

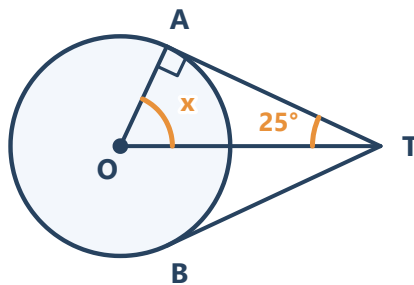
GCSE Maths: Tangents and radii (Higher): answers

GCSE Maths - Circle Theorems - Higher - Lesson 26.6

Answers. Final answers to the worksheet questions. Full step-by-step solutions for every question are free at websink.site/gcse/maths/ch26-circle-theorems/higher/tangents-and-radii/

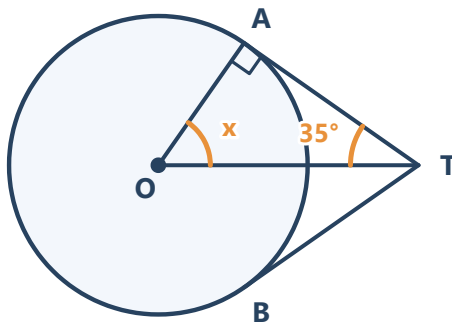
Exercise 26F Tangents and radii Non-calculator

- 1 TA is a tangent to the circle with centre O , touching the circle at A . Angle $ATO = 25^\circ$. Work out the size of angle AOT . Give a reason for each step.



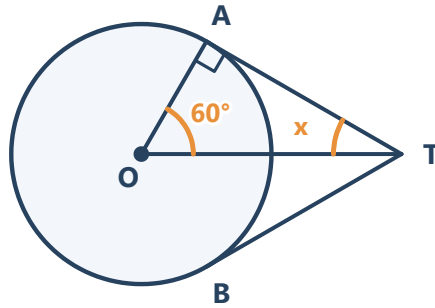
Answer: 65° (a tangent is perpendicular to the radius at the point of contact; the angles in a triangle add up to 180°)

- 2 TA is a tangent to the circle with centre O , touching the circle at A . Angle $ATO = 35^\circ$. Work out the size of angle AOT . Give a reason for each step.



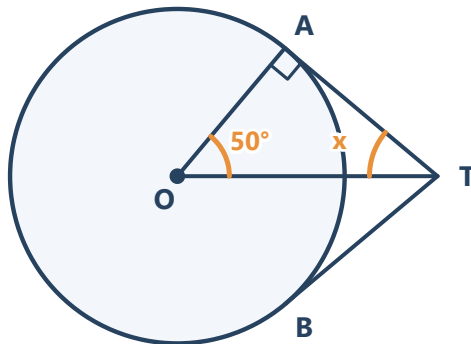
Answer: 55° (a tangent is perpendicular to the radius at the point of contact; the angles in a triangle add up to 180°)

- 3 TA is a tangent to the circle with centre O , touching the circle at A . Angle $AOT = 60^\circ$. Work out the size of angle ATO . Give a reason for each step.



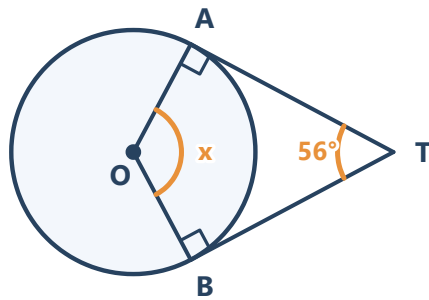
Answer: 30° (a tangent is perpendicular to the radius at the point of contact; the angles in a triangle add up to 180°)

- 4 TA is a tangent to the circle with centre O , touching the circle at A . Angle $AOT = 50^\circ$. Work out the size of angle ATO . Give a reason for each step.



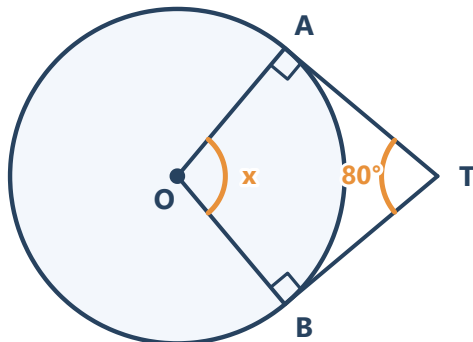
Answer: 40° (a tangent is perpendicular to the radius at the point of contact; the angles in a triangle add up to 180°)

- 5 TA and TB are tangents to a circle with centre O . Angle $ATB = 56^\circ$. Work out the size of angle AOB . Give a reason for each step.



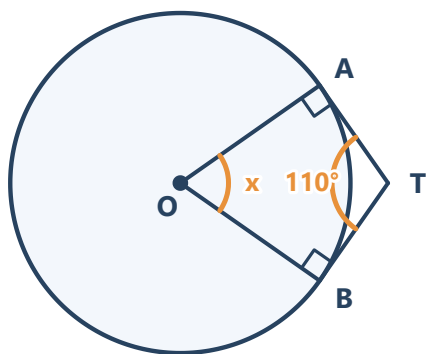
Answer: 124° (a tangent is perpendicular to the radius at the point of contact; the angles in a quadrilateral add up to 360°)

- 6 TA and TB are tangents to a circle with centre O . Angle $ATB = 80^\circ$. Work out the size of angle AOB . Give a reason for each step.



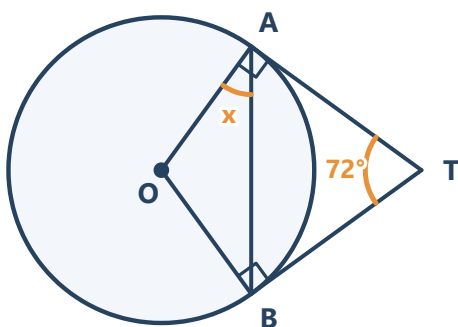
Answer: 100° (a tangent is perpendicular to the radius at the point of contact; the angles in a quadrilateral add up to 360°)

- 7 TA and TB are tangents to a circle with centre O . Angle $ATB = 110^\circ$. Work out the size of angle AOB . Give a reason for each step.



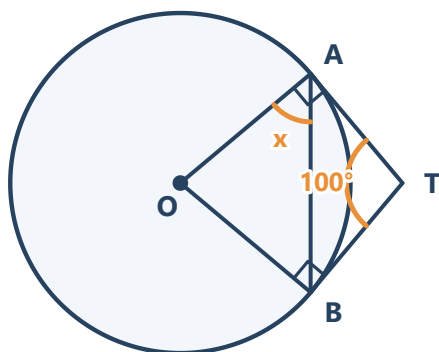
Answer: 70° (a tangent is perpendicular to the radius at the point of contact; the angles in a quadrilateral add up to 360°)

- 8 TA and TB are tangents to a circle with centre O . Angle $ATB = 72^\circ$. Work out the size of angle OAB . Give a reason for each step.



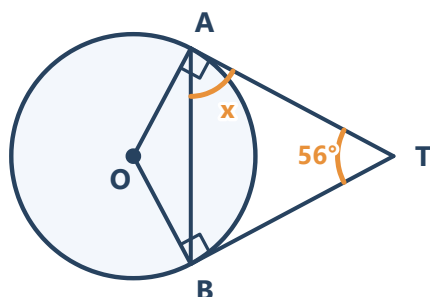
Answer: 36° (a tangent is perpendicular to the radius at the point of contact; the angles in a quadrilateral add up to 360° ; the base angles of an isosceles triangle are equal)

- 9 TA and TB are tangents to a circle with centre O . Angle $ATB = 100^\circ$. Work out the size of angle OAB . Give a reason for each step.



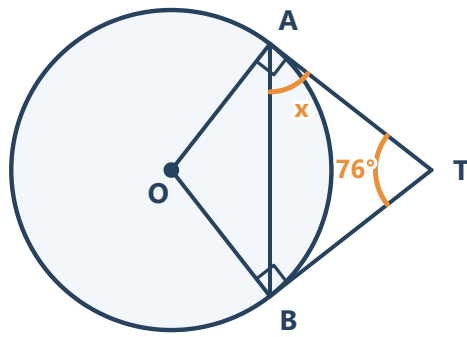
Answer: 50° (a tangent is perpendicular to the radius at the point of contact; the angles in a quadrilateral add up to 360° ; the base angles of an isosceles triangle are equal)

- 10** TA and TB are tangents to a circle with centre O . Angle $ATB = 56^\circ$. Work out the size of angle TAB . Give a reason for each step.



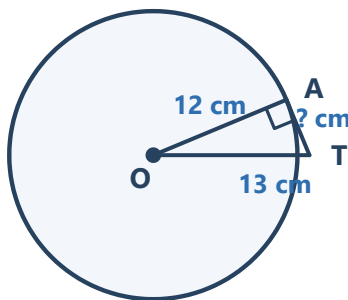
Answer: 62° (tangents from an external point are equal in length; the base angles of an isosceles triangle are equal)

- 11** TA and TB are tangents to a circle with centre O . Angle $ATB = 76^\circ$. Work out the size of angle TAB . Give a reason for each step.



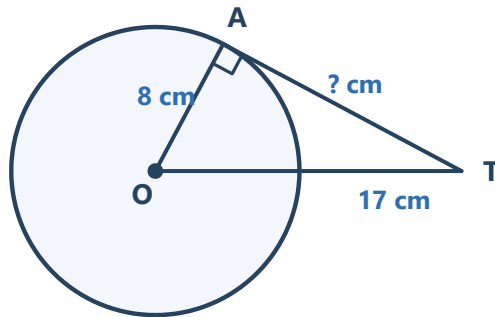
Answer: 52° (tangents from an external point are equal in length; the base angles of an isosceles triangle are equal)

- 12** TA is a tangent to a circle with centre O , touching it at A . The radius of the circle is 12 cm and $OT = 13$ cm. Work out the length of TA .



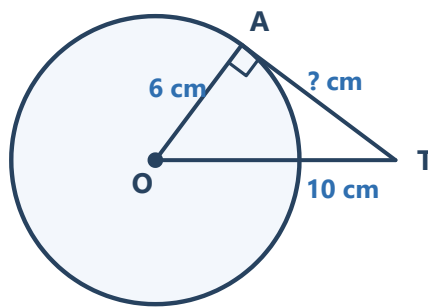
Answer: 5 cm

- 13** TA is a tangent to a circle with centre O , touching it at A . The radius of the circle is 8 cm and $OT = 17$ cm. Work out the length of TA .



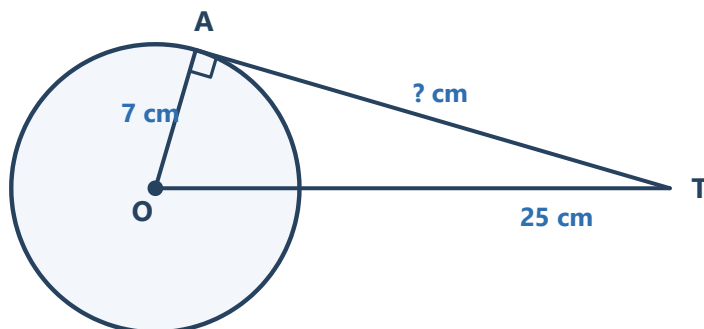
Answer: 15 cm

- 14** TA is a tangent to a circle with centre O , touching it at A . The radius of the circle is 6 cm and $OT = 10$ cm. Work out the length of TA .



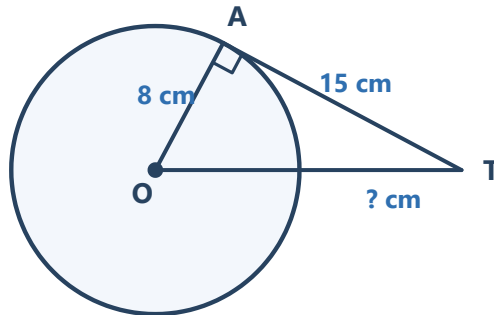
Answer: 8 cm

- 15** TA is a tangent to a circle with centre O , touching it at A . The radius of the circle is 7 cm and $OT = 25$ cm. Work out the length of TA .



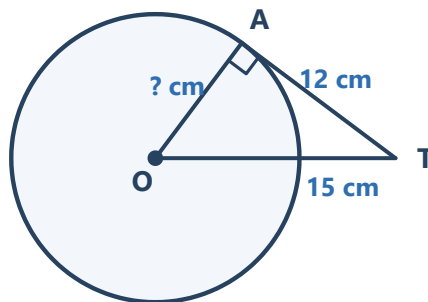
Answer: 24 cm

- 16** TA is a tangent to a circle with centre O , touching it at A . The radius of the circle is 8 cm and $TA = 15$ cm. Work out the distance OT .



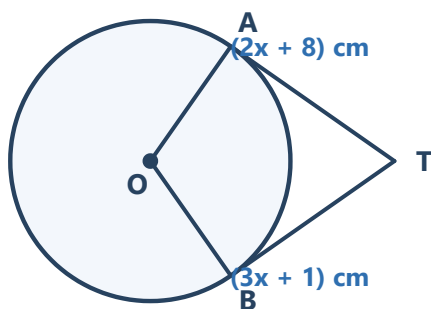
Answer: 17 cm

- 17** TA is a tangent to a circle with centre O , touching it at A . $TA = 12$ cm and $OT = 15$ cm. Work out the radius of the circle.



Answer: 9 cm

- 18** TA and TB are tangents to a circle with centre O . $TA = (2x + 8)$ cm and $TB = (3x + 1)$ cm.



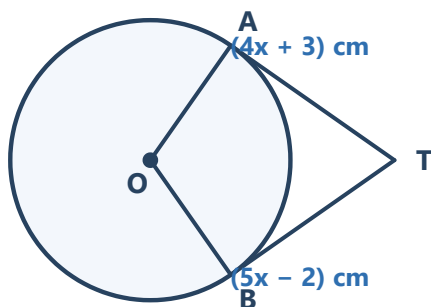
- (a) Work out the value of x .

Answer: $x = 7$

- (b) Work out the length of TA .

Answer: 22 cm

- 19** TA and TB are tangents to a circle with centre O . $TA = (4x + 3)$ cm and $TB = (5x - 2)$ cm.



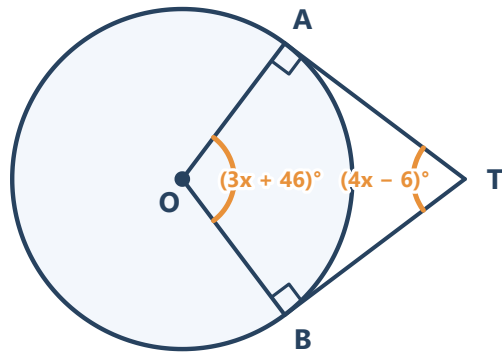
- (a) Work out the value of x .

Answer: $x = 5$

- (b) Work out the length of TA .

Answer: 23 cm

- 20** TA and TB are tangents to a circle with centre O . Angle $ATB = (4x - 6)^\circ$ and angle $AOB = (3x + 46)^\circ$.



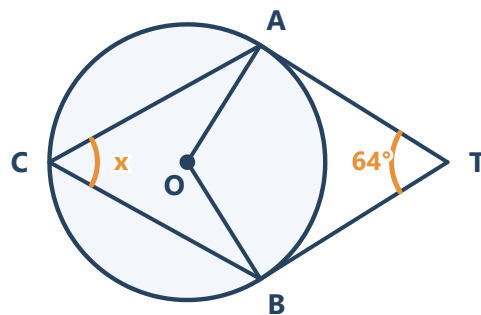
- (a) Work out the value of x .

Answer: $x = 20$

- (b) Work out the size of angle ATB .

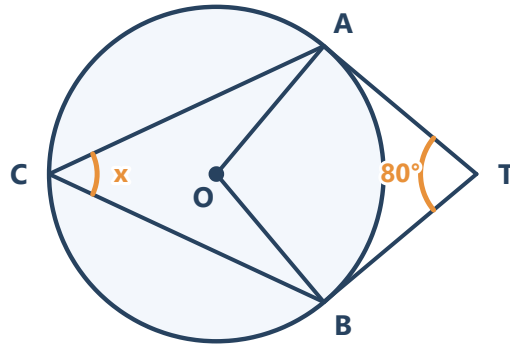
Answer: 74°

- 21** TA and TB are tangents to a circle with centre O . C is a point on the circle. Angle $ATB = 64^\circ$. Work out the size of angle ACB . Give a reason for each step.



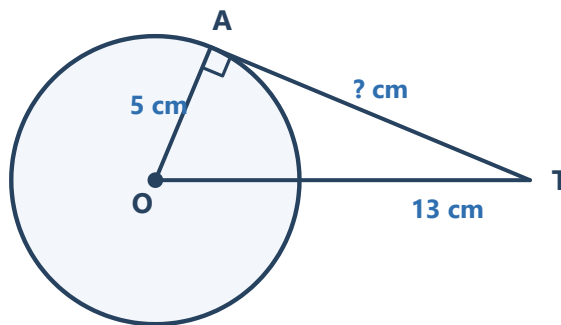
Answer: 58° (a tangent is perpendicular to the radius at the point of contact; the angles in a quadrilateral add up to 360° ; the angle at the centre is twice the angle at the circumference)

- 22** TA and TB are tangents to a circle with centre O . C is a point on the circle. Angle $ATB = 80^\circ$. Work out the size of angle ACB . Give a reason for each step.



Answer: 50° (a tangent is perpendicular to the radius at the point of contact; the angles in a quadrilateral add up to 360° ; the angle at the centre is twice the angle at the circumference)

- 23** TA and TB are tangents to a circle with centre O and radius 5 cm . $TA = 12\text{ cm}$. Work out the area of the kite $OATB$.

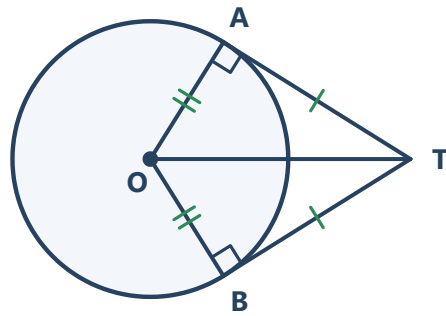


Answer: 60 cm^2

- 24** TA and TB are tangents to a circle with centre O . Show that triangles OAT and OBT are congruent. Hence explain why OT bisects angle ATB .

Answer: RHS: right angles at A and B , common hypotenuse OT , and $OA = OB$ (radii). So the angles at T are equal.

- 25** TA and TB are tangents to a circle with centre O . The line OT crosses the chord AB at M . Prove that OT is perpendicular to AB .



Answer: Triangles OAM and OBM are congruent (SAS), so angle $OMA = \text{angle } OMB = 90^\circ$.