

Tangents, chords and the alternate segment

About 50 minutes No calculator 43 marks



Hints online, answers free with an account:
mathswariz.uk/worksheets/gcse-tangents-chords-and-the-alternate-segment/

Date _____

A Do Now

The first question is what today's lesson needs. The others bring back earlier topics.

- A1** Needed today [2 marks]

A , B and C lie on a circle with centre O , and C is on the major arc AB . Angle $OAB = 64^\circ$. Find angle ACB .

A2 From chapter 19 [2 marks]

A club has 20 boys and 28 girls. 18 of the boys and 25 of the girls can swim. A swimmer is picked at random. Find the probability that it is a girl.

Answer

Answer

- A3** From chapter 16 [2 marks]

$a = 290$ and $b = 150$, both correct to the nearest 10. Work out the lower bound of $a - b$.

A4 Key Stage 3 [2 marks]

In an isosceles triangle, the third angle is 48° more than each base angle. Find the third angle.

Answer

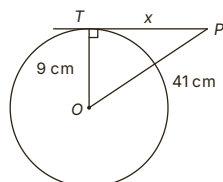
Answer

B Example, then your turn

Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1

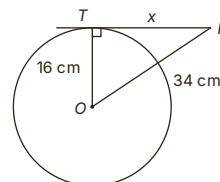
Tangent PT , centre O . Find x .



Not drawn accurately

Hint A tangent meets the radius at 90° .

B1 Tangent PT , centre O . Find x . [3 marks]

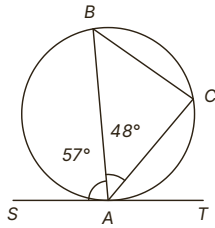


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Answer

EXAMPLE 2

Tangent SAT . Find angle ABC , with reasons.

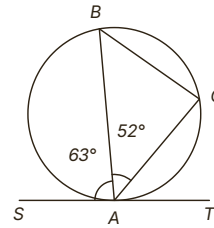


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Hint Use the alternate segment theorem.

B2 Tangent SAT . Find angle ABC , with reasons.

[3 marks]

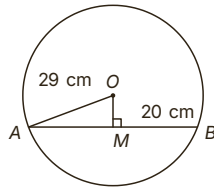


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Answer

c Practice

C1 Centre O , $OM \perp AB$. Find AB . [3 marks]

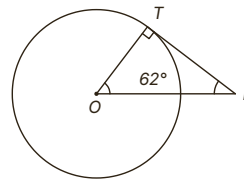


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Answer

C2 Tangent PT , centre O . Find angle TPO . [2 marks]

[2 marks]

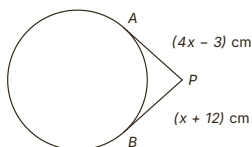


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Answer

C3 Tangents PA and PB . Find the length PA . [3 marks]

[3 marks]

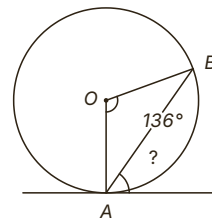


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Answer

C4 Tangent AT , centre O . Find angle BAT . [3 marks]

[3 marks]

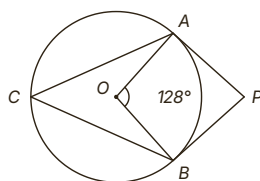


Not drawn accurately

Answer

D Exam-style questions

- D1** PA and PB are tangents to the circle, centre O . C is a point on the major arc AB . Angle $AOB = 128^\circ$.



Not drawn accurately

- (a) Work out the size of angle APB .

[2 marks]

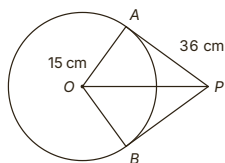
Answer

- (b) Work out the size of angle ACB . Give a reason for each stage of your working. [4 marks]

Answer

Total for D1: 6 marks

- D2** PA and PB are tangents to the circle, centre O . Ali says, " $OP = 15 + 36 = 51$ cm."



Not drawn accurately

- (a) Explain why Ali is wrong. Work out the length of OP .

[3 marks]

Answer

- (b) Prove that triangles OAP and OBP are congruent.

[3 marks]

- (c) Work out the area of the quadrilateral $OAPB$.

[2 marks]

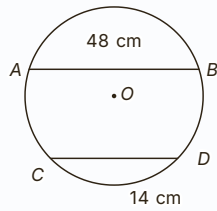
Answer

Total for D2: 8 marks

E Extension

No route is given. The hints are at the end of the sheet. Use one at a time.

- E1** Centre O , radius 25 cm. The parallel chords AB and CD are on opposite sides of O . Find the distance between them. [4 marks]



Not drawn accurately

Answer

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Drop a perpendicular from O to each chord.
Hint 2 For AB : $25^2 - 24^2 = 49$, so AB is 7 cm from O .
Hint 3 Do the same for CD , then add.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

- I can use tangent and radius at 90° . ☐ ☐ ☐
I can use equal tangents and chords. ☐ ☐ ☐
I can use the alternate segment. ☐ ☐ ☐