CLASS VIII – MATHEMATICS

Chapter Test: Proportional Reasoning-1 – Step-by-Step Solutions & Marking Scheme

(Ganita Prakash, Grade 8, Part I – Chapter 7)

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)**	Cross-multiply: 6 × 15 = 90 and 9 × 10 = 90, so 6 : 9 :: 10 : 15 is true. (Others fail: 6 × 6 = 36 ≠ 9 × 9; 6 × 10 = 60 ≠ 9 × 15; 6 × 15 = 90 ≠ 9 × 12 = 108.)
2	**(B)**	48 : 72 – divide both by 24: **2 : 3**.
3	**(B)**	5 × 56 = 8 × x, so x = 280 ÷ 8 = **35**.
4	**(A)**	2 litres = 2000 mL, so 250 : 2000 = **1 : 8**.
5	**(C)**	(9/5) × 30 + 32 = 54 + 32 = **86 °F**.
6	**(A)**	Total parts = 4 + 1 = 5; water = (1/5) × 35 = **7 litres**.
7	**(B)**	Cost of 1 pen = 90 ÷ 12 = ₹7.50; 20 pens = 20 × 7.5 = **₹150**.
8	**(B)**	(3 + 1) : (5 + 1) = 4 : 6 = **2 : 3**.
9	**(A)**	P: 6 : 4 = 3 : 2. Q: 9 : 6 = 3 : 2. R: 10 : 8 = 5 : 4. P and Q have equal width-to-height ratio, so **P and Q** are similar.
10	**(C)**	8 equal parts of 48 cm: one part = 6 cm. Longer piece = 5 × 6 = **30 cm**.

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

Q11. Brick wall (Fig. 3)

(i) Count: coloured bricks = 2 + 2 + 2 = 6; grey bricks = 18 − 6 = 12. Ratio grey : coloured = 12 : 6 = **2 : 1**. [1]

(ii) Coloured bricks are 1 out of every 3 (6 out of 18). In 90 bricks: (1/3) × 90 = **30**. [1]

Q12.

(A) 12 : 16 = 3 : 4 and 27 : 36 = 3 : 4. [1]

Both are equal in simplest form (also 12 × 36 = 432 = 16 × 27), so they are **proportional**. [1]

(B) 9 × 25 = x × 15 [1] ⇒ x = 225 ÷ 15 = **15**. [1]

Q13.

1.2 litres = 1200 mL (same units). [1]

750 : 1200 – divide by 150: **5 : 8**. [1]

Section C – Short Answer Questions (3 marks each)

Q14. Similar rectangles (Fig. 4)

(i) 8 : 6 = **4 : 3**. [1]

(ii) For similarity 20 : h = 4 : 3, so 4h = 60 and h = **15 cm**. [1]

(iii) 15 : 12 = 5 : 4, which is not equal to 4 : 3 (15 × 3 = 45 ≠ 12 × 4 = 48). So it is **not similar** to A. [1]

Q15.

(A) Total parts = 4 + 5 = 9; one part = 9000 ÷ 9 = ₹1,000. [1½]

Asha = 4 × 1000 = **₹4,000**; Bina = 5 × 1000 = **₹5,000**. [1½]

(B) Distance per litre = 156 ÷ 12 = 13 km. [1]

For 20 litres: 20 × 13 = **260 km**. [1]

Petrol for 390 km = 390 ÷ 13 = **30 litres**. [1]

Q16.

(A) 35 °C: (9/5) × 35 + 32 = 63 + 32 = **95 °F**. [1½]

104 °F: (5/9) × (104 − 32) = (5/9) × 72 = **40 °C**. [1½]

(B) 2 kg = 2000 g. Price per 500 g in the first offer = ₹65, so 2000 g would cost 4 × 65 = ₹260 at that rate. [1½]

The 2 kg pack costs ₹240 < ₹260, so the **2 kg pack is the better buy**. (₹120 per kg vs ₹130 per kg.) [1½]

Q17.

(A) (i) 6 : 30 = **1 : 5**. [1]

(ii) After 4 years: 10 : 34 = **5 : 17**. [1]

(iii) 5 : 17 ≠ 1 : 5 (5 × 5 = 25 ≠ 17). Adding the same number to both terms does not multiply both by the same factor, so the ratio changes. [1]

(B) Red = (2/5) × 20 = 8 L; yellow = (3/5) × 20 = 12 L. [1½]

After adding 20 L yellow: red 8 L, yellow 32 L. Ratio = 8 : 32 = **1 : 4**. [1½]

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

Q18.

(A) (i) Asha 2 blocks = ₹20,000; Bela 3 blocks = ₹30,000. Ratio = 20000 : 30000 = **2 : 3**. [1]

(ii) Parts = 2 + 3 = **5**; one part = 7500 ÷ 5 = **₹1,500**. [1]

(iii) Asha = 2 × 1500 = **₹3,000**; Bela = 3 × 1500 = **₹4,500**. [1]

(iv) Bela's investment becomes ₹40,000, so ratio = 20000 : 40000 = 1 : 2. Bela's share = (2/3) × 7500 = **₹5,000**. [1]

(B) (i) Total parts = 5. Sand = (3/5) × 60 = **36 kg**; cement = (2/5) × 60 = **24 kg**. [2]

(ii) Sand stays 36 kg. 6 : 5 :: 36 : c, so c = (5/6) × 36 = 30 kg. Cement to add = 30 − 24 = **6 kg**. [2]

Q19.

(A) (i) Area = 60 × 40 = **2400 m^2**. [1]

(ii) 2400 ÷ 10000 = **0.24 hectare**. [1]

(iii) Fertiliser = 0.24 × 150 = **36 kg**. [1]

(iv) Cost = 36 × 24 = **₹864**. [1]

(B) (i) Total parts = 1 + 4 = 5; concentrate = (1/5) × 750 = **150 mL**; water = (4/5) × 750 = **600 mL**. [2]

(ii) Concentrate stays 150 mL. For 1 : 5, water = 5 × 150 = 750 mL. Water to add = 750 − 600 = **150 mL**. [2]

Q20. Case Study: Annual Day paint

(i) Parts = 2 + 3 = 5; blue = (2/5) × 40 = **16 mL**; yellow = (3/5) × 40 = **24 mL**. [1]

(ii) After adding 6 mL yellow: blue 16 mL, yellow 30 mL. Ratio = 16 : 30 = **8 : 15**. [1]

(iii) 2.5 litres = 2500 mL; yellow = (3/5) × 2500 = **1500 mL** (= 1.5 L). [1]

(iv) Blue = (2/5) × 2500 = 1000 mL = 1 L → ₹300. Yellow = 1.5 L → 1.5 × 200 = ₹300. Total = **₹600**. [1]

Note for teachers: Award full marks for any correct alternative method (e.g. unitary method instead of cross-multiplication). In Q16(B) any valid comparison of price per unit or equal quantities earns the marks. Units must be stated in the final answers.