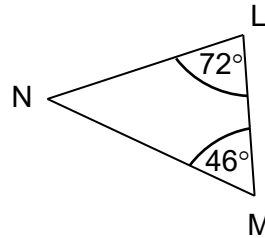
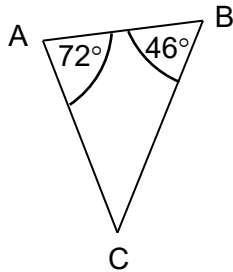


Higher Check In - 9.02 Congruence

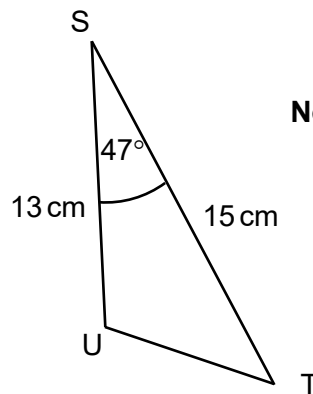
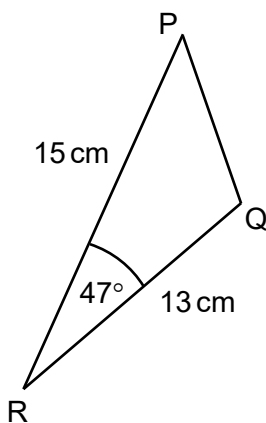
1. Write down the sides of each triangle that must be equal for the triangles to be congruent.



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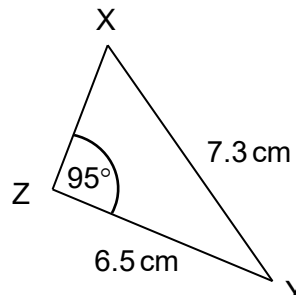
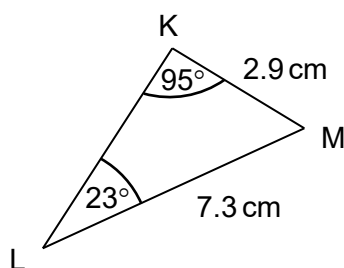
2. Which of the following methods will prove that triangle PQR is congruent to triangle STU?

A RHS **B** SAS **C** ASA **D** SSS



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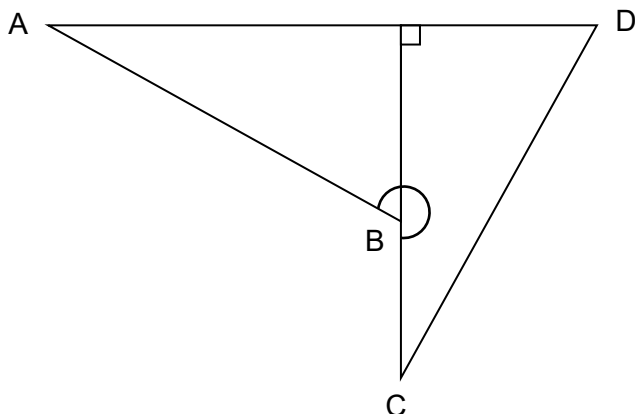
For questions 3 and 4 use the following congruent triangles.



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3. Find the length KL.
4. Find angle ZXY.

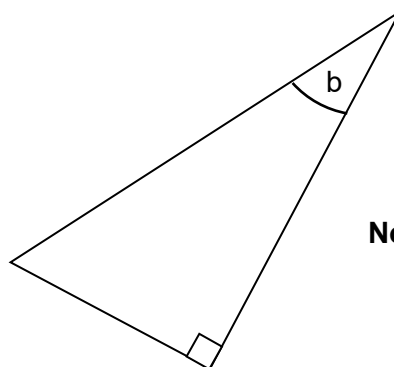
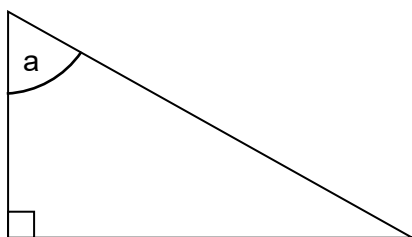
5. The diagram shows two congruent triangles, joined as shown. Find the size of the reflex angle ABC.



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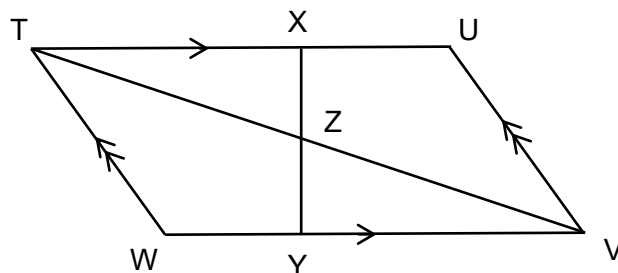
6. For these two triangles, explain why you cannot be certain that the triangles are congruent.

$$\sin a = \frac{4}{5}, \cos a = \frac{3}{5}, \tan b = \frac{3}{4}$$



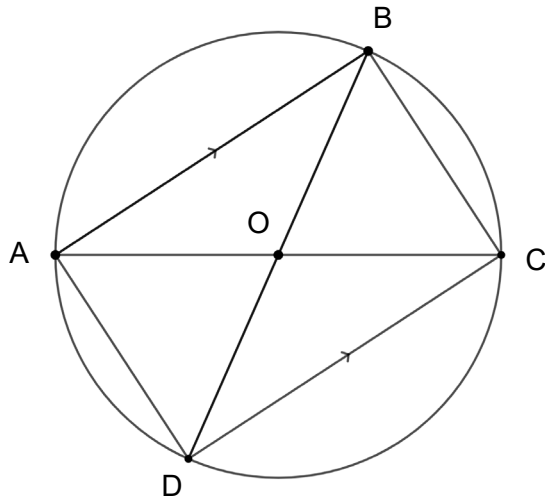
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7. In parallelogram TUVW, $WY = UX$. Prove that triangle TXZ is congruent to triangle VYZ.



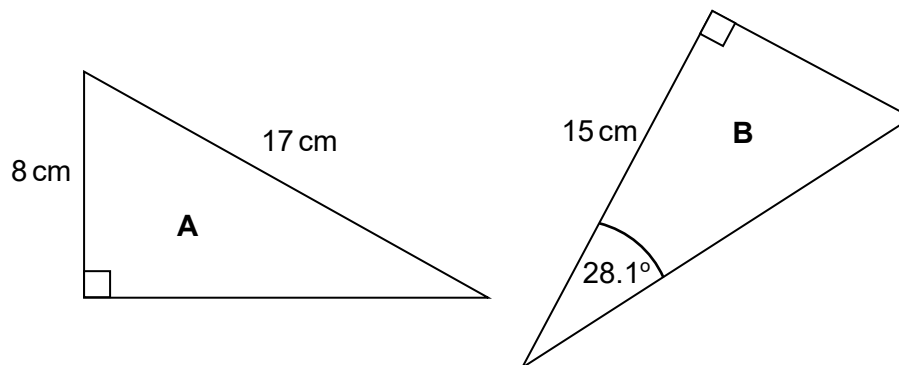
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8. The diagram shows a cyclic quadrilateral ABCD where AC and BD are diameters and AB is parallel to DC. Prove that AOD is congruent to BOC.



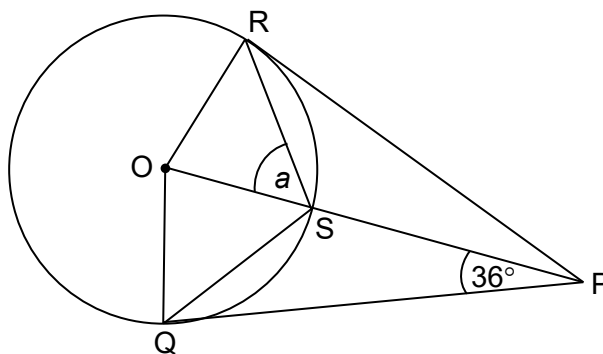
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9. Work out whether these triangles are congruent or not.



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10. The diagram shows a circle, centre O, and two equal length tangents to the circle at Q and R from the point P. The line OP cuts the circle at S. Find the size of angle a, giving a mathematical reason for each stage of your working.

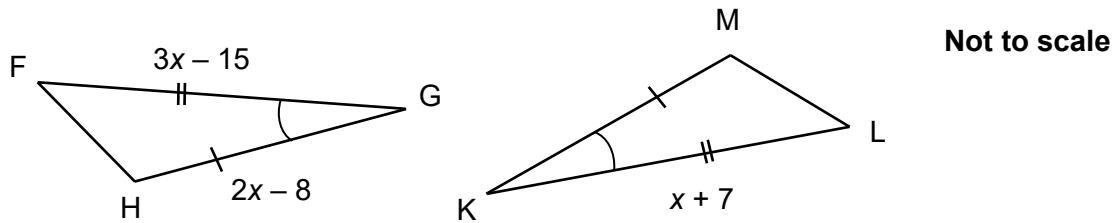


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GCSE (9–1) MATHEMATICS

Extension

Triangle FGH and triangle KLM are congruent and each have an area of 63 cm^2 .
Work out angle LKM .



Answers

1. AB and LM, AC and LN, BC and MN
2. **B** SAS
3. 6.5 cm
4. 62°
5. 242°
6. The sides of each triangle are in the ratio 3 : 4 : 5 but this could be 6 : 8 : 10 so the relationship is $3x : 4x : 5x$. The triangles are similar but not necessarily congruent.
7. Angle XTZ = Angle YVZ (alternate angles)
Angle TXZ = Angle VYZ (alternate angles)
If WY = UX then VY = TX (equal opposite sides of a parallelogram) oe so ASA
8. Angle DAO = Angle CBO (angles in same segment)
AO = BO (radii)
Angle AOD = Angle BOC (vertically opposite angles) oe so ASA
9. Triangle **A**: $\sqrt{17^2 - 8^2} = 15$
Triangle **B**: $\cos(28.1) = \frac{15}{H}$ cm, $H = \frac{15}{\cos(28.1)} = 17.0$
So both triangles RHS: 90° , 17 cm and 15 cm.
10. OQ = OR (radii)
PR = PQ (equal tangents)
OP = OP (common side)
 $\triangle OPQ$ is congruent to $\triangle OPR$ (SSS)
Angle POQ = Angle POR (congruent triangles)
Angle OQP = Angle ORP = 90° (angle of tangent with radius)
Angle POR = 54° (angles in a triangle = 180°)
Angle $a = \frac{180 - 54}{2} = 63^\circ$ (equal angles of isosceles triangle)

Extension

Solving $3x - 15 = x + 7$ gives $x = 11$.
Substituting $x = 11$ gives sides of 14 cm and 18 cm.

$$\frac{1}{2} \times 14 \times 18 \times \sin K = 63$$

$$\text{Angle LKM} = \sin^{-1}(0.5) = 30^\circ$$



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Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Identify corresponding sides to show congruence			
AO1	2	Identify a method for proving congruency			
AO1	3	Find a length using congruence			
AO1	4	Find an angle using congruence			
AO1	5	Find an angle using congruence			
AO2	6	Understand the difference between similar and congruent			
AO2	7	Prove two triangles are congruent			
AO2	8	Prove two triangles are congruent			
AO3	9	Use Pythagoras' theorem and trigonometry to determine if two triangles are congruent			
AO3	10	Find an angle using congruence			

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