CLASS 8 MATHS EXTRA QUESTIONS

Extra Questions for Class 8 Maths Chapter 10: Proportional Reasoning 2 – HOTS

Original HOTS-level (Higher Order Thinking Skills) practice questions for Class 8 Maths Chapter 10 (Proportional Reasoning 2), genuinely harder than the textbook exercise, using fresh numbers not found in the NCERT book. Full worked solutions included.

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Q1 (Three-way ratio division). A prize fund of ₹7,200 is split among Gold, Silver and Bronze winners in the ratio 5 : 3 : 1. Find each winner's share.
Solution: Total parts = 9. Gold = 5/9×7200 = **₹4,000**. Silver = 3/9×7200 = **₹2,400**. Bronze = 1/9×7200 = **₹800**.

Q2 (Inverse proportion test). Check whether the pairs (6,40), (8,30), (12,20), (5,48) are in inverse proportion.
Solution: Products: 6×40=240, 8×30=240, 12×20=240, 5×48=240. All equal, so **yes, they are in inverse proportion** (constant = 240).

Q3 (Assertion–Reason). Assertion (A): If 5 taps fill a tank in 8 hours, then 8 taps will fill it in 5 hours. Reason (R): The number of taps and the time taken are directly proportional.
Solution: 5×8 = 40 tap-hours needed; with 8 taps, time = 40/8 = 5 hours, so **Assertion is true**. But taps and time are *inversely* proportional, not directly, so **Reason is false**.

Q4 (Combined ratio + pie chart). In a survey of 450 people, favourite fruit was Mango : Banana : Apple : Others in the ratio 5 : 3 : 3 : 4. Find the pie-chart angle for each.
Solution: Total parts = 15. Mango = 5/15×360° = **120°**. Banana = 3/15×360° = **72°**. Apple = 3/15×360° = **72°**. Others = 4/15×360° = **96°**. Check: 120+72+72+96 = 360°. ✓

Q5 (Multi-step, work and pumps). Pump A alone fills a tank in 4 hours; Pump B alone fills it in 6 hours; a leak alone would empty a full tank in 12 hours. If A, B and the leak all act together, how long to fill the tank?
Solution: Combined rate = 1/4 + 1/6 – 1/12 = 3/12 + 2/12 – 1/12 = 4/12 = 1/3 tank per hour. Time = **3 hours**.

Q6 (Spot the error). A student says: "If 3 workers finish a job in 12 days, then 1 worker will finish it in 12/3 = 4 days." Is this correct?
Solution: Incorrect. Workers and days are inversely proportional, so fewer workers should take *more* days, not fewer. Correct approach: 3×12 = 1×x ⇒ x = **36 days**.

Q7 (Reverse ratio problem). Two numbers are in the ratio 4 : 7. If 12 is added to each number, the new ratio becomes 3 : 4. Find the original numbers.
Solution: Let the numbers be 4x and 7x. (4x+12)/(7x+12) = 3/4 ⇒ 4(4x+12) = 3(7x+12) ⇒ 16x+48 = 21x+36 ⇒ 12 = 5x ⇒ x = 2.4. Numbers = **9.6 and 16.8**. Check: (9.6+12)/(16.8+12) = 21.6/28.8 = 0.75 = 3/4. ✓

Q8 (Speed-time-distance, inverse proportion). A cyclist covers a fixed route in 45 minutes at 16 km/h. At what speed must she travel to cover it in 36 minutes?
Solution: Speed and time (for fixed distance) are inversely proportional: 16 × 45 = x × 36 ⇒ x = 720/36 = **20 km/h**.

Q9 (Machines and output, two-step). 15 machines produce 900 units in 6 days. How many machines are needed to produce 1,800 units in 4 days (assume each machine works at the same rate)?
Solution: 15 machines make 900 units in 6 days, i.e. 900/6 = 150 units/day with 15 machines, or 10 units/day per machine. To make 1800 units in 4 days: need 1800/4 = 450 units/day. Machines needed = 450/10 = **45 machines**.

Q10 (Pie chart reverse problem). In a pie chart of monthly expenses, the “Rent” sector has angle 108° and represents ₹5,400. Find the total monthly expense and the amount spent on “Food” if its sector angle is 72°.
Solution: 108° corresponds to ₹5,400, so 1° corresponds to 5400/108 = ₹50. Total expense (360°) = 360 × 50 = **₹18,000**. Food (72°) = 72 × 50 = **₹3,600**.