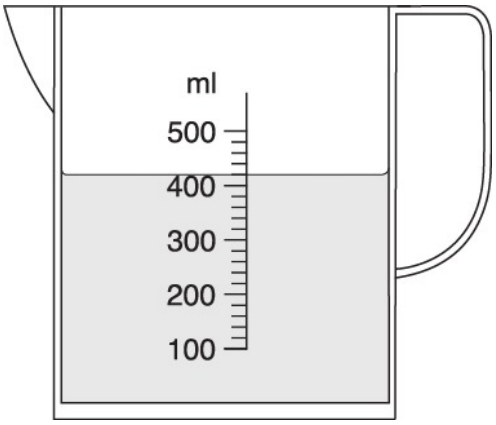
1. Paul has a full one-litre bottle of milk.
He uses this amount of milk for the family's breakfast.



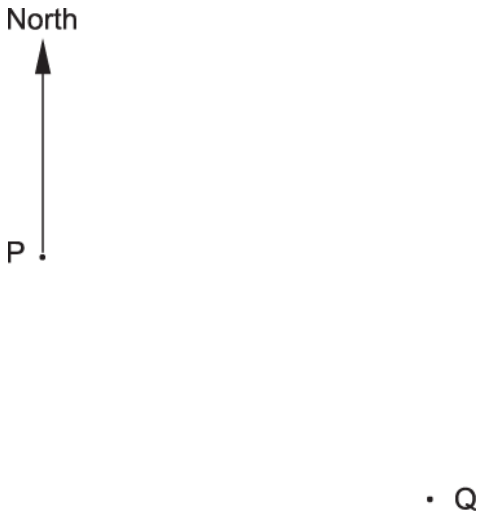
He then uses another 100 ml for a mug of coffee.
He needs 0.75 pints of milk for a recipe.

Does he have enough milk left in the bottle for this recipe?
Show how you decide. You will need to use 1 pint = 568 ml.

[4]

2. Otis keeps bees in two beehives.
They are marked P and Q in the scale drawing below.

Scale: 1 cm represents 50 metres



If Otis walks at about 2 m/s, estimate how long it takes him to walk from beehive P to beehive Q.

(a) _____ [3]

3(a). This scale drawing shows the positions of two ports, Aylton (A) and Borsey (B).

Scale: 1 cm represents 5 km

Find the actual distance of Aylton from Borsey.

_____ km [2]

(b). Find the bearing of Aylton from Borsey.

_____ ° [1]

(c). A boat sails from Aylton on a bearing of 213° for 16 km to C.

On the scale drawing, construct the position of C.

[2]

4. Choose from these metric units to complete the sentences below.

metres	grams	litres
millilitres	kilometres	
kilograms	centimetres	

A tennis ball weighs 57 _____.

The distance from London to Birmingham is 163 _____.

The petrol tank of a car holds 47 _____ of petrol.

[3]

5. Jo went for a bike ride one evening.
She travelled x kilometres in 5 hours.

Show that her average speed can be written as $\frac{x}{18}$ m/s.

[4]

6. One tonne is equal to 1000 kilograms.

Change 7.82×10^6 tonnes to kilograms.
Give your answer in standard form.

(c) _____ kg **[2]**

7(a). 180 g of copper is mixed with 105 g of zinc to make an alloy.

The density of copper is 9 g/cm^3.
The density of zinc is 7 g/cm^3.

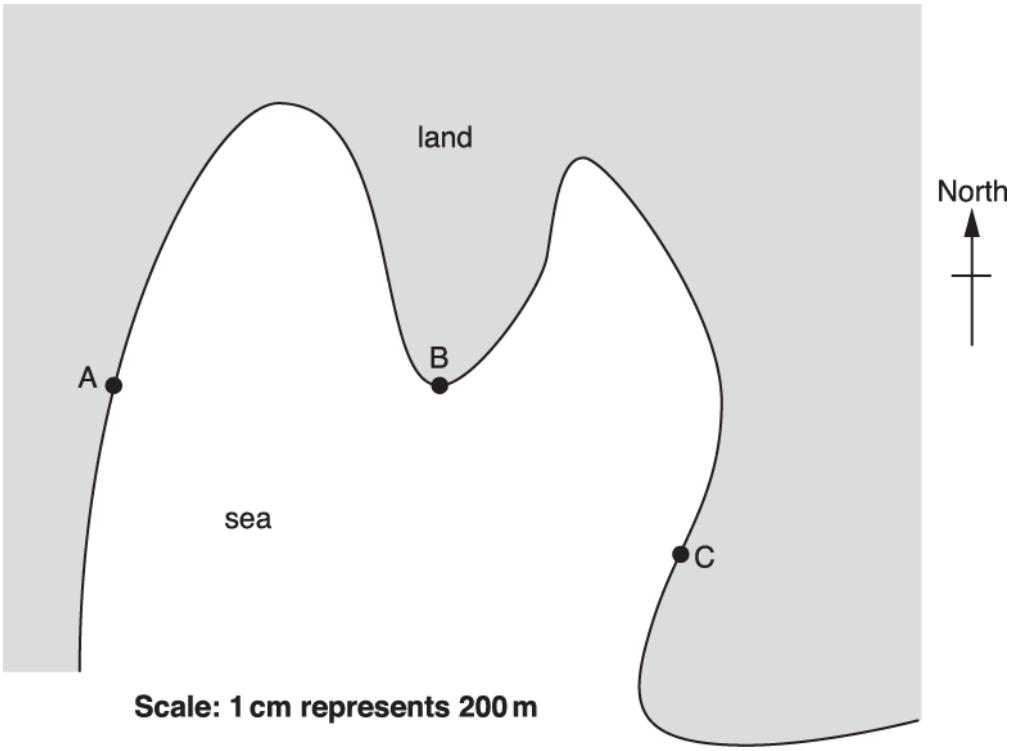
Work out the volume of copper used in the alloy.

(a) _____ cm^3 **[2]**

(b). What is the density of the alloy?

(b) _____ g/cm^3 **[4]**

8(a). This is a map of a coastal area.



Oliver went sailing.

He sailed directly from A to B.

How far did he sail?

_____ m

[2]

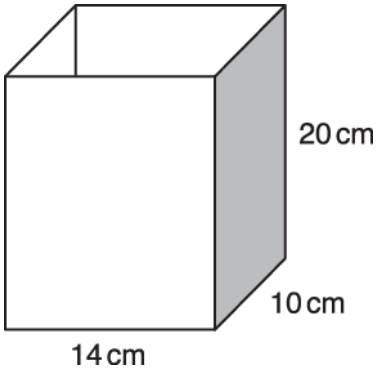
(b). He then sailed directly from B to C.

On what bearing did he sail?

_____ °

[1]

9. Zoe needs a container that can hold at least 2.5 litres of water.
This container is a cuboid.



1000 cm^3 = 1 litre

Could this container hold the amount of water that Zoe wants?
Show working to support your answer.

---

[4]

10(a) Choose a value from the list to complete the following.

.

400 cm 400 g 40 kg 4g

The weight of a tin of soup is about _____

[1]

(b). 60 g 600 ml 60 litres 600 kg

When full, the fuel tank of a car holds about_____

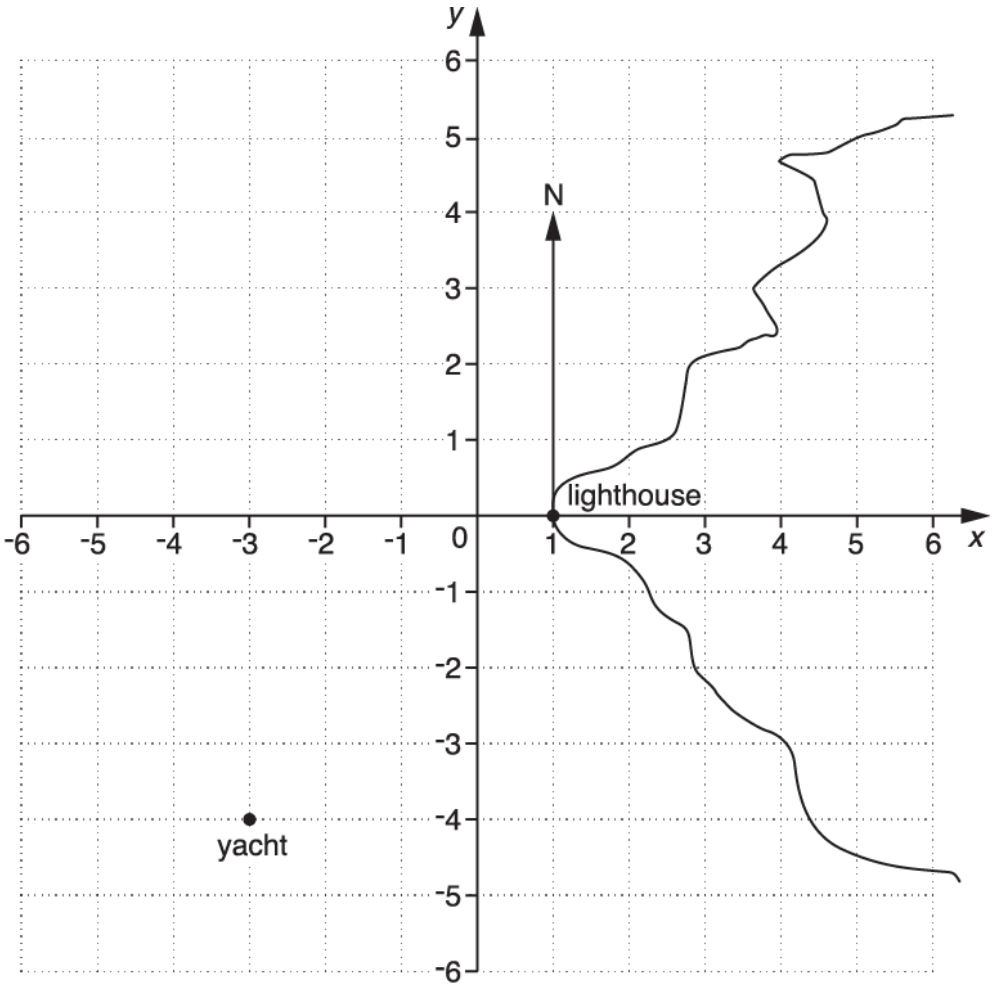
[1]

(c). 300 ml 30 kg 300 cm 30 litres

A can of cola holds_____

[1]

11. The grid shows the positions of a yacht and a lighthouse.



A ferry is on a bearing of 180° from the lighthouse. It is closer to the yacht than the lighthouse.

(i) Plot a possible position for the ferry.
Label the point F.

[2]

(ii) Write down the coordinates of your point F.

(ii) (_____ , _____)

[1]

12(a)

.

(i) Convert 2.65 kilometres to metres.

(i) _____ m

[1]

(ii) Convert 530 grams to kilograms.

(ii) _____ kg

[1]

(b). Gemma has a full, 2-litre bottle of lemonade.

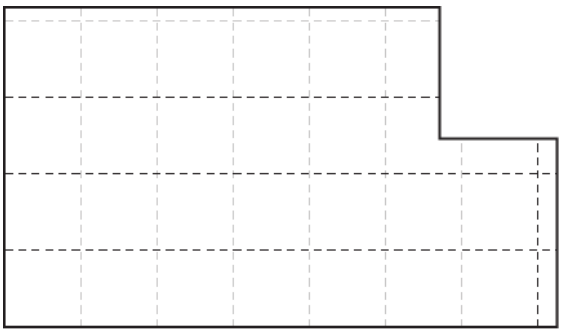
What is the largest number of cups, each holding 150 ml, she can fill from this bottle?
How much lemonade is then left in the bottle?

_____ cups with _____ ml left in the bottle

[3]

13(a) Here is a scale drawing of the floor of a meeting room.

.



Scale: 1 cm represents 2 m

Find the real length of the longest side of the floor.

_____ m

[2]

(b). A large rectangular table is placed in the room so that people can sit all around it. The table measures 4.2 m by 3.4 m.

Draw the table in a suitable position on the scale drawing.

[2]

14. This table can be used to plan a walk along the Norfolk Coast Path.
It shows the times it takes to walk between some places along the path.

Walking times

Blakeney	Cley	Weybourne	Sheringham	Roman Camp
1h 01m				
3h 27m	2h 26m			
4h 38m	3h 37m	1h 11m		
5h 53m	4h 52m	2h 26m	1h 15m	

(i) It takes 4 hours 38 minutes to walk from Blakeney to Sheringham.

How many minutes altogether are there in 4 hours 38 minutes?

(i) _____ minutes **[1]**

(ii) The distance from Blakeney to Sheringham along the path is 11.6 miles.
It takes 4 hours 38 minutes to walk from Blakeney to Sheringham.

How many minutes are you expected to take to walk one mile on this path?
Give your answer correct to the nearest minute.

(ii) _____ minutes **[2]**

15. Choose from these units to complete the following statements.

mm	g	litres	km
	cm^3	m	kg

A small bird weighs 9 _____ .

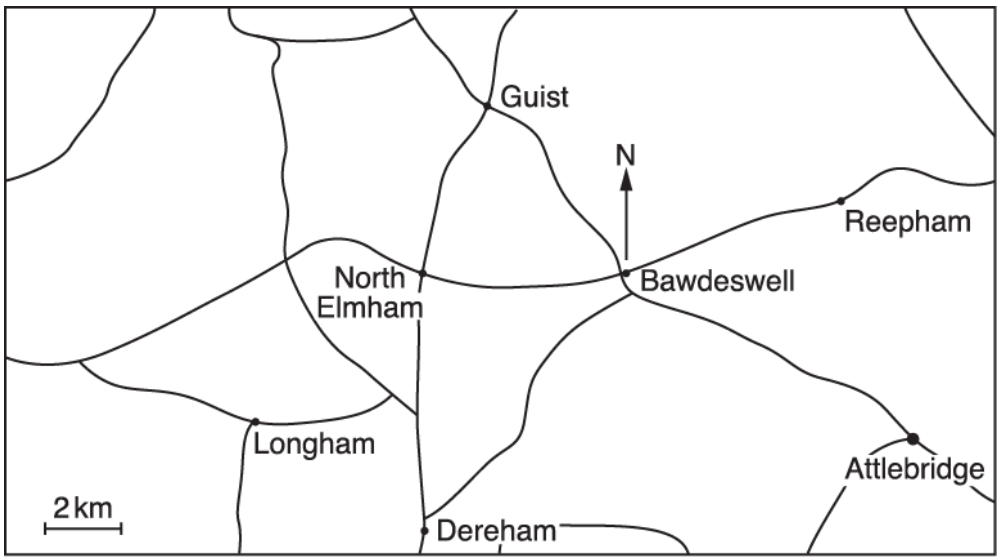
The length of a desk is 900 _____ .

When full, a bucket holds 20 _____ .

The length of a cross-country running race is 6 _____.

[4]

16. This map shows some places in Norfolk.



Scale: 1 cm represents 2 km

A bird flies direct from Bawdeswell to Longham.

(i) Draw a line on the map for this journey and measure it.
Calculate the actual distance the bird flies.

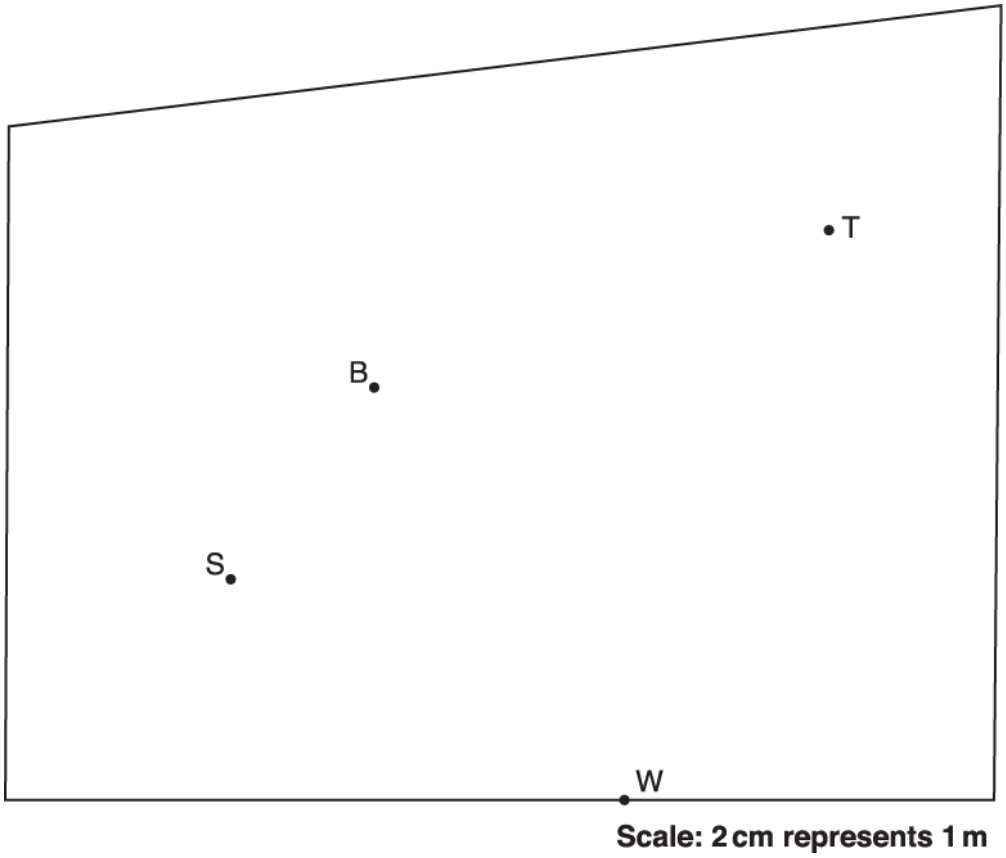
(i) _____ km **[2]**

(ii) Find the bearing of Longham from Bawdeswell.

(ii) _____ ° **[1]**

17. *In this question, use a ruler and a pair of compasses.*
Do not rub out your construction lines.

This scale drawing shows Colin's garden.



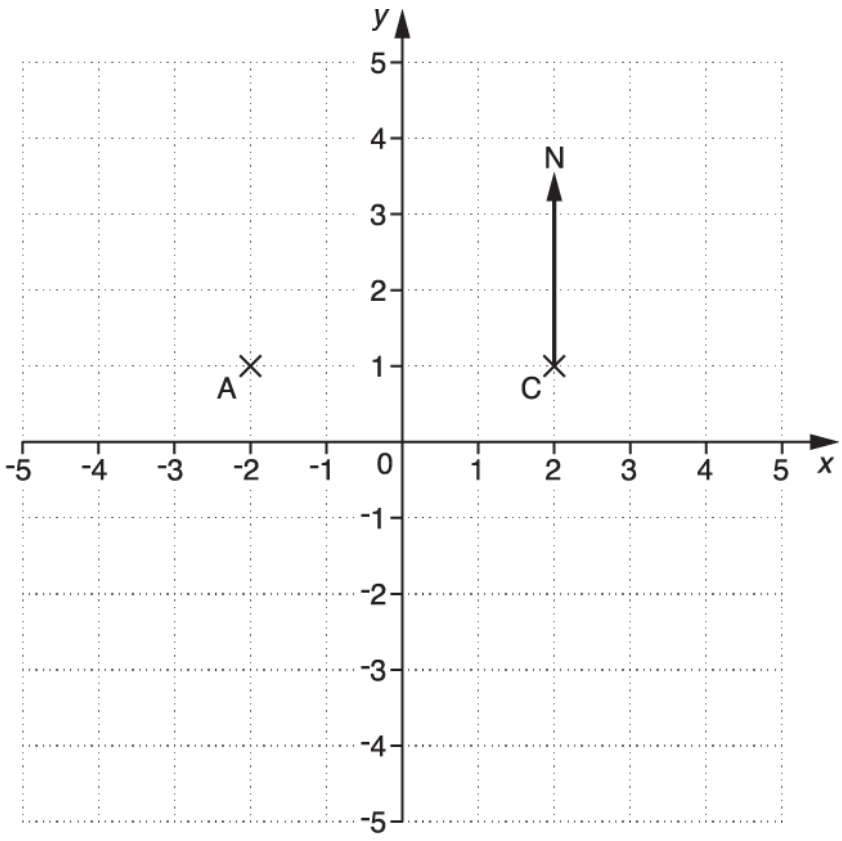
Colin wants to put a bird feeder in his garden.
He wants it to be

- up to 3 m from the tree T
- up to 2 m from the bush B
- nearer to the water tap W than to the seat S.

Construct the region where Colin can put the bird feeder.
Label the region R.

[5]

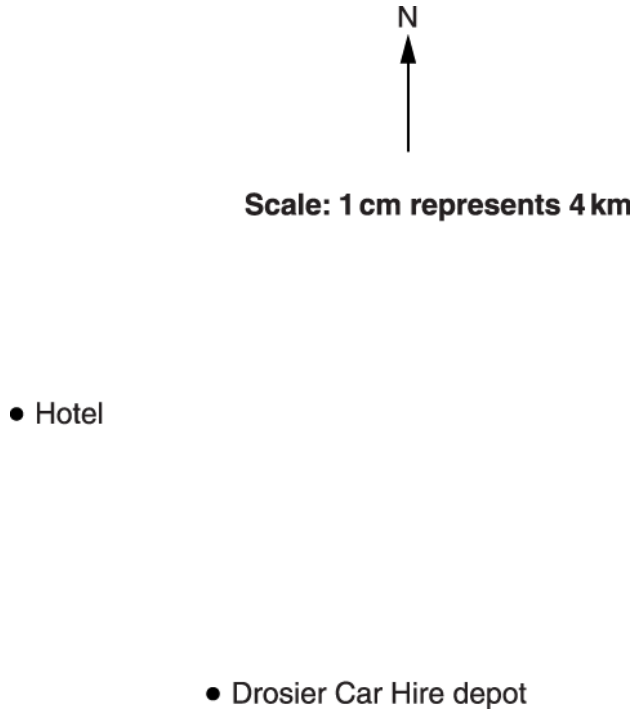
18. Here is a coordinate grid.



What is the bearing of A from C?

_____ ° [1]

19. This scale drawing shows the position of a hotel where Edward is staying.



(i) Measure the bearing of the car hire depot from the hotel.

(i) _____ ° [1]

(ii) What is the real distance from the car hire depot to the hotel?

(ii) _____ km [2]

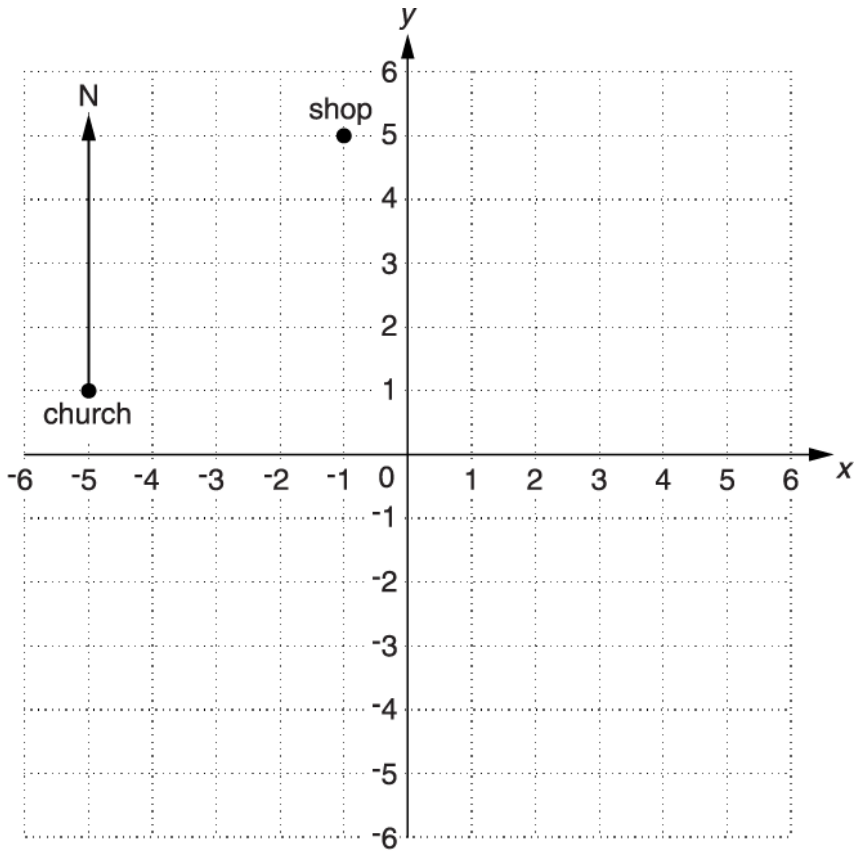
(iii) Edward is going to visit a cathedral.
The cathedral is 30 km on a bearing of 285° from the hotel.

Mark the position of the cathedral on the diagram.

[2]

20(a) Here are some places in a village drawn on a coordinate grid.

.



Write down the coordinates of the church.

(_____, _____) **[1]**

(b). The post office is at (3, –4).

Plot this point and label it P.

[1]

(c). Write down the bearing of the shop from the church.

_____° **[1]**

(d). The school lies directly south of the shop and is closer to the church than the post office.

Plot a possible position for the school and label it S.

Write down the coordinates of your point S.

(_____ , _____) **[2]**

END OF QUESTION PAPER

Question			Answer/Indicative content	Marks	Part marks and guidance	
1			Reading off 420 [ml]	B1		Allow full marks for earlier conversion of both 420 and 100 to pints and correct subsequent working
			Use of 1000 ml	M1	Implied by 480 or 580 or 900 or 54 nfww	
			0.75 × 568	M1	Implied by 426	
			480 and 426 and yes Or 54 and yes Or 946 and yes	B1	FT 900 – *their* reading for 480 **Examiner's Comments** This question discriminated very well between candidates and this was a good question for better candidates. Most scored at least 1 mark, this usually being for a correct reading from the jug. Answers were usually clear and well set out and so were easy to mark. However, many candidates misunderstood and did not use the conversion from 1 litre to 1000 ml. Weaker candidates failed to deal with finding the fraction of a pint, i.e. 0.75 × 568. Many candidates failed to notice that they should be starting with a litre of milk and just used the 420ml in the jug.	If their reading > 474 conclusion is no
			Total	4		
2			140 – 160 (s)	3	**B1** 300 ± 20 (m) **M1** for $\frac{\textit{their}\ '300'}{2}$	
			Total	3		

Question			Answer/Indicative content	Marks	Part marks and guidance	
3	a		30 to 32	2	**M1** for 6.1 to 6.3 or 61 to 63 **Examiner's Comments** A good majority of candidates scored at least 1 mark. A common error was 32.5 from measuring AB as 6.5 cm.	Common with Higher
	b		312 to 314	1	**Examiner's Comments** Was the lowest scoring question on the whole paper. Many candidates gave no answer at all, while those who did write something often gave the bearing of Borsey from Aylton rather than the other way round. Other wrong answers, both obtuse and acute, were very common.	Common with Higher
	c		Correct angle for bearing used, tolerance 2° Mark for C 3.2 cm from A, tolerance 2 mm	1 1	Accept line or evidence such as dot in correct direction from A Or other evidence eg line from A 3.2 cm long If C not marked, allow 2nd mark for an arc centre A radius 3.2 cm drawn, tol 2mm; allow 2 marks for line in correct direction and correct arc centre A **Examiner's Comments** There were a lot of blank answer spaces, but some correct lines were seen, and quite a few candidates scored 1 mark for a line of the correct length in various (incorrect) directions.	Use overlay; if in doubt, use protractor or ruler (accept obtuse angle NAC from 145–149 inclusive) If just a dot, need to be convinced it is not just a fleck from scanning Allow **MR** for B used instead of A – move overlay as required to check accuracy, using protractor or ruler if in doubt ie they can gain 1 mark if C is ft correct Common with Higher

Question			Answer/Indicative content	Marks	Part marks and guidance	
			Total	5		
4			grams kilometres litres	3	**B1** each **Examiner's Comments** Most candidates got off to a good start with this question, although "miles" was occasionally given as the second answer even though it was not one of the given options. Other errors that were often seen in the first two parts were grams and metres instead of kilograms and kilometres respectively.	Accept abbreviations
			Total	3		
5			Average speed = $\frac{\text{Distance}}{\text{Time}} = \frac{x}{5}$ km/h $= \frac{1000x}{60^2 \times 5}$ m/s $= \frac{1000x}{18000}$ m/s **oe** $= \frac{x}{18}$ m/s	4	**B1** for x km = $1000x$ m **B1** for 5 hours = $60^2 \times 5$s **B1** for working to given answer without intermediate expression or statement of formula	
			Total	4		
6			7.82×10^9	2	**M1** for attempting to multiply by 1000	
			Total	2		

Question			Answer/Indicative content	Marks	Part marks and guidance	
7	a		20	2	M1 for $D = \frac{M}{V}$ soi	Can be implied by an answer of 2
	b		$8\frac{1}{7}$ or 8.14[…]	4	M1 for 15 or 105 ÷ 7 And M2 for $\frac{180+105}{\textit{their}(20+15)}$ or $\frac{18+10.5}{\textit{their}\ '(2+1.5)'}$ Or M1 for some attempt to find $\frac{\text{total mass}}{\text{total volume}}$	
			Total	6		

Question			Answer/Indicative content	Marks	Part marks and guidance	
8	a	i	E[ast] or 090 (only)	1		Do not accept W[est] to E[ast] <u>Examiner's Comments</u> In (i) mostly correctly answered with a few errors of West.
		ii	860	2	Accept 820 to 900 **M1** for 4.1[cm] to 4.5[cm] or 41[mm] to 45[mm] seen	May be on the diagram <u>Examiner's Comments</u> In (ii) many answers indicated accurate measuring and the scale seemed well understood by over half the candidates scoring full marks. Part marks were usually awarded for a correct measurement but errors in calculations to convert values such as 4.3 × 200 = 800.3 or 803 demonstrated that decimal multiplication proved challenging. A common error not accurate enough to score was to state the length as 4 cm leading to an answer of 800 m.

Question			Answer/Indicative content	Marks	Part marks and guidance	
	b		125	1	Accept 121 to 129	Condone 125 with S[outh] E[ast] Examiner's Comments The majority of students found finding the bearing in this question more difficult with few correct answers. There was Confusion over which was the angle required with many answers below 90°. Others made no use of a protractor giving a compass point, most commonly south east.
			Total	4		
9			Yes because 2800 > 2500 or yes because 2.8 > 2.5	4	**B1** for 2.5 litres = 2500 [cm^3] soi or *their* 2800 [cm^3] = *their* 2.8 litres soi **and** **B2** for 2800 or **M1** for 14 × 10 × 20	Must come from attempt at volume Examiner's Comments Many candidates found the volume successfully, some encountered problems with their multiplication and some in error calculated the surface area. The most common problem was not stating an explicit conversion between litres and centimetres cubed and candidates need to take care to give enough detail in their answer to support their conclusion.
			Total	4		

Question			Answer/Indicative content	Marks	Part marks and guidance	
10	a		400g	1		May be indicated in the question in all parts
	b		60l	1		Examiner's Comments Often correct.
	c		300 ml	1		Examiner's Comments Another question that was generally well answered although the concept of capacity seemed to be better understood than weight. In part (a) it was obvious that many students were aware of units of measurement but found it difficult to estimate correctly – 4 g and 40 kg were quoted regularly for a tin of soup. Answers to (b) and (c) were more often correct.
			Total	3		
11		i	Point marked at anything directly south of (1, –4)	2	**B1** for point marked at (1, y) where $-4 \leq y < 0$	Allow non-integer points If no point marked allow feedback marks from their coordinates in part (ii). Mark intention if F used only and no 'dot'
		ii	Coordinates written for their marked point	1FT	If no point marked then allow mark for (1, y) for $y < -4$	Examiner's Comments Some struggled to correctly place the point for the ferry according to the instructions given, but were able to give the correct coordinates for their plotted point. The term 'bearing' was not understood by some candidates.
			Total	3		

Question			Answer/Indicative content	Marks	Part marks and guidance	
12	a					Examiner's Comments Conversion between units remains a topic that discriminates achievement. For many candidates, this was very straightforward. Others had little idea of the conversion facts between kilometres and metres and grams and kilograms. A number used 100 or 10 as the conversion factor in both cases.
		i	2650	1		
		ii	[0].53[0]	1		
	b		13 and 50	3	**B2** for 13 with remainder less than 150 or no remainder or 13. .... Or **M1** for 2000 or [0].15[0] seen	Examiner's Comments This involved some reasoning with a capacity problem. Most obtained 13 as the number of cups that could be filled but then were unable to interpret the remainder into ml. Common errors included 13.3, 13 cups and 30 ml, 12 cups and 200 ml. A few were unable to convert 2 litres to ml correctly.
			Total	5		

Question			Answer/Indicative content	Marks	Part marks and guidance	
13	a		14.4 to 14.8	2	**M1** for 7.3 [cm] or 73 [mm] tol 1 mm **Examiner's Comments** Although the majority of answers were 14 or more, there was poor use of scale factors in calculating. There were many answers of 14 or 14.2. A common error was to count up the number of whole squares, double it and then add 0.1 or 0.2 for the remaining part square. Those who measured were more likely to gain the method mark for a correct measurement, going on to score 2 marks.	
	b		rectangle *a* cm by *b* cm $2<a<2.5$ and $1.5<b<2$ at least 0.5 cm from all sides of room	1 1	 ft *their* rectangle **Examiner's Comments** This was reasonably well answered, with most errors being on the 4.2 m side of the table as many candidates drew this 2 squares long. Those candidates who drew the table to the full size were unable to leave the required gap around the edges and so lost both marks. Some candidates tried to put their answer in the space below the question instead of on the scale drawing.	accept 90° drawn by eye if sides in tolerance
			Total	**4**		

Question			Answer/Indicative content	Marks	Part marks and guidance	
14		i	278	1		
		ii	24	2	**M1** for *their* 278 ÷ 11.6 or for 23.9... **Examiner's Comments** Reading information from the table of distances in part (i) was usually done well. However, the calculation of the number of minutes per mile in part (ii) proved more difficult.	
			Total	**3**		
15			g, mm, litres, km	4	**B1** for each **Examiner's Comments** Most candidates scored at least 3 out of the 4 available marks. There were many candidates, however, who thought the length of a desk was measured in cm^3. Conversely, most candidates correctly had the amount of water in a bucket measured in litres.	
			Total	**4**		

Question			Answer/Indicative content	Marks	Part marks and guidance	
16		i	10 to 11	2	**M1** for 5 to 5.5 [cm] **Examiner's Comments** Significantly more were able to measure on the diagram and hence calculate the required distance in part (i).	
		ii	246 to 251	1	**Examiner's Comments** Conversely, part (ii) was one of the worst answered questions on the paper. Few candidates were able to cope with the need to calculate a reflex angle.	
			Total	3		

Question			Answer/Indicative content	Marks	Part marks and guidance	
17			arc of circle centre T radius 6 cm drawn	1	arcs for B and T circles must be compass drawn; radius tol 2 mm, and extending for a sector of at least 30°	
			arc of circle centre B radius 4 cm drawn	1		
			Perpendicular bisector of WS drawn with correct arcs	2	must be at least 3 cm long **B1** if no / wrong arcs e.g. arcs touching at midpoint of WS; line must be within 1 mm of centre of WS and tol 1°; or allow **M1** for two correct pairs of arcs but no line or line inaccurate or too short (e.g. if arcs too close)	
			Correct region indicated clearly, dep on arcs centres B and T drawn and straight line attempt at perpendicular bisector	1	accept lack of label R if other indication is clear; assume their region is bounded by the requested loci – ignore construction arcs for the perpendicular bisector going through this region **Examiner's Comments** Whilst most candidates were able to score 1 or 2 marks for correct arcs centred at points T and / or B, few were able to successfully construct the perpendicular bisector of T and B. Even those who did manage to construct the bisector could not then often identify the correct region. Full marks were very rarely awarded for this question.	
			Total	5		

Question			Answer/Indicative content	Marks	Part marks and guidance	
18			270°	1	Accept 267° to 273° **Examiner's Comments** Responses were weak and many candidates appeared to not understand the term 'bearing'. There was a range of incorrect responses including 90°, 180°, and some who measured the distance between the points A and C.	
			Total	**1**		
19		i	144–148	1		
		ii	17.2–18.8	2	**M1** for 4.3–4.7 or *their* length × 4	length may be seen on diagram
		iii	Point indicated at 7.3–7.7 cm	1		
		iii	Bearing of 283°–287°	1	**Examiner's Comments** In parts (i) and (ii) some candidates confused the bearing and the distance. In (iii) several were able to correctly measure the distance, but not the bearing of the cathedral. Candidates should be encouraged to plot the subject of the question with a cross or point rather than just writing the word.	
			Total	**5**		

Question			Answer/Indicative content	Marks	Part marks and guidance	
20	a		(–5, 1)	1	Examiner's Comments This was very well answered with few incorrect answers.	
	b		Plots point at (3, –4)	1	Condone no label Examiner's Comments This was very well answered with few incorrect answers.	Condone P marked in correct place with no point plotted
	c		[0]45	1	43 to 47 Examiner's Comments A number struggled with the bearing and gave answers such as 60°, 125° and a selection of other incorrect angles. A few gave a compass direction such as NE which is not acceptable for a bearing.	
	d		Plots point at (–1, k) where $-1.5 < k < 5$ Gives coordinate of *their* plot for S	1 1FT	Condone no label FT dep on S due south of shop **or** a point closer to the church than the post office Examiner's Comments Involved simple interpretation of two conditions and was answered reasonably well. The most common error was to plot and give the coordinates of a point that satisfied one of the conditions only.	Allow (–1, k) where $-1.5 < k < 5$ if no plot
			Total	5		