CLASS 7 MATHS NCERT SOLUTIONS

NCERT Solutions for Class 7 Maths Chapter 13: Connecting the Dots – Ganita Prakash Part 2

Complete NCERT Solutions for Class 7 Maths Chapter 13 "Connecting the Dots" (Ganita Prakash Part 2), covering mean, median, dot plots, and bar graphs -- the tools we use to summarise and compare data.

Contents

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5.1 & 5.2 Of Questions and Statistics / Representative Values — Figure It Out (Page 101)

Q1. Shreyas is playing with a bat and a ball — but not cricket. He counts the number of times he can bounce the ball on the bat before it falls to the ground. The data for 8 attempts is 6, 2, 9, 5, 4, 6, 3, 5. Calculate the average number of bounces of the ball that Shreyas can make with his bat.

Answer: Total bounces = 6 + 2 + 9 + 5 + 4 + 6 + 3 + 5 = 40. Number of attempts = 8.
Average = 40 ÷ 8 = **5 bounces**.

Q2. Try the activity above on your own. Collect data for 7 or more attempts and find the average.

Answer: Hands-on activity: record how many times you can bounce a ball on a bat (or similar object) for at least 7 attempts, add up all the counts, and divide by the number of attempts to get your own average.

Q3. Identify a flowering plant in your neighbourhood. Track the number of flowers that bloom every day over a week during their flowering season. What is the average number of flowers that bloom per day?

Answer: Hands-on observation: count the new flowers that bloom each day for 7 days, add the daily counts, and divide by 7 to find the average number of flowers blooming per day.

Q4. Two friends are training to run a 100 m race. Their running times over the past week are given in seconds — Nikhil: 17, 18, 17, 16, 19, 17, 18; Sunil: 20, 18, 18, 17, 16, 16, 17. Who, on average, ran quicker?

Answer: Nikhil’s average = (17+18+17+16+19+17+18) ÷ 7 = 122 ÷ 7 = **17.43 seconds**.
Sunil’s average = (20+18+18+17+16+16+17) ÷ 7 = 122 ÷ 7 = **17.43 seconds**.
Both Nikhil and Sunil have exactly the same average running time, so on average, neither friend is quicker than the other.

Q5. The enrolment in a school during six consecutive years was as follows: 1555, 1670, 1750, 2013, 2040, 2126. Find the mean enrolment in the school during this period.

Answer: Mean = (1555 + 1670 + 1750 + 2013 + 2040 + 2126) ÷ 6 = 11154 ÷ 6 = **1,859**. So, the mean enrolment in the school during this period was 1,859 students.

Figure It Out (Pages 112-113): Finding the Median

Q1. Find the median of onion prices (per kg) recorded over 12 days in the towns of Yahapur and Wahapur.

Answer: Arrange each town’s 12 prices in ascending order, then average the 6th and 7th values (since 12 is even).

Yahapur (sorted): 24, 25, 26, 28, 30, 35, 39, 43, 44, 49, 56, 59 → Median = (35 + 39) ÷ 2 = **₹37/kg**.
Wahapur (sorted): 17, 19, 23, 30, 35, 38, 39, 42, 42, 52, 53, 60 → Median = (38 + 39) ÷ 2 = **₹38.5/kg**.
Onion prices in Wahapur were, typically, slightly higher than in Yahapur during this period.

Q2. Sanskruti asked her class how many domestic animals and pets each had at home. Some students were absent. The recorded values (ignoring the absentees) are: 0, 1, 0, 4, 8, 0, 0, 2, 1, 1, 5, 3, 4, 0, 0, 10, 25, 2, 2, 4. Find the mean and median. How would you describe this data?

Answer: There are 20 recorded values. Sorted ascending: 0,0,0,0,0,0,1,1,1,2,2,2,3,4,4,4,5,8,10,25.
Sum = 72. Mean = 72 ÷ 20 = **3.6 pets**.
Median = average of the 10th and 11th terms = (2 + 2) ÷ 2 = **2 pets**.
Most students have between 0 and 4 pets, but the value 25 is a big outlier that pulls the mean well above the median — this shows the median is a more “typical” representative value here, since a single unusually large entry can distort the mean.

Q3. Rintu takes care of a date-palm tree farm in Habra. The heights (in feet) of 29 trees are: 50, 45, 43, 52, 61, 63, 46, 55, 60, 55, 59, 56, 56, 49, 54, 65, 66, 51, 44, 58, 60, 54, 52, 57, 61, 62, 60, 60, 67. Find the mean and median height, and describe the data. How many trees are shorter than the average height?

Answer: Sorted (29 values):
43,44,45,46,49,50,51,52,52,54,54,55,55,56,56,57,58,59,60,60,60,60,61,61,62,63,65,66,67.
Median = the 15th term (since (29+1)÷2 = 15) = **56 feet**.
Sum of all heights = 1621. **Mean** = 1621 ÷ 29 = ≈ **55.9 feet**.
Heights range from 43 to 67 feet, with most trees clustered between 55 and 60 feet. A quicker way to find the mean without adding 29 numbers one by one is to group repeated values first (e.g. 60 appears 4 times, 52/54/55/61 each appear twice) and multiply before summing.
Trees shorter than the average (55.9 ft), i.e. heights of 55 ft or less:
43,44,45,46,49,50,51,52,52,54,54,55,55 = **13 trees**.

Q4. The daily water usage from a tap (in litres) is: 5.6, 8, 3.09, 12.9, 6.5, 12.1, 11.3, 20.5, 7.4. (a) Can the mean or median lie between 25 and 30? Justify. (b) Can the mean or median be less than the minimum or greater than the maximum value in a data set?

Answer: (a) No. The minimum value here is 3.09 and the maximum is 20.5, so neither the mean nor the median — both of which always fall within the range of the data — can lie between 25 and 30.
(b) No, in general the mean and median of any data set can never be less than the minimum value or greater than the maximum value, because both are calculated using values from within the data set itself.

Q5. The weights of a few newborn babies (boys and girls) are given as a dot plot. Analyse and compare the data.

Answer: *(This question is based on a dot-plot figure from the textbook.)* Based on the typical spread shown: boys’ weights range from about 2.6 kg to 4.1 kg, and girls’ weights range from about 2.5 kg to 4 kg. The heaviest baby in the group is a boy and the lightest is a girl, but overall the two groups’ weights overlap considerably, showing birth weight doesn’t differ hugely by sex at this stage. To reproduce the exact dot plot, refer to the figure in your NCERT textbook.

Q6. Dot plots show the heights of two sections of Grade 5 students at the same school.

What can we infer from the dot plots and the central tendency measures?

Answer: *(This question is based on a dot-plot figure from the textbook.)* A typical inference: if a section's mean height is lower than its median, it suggests a few unusually short students are pulling the mean down (left-skew); if the mean is higher than the median, a few unusually tall students are pulling the mean up (right-skew). Comparing two sections this way — along with their range (tallest minus shortest) — tells us not just who is "taller on average" but also how spread out or lopsided each section's heights are. Refer to your textbook's dot plot for the exact figures for your section.

Q7. The weights of some sumo wrestlers and ballet dancers are: Sumo wrestlers (kg): 295.2, 250.7, 234.1, 221.0, 200.9. Ballet dancers (kg): 40.3, 37.6, 38.8, 45.5, 44.1, 48.2. Approximately how many times heavier is a sumo wrestler compared to a ballet dancer?

Answer: Mean sumo wrestler weight = (295.2+250.7+234.1+221.0+200.9) ÷ 5 = 1201.9 ÷ 5 = 240.38 kg.
Mean ballet dancer weight = (40.3+37.6+38.8+45.5+44.1+48.2) ÷ 6 = 254.5 ÷ 6 = 42.42 kg.
Ratio = 240.38 ÷ 42.42 ≈ 5.67, which rounds to approximately **6 times heavier**.

5.3 Visualising Data — Figure It Out (Pages 122-125)

Q1. An infographic shows the speeds of a few animals in the air, on land, and in the water. (a) What scale is used? (b) What's interesting here? (c) Find a pair of creatures where one's speed is about twice the other's. (d) Is a sailfish about 4 times faster than a humpback whale? Is a sailfish the fastest aquatic animal shown?

Answer: *(Based on the textbook's infographic.)* (a) A typical scale used is 1 unit length = 16 km/h. (b) Compare speeds across air, land, and water to see which domain has the fastest movers overall. (c) Comparing the green darner dragonfly (about 64 km/h) to the gentoo penguin (about 35 km/h) gives a ratio of roughly 1.8 — close to, but not exactly, "twice." (d) Sailfish (about 109 km/h) versus humpback whale (about 26 km/h): 26 × 4 = 104, close to 109, so yes, a sailfish is about 4 times faster than a humpback whale, and based on the figures given, the sailfish is shown as the fastest aquatic animal in the infographic.

Q2. Preyashi asked her students: "If you could get a super power to become aquatic, aerial, or spaceborne, which would you choose?" Draw a double-bar graph comparing how two grades chose each option, using an appropriate scale.

Answer: This is a drawing activity. Collect responses from two groups (e.g., two class sections) for each of the three options, then draw a double-bar graph with the three categories (aquatic/aerial/spaceborne) on one axis and two bars (one per grade) side by side for each category, choosing a scale that comfortably fits your largest count.

Q3. Temperature variation over two days in different months in Jodhpur, Rajasthan, is given. Draw a double-bar graph using the scale 1 unit = 4°C. Which two months might these days belong to?

Answer: This is a drawing activity based on the textbook's temperature table. Once plotted, a day with a high temperature range typically corresponds to a summer month (such as May), while a day with a lower temperature range corresponds to a winter month (such as December) — so the two days shown likely belong to **December and May**.

Q4. A clustered-bar graph shows electric vehicle registrations in some states from 2022 to 2024. (a) Mark the Gujarat and Delhi bars from the given table. (b) What scale, organisation, and patterns do you notice? (c) How did registrations change across states between 2022 and 2024? (d) Approximately how many more registrations did Assam get in 2023 compared to 2022? (e) How many times did West Bengal's registrations increase from 2022 to 2024? (f) Is it correct to say Uttarakhand had very few new registrations in 2023 and 2024 because its bars barely changed?

Answer: *(Based on the textbook's bar-graph figure.)* (b) A typical scale used is 1 unit = 25,000 vehicles. (c) Most states show a rising trend from 2022 to 2024; Delhi and Gujarat have the highest registrations throughout, Uttarakhand the lowest, while Assam and Andhra Pradesh show the sharpest growth. (d) If Assam's 2022 figure is about 40,000 and its 2023 figure is about 60,000, the increase is 60,000 – 40,000 = **about 20,000 more registrations**. (e) If West Bengal's 2022 figure is about 11,000 and its 2024 figure is about 44,000, the number of times its registrations increased is found by **dividing** the later value by the earlier one: 44,000 ÷ 11,000 = **4 times** (note: you must divide, not add, to find "how many times more"). (f) Yes, that statement is correct — when a bar's length barely changes across years, it means the underlying quantity barely changed too.

5.4 Data Detective — Figure It Out (Pages 129-134)

Q1. Dot plots show the number of pockets on clothing for a group of boys and a group of girls. Which statements are true? (a) The data varies more for boys than girls. (b) The median number of pockets for boys is more than for girls. (c) The mean number of pockets for girls is more than for boys. (d) The maximum number of pockets for boys is greater than for girls.

Answer: *(Based on the textbook's dot plots.)* (a) **False** (b) **True** (c) **False** (d) **True**.

Q2. A table shows points scored by players A, B, C, D in four games (A scored 14, 16, 10, 10; C did not play game 3; B played all four games). (a) Find A's average points per game. (b) Should C's mean be found by dividing by 3 or by 4? What about B? (c) Who is the best performer?

Answer: (a) A's average = (14 + 16 + 10 + 10) ÷ 4 = 50 ÷ 4 = **12.5 points per game**.
(b) For C, divide the total by **3**, because C only actually played 3 games (games not played shouldn't be counted as zero, or they'd unfairly lower the average). For B, divide by **4**, because B played in all four games.
(c) Based on the full table in your textbook, compare each player's mean points per game (not their total, since some players played fewer games) to identify the best performer — the player with the highest per-game average is the best performer.

Q3. Marks (out of 100) in a GK quiz — Group 1: 85, 76, 90, 85, 39, 48, 56, 95, 81, 75. Group 2: 68, 59, 73, 86, 47, 79, 90, 93, 86. Compare and describe both groups' performance using mean and median.

Answer: Group 1 (10 students): Sum = 730, Mean = 73. Sorted: 39,48,56,75,76,81,85,85,90,95 → Median = (76+81) ÷ 2 = 78.5.
Group 2 (9 students): Sum = 681, Mean = 75.67. Sorted: 47,59,68,73,79,86,86,90,93 → Median (5th term) = 79.

Comparison: Group 2 has both a higher mean (75.67 vs 73) and a higher median (79 vs 78.5) than Group 1, so Group 2 performed slightly better overall in the quiz, though both groups show a fairly similar spread of scores.

Q4. Data from a colony survey on sports watched vs. played. Choose an appropriate scale, draw a double-bar graph, and write your observations.

Answer: This is a drawing activity based on the textbook's survey table. A typical observation: cricket is the most popular sport for both watching and participating, more people watch each sport than actually play it, athletics has the lowest numbers for both, and while basketball and swimming have similar participation numbers, more people watch swimming than basketball.

Q5. Heights (cm) of 17 students: 106, 110, 123, 125, 117, 120, 112, 115, 110, 120, 115, 102, 115, 115, 109, 115, 101. The sports teacher wants to split the class into two equal-sized groups, one shorter and one taller. Suggest a way to do this.

Answer: Since 17 is odd, it cannot be split into two perfectly equal groups of students — one group will always have one more student than the other.
Sorted: 101,102,106,109,110,110,112,115,115,115,115,115,117,120,120,123,125.
The **median** = the 9th term (since (17+1)÷2 = 9) = **115 cm**. (Note: the mean is different from the median here — the mean works out to about 113.5 cm.)
A sensible split is to use a height around 113-114 cm as the dividing line: **Group 1** (heights up to 112 cm) = 101, 102, 106, 109, 110, 110, 112 — **7 students**; **Group 2** (heights 115 cm and above) = 115, 115, 115, 115, 115, 117, 120, 120, 123, 125 — **10 students**. Since no student has a height strictly between 112 and 115 cm, a perfectly even 8-9 split isn't possible with a single cut-off, so 7 and 10 is the closest practical division.

Q6. Describe the mean and median of the heights of your class. You can visualise the heights on a dot plot.

Answer: Hands-on activity: measure (or collect) the heights of everyone in your class, plot them as a dot plot on a number line, then calculate the mean (sum ÷ number of students) and median (middle value of the sorted heights) to describe your class's typical height and how much it varies.

Q7. Two 7th-grade sections each have 15 boys and 15 girls. In one section, the mean height is 154.2 cm. What must be true about the mean height in the other section? (a) 154.2 cm (b) less than 154.2 cm (c) more than 154.2 cm (d) cannot be determined.

Answer: (d) Cannot be determined. The mean height of one independent section tells us nothing about the mean height of a completely different section — the two groups of students are not related, so there's no way to predict one from the other.

Q8. "Standing Tall in the Storm": an infographic shows skyscraper counts by city. (a) Estimate the number of skyscrapers in New York, Tokyo, and London. (b) Are these statements valid? (i) Only 12 cities have more skyscrapers than Mumbai. (ii) Only 7 cities have fewer skyscrapers than Mumbai. (iii) The tallest building in the world is in Hong Kong.

Answer: *(Based on the textbook's infographic.)* (a) Typical estimates: New York — around 38; Tokyo —

around 160; London — around 305 (read these directly off your textbook's chart, since exact values depend on the figure). (b) (i) and (ii) can be checked directly by counting how many cities appear above and below Mumbai in the ranked infographic. (iii) is **not necessarily true** just because a city has many skyscrapers — having the most skyscrapers doesn't mean having the single tallest building, so this statement should be checked against real-world data rather than assumed from the skyscraper-count infographic alone.

Q9. Estimate and then measure a few everyday objects. Draw a double-bar graph comparing your estimates with the actual measurements. How accurate were your estimates? Find the average difference between estimated and measured values.

Answer: This is a hands-on measuring activity. For example, if your estimate-minus-measured differences (in cm) for five objects were 0.5, -0.6, 1.5, -2.4, and 0.5: Sum = 0.5 + (-0.6) + 1.5 + (-2.4) + 0.5 = -0.5. Average difference = -0.5 ÷ 5 = **-0.1 cm**, meaning the estimates were, on average, about 0.1 cm less than the actual measured values. Use your own five measurements the same way: add up the signed differences and divide by the number of objects.

Q10. Aditi likes solving puzzles. Her Sudoku solve times (in seconds) over two weeks: 410, 400, 370, 340, 360, 400, 320, 330, 310, 320, 290, 380, 280, 270, 230, 220, 240 (first 9 = Week 1, rest = Week 2). (a) Construct a dot plot for both weeks. (b) Describe the mean, median, and your observations.

Answer: (a) Plot all 17 times on a number line, using two different colours/symbols for Week 1 and Week 2 values.
(b) Sorted (all 17 values): 220,230,240,270,280,290,310,320,320,330,340,360,370,380,400,400,410.
Median = the 9th term (since (17+1)÷2 = 9) = **320 seconds**.
Sum of all 17 times = 5470. **Mean** = 5470 ÷ 17 ≈ **321.8 seconds**.
Since the mean (≈321.8 s) and median (320 s) are close to each other, the data is fairly evenly spread without extreme outliers. Comparing Week 1 (mostly higher/slower times) to Week 2 (mostly lower/faster times) also shows Aditi's solving speed improved with practice over the two weeks.

Q11. Individual Project: Choose one — (a) "How long is a sentence?": dot-plot the word counts of sentences from two textbook pages and compare using mean/median. (b) "What is in a Name?": find the mean/median length of your classmates' names, visualise it, and study starting letters and vowel/consonant patterns for boys' vs girls' names.

Answer: This is an open-ended individual project — pick option (a) or (b), collect your own data (word counts or name lengths), organise it in a dot plot or double-bar graph, and compute the mean and median to describe your findings.

Q12. Individual Project (long-term): Track how many times you step out of your house each day for a month. (i) Describe the variability and central tendency using a dot plot. (ii) Share interesting observations. (iii) Optionally, have family or friends do this too and compare.

Answer: This is an open-ended, month-long personal tracking project — keep a daily log, plot the values as a dot plot, and calculate the mean and median to summarise your own typical daily pattern and how much it varies day to day.

Q13. Small-Group Project: Groups of 8-10 students, choose one — (a) "Our heights vs.

our family's heights": compare using dot plots and a double-bar graph. (b) "Estimating time": have each member estimate 1-minute and 3-minute intervals with eyes closed, then compare using dot plots and a double-bar graph of means.

Answer: This is an open-ended group project — pick option (a) or (b), collect data from every group member, visualise it with dot plots and a double-bar graph, and use the mean and median to compare and discuss your group's results.

Practice more: Extra Questions for Class 7 Maths Chapter 13

Quick revision: Revision Notes for Class 7 Maths Chapter 13