

Practice the following Assertion and Reasoning Questions for Statistics - Class 10

Q1. Assertion (A): In grouped data, the class mark is taken as the representative value of the entire class interval.

Reason (R): The class mark is the average of the upper and lower class limits.

Options:

- a) Both A and R are true and R is the correct explanation of A
- b) Both A and R are true but R is NOT the correct explanation of A
- c) A is true but R is false
- d) A is false but R is true

Answer: a)

Explanation: The class mark is calculated as the midpoint of a class interval and is assumed to represent all observations in that class while finding the mean of grouped data.

Q2. Assertion (A): The direct method for finding mean of grouped data uses the formula: $\text{Mean} = \frac{\sum fix_i}{\sum f_i}$.

Reason (R): In the direct method, x_i represents the class marks of the class intervals.

Options:

- a) Both A and R are true and R is the correct explanation of A
- b) Both A and R are true but R is NOT the correct explanation of A
- c) A is true but R is false

d) A is false but R is true

Answer: a)

Explanation: The direct method calculates the weighted average using class marks as representative values and their corresponding frequencies.

Q3. Assertion (A): The assumed mean method reduces calculation effort compared to the direct method.

Reason (R): In this method, deviations are taken from a conveniently chosen value called the assumed mean.

Options:

- a) Both A and R are true and R is the correct explanation of A
- b) Both A and R are true but R is NOT the correct explanation of A
- c) A is true but R is false
- d) A is false but R is true

Answer: a)

Explanation: By taking deviations from an assumed mean, the values become smaller and calculations become simpler.

Q4. Assertion (A): Step-deviation method is useful when all deviations have a common factor.

Reason (R): The formula $u_i = (x_i - a)/h$ reduces large deviations into smaller values.

Options:

- a) Both A and R are true and R is the correct explanation of A

- b) Both A and R are true but R is NOT the correct explanation of A
- c) A is true but R is false
- d) A is false but R is true

Answer: a)

Explanation: Dividing deviations by a common factor h simplifies calculations and reduces computational work.

Q5. Assertion (A): The mean obtained by direct, assumed mean and step-deviation methods is always the same.

Reason (R): Assumed mean and step-deviation methods are simplified forms of the direct method.

Options:

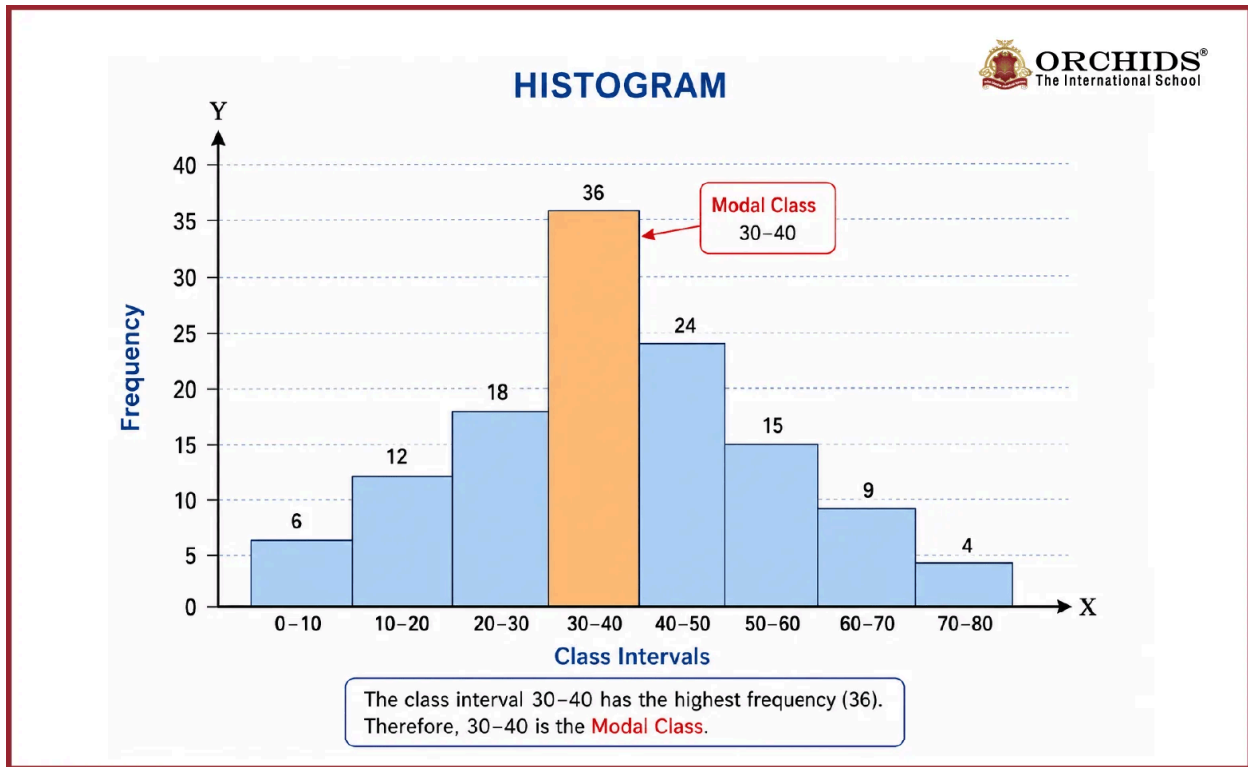
- a) Both A and R are true and R is the correct explanation of A
- b) Both A and R are true but R is NOT the correct explanation of A
- c) A is true but R is false
- d) A is false but R is true

Answer: a)

Explanation: Though the methods differ in computation style, they are based on the same statistical principle and yield identical results.

Q6. Assertion (A): The modal class of grouped data is the class interval having the maximum frequency.

Reason (R): Mode always lies inside the modal class.



Options:

- Both A and R are true and R is the correct explanation of A
- Both A and R are true but R is NOT the correct explanation of A
- A is true but R is false
- A is false but R is true

Answer: b)

Explanation: Modal class is indeed the class with maximum frequency. The mode lies inside it, but that fact does not explain why it is called modal class.

Q7. Assertion (A): The formula for mode of grouped data is

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

Reason (R): f_1 denotes the frequency of the modal class.

Options:

- a) Both A and R are true and R is the correct explanation of A
- b) Both A and R are true but R is NOT the correct explanation of A
- c) A is true but R is false
- d) A is false but R is true

Answer: b)

Explanation: The formula is correct and f_1 represents the modal class frequency, but this alone does not explain the formula.

Q8. Assertion (A): Median class is the class whose cumulative frequency first exceeds $n/2$.

Reason (R): Median divides the observations into two equal parts.

Options:

- a) Both A and R are true and R is the correct explanation of A
- b) Both A and R are true but R is NOT the correct explanation of A
- c) A is true but R is false
- d) A is false but R is true

Answer: a)

Explanation: Median represents the middle value of data, so the class containing the $n/2$ th observation becomes the median class.

Q9. Assertion (A): Cumulative frequency is obtained by adding frequencies of all previous classes including the current class.

Reason (R): Cumulative frequency helps in locating the median class.

Options:

- a) Both A and R are true and R is the correct explanation of A
- b) Both A and R are true but R is NOT the correct explanation of A
- c) A is true but R is false
- d) A is false but R is true

Answer: b)

Explanation: Both statements are true, but the definition of cumulative frequency is independent of its use in finding median.

Q10. Assertion (A): In a salary distribution with some extremely high incomes, median may be preferred over mean.

Reason (R): Extreme values affect the mean more than the median.

Options:

- a) Both A and R are true and R is the correct explanation of A
- b) Both A and R are true but R is NOT the correct explanation of A
- c) A is true but R is false
- d) A is false but R is true

Answer: a)

Explanation: Mean gets distorted by unusually large or small values, whereas median remains comparatively stable.

Q11. Assertion (A): The empirical relation among mean, median and mode is:

$$\text{Mode} = 3 \text{ Median} - 2 \text{ Mean}$$

Reason (R): This relation holds exactly for every grouped data distribution.

Options:

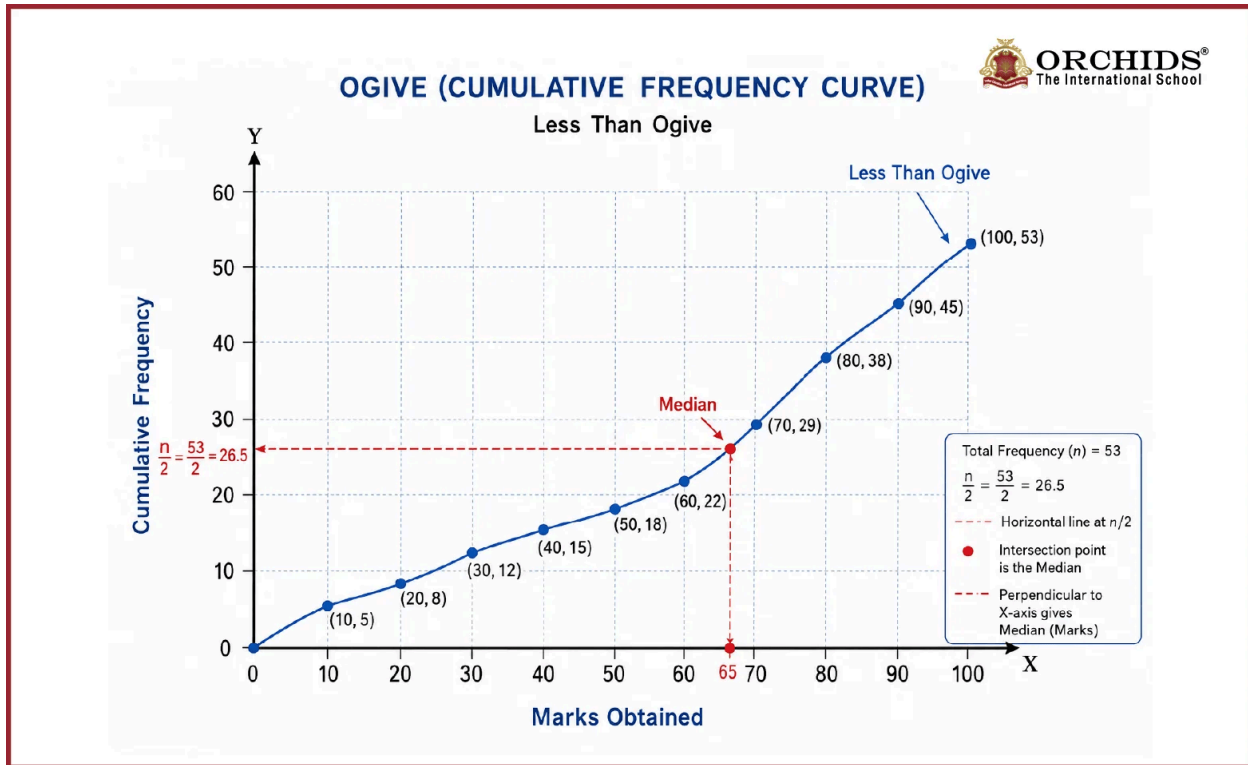
- a) Both A and R are true and R is the correct explanation of A
- b) Both A and R are true but R is NOT the correct explanation of A
- c) A is true but R is false
- d) A is false but R is true

Answer: c)

Explanation: The relation is correct, but it is empirical and only approximate; it does not hold exactly for all distributions.

Q12. Assertion (A): For constructing an ogive, class intervals should be continuous.

Reason (R): Median obtained graphically from ogives depends on cumulative frequencies of continuous intervals.



Options:

- a) Both A and R are true and R is the correct explanation of A
- b) Both A and R are true but R is NOT the correct explanation of A
- c) A is true but R is false
- d) A is false but R is true

Answer: a)

Explanation: Continuous class intervals ensure accurate cumulative frequency representation and proper ogive construction.