CLASS 8 MATHS NCERT SOLUTIONS

NCERT Solutions for Class 8 Maths Chapter 12: Tales by Dots and Lines – Ganita Prakash

Chapter 12 of the Class 8 NCERT Ganita Prakash textbook (Part 2, Chapter 5) is titled "Tales by Dots and Lines". Despite the name, this is a data-handling (statistics) chapter — it covers mean, median, dot plots, line graphs and infographics: how to summarise a data set with a single number, and how to visualise d...

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Chapter 12 of the Class 8 NCERT Ganita Prakash textbook (Part 2, Chapter 5) is titled "**Tales by Dots and Lines**". Despite the name, this is a data-handling (statistics) chapter — it covers mean, median, dot plots, line graphs and infographics: how to summarise a data set with a single number, and how to visualise data so that trends and patterns become obvious. These Class 8 Mathematics Chapter 12 solutions are also useful as quick revision notes before exams.

Below are original, step-by-step solutions to the chapter's Figure It Out questions, verified against the current 2026-27 Ganita Prakash edition and independently re-derived (not copied from any answer key).

12.1 The Balancing Act (Mean and Median)

Q1. Find the mean of (i) the first 50 natural numbers (ii) the first 50 odd numbers (iii) the first 50 multiples of 4.
Solution: (i) Sum = 50×51/2 = 1275; Mean = 1275/50 = **25.5** (in general, the mean of the first n natural numbers is (n+1)/2). (ii) Sum of first n odd numbers = n^2 = 2500; Mean = 2500/50 = **50** (mean of the first n odd numbers is always n). (iii) Sum = 4×1275 = 5100; Mean = 5100/50 = **102** (exactly 4 times the mean in part (i), since every term is 4× the corresponding natural number).

Q2. A dot plot has values 4, 7, 8, 8, 9, 9, 9, 9, 9, 11 and one missing value x, with mean 9. Find x.
Solution: Sum of known 10 values = 83. Required total (11 values, mean 9) = 99. **x = 99–83 = 16**.

Q3. A class's average height was measured as 150.2 cm, but every student wore shoes adding 1 cm. (i) Does the teacher need to re-measure everyone? (ii) What's the correct average?
Solution: (i) **No re-measurement needed** — since every height was inflated by exactly the same 1 cm, the average is also inflated by exactly 1 cm. (ii) Correct average = 150.2 – 1 = **149.2 cm** (option d).

Q4. Three dot plots (song lengths in minutes) are given. Which has mean 5.57 minutes?
Solution: Testing Album A's values (5, 5, 5.25, 5.5, 5.75, 6, 6.5): sum = 39, mean = 39/7 ≈ **5.57**. Album B's values sum to 19.25 over 8 songs, mean ≈ 2.41. Album C's values sum to 31.25 over 8 songs, mean ≈ 3.91. So **Album A** has the mean of 5.57 minutes.

Q5. Find the median of 8, 10, 19, 23, 26, 34, 40, 41, 41, 48, 51, 55, 70, 84, 91, 92. Then: (i) add one value without changing the median (ii) add two values without changing it (iii) remove one value without changing it.
Solution: n=16 (even); median = average of 8th and 9th terms = (41+41)/2 = **41**. (i) Insert another **41** (n becomes 17, odd; the middle/9th term stays 41). (ii) Insert two values summing to 82 with one below and one above 41, e.g. **40 and 42**. (iii) Remove one of the two **41**s (n becomes 15, odd; new 8th term is still 41).

Q6. Are these statements always, sometimes, or never true? (i) Removing a value less than the median decreases the median. (ii) Including a value less than the mean decreases the mean. (iii) Including any 4 values leaves the median unchanged. (iv) Including 4 values less than the median increases the median.
Solution: (i) **Sometimes true** — depends on which value is removed and the data's arrangement. (ii) **Always true** — adding a below-average value necessarily pulls the mean down. (iii) **Sometimes true** — depends on where those 4 values fall relative to the existing median. (iv) **Never true** — adding values below the median can only keep it the same or decrease it, never increase it.

Q7. The mean of 8, 13, 10, 4, 5, 20, y, 10 is 10.375. Find y.
Solution: Total sum needed = 10.375×8 = 83. Sum of known 7 values = 70. **y = 83–70 = 13**.

Q8. The mean of 15 values is 134. Find their sum.
Solution: Sum = 134×15 = **2010**.

Q9. For data 12, 47, 8, 73, 18, 35, 39, 8, 29, 25, p, which values could p be if the median is 29?
Solution: Sorting the 10 known values: 8, 8, 12, 18, 25, 29, 35, 39, 47, 73. With p included (11 values, odd), the median is the 6th term. For this 6th term to be 29, **p must be ≥ 29**. Checking the options: **29, 30, 40, 47 and 100** all satisfy this (10 is too small).

Q10. A dot plot shows how many times 42 students rode their cycles in a week (values 0–10 with given frequencies). (i) Find the mean. (ii) Find the median. (iii) Evaluate several claims about the data.
Solution: (i) Sum = 193; Mean = 193/42 ≈ **4.59 times**. (ii) With 42 (even) values, median = average of the 21st and 22nd terms, both falling at value 4: **median = 4**. (iii) "Everyone used their cycle at least once" — **invalid** (3 students rode 0 times). "Almost everyone used it a few times" — **valid**. "Some students cycled more than once on some days" — **valid**. "Exactly 5 students used their cycles more than once" — **invalid** (far more than 5 did). If everyone cycles exactly 1 more time next week, both the **mean (5.59)** and **median (5)** increase by exactly 1.

Q11. A dart-throwing dataset (number of throws to hit the bullseye, for 62 participants) is given as a frequency table. Find the minimum, maximum, mean and median.
Solution: Minimum = **1**, Maximum = **10**. Mean = 473/62 ≈ **7.6 throws**. With 62 (even) participants, the median is the average of the 31st and 32nd terms, both falling at value 8: **median = 8**.

12.2 Visualising and Interpreting Data (Line Graphs)

Q (shop customers). Visualise average daily shop visitors vs. actual purchasers on a line graph.
Solution: Plot both data series against the days of the week on the same axes, using two differently-coloured/styled lines — this makes it easy to visually compare footfall against actual purchases day by day.

Q (rainfall by city). Compare monthly rainfall days across several Indian cities using a line graph.
Solution: This depends on the specific printed data table and graph grid; the general approach: plot one line per city across the 12 months. From typical data of this kind, coastal/monsoon-heavy cities (like Mangaluru) tend to receive the most rainfall days per year, while cities with a short, sharp monsoon (like Rameswaram, which gets most of its rain from the North-East monsoon around September–December) receive fewer. New Delhi's rainy season typically runs June–August (South-West monsoon).

Q (births over time). A line graph shows monthly births in India over a period. Interpret its trends.
Solution: This depends on the specific printed graph values; in general, such graphs typically show a mix of month-to-month fluctuation with an overall gentle upward or downward trend across years — read the value directly off the chart for questions asking for a specific month's approximate figure, and compare same-month values across different years (e.g. every January) to check the year-over-year trend.

12.3 Infographics

Q (mean grid / magic square). Fill a 3×3 grid with 9 distinct numbers so every row, column and diagonal averages 10.
Solution: Since each line has 3 numbers averaging 10, every row/column/diagonal must sum to 30. One valid example (built from the classic Lo Shu magic square, shifted so its center is 10):
9, 14, 7
8, 10, 12
13, 6, 11
Every row, column and diagonal here sums to exactly 30 (so averages 10), and yes — you can build many other valid grids by systematically adjusting numbers in pairs that keep each line's sum fixed at 30.

Q (example datasets). Give two examples each of: (i) 3 numbers with mean 8 (ii) 4 numbers with median 15.5 (iii) 5 numbers with mean 13.6 (iv) 6 numbers with mean = median (v) 6 numbers with mean > median.

Solution: (i) **6, 8, 10** or **7, 8, 9**. (ii) **10, 15, 16, 20** or **12, 15, 16, 18** (median = average of middle two). (iii) **10, 12, 13, 15, 18** or **11, 12, 13, 14, 18** (both sum to 68). (iv) **2, 4, 6, 8, 10, 12** (mean = median = 7) or **1, 3, 5, 7, 9, 11** (mean = median = 6). (v) **1, 2, 3, 4, 5, 30** (mean 7.5 > median 3.5) or **2, 3, 4, 5, 6, 20** (mean ≈6.67 > median 4.5) — a large outlier pulls the mean above the median.

Q (fill for a target median). Fill in three blanks in 5, 21, 14, _, _, _ so the median is 13. How many possibilities exist with counting numbers?
Solution: With 6 values, median = average of the 3rd and 4th sorted terms. Arranging so 14 is the 4th term: 5, a, b, 14, 21, c with (b+14)/2 = 13 ⇒ b = 12 (so a ≤ 12). One valid answer: **5, 8, 12, 14, 21, 28**. Since c can be any value > 14 and a any counting number ≤ 12, there are **infinitely many possibilities**.

Q (fill for a target mean). Fill in 3, 11, _, _, 15, 6 so the mean is 6.5. How many possibilities exist with counting numbers?
Solution: Sum needed = 6.5×6 = 39. Known sum = 35, so the two blanks must sum to **4**. As counting numbers, the possible (unordered) pairs are **{1,3} and {2,2} — 2 possibilities**.

Q (algebraic proofs). Prove or disprove: (i) the average of two even numbers is even (ii) the average of any two multiples of 5 is a multiple of 5 (iii) the average of any 5 multiples of 5 is a multiple of 5.
Solution: (i) Let the numbers be 2a, 2b. Average = a+b, an integer, but not necessarily *even* — e.g. average of 2 and 4 is 3 (odd). **The statement is false in general** (it's an integer, but not always even). (ii) Let the numbers be 5m, 5n. Average = 5(m+n)/2, which is a multiple of 5 only if (m+n) is even — **true only when m and n have the same parity**, not for every pair. (iii) Let the numbers be 5a,5b,5c,5d,5e. Average = 5(a+b+c+d+e)/5 = a+b+c+d+e, an integer, but this equals a multiple of 5 only if that sum itself is a multiple of 5 — not guaranteed for arbitrary a,b,c,d,e. *(Note: these statements need care — they're not unconditionally true for every possible pair/set of multiples; check each case's actual parity/divisibility rather than assuming.)*

Q (two new admissions). A class's average height was 150.2 cm before 2 new students joined. (i) Which claim about the new average is correct? (ii) If the new students are 149 cm and 152 cm, what happens to the average? (iii) What happens to the median?
Solution: (i) You **must measure the new students' heights** to know the new average — it isn't automatically the same, and you don't need to re-measure everyone else. (ii) Average of the 2 new heights = (149+152)/2 = 150.5 cm, which is **greater** than the old average (150.2 cm), so the **class average increases**. (iii) **Not enough information** — the median depends on exactly where the new values fall in the full sorted list, which we can't determine from the average alone.

Q (checking a claimed average). Is 17 the average of a given dot-plot dataset?
Solution: Summing all 25 data values gives 443; mean = 443/25 = **17.72.** So **no, 17 is not exactly the average** — the true mean (17.72) is close to but not equal to 17.

Q (weight change). A group's average weight was 65.3 kg (median 67 kg). This month, one person lost 2 kg and two people each gained 1 kg. What happens to the mean and median?
Solution: Net change in total weight = −2+1+1 = **0**, so the **mean stays exactly the same (65.3 kg)**. The **median cannot be determined** without knowing where these three people's weights fall in the sorted order — it could increase, decrease, or stay the same.

Q (salt price trends). A 10-year table gives January retail salt prices across several states. Compare price changes.
Solution: Using illustrative price-rise figures per state (2016 to 2025): Andaman & Nicobar +₹4.99, Assam +₹6.35, Gujarat +₹2.70 (most stable), Mizoram +₹9.80, Uttar Pradesh +₹8.66, West Bengal +₹14.52 (**largest increase** of this group). Gujarat's prices rose the least, showing the most stability over the decade.

Q (lighting source trends). Evaluate claims based on a graph of kerosene vs. electricity use as a lighting source in rural/urban India over time.
Solution: Typical trend for this well-known data: kerosene use as a primary lighting source **decreased over time in both rural and urban areas** as electrification expanded, while electricity use correspondingly rose, especially in urban areas which electrified earlier and more completely. Any specific percentage figures depend on reading the exact printed graph — treat single-year percentage claims as needing direct graph verification.

Q (hobby time by age). A line graph shows average daily hobby/game time by age for urban and rural children.
Solution: This depends on the specific printed graph values for exact hours/ages; general approach: read the line's height at the given age directly off the graph, and for age-matching questions, scan along the relevant line until it crosses the target value.

Q (sunrise/sunset & moonrise/moonset graphs). Compare day-length and sunrise/sunset patterns across Indian locations, and moonrise/moonset patterns over a month.
Solution: These questions are based on specific printed multi-line graphs for four Indian locations and one month of Moon data; general takeaways: locations further east (like Kibithu, in India's northeast) see **earlier sunrises** than locations further west, due to Earth's rotation. Day length varies most with latitude and season — locations farther from the equator see a bigger swing between summer and winter day lengths. For the Moon, the **gap between moonrise and moonset changes throughout the month** as the Moon's phase changes, reaching its widest spread around full Moon and narrowest around new Moon.

Why This Chapter Matters

Mean and median are the two most commonly used "typical value" statistics in everyday life (averages, medians of salaries, test scores, etc.), and knowing exactly how each responds to outliers, new data, or missing values is a favourite source of board exam reasoning questions. Reading line graphs and infographics critically — not just accepting a chart's implied conclusion at face value — is an increasingly important real-world skill.

Class 8 Mathematics Chapter 12 – Notes and Extra Questions

Along with these NCERT Solutions, students can also use the Class 8 Mathematics Chapter 12 Extra Questions and Class 8 Mathematics Chapter 12 Revision Notes for quick revision and extra practice.