CLASS VIII – MATHEMATICS

Chapter Test: Tales by Dots and Lines – Step-by-Step Solutions & Marking Scheme

(Ganita Prakash, Grade 8, Part II – Chapter 5)

M. M.: 40 | Marks for each step are shown in square brackets.

Section A – Multiple Choice Questions (1 mark each)

Q.	Ans.	Solution
1	**(B)**	Sum = mean × number of values = 14.5 × 8 = **116**.
2	**(C)**	Adding a fixed number to every value adds the same number to the mean: 12.4 + 7 = **19.4**.
3	**(A)**	Doubling every value keeps the order the same, so the middle value is also doubled: the median becomes **double**.
4	**(B)**	A cell is named by its column letter followed by its row number: **D7**.
5	**(A)**	**=AVERAGE(B2:B9)** uses the range B2:B9, i.e. all 8 cells (B2,B9 would use only two cells).
6	**(C)**	A value smaller than the mean pulls the mean down: the mean **decreases**.
7	**(B)**	New data: 3, 5, 8, 11, 14, 20 (6 values). Median = (8 + 11)/2 = **9.5**.
8	**(D)**	Line graphs are used to show how a quantity **changes over time**.
9	**(D)**	Values to the left of 7 are 3, 4, 5. Distances: 4 + 3 + 2 = **9**. (Check: right side 2 + 7 = 9.)
10	**(C)**	Day-to-day changes: +2, +3, −2, +4, −3. The greatest rise is **4 °C** (Thursday to Friday).

Section B – Very Short Answer Questions (2 marks each)

Q11. Dot plot (Fig. 3)

(i) Values: 1 (2 times), 2 (3 times), 3 (2 times), 4 (2 times), 5 (1 time); 10 students. Sum = 2 + 6 + 6 + 8 + 5 = 27. Mean = 27/10 = **2.7 books**. [1]

(ii) Ordered data: 1, 1, 2, 2, 2, 3, 3, 4, 4, 5. The 5th value is 2 and the 6th is 3. Median = (2 + 3)/2 = **2.5 books**. [1]

Q12. Including / removing a value

(A) Sum of 6 numbers = 6 × 20 = 120. [1]

New sum = 120 + 41 = 161 for 7 numbers. New mean = 161/7 = **23**. [1]

(B) Sum of 5 numbers = 5 × 18 = 90. After removing 30, the sum = 60 for 4 numbers. [1]

New mean = 60/4 = **15**. [1]

Q13. Correcting the mean

Wrong sum = 12 × 62.5 = 750. Correct sum = 750 − 84 + 48 = 714. [1]

Correct mean = 714/12 = **59.5 kg**. [1]

Section C – Short Answer Questions (3 marks each)

Q14. Line graph (Fig. 4)

(i) Both towns show 14 on the graph in **September**: **14 days**. [1]

(ii) Town P: 20 + 26 + 24 + 14 + 8 + 4 = 96. Mean = 96/6 = **16 days**. [1]

(iii) Town Q: 6, 8, 10, 14, 19, 12. Rises: +2, +2, +4, +5. The greatest rise is from **September to October**, **5 days**. [1]

Q15. Balance of distances about the mean

(A) Mean = (4 + 8 + 10 + 14 + 24)/5 = 60/5 = 12. [1]

Left of 12: (12 − 4) + (12 − 8) + (12 − 10) = 8 + 4 + 2 = 14. [1]

Right of 12: (14 − 12) + (24 − 12) = 2 + 12 = 14. Both sums are equal. [1]
(B) Mean = (7 + 9 + 10 + 18 + 26)/5 = 70/5 = 14. [1]
Left of 14: (14 − 7) + (14 − 9) + (14 − 10) = 7 + 5 + 4 = 16. [1]
Right of 14: (18 − 14) + (26 − 14) = 4 + 12 = 16. Both sums are equal. [1]

Q16.

(A) Sum of 10 numbers = 10 × 24 = 240. [1]
Sum of 11 numbers = 11 × 25 = 275. [1]
New number = 275 − 240 = **35**. [1]
(B) Sum of 12 numbers = 12 × 40 = 480. [1]
Sum of the remaining 11 numbers = 11 × 38 = 418. [1]
Number removed = 480 − 418 = **62**. [1]

Q17.

(A) (i) Column C is Science and the row is 5: **C5**. [1]
(ii) Marks of the student in row 3 are in B3 to D3: **=SUM(B3:D3)**. [1]
(iii) English marks of all 8 students are in D2 to D9: **=AVERAGE(D2:D9)**. [1]
(B) Sum of the original 5 values = 5 × 11 = 55. [1]
For 7 values with mean 11, the sum must be 7 × 11 = 77. [1]
55 + 7 + x = 77, so x = **15**. (7 is below the mean and 15 is above it, so the mean is balanced.) [1]

Section D – Long Answer / Case-based Questions (4 marks each)

Q18.

(A) (i) Totals: Jan 70, Feb 95, Mar 135, Apr 155, May 160, Jun 135. Highest: **May, 160 (hundreds)** = 16000 tickets. [1]
(ii) Students 70 > adults 65 in **March** only. [1]
(iii) Adults: 40 + 60 + 65 + 80 + 90 + 85 = 420. Mean = 420/6 = **70** (hundreds). [1]
(iv) Students: 30 + 35 + 70 + 75 + 70 + 50 = 330. Mean = 330/6 = **55**. Adults have the higher mean, by 70 − 55 = **15** (hundreds). [1]
(B) (i) Total = 5 × 30 = 150. Known sum = 18 + 24 + 28 + 40 = 110. [1] x = 150 − 110 = **40**. [1]
(ii) Ordered: 18, 24, 28, 40, 40. The middle (3rd) value is **28**. [1]
(iii) New sum = 150 + 30 = 180 for 6 values. New mean = 180/6 = **30** (a value equal to the mean does not change the mean). [1]

Q19.

(A) (i) Total books = (1×4) + (2×7) + (3×10) + (4×6) + (5×3) = 4 + 14 + 30 + 24 + 15 = **87**. [1]
(ii) Mean = 87/30 [1] = **2.9 books**. [1]
(iii) 30 values: the median is the average of the 15th and 16th. Cumulative frequencies: 4, 11, 21. Positions 12 to 21 are 3, so the median = **3**. [1]
(B) (i) Mean increases by 6: 18 + 6 = **24**. [1]
(ii) Mean is multiplied by 3: 18 × 3 = **54**. [1]
(iii) After reducing by 2 the mean is 16 [1] and after multiplying by 5 it is 16 × 5 = **80**. [1]

Q20. Case Study: Batter's innings

(i) Sum = 24 + 36 + 18 + 52 + 40 + 30 + 36 + 44 = 280. Mean = 280/8 = **35**. [1]
(ii) Ordered: 18, 24, 30, 36, 36, 40, 44, 52. Median = (36 + 36)/2 = **36**. [1]
(iii) New sum = 280 + 62 = 342; new mean = 342/9 = **38**. Yes, it has increased, because 62 is greater than the old mean 35. [1]
(iv) For a mean of 40 in 10 innings, the total must be 400. Required score = 400 − 342 = **58** runs. [1]

Note for teachers: Award full marks for any correct alternative method. Read-off values from the graphs are exact (data values are marked on Figs. 4 and 5). Units must be stated in the final answers.