

Scale drawings and maps

Foundation and Higher tiers | Total marks: 81

Marks

- M** Method mark, for a correct method. It can be implied by a correct answer.
- A** Accuracy mark, for a correct answer. It needs the method mark before it.
- B** A mark for a correct value or statement, with or without working.
- ft** Follow through: the mark is given for using an earlier wrong answer correctly.
- oe** Or equivalent.
- [a, b]** Any value from a to b inclusive.

Questions

Q	Skill	Spec	Tier	Grade	Calculator	Marks
1	Measuring and using a scale	G15 R2	Foundation	2	No	2
2	Scale models	R2	Foundation	3	No	4
3	Drawing to scale	R2	Foundation	3	No	2
4	Distances on a map	G15 R2	Foundation	4	No	3
5	Reading a scale drawing	G15 R2	Foundation	4	No	3
6	Understanding a scale	R2	Foundation	4	No	2
7	Using a plan to decide	G15 R2	Foundation	4	No	2
8	Maps with a scale bar	G15 R2	Foundation	4	No	3
9	A scale as a ratio	R2	Foundation	5	No	3
10	Comparing two map scales	R2	Foundation	5	No	3
11	Choosing a scale	R2	Foundation	5	No	3
12	Area on a map, worked backwards	R2 R12	Common	7	No	3
13	Finding a scale from areas	R2 R12	Common	7	No	3
14	Scale models: the scale from volumes	R12 G19	Higher	7	No	3
15	Real distance from a map scale	R2 N13	Foundation	3	Yes	3
16	Scale models: both ways	R2	Foundation	4	Yes	4

Q	Skill	Spec	Tier	Grade	Calculator	Marks
17	Using a plan to choose	R2	Foundation	4	Yes	3
18	Real area from a plan	R2 G16	Foundation	5	Yes	3
19	Maps with speed	R2 R11	Foundation	5	Yes	3
20	Finding a scale	R2	Foundation	5	Yes	2
21	Fencing from a plan	R2 G17	Foundation	5	Yes	4
22	Real area and cost from a plan	R2 G16	Foundation	5	Yes	4
23	Pythagoras on a plan	R2 G20 G16	Common	6	Yes	4
24	Area on a map	R2 R12	Common	7	Yes	3
25	Scale models: area and volume	R12 G19	Higher	7	Yes	5
26	Similar solids with density	R12 R11 G19	Higher	8	Yes	4
	Total					81

Question 1 G15 R2 · Foundation · Grade 2 · 2 marks

Q	Answer	Mark	Comments
1(a)	7.4	B1	accept [7.3, 7.5]
1(b)	14.8	B1ft	ft 2 × their (a)

Question 2 R2 · Foundation · Grade 3 · 4 marks

Q	Answer	Mark	Comments
2(a)	28 × 40 or 1120	M1	oe
	11.2	A1	
2(b)	920 ÷ 40 or 9.2 ÷ 40 or 0.23	M1	oe
	23	A1	

Question 3 R2 · Foundation · Grade 3 · 2 marks

Q	Answer	Mark	Comments
3	a rectangle 4 cm by 3 cm	B2	either way round. B1 for one side correct, or for 4 and 3 seen

Question 4 G15 R2 · Foundation · Grade 4 · 3 marks

Q	Answer	Mark	Comments
4(a)	6.5 cm measured	M1	accept [6.4, 6.6]
	13	A1	accept [12.8, 13.2]
4(b)	cross on the road 2.5 cm from Fenton	B1	accept [2.3, 2.7] cm from Fenton

Question 5 G15 R2 · Foundation · Grade 4 · 3 marks

Q	Answer	Mark	Comments
5(a)	9.3 cm measured	M1	accept [9.2, 9.4]
	4.65	A1	accept [4.6, 4.7]
5(b)	15	B1	accept [13, 17]

Question 6 R2 · Foundation · Grade 4 · 2 marks

Q	Answer	Mark	Comments
6(a)	1 cm represents 500 cm, not 500 m	B1	oe, or 500 m would be 1 : 50 000
6(b)	5	B1	

Question 7 G15 R2 · Foundation · Grade 4 · 2 marks

Q	Answer	Mark	Comments
7	1.4×50	M1	accept [1.3, 1.5] measured, or $62 \div 50 = 1.24$ cm
	Yes with 70	A1	accept [65, 75], or $1.24 < 1.4$

Question 8 G15 R2 · Foundation · Grade 4 · 3 marks

Q	Answer	Mark	Comments
8	AB = 4.2 cm or BC = 3.1 cm	M1	accept [4.1, 4.3] or [3.0, 3.2]
	uses 1 cm represents 2 km	M1	oe, from the scale bar
	14.6	A1	accept [14.2, 15]

Question 9 R2 · Foundation · Grade 5 · 3 marks

Q	Answer	Mark	Comments
9(a)	1 km = 100 000 cm	M1	oe, or 4 : 100 000
	1 : 25 000	A1	
9(b)	10.4	B1	

Question 10 R2 · Foundation · Grade 5 · 3 marks

Q	Answer	Mark	Comments
10	$6 \times 50\,000$ or 300 000	M1	oe
	3 km or $300\,000 \text{ cm} \div 250\,000$	M1	oe
	1.2	A1	

Question 11 R2 · Foundation · Grade 5 · 3 marks

Q	Answer	Mark	Comments
11	140 m = 14 000 cm	M1	oe, or converts 29.7 cm to a real length for one scale
	70 and 28 and 14	M1	oe, the plan length in cm for each scale
	1 : 500	A1	with correct values

Question 12 R2 R12 · Common · Grade 7 · 3 marks

Q	Answer	Mark	Comments
12	1 cm represents 400 m or 0.4 km	M1	oe
	0.4^2 or 0.16 km^2 for each cm^2	M1	oe, or $0.72 \text{ km}^2 = 720\,000 \text{ m}^2$ and $400^2 = 160\,000$
	4.5	A1	

Question 13 R2 R12 · Common · Grade 7 · 3 marks

Q	Answer	Mark	Comments
13	$8 \div 2$ or 4	M1	the area scale factor, or the real area $500\,000 \text{ m}^2$
	$\sqrt{4}$ or 2	M1	the length scale factor, or 1 cm^2 represents $250\,000 \text{ m}^2$ on map Q
	50 000	A1	

Question 14 R12 G19 · Higher · Grade 7 · 3 marks

Q	Answer	Mark	Comments
14	$750 \times 1000 \div 6$ or 125 000	M1	oe, the volume scale factor; or $750 \div 0.006$
	$\sqrt[3]{125\,000}$	M1	oe, the length scale factor
	50	A1	

Question 15 R2 N13 · Foundation · Grade 3 · 3 marks

Q	Answer	Mark	Comments
15	$18.6 \times 25\,000$ or 465 000	M1	oe, or $5 \text{ km} = 500\,000 \text{ cm}$
	$465\,000 \div 100\,000$ or 4650 m	M1	oe, or $500\,000 \div 25\,000 = 20 \text{ cm}$
	No with 4.65 km	A1	or No with 4650 m, or No with 20 cm and 18.6 cm

Question 16 R2 · Foundation · Grade 4 · 4 marks

Q	Answer	Mark	Comments
16(a)	$189 \div 12$ or $1.89 \div 12$ or 0.1575	M1	oe
	15.75	A1	
16(b)	16.8×12 or 201.6	M1	oe, or $203 \div 12$ or 16.9...
	No with 201.6 cm or 2.016 m	A1	or No with 16.9... > 16.8

Question 17 R2 · Foundation · Grade 4 · 3 marks

Q	Answer	Mark	Comments
17	3.65×120 or 438 or 2.4×120 or 288	M1	oe, a real length of the pond
	their $438 + 60$ and their $288 + 60$	M1	oe, 498 cm and 348 cm
	5 m by 4 m with 498 and 348	A1	oe in metres

Question 18 R2 G16 · Foundation · Grade 5 · 3 marks

Q	Answer	Mark	Comments
18	6.4×2500 or 160 or 3.8×2500 or 95	M1	oe, a real length
	160×95 or 15 200	M1	oe
	Yes with 15 200 m² or 1.52 hectares	A1	or $15\,200\text{ m}^2 > 15\,000\text{ m}^2$

Question 19 R2 R11 · Foundation · Grade 5 · 3 marks

Q	Answer	Mark	Comments
19	$7.5 \times 200\,000$ or 1 500 000 cm or 15 km	M1	oe
	$15 \div 24$ or 0.625	M1	oe, ft their distance in km
	37.5	A1	accept 37 minutes 30 seconds

Question 20 R2 · Foundation · Grade 5 · 2 marks

Q	Answer	Mark	Comments
20	$2130 \div 24.2$	M1	oe, or 88.02...
	1 : 88	A1	

Question 21 R2 G17 · Foundation · Grade 5 · 4 marks

Q	Answer	Mark	Comments
21	8.4×150 or 12.6 m, or 5.8×150 or 8.7 m	M1	oe, a real length
	$12.6 + 8.7 + 8.7$ or 30	M1	oe, or $(8.4 + 5.8 + 5.8) \times 150$
	their $30 \div 1.8$ or 16.6... and 17 panels	M1	rounded up; or 7 + 5 + 5 panels side by side
	£594.83	A1	

Question 22 R2 G16 · Foundation · Grade 5 · 4 marks

Q	Answer	Mark	Comments
22	3.7×50 or 185 cm or 1.85 m, or 2.9×50 or 145 cm or 1.45 m	M1	oe, a real length
	1.85×1.45 or 2.6825	M1	oe, the area of one window in m^2
	their $2.6825 \times 6 \times 84.50$	M1	oe
	No with £1360.03	A1	

Question 23 R2 G20 G16 · Common · Grade 6 · 4 marks

Q	Answer	Mark	Comments
23	$11.3^2 - 6.4^2$ or 86.73	M1	oe, or $45.2^2 - 25.6^2$
	$\sqrt{86.73}$ or 9.31...	M1	oe, the length on the plan; or 37.25... m
	their $9.31 \times 4 \times 25.6$	M1	oe, both real lengths multiplied; or plan area $\times 16$
	954	A1	accept [953, 954]

Question 24 R2 R12 · Common · Grade 7 · 3 marks

Q	Answer	Mark	Comments
24	1 cm represents 0.25 km or 250 m	M1	oe
	12×0.25^2 or 1 cm^2 represents 0.0625 km^2	M1	oe, or $12 \times 25\,000^2 = 7\,500\,000\,000 \text{ cm}^2$
	0.75	A1	

Question 25 R12 G19 · Higher · Grade 7 · 5 marks

Q	Answer	Mark	Comments
25(a)	43^2 or 1849	M1	the area scale factor
	96.2×1849 or 177 873.8	M1	oe, cm^2 ; or $\div 10\,000$ seen
	17.8	A1	accept 17.8 or [17.78, 17.79]
25(b)	$55\,000 \div 43^3$ or $55\,000 \div 79\,507$	M1	oe
	0.69	A1	

Question 26

R12 R11 G19 · Higher · Grade 8 · 4 marks

Q	Answer	Mark	Comments
26	$640 \div 1.2$ or 533.3...	M1	the volume of the model
	$330 \div 24$ or 13.75 and $(13.75)^3$ or 2599.6...	M1	oe, the volume scale factor
	their $533.3 \times$ their 2599.6×8.8	M1	oe, 12 200 833... g
	12.2	A1	accept [12.2, 12.21]