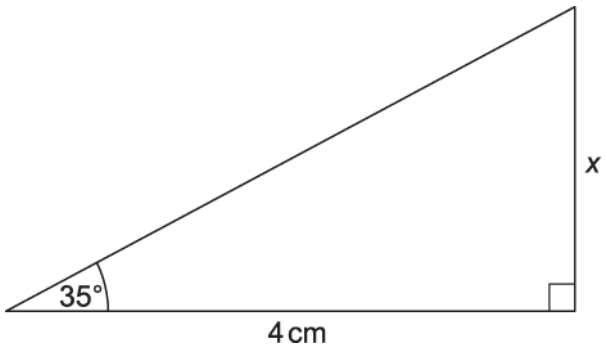
1. The diagram shows a right-angled triangle.

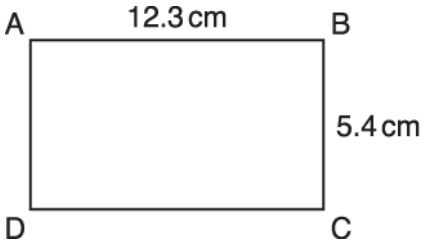


Not to scale

Calculate *x*.

_____ cm **[3]**

2. ABCD is a rectangle.



Not to scale

Calculate the length of a diagonal.

_____ cm

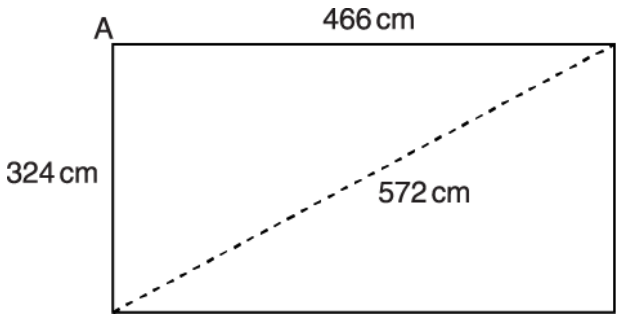
[3]

3(a). Catherine is designing a new kitchen.

She wants to find out whether the walls meet at an angle of 90°.

She measures two walls and a diagonal across the kitchen floor.

This diagram of the floor shows her measurements.



Not to scale

Use the wall measurements to calculate what the length of the diagonal should be if angle A = 90°.

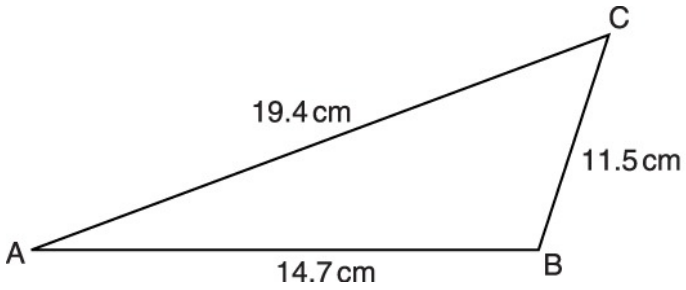
_____ cm **[3]**

(b). Use your result for the length of the diagonal to decide whether angle A is equal to 90°, less than 90° or more than 90°. Show how you decide.

Angle A is _____ 90° because _____

_____ **[1]**

4. The diagram shows a triangle ABC.
AB = 14.7 cm, BC = 11.5 cm and AC = 19.4 cm.

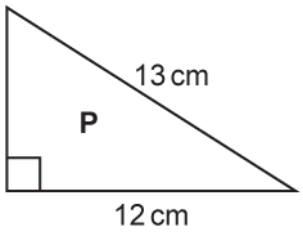


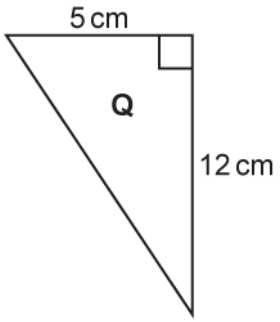
Not to scale

Show that triangle ABC is **not** a right-angled triangle.

[3]

5(a). Triangles **P** and **Q** are right-angled.





Not to scale

Show that the two shorter sides in triangle **P** have the same lengths as the two shorter sides in triangle **Q**. **[3]**

(b). Explain why the two triangles are congruent.

---

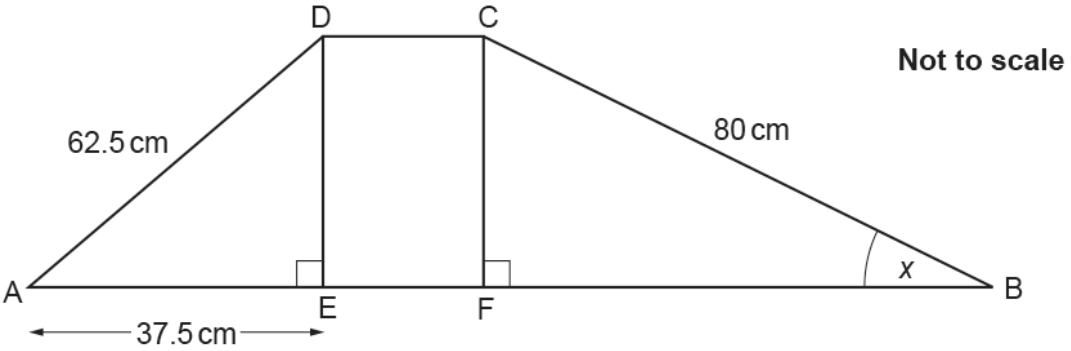
[1]

6. In the diagram below, ABCD is a trapezium.

Length AE is 37.5 cm.

DE = CF

Find the value of angle *x*.



x = ---------- ° [6]

7(a). The angles in a triangle are in the ratio 1 : 2 : 3.

Show that the triangle is a right-angled triangle. **[2]**

(b). The hypotenuse of the triangle is 15 cm long.

Calculate the length of the shortest side in the triangle.

---------- cm **[4]**

END OF QUESTION PAPER

Question			Answer/Indicative content	Marks	Part marks and guidance	
1			2.8(0…)	3	**B1** for $\tan\theta = \frac{\text{opp}}{\text{adj}}$ **M1** for 4 × tan 35	
			Total	**3**		
2			13.4[3]	3	**M2** for $\sqrt{12.3^2 + 5.4^2}$ **M1** for $12.3^2 + 5.4^2$ soi by 180.45	**Examiner's Comments** The best candidates understood and used Pythagoras effectively and achieved a correct result. However, most responses displayed no use of a correct method and simply added or multiplied the figures given on the diagram. Method marks were rarely required as those who knew what to do did it successfully. It was obvious that some did not know where to find the diagonal. The most common incorrect answers were calculating the area or perimeter of a rectangle or area of a triangle.
			Total	**3**		
3	a		567.5 to 567.6 or 568 or 570	3	nfww **M2** for $\sqrt{466^2 + 324^2}$ oe or equivalent complete method using trig (condone poor notation) Or **M1** for $466^2 \pm 324^2$ or for 322 132 or any attempt at Pythagoras (eg 217156 + 104976)	570 from scale drawing scores **0**

Question			Answer/Indicative content	Marks	Part marks and guidance	
	b		More than 90 since diagonal should be less than 572 oe	1FT	FT only if at least **M1** gained in (a) **Examiner's Comments** As might be expected from the performance of candidates on similar questions in the past, Pythagoras' theorem appears to be a topic few candidates at this level understand. Only the best candidates were able to score any marks in part (a), and even fewer provided a valid reason in part (b).	
			Total	4		

Question			Answer/Indicative content	Marks	Part marks and guidance	
4			full correct argument e.g. $14.7^2 + 11.5^2$ [=] 19.4^2 348.34 ≠ 376.36 use of appropriate symbol (≠) or a statement that these two numbers are not the same	3	**M1** for an appropriate method e.g. $\sqrt{19.4^2 - 11.5^2}$, $\sqrt{19.4^2 - 14.7^2}$, $\sqrt{11.5^2 + 14.7^2}$ **oe** or cosine rule for angle B **A1** for correct result to compare e.g. 15.6…, 12.6…, 18.6… or 18.7 or B = 94.7 **A1** for a statement that the result does not equal the actual figure **Examiner's Comments** It was intended that candidates would use Pythagoras' theorem, but several did accurate drawings and gained the marks. Despite the fact that 'Not to scale' was printed next to the diagram, some candidates measured the angle in the diagram. Others added the perimeter and stated it did not total 90. Those who knew to use Pythagoras' theorem were not always able to express themselves clearly enough to score full marks.	accept any correct method including a drawing tolerance ±2 mm, **M1** for a triangle with one side correct **A1** for all three sides correct **A1** for measuring *their* angle accurately ±2° or stating clearly it is not 90° e.g. another equivalent method would be $11.5^2 + 14.7^2 = 18.6\ldots^2$ for **M1 A1** allow these results rounded
			Total	**3**		

Question			Answer/Indicative content	Marks	Part marks and guidance		
5	a		$13^2 - 12^2$ or 169 – 144	M1	Or $5^2 + 12^2$ or 25 + 144	5^2+12^2 seen with 13^2+12^2 scores M0 May be seen in stages eg 5 × 5 =25 12 × 12 = 144 25 + 144 =	
			$\sqrt{13^2 - 12^2}$ soi	M1 dep	or $\sqrt{5^2 + 12^2}$ soi	For second M1 must see √ symbol $\sqrt{13^2+12^2}$ scores M0	
			Two shortest sides in both triangles are 5 [cm] and 12 [cm]	A1	or 5[cm] side clearly labelled on triangle P **and** 13[cm] clearly labelled on triangle Q		
					Examiner's Comments Although not attempted by many, candidates who recognised that (a) related to Pythagoras' theorem usually gained at least 1 mark. Not all showed the square root however required for the second method mark. Others used Pythagoras' theorem by squaring and adding 12 and 13. Very few candidates gave a concluding statement, although some indicated the lengths of the sides on the diagrams. In (b) very few were able to explain conditions for congruency. Many comments attempted a definition of congruence, such as they are the same or one is just a rotation of the other one, rather than identifying evidence for these triangles' congruence. Many thought that equal angles meant	

Question			Answer/Indicative content	Marks	Part marks and guidance	
					congruent. Other explanations commonly referred to the two triangles being right angled. Some vaguely referred to them being the same size, but only a very small number of candidates correctly identified that all of the sides were the same lengths, or used the congruence condition SSS or RHS.	
	b		[All] the sides are the same length	1	Accept SAS **or** RHS **or** SSS **soi** | **See Appendix B**	
			Total	4		

Question			Answer/Indicative content	Marks	Part marks and guidance		
6			38.7	6		Allow 39	
					B3 for 50 for *DE* or *CF* nfww Or M1 for $62.5^2 - 37.5^2$ $\sqrt{62.5^2 \pm 37.5^2}$ M1 for B3 FT for $\frac{their\,50}{80}$ $^{-1}$ correctly evaluated or M2 FT for ft for $\frac{their\,50}{80}$ $^{-1}$ or M1 FT for sin [x] = $\frac{their\,50}{80}$	May be in correct place on diagram 2500 implies M1	
					<u>Examiner's Comments</u> In order to answer this question, candidates needed to recognise that Pythagoras and trigonometry should be used and then apply them		

Question			Answer/Indicative content	Marks	Part marks and guidance	
					correctly. Many candidates thought that angles in a triangle played a part in working out the correct answer. A small number of candidates who were able to correctly use Pythagoras to calculate 50, then attempted to use Pythagoras again to obtain a further side length seemingly forgetting that an angle was required. Only a small number of fully correct answers were seen. Of those who did realise the need to use trigonometry many were unable to apply it correctly.	
			Total	6		

Question			Answer/Indicative content	Marks	Part marks and guidance		
7	a		180 × (1 + 2 + 3) × 3 [= 90]	2	**M1** for 180 × (1 + 2 + 3) If 0 scored, **SC1** for angles 30, 60, 90	Condone 6 for 1 + 2 + 3	
	b		7.5	4	**B1** for sin 30° or cos 60° = ½ **soi** **M2** for 15 sin 30 **oe** or **M1** for *x*/15 = sin 30 **oe** <u>Examiner's Comments</u> Many candidates identified 1+2+3 = 6 in part (a) but then used 90° or 360° to split into constituent parts rather than 180°. Others didn't make use of the value of 6 they had identified. Very few achieved both marks, as they would often forget to explicitly say that 30 × 3 = 90. Some worked backwards from the right angle given and a few just drew a triangle with a right angle indicated. Extremely few used trigonometry in part (b), some achieved the correct answer with no evidence of trigonometry used. Most that attempted to show working split the lengths in the ratio 1 : 2 : 3, giving 5 cm as the shortest side. Many candidates did not attempt this part.	
			Total	6			