

Ratio and Proportion

Maths

Level 2

Exam-style practice · 12 questions · 30 marks · Calculator allowed

Remember

Sharing in a ratio: add the parts, divide the total by the number of parts, then multiply. £240 shared 3 : 5 → 8 parts → £30 each part → £90 : £150.

Direct proportion: if one goes up, the other goes up at the same rate. Find the value of *one* first (unitary method).

Inverse proportion: if one goes up, the other goes down. More workers → less time. Multiply to find the "total work", then divide.

Scale: 1 : 25,000 means 1 cm on the map = 25,000 cm (250 m) in real life.

Section A – Sharing in a ratio

1. Three friends share a £180 restaurant bill in the ratio 2 : 3 : 4. How much does each person pay? (2 marks)

2. Orange squash is mixed with water in the ratio 1 : 6. Jamal makes 1.4 litres of drink. How much squash does he use? Give your answer in millilitres. (2 marks)

3. A charity splits its donations between food banks and shelters in the ratio 5 : 3. The shelters received £4,800. How much did the food banks receive? (2 marks)

4. Concrete is made from cement, sand and gravel in the ratio 1 : 2 : 3. A builder has 50 kg of cement and 90 kg of sand. What is the maximum amount of concrete she can make? Explain your answer. (3 marks)

Section B – Direct proportion

5. A recipe for 4 people uses 300 g of rice and 2 onions. Rewrite the quantities for 10 people. (2 marks)

6. A printer prints 45 pages in 3 minutes. How long will it take to print 210 pages? Give your answer in minutes. (2 marks)

7. 5 litres of paint cover 60 m^2 . A community hall has walls with a total area of 204 m^2 . Paint is sold in 5-litre tins costing £24.99. How much will it cost to paint the walls? (3 marks)

Section C – Inverse proportion

8. It takes 4 cleaners 6 hours to clean an office block. How long would it take 3 cleaners, working at the same rate? (2 marks)

9. A journey takes 2 hours 30 minutes at an average speed of 48 mph. How long would the same journey take at 60 mph? (3 marks)

Section D – Best value and scale

10. Washing powder is sold in three sizes:

Size	Weight	Price
Small	1.2 kg	£3.60
Medium	2.5 kg	£7.00
Large	4 kg	£10.80

Which size is the best value for money? Show your working. (3 marks)

11. A map has a scale of 1 : 50,000. Two villages are 7.5 cm apart on the map. What is the real distance between them in kilometres? (2 marks)

12. Sunita is exchanging money for a holiday. The exchange rate is £1 = €1.16. She exchanges £350. On holiday she spends €290. She changes what is left back into pounds at €1 = £0.84. How much money does she get back? Give your answer to the nearest penny. (4 marks)

Check before you finish: Did you convert units (litres to ml, cm to km) before answering? For best-value questions, have you compared like with like (price per kg, or kg per £)? Have you written a final sentence stating your decision?

Ratio and Proportion – Answers

Level 2 · Working shown so you can check your method, not just the final number.

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Section A

1. 9 parts. $180 \div 9 = \text{£}20$ per part. **£40, £60 and £80.**
2. 7 parts. $1,400 \text{ ml} \div 7 = \textbf{200 ml}$ of squash.
3. 3 parts = $\text{£}4,800 \rightarrow 1 \text{ part} = \text{£}1,600$. Food banks = $5 \times 1,600 = \textbf{£8,000}$.
4. 50 kg cement needs 100 kg sand and 150 kg gravel – but she only has 90 kg sand. So sand is the limit: 90 kg sand $\rightarrow$ 45 kg cement and 135 kg gravel. Maximum concrete = $45 + 90 + 135 = \textbf{270 kg}$. (Full marks need the explanation that sand runs out first.)

Section B

5. $\times 2.5$: **750 g rice and 5 onions.**
6. $45 \div 3 = 15$ pages per minute. $210 \div 15 = \textbf{14 minutes}$.
7. $204 \div 60 = 3.4$ tins $\rightarrow$ must buy **4 tins** (you cannot buy 0.4 of a tin). $4 \times 24.99 = \textbf{£99.96}$. A common error is rounding down to 3 tins.

Section C

8. $4 \times 6 = 24$ cleaner-hours. $24 \div 3 = \textbf{8 hours}$.
9. Distance = $48 \times 2.5 = 120$ miles. Time = $120 \div 60 = \textbf{2 hours}$. (Or: $48/60 \times 2.5 = 2$.)

Section D

10. Price per kg – Small: $\text{£}3.00$. Medium: $\text{£}2.80$. Large: $\text{£}2.70$. **Large is best value.** (Accept kg per £ : 0.333, 0.357, 0.370 – Large is highest.)
11. $7.5 \times 50,000 = 375,000 \text{ cm} = 3,750 \text{ m} = \textbf{3.75 km}$.
12. $350 \times 1.16 = \text{€}406$. Left over: $406 - 290 = \text{€}116$. $116 \times 0.84 = \textbf{£97.44}$.

Where Level 2 students lose marks on ratio

- Dividing the total by the *wrong* number (e.g. by 2 instead of by the total number of parts).
- Treating an inverse-proportion problem as direct (getting 4.5 hours instead of 8 hours in Q8).
- In "how many tins/boxes/coaches" questions, not rounding **up** to a whole number.