How Quantities Combine: Understanding Data

Standard difficulty · 20 questions · 40 marks · Time: 36 minutes

Name: _____ Date: _____ Score: ____ / 40

Show your working for Sections B and C. Answers are on the last page — try every question first!

Section A — Choose the correct answer — 8 × 1 = 8 marks

1. The combined average of two groups of different sizes is:
   (a) closer to the average of the smaller group
   (b) the larger of the two averages
   (c) always the simple average of the two
   (d) closer to the average of the larger group

2. Class A has 12 students with average 24 marks; class B has 25 with average 98. The combined average is:
   (a) 74 **(b)** 61 **(c)** 75 **(d)** 73

3. 2 kg of rice at Rs 134 per kg is mixed with 1 kg at Rs 137 per kg. The mixture costs per kg:
   (a) Rs 133 **(b)** Rs 135.5 **(c)** Rs 137 **(d)** Rs 135

4. A test gives +4 for a correct answer and −2 for a wrong one. A student has 10 correct and 15 wrong. The score is:
   (a) 10 **(b)** 40 **(c)** 25 **(d)** −20

5. In a stacked bar, 16 of the 40 students come by walk. In the 100% stacked bar, the walk part is:
   (a) 40% **(b)** 45% **(c)** 16% **(d)** 60%

6. A report card counts term 1 as 40% and term 2 as 60%. Scores of 70 and 80 give:
   (a) 150 **(b)** 75 **(c)** 74 **(d)** 76

7. The final mark counts test 1 as 40% and test 2 as 60%. Scores of 80 and 80 give a final mark of:
   (a) 80 **(b)** 81 **(c)** 82 **(d)** 78

8. 50 students average 72. The 15 boys average 51. The 35 girls average:
   (a) 72 **(b)** 93 **(c)** 81 **(d)** 82

Section B — Short answer — 8 × 2 = 16 marks

9. Science counts theory as 60% and practical as 40%. A student scores 70 in theory and 72 in practical (both out of 100). Find the final percentage.

10. In what ratio must rice at Rs 35 per kg be mixed with rice at Rs 80 per kg so the mixture costs Rs 73 per kg?

11. A test gives +4 for correct and −2 for wrong answers. Zoya attempted 51 questions and scored 72. How many were correct?

12. A stacked bar shows 180 students: 81 walk, 72 cycle and 27 come by bus. Give the parts of the 100% stacked bar.

13. The average age of 38 students is 16 years. When the teacher's age is included, the average rises by 2 years. Find the teacher's age.

14. 40 L of 29% acid is mixed with 50 L of 47% acid. What percent acid is the mixture?

15. School P has 700 students and 20% walk to school. School Q has 700 students and 30% walk. Which school has more walkers, and by how many?

16. The average of 6 numbers is 23. One more number is added and the average becomes 26. Find the number added.

Section C — Word problems — 4 × 4 = 16 marks

17. A school counts term 1 as 25%, term 2 as 25% and the final exam as 50%. Rahul scores 96, 82 and 46 (out of 100). Find the overall mark, and say how much higher or lower it is than the simple average.

18. A shopkeeper mixes 6 kg of tea at Rs 335 per kg with 5 kg at Rs 368 per kg and sells the mixture at Rs 440 per kg. Find the cost per kg of the mixture and the total profit.

19. Section 9A (18 students) averages 71 marks and 9B (12 students) averages 81. A teacher says the two sections together average 76. Is the teacher right? Find the true combined average.

20. A family spends Rs 63,000 a month. A 100% stacked bar shows food 35%, rent 30%, education 15% and the rest on other things. How much goes to other things, and how much more is spent on food than on education?

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Answer key

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Q	Answer	Working
1	**(d) closer to the average of the larger group**	each value counts once, so the bigger group pulls harder
2	**(a) 74**	(12 × 24 + 25 × 98) ÷ 37 = 2738 ÷ 37
3	**(d) Rs 135**	(2 × 134 + 1 × 137) ÷ 3 = 405 ÷ 3
4	**(a) 10**	4 × 10 − 2 × 15 = 40 − 30
5	**(a) 40%**	16 ÷ 40 × 100
6	**(d) 76**	0.4 × 70 + 0.6 × 80 = 76
7	**(a) 80**	40% of 80 + 60% of 80 = 32 + 48
8	**(c) 81**	(3600 − 765) ÷ 35
9	**70.8%**	60% of 70 + 40% of 72 = 42 + 28.8
10	**7 : 38**	cheap : dear = (80 − 73) : (73 − 35) = 7 : 38
11	**29**	4c − 2(51 − c) = 72, so 6c = 174, c = 29
12	**walk 45%, cycle 40%, bus 15%**	81 ÷ 180, 72 ÷ 180, 27 ÷ 180, each × 100
13	**94 years**	new total = 39 × 18 = 702; old total = 38 × 16 = 608
14	**39%**	acid: 11.6 + 23.5 = 35.1 L in 90 L
15	**School Q, by 70**	P: 20% of 700 = 140; Q: 30% of 700 = 210
16	**44**	7 × 26 − 6 × 23 = 182 − 138
17	**67.5; 7.17 lower than the simple average**	25% of 96 + 25% of 82 + 50% of 46 = 67.5; simple average = 224 ÷ 3 = 74.67
18	**Rs 350 per kg; profit Rs 990**	cost = (2010 + 1840) ÷ 11 = 350; profit = (440 − 350) × 11
19	**No; the combined average is 75**	(18 × 71 + 12 × 81) ÷ 30 = 2250 ÷ 30 = 75; the larger section counts more
20	**Rs 12,600; Rs 12,600 more**	other = 20% of 63000; food − education = 20% of 63000

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