CLASS 8 MATHS NCERT SOLUTIONS

NCERT Solutions for Class 8 Maths Chapter 7: Proportional Reasoning-1 – Free PDF Download

Chapter 7 — Proportional Reasoning-1 — builds on ratios and proportion: recognising true proportions, finding ratios in their simplest form, using the unitary method (rule of three) to solve real-world scaling problems, sharing a quantity unequally in a given ratio, and converting between units using proportiona...

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Chapter 7 — Proportional Reasoning-1 — builds on ratios and proportion: recognising true proportions, finding ratios in their simplest form, using the unitary method (rule of three) to solve real-world scaling problems, sharing a quantity unequally in a given ratio, and converting between units using proportional reasoning. The chapter has four Figure It Out blocks totalling 26 questions. Below are complete, verified answers, sourced directly from the official NCERT PDF and independently recalculated. These Class 8 Mathematics Chapter 7 solutions are also useful as quick revision notes before exams.

NCERT Solutions for Class 8 Maths Chapter 7: Proportional Reasoning-1

Figure It Out — Sections 7.1–7.3: Observing Similarity in Change, Ratios, Ratios in Their Simplest Form (6 Questions)

1. Which of these are true proportions? (i) 4:7::12:21 (ii) 8:3::24:6 (iii) 7:12::12:7 (iv) 21:6::35:10 (v) 12:18::28:12 (vi) 24:8::9:3.
True: (i), (iv), (vi) — 4/7=12/21; 21/6=35/10=3.5; 24/8=9/3=3. **False: (ii), (iii), (v)** — their cross products don't match.

2. Give 3 ratios proportional to 4:9.
Any equal multiples work, e.g. **8:18, 12:27, 16:36** (scaling 4:9 by 2, 3, and 4).

3. Fill in the missing numbers for ratios proportional to 18:24: (i) 3:__ (ii) 12:__ (iii) 20:__ (iv) 27:__.
18:24 simplifies to 3:4. (i) **3:4**. (ii) **12:16**. (iii) **20:80⁄3** (26⅔) — a reminder that a ratio's terms don't have to scale to whole numbers. (iv) **27:36**.

4. Which rectangles are similar, given width:height ratios A=1:3, B=3:2, C=9:4, D=7:2, E=3:1?
Only **A and E** are similar — 1:3 and 3:1 are the same ratio, just with the rectangle rotated 90°.

5. Given a 32 mm × 18 mm rectangle, draw a smaller and a bigger similar rectangle.
Halving: **16 mm × 9 mm**. Doubling: **64 mm × 36 mm** — both keep the same 16:9 width:height ratio.

6. Find the ratio of grey to coloured bricks in each wall pattern (simplest form).
(a) 9 grey to 6 coloured → **3:2**. (b) 16 grey to 12 coloured → **4:3**.

Figure It Out — Section 7.4: Problem Solving with Proportional Reasoning (3 Questions)

1. Earth travels about 94,00,00,000 km per year around the Sun. How far does it travel in 1 week?
(94,00,00,000÷365)×7 = **about 1,80,27,397 km**.

2. A mason needs 1450 bricks per 10 ft of wall (145 bricks/ft). A house plan needs walls totalling 108 ft. How many bricks are needed?
145×108 = **15,660 bricks**.

3. Puneeth's father rides 2 hours at 50 km/h from Lucknow to Kanpur. Is 50:2::75:x a valid proportion for finding the time at 75 km/h? How long would the trip take at 75 km/h?
No, that proportion is invalid — speed and time are inversely, not directly, proportional for a fixed distance. The actual distance is 50×2=100 km, so at 75 km/h the time is 100÷75 = **4⁄3 hours (80 minutes)**, which is less than 2 hours, not more as the naive direct proportion would suggest.

Figure It Out — Section 7.5: Sharing, But Not Equally (5 Questions)

1. Divide ₹4,500 between two people in the ratio 2:3.

4,500÷5 = 900 per part → **₹1,800 and ₹2,700**.

2. An acid-water solution has acid:water = 1:5, total volume 240 mL. Find the amount of each.
240÷6 = 40 mL per part → **Acid = 40 mL, Water = 200 mL**.

3. Blue:yellow = 3:5 makes 40 mL of green paint. Find each amount; then 20 mL more yellow is added — find the new ratio.
40÷8 = 5 mL per part → **Blue = 15 mL, Yellow = 25 mL**. After adding 20 mL yellow, Yellow = 45 mL, so the new ratio Blue:Yellow = 15:45 = **1:3**.

4. Rice:urad dal = 2:1 makes 6 cups of idli batter mix. Find each quantity.
6÷3 = 2 cups per part → **Rice = 4 cups, Urad dal = 2 cups**.

5. Red:yellow paint = 3:5 in one bucket. One more full bucket of yellow paint is added. Find the new ratio.
Taking the bucket as 8 units (3 red + 5 yellow), adding 8 more yellow units gives Yellow = 5+8 = 13 units, so the new ratio Red:Yellow = **3:13**.

Figure It Out — Section 7.6: Unit Conversions (12 Questions)

1. Orange juice:apple juice = 600 mL:900 mL. Simplify.
2:3.

2. 3 full buses carried 162 people last year. This year 204 students need transport. How many buses are needed, and will they all be full?
Capacity per bus = 162÷3 = 54. 204÷54 = 3.78, so **4 buses are needed**, giving 216 total seats — **not all full**, with 12 seats vacant.

3. Compare crowding: Delhi (1,484 sq km, ~3 crore people) vs Mumbai (550 sq km, ~2 crore people). Which is more crowded?
Mumbai is more crowded. At Delhi's population density, Mumbai's smaller area would hold only about 1.11 crore people — but it actually holds 2 crore, showing Mumbai packs far more people per sq km.

4. A crane's neck:body height ratio is 4:6. If a person's total height of 165 cm followed the same ratio, how long would their neck be?
4:6 simplifies to parts out of 10 total → neck = (4÷10)×165 = **66 cm**. (The crane's own 155 cm height isn't used in this calculation — only its neck:body ratio applies to the person.)

5. Lilavati's problem: 2½ palas of saffron costs 3⁄7 niskas. How many palas cost 9 niskas?
Ratio palas:niskas = 2.5 : 3⁄7 = 35:6. For 9 niskas: (35÷6)×9 = **52.5 palas**.

6. Harmain is 1 year old; his brother is 5. After how many years will the ratio of their ages be 1:2?
Let x years pass: (1+x):(5+x) = 1:2 ⇒ 2+2x = 5+x ⇒ x=3. So **after 3 years** (Harmain 4, brother 8).

7. Gold:water mass ratio (equal volumes) is 37:2. 1 L water = 1 kg. Find the mass of 1 L of gold.
(37÷2)×1 = **18.5 kg**.

8. Manure needed is 10 tonnes/acre. A plot measures 200 ft × 500 ft (1 acre = 43,560 sq ft). How much manure is needed?
Plot area = 1,00,000 sq ft. Manure = 10×(1,00,000÷43,560) = **about 22,956.8 kg (~22.96 tonnes)**.

9. A tap fills a 500 mL mug in 15 seconds. How long to fill a 10 L bucket?

10 L = 10,000 mL. Time = 15×(10,000÷500) = **300 seconds (5 minutes)**.

10. 1 acre of land costs ₹15,00,000. Find the cost of 2,400 sq ft.
Cost = 2,400×(15,00,000÷43,560) = **₹82,644.63** (rounded to the nearest paisa).

11. A tractor plows 4 times faster than a pair of oxen, which take 6 hours per acre. How long to plow a 20-acre field by oxen, and by tractor?
Oxen: 6×20 = **120 hours**. Tractor: 120÷4 = **30 hours**.

12. A ₹10 coin (7.74 g) is a copper:nickel alloy in ratio 3:1. Copper costs ₹906/kg, nickel ₹1,341/kg. Find the cost of each metal in one coin.
Copper mass = 7.74×(3÷4) = 5.805 g → cost = 5.805×0.906 = **₹5.26**. Nickel mass = 7.74×(1÷4) = 1.935 g → cost = 1.935×1.341 = **₹2.59**.

Why This Chapter Matters

Ratio and proportion reasoning is the mathematical backbone of everyday scaling problems — recipes, maps, speeds, mixing solutions, splitting bills, and unit conversions — and sets up direct/inverse proportion and percentages for the rest of Class 8 and beyond.

Class 8 Mathematics Chapter 7 – Notes and Extra Questions

Along with these NCERT Solutions, students can also use the Class 8 Mathematics Chapter 7 Extra Questions and Class 8 Mathematics Chapter 7 Revision Notes for quick revision and extra practice.