

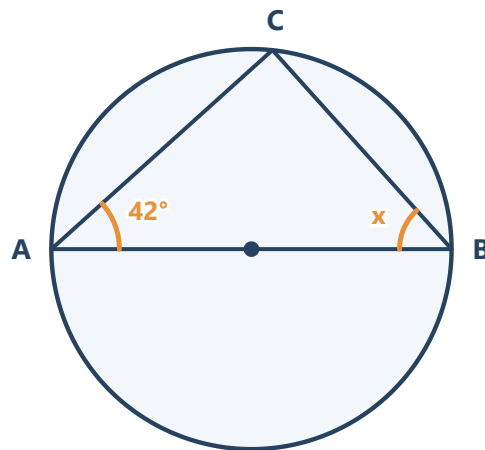
GCSE Maths Circle Theorems (Higher): check-up and exam-style questions: answers

GCSE Maths - Circle Theorems - Higher - Test yourself

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/check-up-and-exam-style-questions/

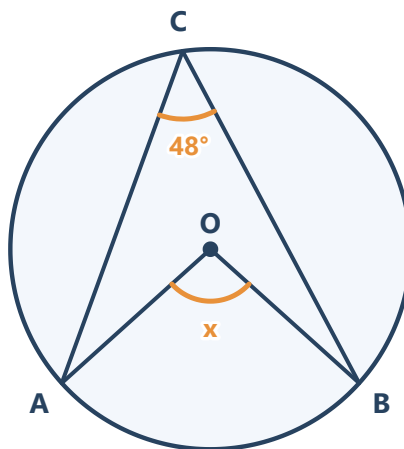
Exercise 26Z Check-up (non-calculator) Non-calculator

- 1 AB is a diameter of the circle. C is a point on the circle. Angle $CAB = 42^\circ$. Work out the size of angle ABC . Give a reason for each step.



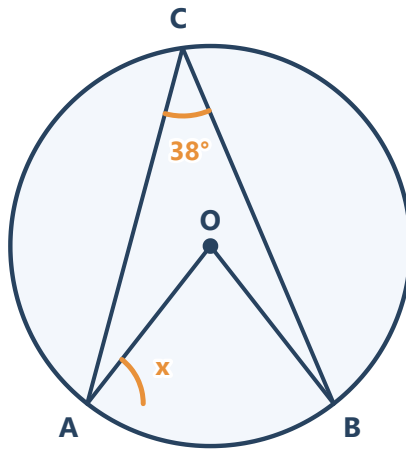
Answer: 48° (angle in a semicircle is 90° ; the angles in a triangle add up to 180°)

- 2 A , B and C are points on a circle with centre O . Angle $ACB = 48^\circ$. Work out the size of angle AOB . Give a reason for your answer.



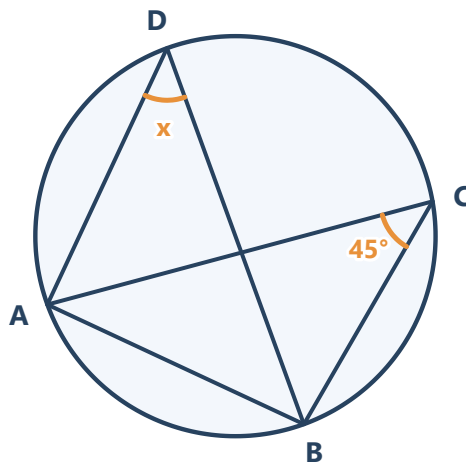
Answer: 96° (the angle at the centre is twice the angle at the circumference)

- 3 A , B and C are points on a circle with centre O . Angle $ACB = 38^\circ$. Work out the size of angle OAB . Give a reason for each step.



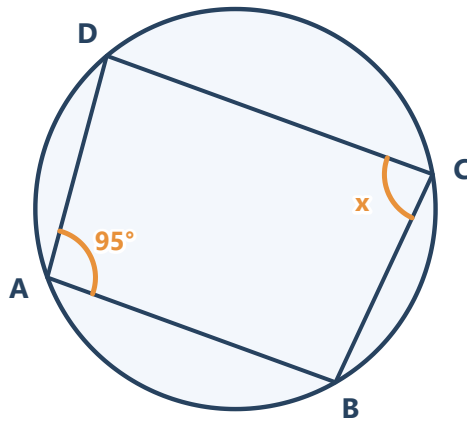
Answer: 52° (the angle at the centre is twice the angle at the circumference; the base angles of an isosceles triangle are equal)

- 4 A, B, C and D are points on a circle. Angle $ACB = 45^\circ$. Work out the size of angle ADB . Give a reason for your answer.



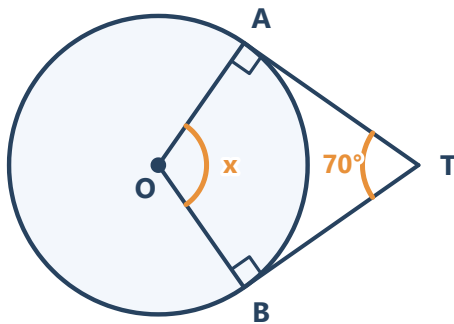
Answer: 45° (angles in the same segment are equal)

- 5 $ABCD$ is a cyclic quadrilateral. Angle $DAB = 95^\circ$. Work out the size of angle BCD . Give a reason for your answer.



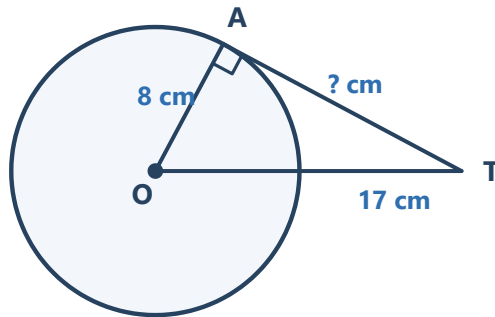
Answer: 85° (opposite angles of a cyclic quadrilateral add up to 180°)

- 6 TA and TB are tangents to a circle with centre O . Angle $ATB = 70^\circ$. Work out the size of angle AOB . Give a reason for each step.



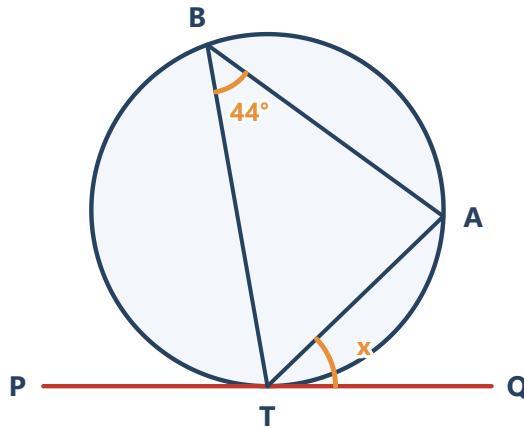
Answer: 110° (a tangent is perpendicular to the radius at the point of contact; the angles in a quadrilateral add up to 360°)

- 7 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 .



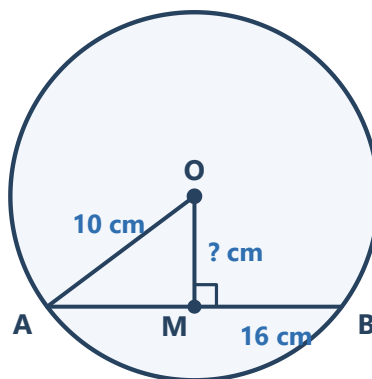
Answer: 15 cm

- 8 PQ is a tangent to the circle at T . A and B are points on the circle. Angle $TBA = 44^\circ$. Work out the size of angle QTA . Give a reason for your answer.



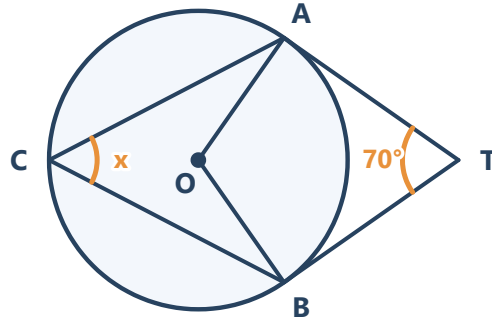
Answer: 44° (the angle between a tangent and a chord is equal to the angle in the alternate segment)

- 9 AB is a chord of a circle with centre O and radius 10 cm. $AB = 16$ cm. M is the point where the perpendicular from O meets the chord. Work out the distance OM .



Answer: 6 cm

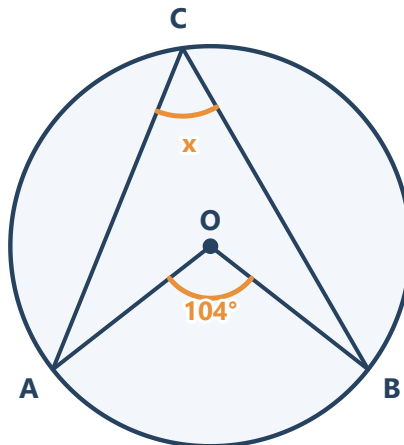
- 10** TA and TB are tangents to a circle with centre O . C is a point on the circle. Angle $ATB = 70^\circ$. Work out the size of angle ACB . Give a reason for each step.



Answer: 55° (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)

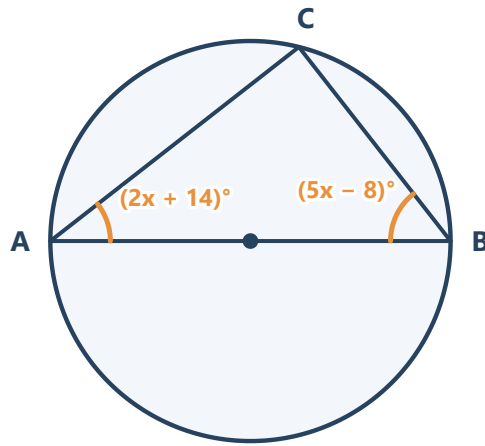
Exercise 26X Exam-style questions Non-calculator

- 1** A , B and C are points on a circle with centre O . Angle $AOB = 104^\circ$. Work out the size of angle ACB . Give a reason for your answer. [2 marks]



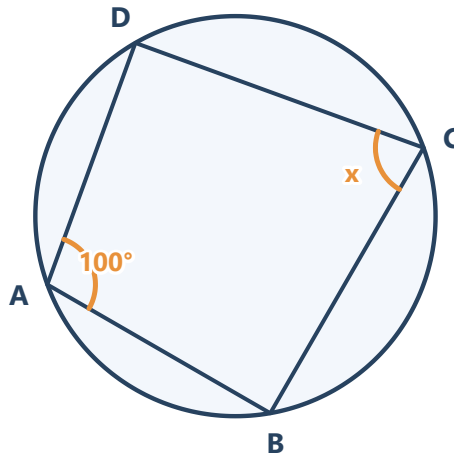
Answer: 52° (the angle at the centre is twice the angle at the circumference)

- 2** AB is a diameter of the circle. Angle $CAB = (2x + 14)^\circ$ and angle $ABC = (5x - 8)^\circ$. Work out the value of x . [4 marks]



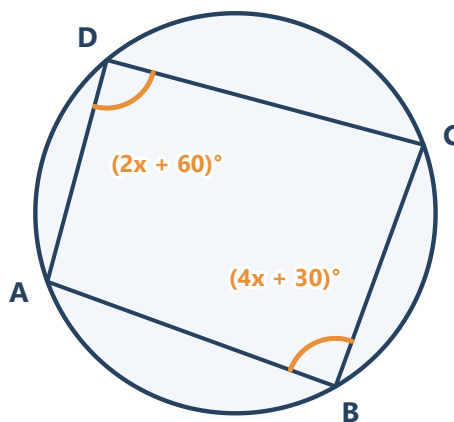
Answer: $x = 12$

- 3 $ABCD$ is a cyclic quadrilateral. Angle $DAB = 100^\circ$. Work out the size of angle BCD . Give a reason for your answer. [2 marks]



Answer: 80° (opposite angles of a cyclic quadrilateral add up to 180°)

- 4 $ABCD$ is a cyclic quadrilateral. Angle $ABC = (4x + 30)^\circ$ and angle $CDA = (2x + 60)^\circ$. [4 marks]



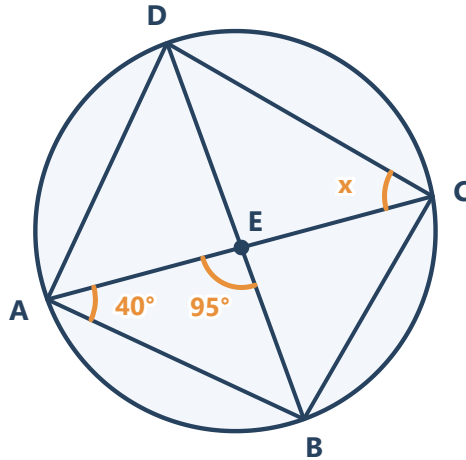
- (a) Work out the value of x .

Answer: $x = 15$

- (b) Work out angles ABC and CDA .

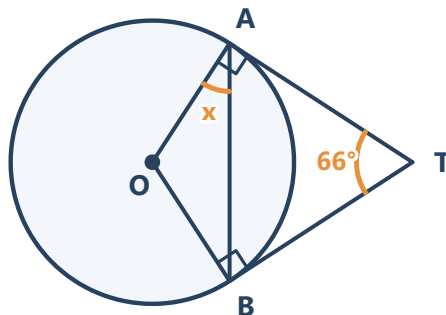
Answer: 90° and 90°

- 5 A, B, C and D are points on a circle. The chords AC and BD meet at E . Angle $BAC = 40^\circ$ and angle $AEB = 95^\circ$. Work out the size of angle ACD . Give a reason for each step. [4 marks]



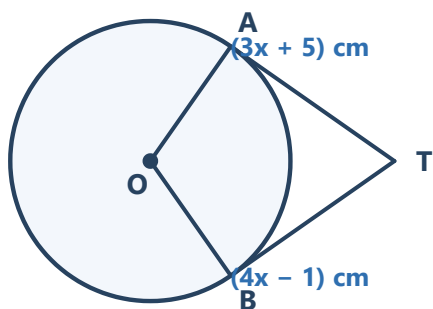
Answer: 45° (the angles in a triangle add up to 180° ; angles in the same segment are equal)

- 6 TA and TB are tangents to a circle with centre O . Angle $ATB = 66^\circ$. Work out the size of angle OAB . Give a reason for each step. [4 marks]



Answer: 33° (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)

- 7 TA and TB are tangents to a circle with centre O . $TA = (3x + 5)$ cm and $TB = (4x - 1)$ cm. [4 marks]



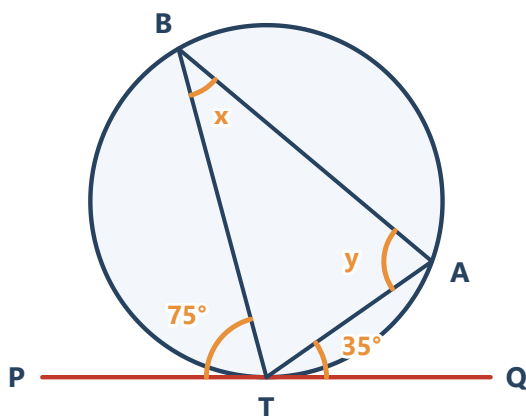
- (a) Work out the value of x .

Answer: $x = 6$

- (b) Work out the length of TA .

Answer: 23 cm

- 8 PQ is a tangent to the circle at T . A and B are points on the circle. Angle $QTA = 35^\circ$ and angle $PTB = 75^\circ$. Give a reason for each answer. [5 marks]



- (a) Work out angle TBA

Answer: 35° (the angle between a tangent and a chord is equal to the angle in the alternate segment)

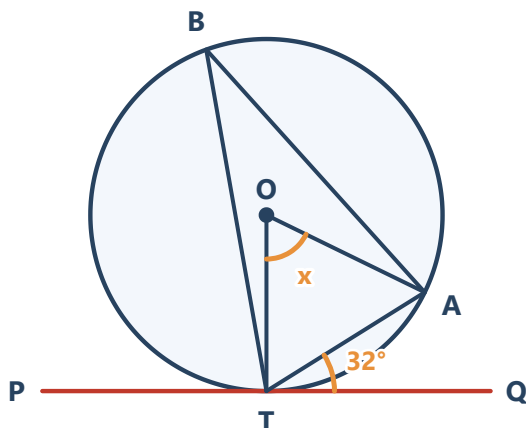
- (b) Work out angle TAB

Answer: 75° (the angle between a tangent and a chord is equal to the angle in the alternate segment)

- (c) Work out angle ATB

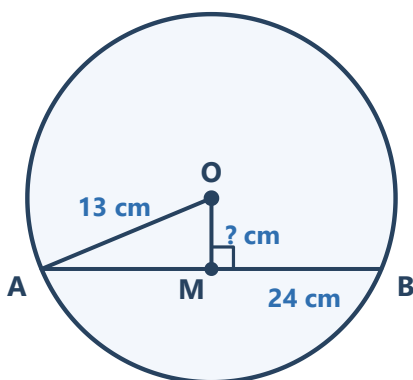
Answer: 70° (the angles in a triangle add up to 180°)

- 9 PQ is a tangent at T to a circle with centre O . Angle $QTA = 32^\circ$. Work out the size of angle TOA . Give a reason for each step. [4 marks]



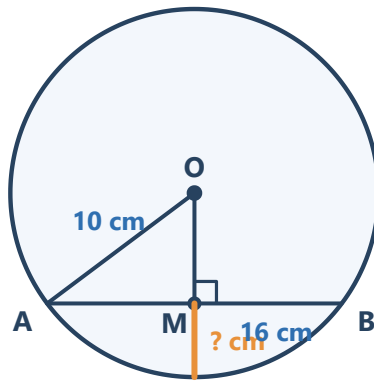
Answer: 64° (the angle between a tangent and a chord is equal to the angle in the alternate segment; the angle at the centre is twice the angle at the circumference)

- 10 AB is a chord of a circle with centre O and radius 13 cm. $AB = 24$ cm. M is the point where the perpendicular from O meets the chord. Work out the distance OM . [3 marks]



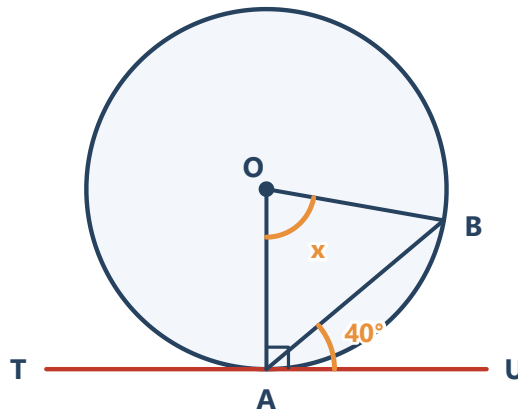
Answer: 5 cm

- 11 A circular pipe has radius 10 cm. Water fills the pipe to a level so that the water surface is a chord of length 16 cm. Work out the depth of the water at its deepest point (the vertical distance from the chord to the lowest part of the circle). [4 marks]



Answer: 4 cm

- 12** TU is a tangent to a circle with centre O , touching the circle at A . B is a point on the circle. Angle $UAB = 40^\circ$. Give a reason for each step. [5 marks]



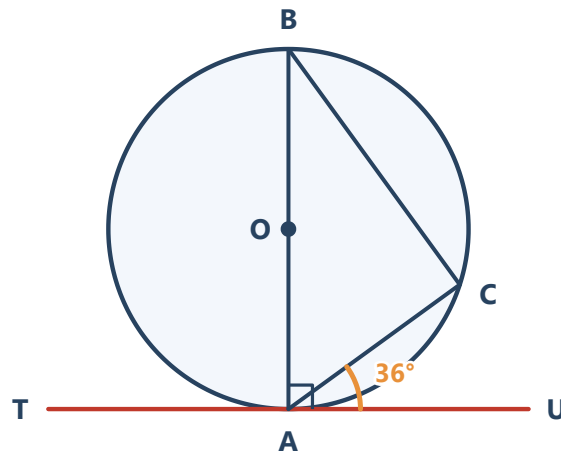
- (a)** Work out angle OAB

Answer: 50° (a tangent is perpendicular to the radius at the point of contact)

- (b)** Work out angle AOB

Answer: 80° (the base angles of an isosceles triangle are equal; the angles in a triangle add up to 180°)

- 13** AB is a diameter of a circle with centre O . TU is a tangent to the circle at A . C is a point on the circle. Angle $UAC = 36^\circ$. Give a reason for each answer. [6 marks]



- (a) Work out angle CAB .

Answer: 54° (a tangent is perpendicular to the radius at the point of contact)

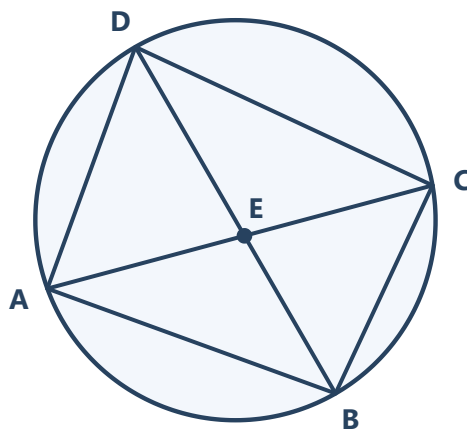
- (b) Work out angle ACB .

Answer: 90° (angle in a semicircle is 90°)

- (c) Work out angle ABC .

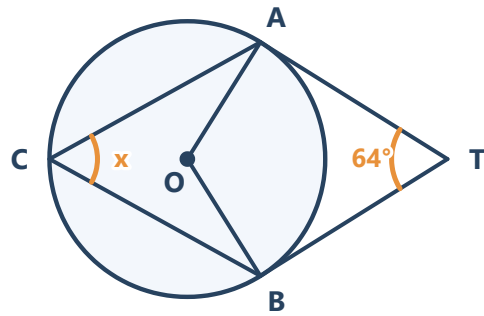
Answer: 36° (the angles in a triangle add up to 180° ; the angle between a tangent and a chord is equal to the angle in the alternate segment)

- 14 A, B, C and D are points on a circle. The chords AC and BD cross at E . Prove that triangles ABE and DCE are similar. [4 marks]



Answer: Angle $AEB =$ angle DEC (vertically opposite) and angle $BAE =$ angle CDE (angles in the same segment), so the triangles are similar (two equal angles).

- 15 TA and TB are tangents to a circle with centre O . C is a point on the major arc AB . Prove that angle $TAB =$ angle ACB . [4 marks]



Answer: Triangle TAB is isosceles (tangents from T are equal), and angle $TAB = \text{angle } ACB$ by the alternate segment theorem. (Or both equal $90^\circ - \frac{1}{2} \text{ angle } ATB$.)