

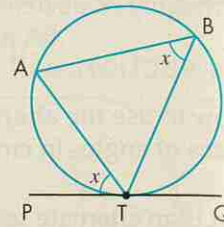
Circle theorem 9

PTQ is the tangent to a circle at T.

The segment containing the angle TBA is the alternate segment of angle PTA.

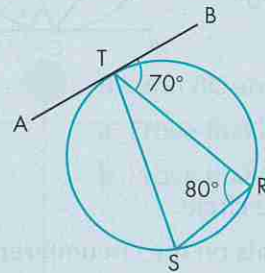
The angle between a tangent and a chord through the point of contact is equal to the angle in the alternate segment.

$\angle PTA = \angle TBA$



Example 6

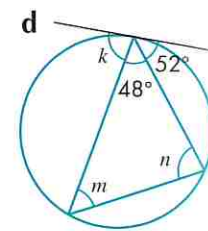
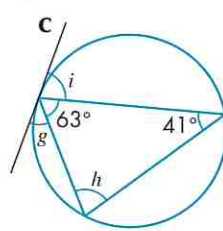
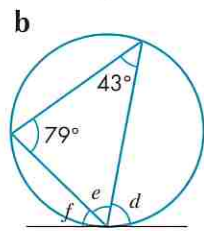
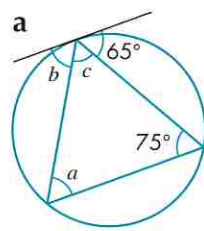
In the diagram, find the size of: **a** $\angle ATS$ **b** $\angle TSR$.



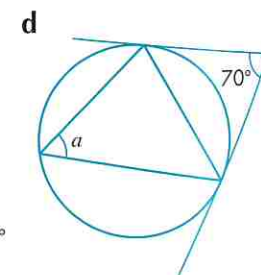
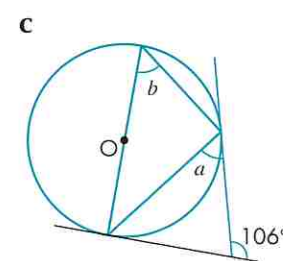
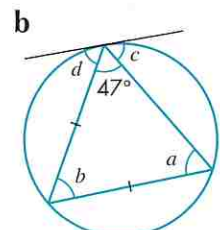
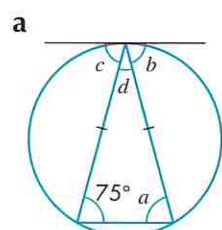
- a** $\angle ATS = 80^\circ$ Angle in the alternate segment
b $\angle TSR = 70^\circ$ Angle in the alternate segment

Exercise 20F

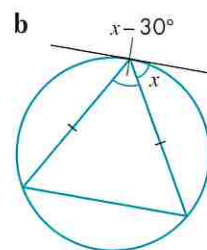
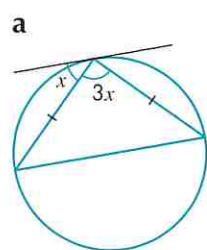
1 Find the size of the lettered angles in each diagram.



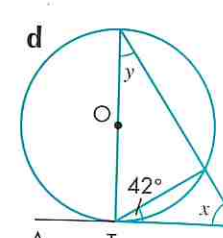
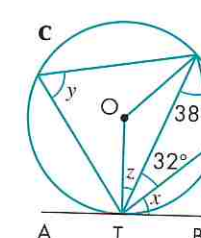
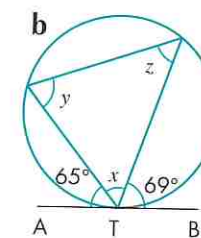
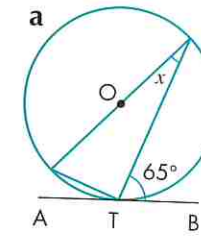
2 Find the size of the lettered angles in each diagram.



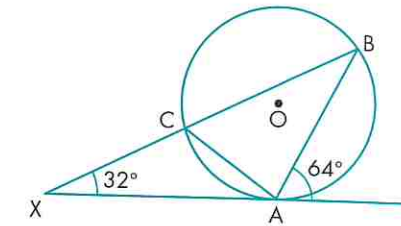
3 In each diagram, find the value of x .



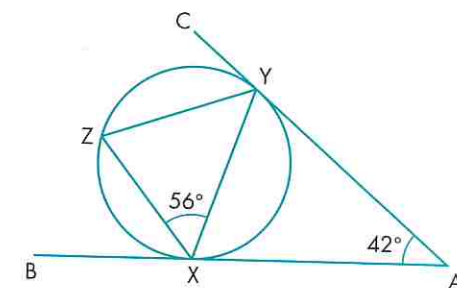
4 In each diagram, ATB is a tangent to the circle. O is the centre, where marked. Find the size of each lettered angle.



EV **5** In the diagram, O is the centre of the circle. XY is a tangent to the circle at A. BCX is a straight line. Yuka said that triangle ACX is isosceles. Evaluate Yuka's statement.

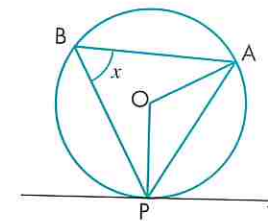


PS **6** AB and AC are tangents to the circle at X and Y. Work out the size of $\angle XYZ$. Give reasons to justify your answer.



CM **7** PT is a tangent to a circle, centre O. A and B are points on the circumference. $\angle PBA = x$

- a** Write down the value of $\angle AOP$.
b Calculate $\angle OPA$ in terms of x .
c Prove that $\angle APT = \angle PBA$.



CM **8** A circle has two tangents PQ and PT from a common point P. Use the alternate segment theorem to prove that $PQ = PT$.