

Maps and Scale Drawings

Maths

Level 2

Exam-style practice · 10 questions · 26 marks · Calculator allowed

Remember

Ratio scale 1 : n: real distance = map distance $\times$ n. Map distance = real distance $\div$ n. Both in the same unit, then convert.

1 : 25,000 $\rightarrow$ 1 cm = 25,000 cm = 250 m = 0.25 km. **1 : 50,000** $\rightarrow$ 1 cm = 500 m. **1 : 100** (a floor plan) $\rightarrow$ 1 cm = 1 m.

Written scales: '2 cm to 1 km' $\rightarrow$ 1 cm = 500 m, i.e. 1 : 50,000.

Drawing to scale: choose a scale that fits the paper, convert every real length, draw with a ruler, and write the scale on the drawing.

Section A – Using a scale

1. A map has a scale of 1 : 25,000. Two farms are 6.4 cm apart on the map. What is the real distance in km? (2 marks)

2. On a 1 : 50,000 map, how many centimetres represent a real distance of 7.5 km? (2 marks)

3. A floor plan is drawn at 1 : 100. The living room measures 5.5 cm by 4.2 cm on the plan. What are its real dimensions, and what is its real area? (3 marks)

4. A model railway is built at 1 : 76. A real carriage is 20 m long. How long is the model, to the nearest cm? (2 marks)

5. A map uses the scale '1 cm to 2 km'. Write this as a ratio scale. (1 mark)

Section B – Planning and drawing

6. Amira plans a walk on a 1 : 25,000 map. The route measures 9 cm, 5.5 cm and 12 cm for the three legs. She walks at 4 km/h. How long will the walk take? Give your answer in hours and minutes. (4 marks)

7. A rectangular garden is 18 m by 12 m. Using a scale of 1 : 200, what size should the rectangle be on a scale drawing? Would it fit on an A4 sheet (21 cm by 29.7 cm)? (3 marks)

8. A room is 6 m by 4.5 m. Choose a suitable scale so that the drawing fits on a sheet 20 cm wide, and give the drawn dimensions. (3 marks)

9. On a 1 : 50,000 map, a straight road from Ashby to Brookford is 14 cm. The speed limit is 60 mph. Estimate the driving time at the speed limit. (5 miles $\approx$ 8 km) (4 marks)

10. A drawing of a kitchen unit is 8 cm wide at 1 : 25. The real gap it must fit into is 190 cm. Will it fit? (2 marks)

Maps and Scale Drawings – Answers

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

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Section A

- $6.4 \times 25,000 = 160,000 \text{ cm} = \mathbf{1.6 \text{ km}}$.
- $7.5 \text{ km} = 750,000 \text{ cm} \div 50,000 = \mathbf{15 \text{ cm}}$.
- $\mathbf{5.5 \text{ m by } 4.2 \text{ m}}$; area $\mathbf{23.1 \text{ m}^2}$.
- $2,000 \div 76 = 26.3 \rightarrow \mathbf{26 \text{ cm}}$.
- $2 \text{ km} = 200,000 \text{ cm}$, so $\mathbf{1 : 200,000}$.

Section B

- $26.5 \text{ cm} \times 25,000 = 662,500 \text{ cm} = 6.625 \text{ km}$. $6.625 \div 4 = 1.656 \text{ h} = \mathbf{1 \text{ h } 39 \text{ min}}$ (accept 1 h 40 min).
- $18 \text{ m} = 1,800 \text{ cm} \div 200 = 9 \text{ cm}$; $12 \text{ m} \rightarrow 6 \text{ cm}$. $\mathbf{9 \text{ cm by } 6 \text{ cm}}$ – yes, easily fits.
- Any sensible scale, e.g. $\mathbf{1 : 50}$ gives 12 cm by 9 cm; $1 : 40$ gives 15 cm by 11.25 cm. Both fit on 20 cm.
- $14 \times 50,000 = 700,000 \text{ cm} = 7 \text{ km} = 4.375 \text{ miles}$. $4.375 \div 60 = 0.073 \text{ h} \approx \mathbf{4.4 \text{ minutes}}$ (accept 4–5 minutes).
- $8 \times 25 = \mathbf{200 \text{ cm}}$. **No** – the unit is 10 cm wider than the gap.

Where Level 2 students lose marks on this topic

- Multiplying when you should divide (or vice versa). Real distance is always the bigger number.
- Stopping at 160,000 cm. Convert to a sensible unit – metres or kilometres.
- Drawing to scale without a ruler, or forgetting to state the scale on the drawing.