

CLASS 8

MATHS

EXTRA QUESTIONS

Extra Questions for Class 8 Maths Chapter 12: Tales by Dots and Lines – HOTS

Original HOTS-level (Higher Order Thinking Skills) practice questions for Class 8 Maths Chapter 12 (Tales by Dots and Lines), using fresh numbers not found in the NCERT book. Full worked solutions included.

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Q1 (Reverse mean). The mean of 6 numbers is 24. If one number is removed, the mean of the remaining 5 becomes 22. Find the removed number.

Solution: Original total = $6 \times 24 = 144$. New total = $5 \times 22 = 110$. Removed number = $144 - 110 = 34$.

Q2 (Median with even/odd shift). A dataset of 9 numbers has median 30. If one more number is added and the new median is still 30, what can you say about the added number?

Solution: With 10 (even) numbers, the median becomes the average of the 5th and 6th sorted terms. For this average to still be exactly 30 (matching the original 9-number median, which was the 5th term), the **added number must be ≥ 30** if it lands after the original median position, or the arrangement must otherwise keep both middle terms at 30 — in the simplest case, adding **exactly 30** always works.

Q3 (Assertion–Reason). Assertion (A): Adding a value equal to the current mean never changes the mean. Reason (R): The mean is defined as the sum of all values divided by the count.

Solution: If you add a value exactly equal to the mean, the new sum increases by exactly the mean, and dividing by one more count keeps the ratio the same — so **Assertion is true**. The **Reason is also true** and correctly explains why: since mean = sum/count, adding the mean itself to both sum and count (scaled correctly) preserves the ratio. **Both true, R explains A**.

Q4 (Combined mean). Class A (25 students) has a mean score of 68. Class B (15 students) has a mean score of 76. Find the combined mean of both classes.

Solution: Total marks = $25 \times 68 + 15 \times 76 = 1700 + 1140 = 2840$. Total students = 40. Combined mean = $2840/40 = 71$.

Q5 (Multi-step, median shift). A sorted dataset has 11 values with median 50. If the 3 smallest values are each reduced by 10, does the median change? Explain.

Solution: No, the median doesn't change. The median (6th term of 11) only depends on the values below and at that position remaining below it in rank — reducing the 3 smallest values (which are already below the median) keeps them below the median, so the value at the 6th position, and hence the median, is unaffected.

Q6 (Spot the error). A student says: “Since the mean of my test scores went up after I added a new score, that new score must be higher than my old mean.” Is this reasoning valid?

Solution: Yes, this reasoning is valid. If the mean increases after adding one value, that new value must be greater than the mean it's being averaged into (a value equal to or below the current mean would keep the mean the same or pull it down).

Q7 (Data reconstruction). Five numbers have mean 20 and median 18. Three of them are 12, 18, 25. Find two numbers that complete the set, given all five numbers are distinct.

Solution: Sum needed = $20 \times 5 = 100$. Sum of known 3 = $12 + 18 + 25 = 55$. Remaining two numbers sum to 45. For the median to stay 18 (the middle value when sorted), one number must be ≤ 18 and the other ≥ 18 , and 18 must remain the middle (3rd) value. Try **15 and 30**: sorted set = 12, 15, 18, 25, 30 — median = 18 ✓, sum = $12 + 15 + 18 + 25 + 30 = 100$ ✓. Valid answer: **15 and 30** (other valid pairs also exist).

Q8 (Line graph rate of change). A line graph shows sales rising from 200 units in January to 500 units in June. Assuming a steady (linear) rate of increase, find the sales in April.

Solution: Total increase over 5 months (Jan→June) = 300 units, i.e. 60 units/month. April is 3 months after January: sales = $200 + 3 \times 60 = 380$ units.

Q9 (Weighted mean). A student scores 80 in a test worth 20% of the grade, and 90 in a test worth 80% of the grade. Find the weighted mean score.

Solution: Weighted mean = $(0.20 \times 80) + (0.80 \times 90) = 16 + 72 = 88$.

Q10 (Comparing mean and median for skew). A small company's monthly salaries (in ₹'000s) are 25, 28, 30, 32, 250 (the owner's salary). Find the mean and median, and explain which better represents a "typical" employee's salary.

Solution: Mean = $(25+28+30+32+250)/5 = 365/5 = ₹73,000$. Median (middle of sorted list 25, 28, 30, 32, 250) = ₹30,000. The **median** better represents a typical employee's salary here — the owner's unusually high salary is an outlier that pulls the mean far above what most employees actually earn.