}^, stands for class size
\text{Class size }=\frac{\text{Upper limit+Lower limit}}{2}

Q16. In the formul \bar{\text{x}}=\text{a+h}\big(\frac{\sum\text{f}_\text{i}\text{u}_\text{i}}{\sum\text{f}_\text{i}}\big) a stands for: **1 Mark**

A Assumed mean **B** Class size **C** Class mark **D** Mean

Ans: A Assumed mean

Solution:

In the formula \bar{\text{x}}=\text{a+h}\big(\frac{\sum\text{f}_\text{i}\text{u}_\text{i}}{\sum\text{f}_\text{i}}\big)
a' stands for Assumed Mean i.e., assumed mean value is the mid value (\text{x}_\text{i}) of class intervals of a set of grouped data.

Q17. The mean of 1, 3, 4, 5, 7, 4 is m. The number 3, 2, 2, 4, 3, 3, p have mean m – 1 and median q. Then p + q = **1 Mark**

A 4 **B** 5 **C** 6 **D** 7

Ans: D 7

Solution:

Mean of 1, 3, 4, 5, 7, 4 is m

$\therefore\frac{1+3+4+5+7+4}{6}=\text{m}$

$\Rightarrow\frac{24}{6}=\text{m}$

$\Rightarrow\text{m}=4$

Mean of 3, 2, 2, 4, 3, 3, p is m = 1

$\Rightarrow\frac{3+2+2+4+3+3+p}{7}=\text{m}-1$

$\Rightarrow\frac{17+\text{p}}{7}=4-1$

$\Rightarrow\frac{17+\text{p}}{7}=3$

$\Rightarrow17+\text{p}=21$

$\Rightarrow\text{p}=21-17=4$

Median of 3, 2, 2, 4, 3, 3, p is q

3, 2, 2, 4, 3, 3, 4 is q

Arranging in order, we get 4, 4, 3, 3, 3, 2, 2

Here n = 7

$\therefore\text{Median}=\frac{7+1}{2}\text{th term}=4\text{th term}$

=3

$\therefore\text{q}=3$

$\therefore\text{p}+\text{q}=4+3=7$

Q18. Mode is: **1 Mark**

A Least frequent value. **B** Middle most value. **C** Most frequent value. **D** None of these.

Ans: C Most frequent value.

Solution:

Mode is the most frequency value of observation or a class,

Q19. If the mean of first n natural numbers is $\frac{5\text{n}}{9}$, then n = **1 Mark**

A 5 **B** 4 **C** 9 **D** 10

Ans: C 9

Solution:

Given:

Mean of first n natural number $=\frac{5\text{n}}{9}$

$\Rightarrow\frac{1+2+3+.....+\text{n}}{\text{n}}=\frac{5\text{n}}{9}$

$\Rightarrow\frac{\frac{\text{n}(\text{n}+1)}{2}}{\text{n}}=\frac{5\text{n}}{9}$

$\Rightarrow\frac{\text{n}+1}{2}=\frac{5\text{n}}{9}$

$\Rightarrow9\text{n}+9=10\text{n}$

$\Rightarrow\text{n}=9$

Hence, the correct option is (c).

Q20. The percentage of marks obtained by 100 students in an examination are as follows: **1 Mark**

Mark	30-35	35-40	40-45	45-50	50-55	55-60	60-65
Frequency	10	15	18	22	23	8	4

The median class is:

A 35-40 **B** 45-50 **C** 40-45 **D** 50-55

Ans: B 45-50

Solution:

Classes	30-35	35-40	40-45	45-50	50-55	55-60	60-65
Frequency	10	15	18	22	23	8	4
Cumulative Frequency	10	25	43	65	88	96	100

Here N = 100

$\Rightarrow \frac{\text{n}}{2}=50$

$\therefore$ median class is 45–50.

Q21. Look at the frequency distribution table given below: **1 Mark**

Class interval	35-45	45-55	55-65	65-75
Frequency	8	12	20	10

The median of the above distribution is:

A 56.5 **B** 57.5 **C** 58.5 **D** 59

Ans: C 58.5

Solution:

Class intervalClass interval	FrequencyFrequency	Cumulative frequencyCumulative frequency
35-45	8	8
45-55	12	20
55-65	20	40
65-75	10	50

Here, \text{N}=50\Rightarrow\frac{\text{N}}{2}=25

The cumulaove frequency just greater than 25 is 40.

Hence, median class is 55-65.

Now, median =\text{l}+\begin{Bmatrix}\text{h}\times\frac{\Big(\frac{\text{N}}{2}-\text{cf}\Big)}{\text{f}}\end{Bmatrix}

=55+\Big\{10\times\frac{(25-20)}{20}\Big\}

=55+2.5

=57.5

Q22. For the following distribution: **1 Mark**

Class	60-70	70-80	80-90	90-100	100-110
Frequency	13	10	15	8	11

The lower limit of the modal class is:

A 100 **B** 80 **C** 90 **D** 70

Ans: B 80

Solution:

In the given data, Maximum frequency is 15.

Therefore, the modal class is 80 - 90.

The lower limit of the modal class is 80.

Q23. Mode =? **1 Mark**

A \text{x}_\text{k}+\text{h}.\Big\{\frac{(\text{f}_{\text{k}-1}-\text{f}_\text{k})}{(2\text{f}_\text{k}-\text{f}_{\text{k}-1}-\text{f}_{\text{k}+1})}\Big\}

B \text{x}_\text{k}+\text{h}.\Big\{\frac{(\text{f}_\text{k}-\text{f}_{\text{k}-1})}{(2\text{f}_\text{k}-\text{f}_{\text{k}-1}-\text{f}_{\text{k}+1})}\Big\}

C \text{x}_\text{k}+\text{h}.\Big\{\frac{(\text{f}_\text{k}-\text{f}_{\text{k}-1})}{(\text{f}_\text{k}-2\text{f}_{\text{k}-1}-\text{f}_{\text{k}-1})}\Big\}

D \text{x}_\text{k}+\text{h}.\Big\{\frac{(\text{f}_\text{k}-\text{f}_{\text{k}-1})}{(\text{f}_{\text{k}}-\text{f}_{\text{k}-1}-2\text{f}_{\text{k}+1})}\Big\}

Ans: B \text{x}_\text{k}+\text{h}.\Big\{\frac{(\text{f}_\text{k}-\text{f}_{\text{k}-1})}{(2\text{f}_\text{k}-\text{f}_{\text{k}-1}-\text{f}_{\text{k}+1})}\Big\}

2. \text{x}_\text{k}+\text{h}.\Big\{\frac{(\text{f}_\text{k}-\text{f}_{\text{k}-1})}{(2\text{f}_\text{k}-\text{f}_{\text{k}-1}-\text{f}_{\text{k}+1})}\Big\}

Q24. In a data, if l = 60, h = 15, f_1 = 16, f_0 = 6, f_2 = 6, then the mode is: **1 Mark**

A 67.5 **B** 72 **C** 60 **D** 62

Ans: A 67.5

Solution:

Mode l=\text{l}+\Big(\frac{\text{f}_1-\text{f}_0}{2\text{f}_1-\text{f}_0-\text{f}_2}\Big)\times\text{h}

=60+\frac{16-6}{2\times16-6-6}\times15

=60+\frac{10-6}{32-12}\times15

=60+\frac{10}{20}\times15

=60+7.5

=67.5

Q25. For the following distribution: **1 Mark**

Mark	60-70	70-80	80-90	90-100	100-110
Frequency	10	15	12	20	9

The sum of lower limits of the median class and modal class is:

A 20 **B** 180 **C** 170 **D** 190

Ans: C 170

Solution:

Mark	60-70	70-80	80-90	90-100	100-110
Frequency	10	15	12	20	9
Cumulative Frequency	10	25	37	57	66

Here N = 66

$\Rightarrow\frac{\text{N}}{2}=33$

$\therefore$ The median class is 80 - 90 and Modal class is 90-100

Sum of lower limits of Median class and Modal class = 80 + 90 = 170

Q26. While computing the mean of the grouped data, we assume that the frequencies are: **1 Mark**

A Evenly distributed over the classes.
B Centred at the class marks of the classes.
C Centred at the lower limits of the classes.
D Centred at the upper limits of the classes.

Ans: B Centred at the class marks of the classes.

Solution:

While computing the mean of the grouped data. we assume that the frequencies are centred at the class marks of the classes.

Q27. Median =? **1 Mark**

A $\text{l+}\begin{Bmatrix}\text{h}\times\frac{\Big(\frac{\text{N}}{2}-\text{cf}\Big)}{\text{f}}\end{Bmatrix}$

B $\text{l+}\begin{Bmatrix}\text{h}\times\frac{\Big(\text{cf}-\frac{\text{N}}{2}\Big)}{\text{f}}\end{Bmatrix}$

C $\text{l}-\begin{Bmatrix}\text{h}\times\frac{\Big(\frac{\text{N}}{2}-\text{cf}\Big)}{\text{f}}\end{Bmatrix}$

D None of these.

Ans: A $\text{l+}\begin{Bmatrix}\text{h}\times\frac{\Big(\frac{\text{N}}{2}-\text{cf}\Big)}{\text{f}}\end{Bmatrix}$

1. $\text{l+}\begin{Bmatrix}\text{h}\times\frac{\Big(\frac{\text{N}}{2}-\text{cf}\Big)}{\text{f}}\end{Bmatrix}$

Q28. If the mode of the data : 16, 15, 17, 16, 15, x, 19, 17, 14 is 15, then x = **1 Mark**

A 15 **B** 16 **C** 17 **D** 19

Ans: A 15

Solution:

Mode of 16, 15, 17, 16, 15, x, 19, 17, 14 is 15

$\because$ By definition mode of a number which has maximum frequency which is 15

$\therefore\text{x}=15$

Q29. The mode of a frequency distribution can be determined graphically from: **1 Mark**

A Histogram. **B** Frequency polygon. **C** Ogive. **D** Frequency curve.

Ans: C Ogive.

Solution:

Mode of frequency can be found graphically by an ogive,

Q30. If 35 is removed from the data : 30, 34, 35, 36, 37, 38, 39, 40, then the median increases by: **1 Mark**

A 2 **B** 1.5 **C** 1 **D** 0.5

Ans: D 0.5

Solution:

Given data = 30, 34, 35, 36, 37, 38, 39, 40

Here n = 8 which is even

$\therefore\text{Median}=\frac{1}{2}\Big[\frac{\text{n}}{2}\text{th}+\Big(\frac{\text{n}}{2}+1\Big)\text{th}\Big]\text{term} =\frac{1}{2}(4\text{th}+5\text{th term})$

$=\frac{1}{2}(36+37)=\frac{73}{2}=36.5$

After removing 35, then n = 7

$\therefore$ New $\text{median}=\frac{7+1}{2}\text{th term}=4\text{th term}=37$

$\therefore$ Increase in $\text{median}=37-36.5=0.5$

Q31. Choose the correct answer from the given four options: **1 Mark**

The times, in seconds, taken by 150 atheletes to run a 110 m hurdle race are tabulated below:

Class	13.8-14	14-14.2	14.2-14.4	14.4-14.6	14.6-14.8	14.8-15
Frequency	2	4	5	71	48	20

The number of atheletes who completed the race in less then 14.6 seconds is:

A 11 **B** 71 **C** 82 **D** 130

Ans: C 82

Solution:

The number of atheletes who completed the race in less than 14.6

$= 2 + 4 + 5 + 71 = 82$

Q32. If the mean of observations $x_1, x_2, \ldots, x_n$ is $\bar{\text{x}}$, then the mean of $x_1 + a, x_2 + a, \ldots, x_n + a$ is **1 Mark**

A $\text{a}\bar{\text{x}}$ **B** $\bar{\text{x}}-\text{a}$ **C** $\bar{\text{x}}+\text{a}$

D $\frac{\bar{\text{x}}}{\text{a}}$

Ans: C $\bar{\text{x}}+\text{a}$

Solution:

Meam of observations $x_1, x_2, \ldots\ldots, x_n$ is $\bar{\text{x}}$

$\frac{\text{x}_1+\text{x}_2+\text{x}_3.\ldots\ldots+\text{x}_\text{n}}{\text{n}}=\bar{\text{x}}$

$x_1 + a + x_2 + a + x_3 + a + \ldots\ldots x_n + a$

$= x_1 + x_2 + x_3 + \ldots . x_n + na$

$\therefore$ Mean of $(x_1 + x_2 + x_3 \ldots\ldots + x_n) + na$

$=\bar{\text{x}}+\frac{\text{na}}{\text{n}}=\bar{\text{x}}+\text{a}$

Q33. Which one of the following is not a measure of central tendency? **1 Mark**

A Arithmetic mean **B** Median **C** Mode **D** Variance

Ans: D Variance

Solution:

Mean, Median and Mode are the most common measures of central tendency.

These may be considered depending on the type of data and data distribution.

Variance measures how far the data set is spread out and is not a measure of central tendency.

Q34. The percentage of marks obtained by 100 students in an examination are as follows: **1 Mark**

Mark	130-135	135-140	140-145	145-150	150-155	155-160	160-165
Frequency	14	16	18	23	18	8	3

The cumulative frequency of the class interval 140-145 is:

A 52 **B** 48 **C** 50 **D** 40

Ans: B 48

Solution:

Mark	130-135	135-140	140-145	145-150	150-155	155-160	160-165
Frequency	14	16	18	23	18	8	3
Cumulative Frequency	14	30	48	71	89	97	100

Therefore, the cumulative frequency of the class interval of 140-145 is 48.

Q35. If the mean of frequency distribution is 8.1 **1 Mark**

and $\sum\text{f}_\text{i}\text{x}_\text{i}=132+5\text{k},\sum\text{f}_\text{i}=20$, then k =

A 3 **B** 4 **C** 5 **D** 6

Ans: D 6

Solution:

Given:

$\sum\text{f}_\text{i}\text{x}_\text{i}=132+5\text{k},\sum\text{f}_\text{i}=20$ and mean = 8.1.

Then,

$\text{Mean}=\frac{\sum\text{f}_\text{i}\text{x}_\text{i}}{\sum\text{f}_\text{i}}$

$8.1=\frac{132+5\text{k}}{20}$

$162=132+5\text{k}$

$5\text{k}=30$

$\text{k}=6$

Hence, the correct option is (d).

Q36.. The mean of the first 10 natural numbers is- **1 Mark**

A 5.5 **B** 5 **C** 6 **D** 4.5

Ans: A 5.5

Solution:

The first 10 natural numbers are 1, 2, 3, ... 10

$\therefore\text{Mean}=\frac{\text{sum of first 10 natural numbers are1,2,3....10}}{10}$

$=\frac{1+2+3+.....+10}{10}$

$=\frac{55}{10}$

$=5.5$

Q37. If the median of the data: 24, 25, 26, x + 2, x + 3, 30, 31, 34 is 27.5, then x = **1 Mark**

A 27 **B** 25 **C** 28 **D** 30

Ans: B 25

Solution:

The given observations are 24, 25, 26, x + 2, x + 3, 30, 31, 34.

Median = 27.5

Here, n = 8

$\text{Median}=\frac{\Big(\frac{\text{n}}{2}\Big)^\text{th}\text{term}+\Big(\frac{\text{n}}{2}+1\Big)^\text{th}\text{term}}{2}$

$27.5=\frac{4\text{th term}+5\text{th term}}{2}$

$27.5=\frac{(\text{x}+2)+(\text{x}+3)}{2}$

$27.5=\frac{2\text{x}+5}{2}$

$2\text{x}+5=55$

$2\text{x}=50$

$\text{x}=25$

Hence, the correct option is (b).

Q38.Directions: In the following questions, a statement of assertion (A) is followed by a statement of reason (R).Mark the correct choice as: **1 Mark**

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)

A Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

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).

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.

C Assertion (A) is true but reason (R) is false.

D Assertion (A) is false but reason (R) is true.

D Assertion (A) is false but reason (R) is true.

Ans: C Assertion (A) is true but reason (R) is false.

C Assertion (A) is true but reason (R) is false.

Solution:

$\text{Median}=\frac{1}{3}(\text{mode+2 mean})$

$=\frac{1}{3}(60+2\times66)=64$

Q39.Assertion: If for a certain frequency distribution, $\text{l}=24.5,\text{h}=4,\text{f}_0=14,\text{f}_1=14,\text{f}_2=15$ then the value of mode is 25. **1 Mark**

Reason: Mode of a frequency distribution is given by:

$\text{Mode}=\text{l}+\bigg(\frac{\text{f}_1-\text{f}_0}{2\text{f}_1-\text{f}_0-\text{f}_2}\bigg)\times\text{h}$

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.

Ans: D Assertion (A) is false but reason (R) is true.

Solution:

Now, it is given that $\text{l}=24.5,\text{h}=4,\text{f}_0=14,\text{f}_1=14,\text{f}_2=15$

$\therefore\text{Mode}=24.5+\bigg(\frac{14-14}{28-14-15}\bigg)\times4$

$\Rightarrow\text{Mode}=24.5+0$

$\Rightarrow\text{Mode}=24.5$

Q40.Assertion: If the value of mode and mean is 60 and 66 respectively, then the value of median is 64. **1 Mark**

Reason: Median = (mode + 2 mean)

A Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

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).

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.

C Assertion (A) is true but reason (R) is false.

D Assertion (A) is false but reason (R) is true.

Ans: C Assertion (A) is true but reason (R) is false.

C Assertion (A) is true but reason (R) is false.

Solution:

Median $=\frac{1}{3}(\text{mode+2 mean})$

$=\frac{1}{3}(60+2\times66)=64$

Q41.Assertion: Consider the following frequency distribution: **1 Mark**

Class interval	3-6	6-9	9-12	12-15	15-18	18-21
Frequency	2	5	21	23	10	12

he mode of the above data is 12.4.

Reason: The value of the variable which occurs most often is the mode.

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.

Ans: B Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

Solution:

The maximum frequency is 23 and the modal class is 12 - 15.

So, $\text{l} = 12,\text{ f}_\text{i} = 23,\text{ f}_0 = 21, \text{ f}_2 = 10$ and $\text{h}=3$

$\therefore\text{ Mode}=12+\bigg(\frac{23-21}{2\times23-21-10}\bigg)\times3$

$=\bigg(12+3\times\frac{2}{15}\bigg)$

$=12.4$

Q42.Assertion: If the value of mode and mean is 60 and 66 respectively, then the value of median is 64. **1 Mark**

Reason: Median = (mode + 2 mean)

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.

Ans: C Assertion (A) is true but reason (R) is false.

Solution:

Median $=\frac{1}{3}(\text{mode+2 mean})$

$=\frac{1}{3}(60+2\times66)$

$=64$

Q43.Assertion: Consider the following frequency distribution: **1 Mark**

Class interval	0-4	4-8	8-12	12-16	16-20
Frequency	6	3	5	20	10

The median class is 12-16.

Reason: Let $\text{n}=\sum\text{f}_\text{i}$ Then, the class whose cumulative frequency is just lesser than$\big(\frac{\text{n}}{2}\big)$is the median 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.

Ans: C Assertion (A) is true but reason (R) is false.

Solution:

We know that, the class whose cumulative frequency is just greater than$\frac{\text{n}}{2}$ is the median class.

So, Reason is wrong.

The cumulative frequency distribution table from the given data can be drawn as:

Class Interval	**Frequency**	**Cumulative Frequency**
0-4	6	6
4-8	3	9
8-12	5	14
12-16	20	34
16-20	10	44

Here $\text{n}=44\Rightarrow\frac{\text{n}}{2}=22$, which lies in the interval 12 - 16.

So, it is the median class.

Q44.Assertion: The arithmetic mean of the following frequency distribution is 25. **1 Mark**

Class Interval	0-10	10-20	20-30	30-40	40-50
Frequency	5	18	15	16	6

Reason: $\text{Mean }(\overline{\text{x}})=\frac{\sum\text{f}_\text{i}\text{x}_\text{i}}{\sum\text{f}_\text{i}}$ where $\text{x}_\text{i}=\frac{1}{2}$ (Lower limit+Upper limit) of the i^th class interval and f_i is its frequency.

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.

Ans: A Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

Solution:

Clearly, Reason is correct.

Now, the frequency distribution table from the given data can be drawn as:

Class Interval	**Frequency (f_i)**	x_i	f_ix_i
0-10	5	5	25
10-20	18	15	270
20-30	15	25	375
30-40	16	35	560
40-50	6	45	270
	$\sum\text{f}_\text{i}=60$		$\sum\text{f}_\text{i}\text{x}_\text{i}=1500$

$\therefore\text{Mean }=\frac{\sum\text{f}_\text{i}\text{x}_\text{i}}{\sum\text{f}_\text{i}}$

$\Rightarrow$ Mean $=\frac{1500}{60}$

$\Rightarrow$ Mean = 25, which is true.

Q45.Assertion: Consider the following frequency distribution: **1 Mark**

Class interval	10-15	15-20	20-25	25-30	30-35
Frequency	5	9	12	6	8

Reason: The class having maximum frequency is called 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.

Ans: D Assertion (A) is false but reason (R) is true.

Solution:

The maximum frequency is 12, which lies in the interval 20 - 25. So, the modal class is 20 - 25.