

## Questions

Q1.

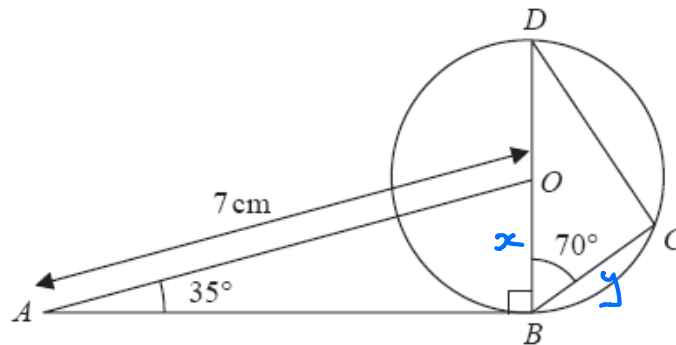


Diagram NOT  
accurately drawn

$B$ ,  $C$  and  $D$  are points on the circumference of a circle, centre  $O$ .  
 $BOD$  is a diameter of the circle.

$AO = 7 \text{ cm}$     Angle  $ABO = 90^\circ$     Angle  $OAB = 35^\circ$     Angle  $DBC = 70^\circ$

\*(a) Explain why angle  $BCD$  is  $90^\circ$

Angle in a semi-circle

$$\cos 70^\circ = \frac{y}{2x} \quad (1)$$

(b) Calculate the length of  $BC$ .  
Give your answer correct to 3 significant figures.

$$y = 2 \times 4.015 \cos 70^\circ = 2.75 \text{ cm}$$

$$\sin 35^\circ = \frac{x}{7}$$

$$x = 7 \sin 35^\circ = 4.015$$

$$BC = 2.75 \text{ cm}$$

(4)

(Total for question = 5 marks)

Q2.

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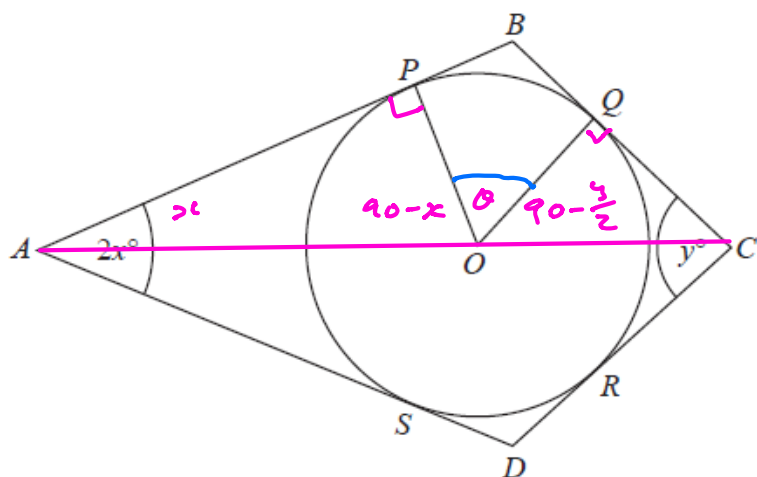


Diagram NOT  
accurately drawn

$$90 - x + \theta + 90 - \frac{y}{2} = 180$$

Angles on a straight line

$$180 + \theta - 180 = x + \frac{y}{2}$$

$$\theta = x + \frac{y}{2}$$

$$\angle POQ = x + \frac{y}{2}$$

$P$ ,  $Q$ ,  $R$  and  $S$  are points on the circumference of a circle, centre  $O$ .  
 $APB$ ,  $BQC$ ,  $CRD$  and  $DSA$  are tangents to the circle.  
 $ABCD$  is a kite.

Angle  $PAS = 2x^\circ$

Angle  $QCR = y^\circ$

Find an expression in terms of  $x$  and  $y$  for the size, in degrees, of the angle  $POQ$ .

Give your expression in its simplest form.

Give reasons for your answer.

(Total for question = 5 marks)

Q3.

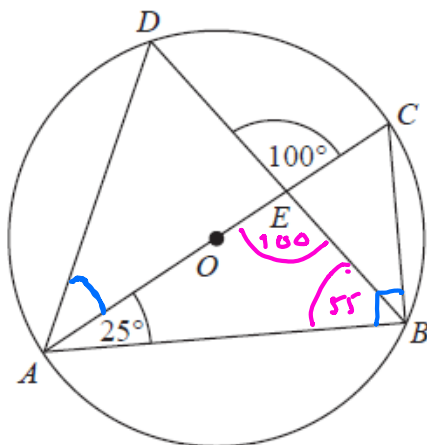


Diagram NOT  
accurately drawn

$$\angle ABC = 90^\circ \text{ (}\angle \text{ in semi circle)}$$

$$\angle AEB = 100^\circ \text{ (vert opp } \angle \text{ s equal)}$$

$$\angle ABE = 55^\circ \text{ (}\angle \text{ sum of } \Delta \text{)}$$

$$\angle CBD = 35^\circ \text{ (} 90 - \angle ABE \text{)}$$

$A$ ,  $B$ ,  $C$  and  $D$  are points on the circumference of a circle, centre  $O$ .

$AC$  is a diameter of the circle.

$AC$  and  $BD$  intersect at  $E$ .

Angle  $CAB = 25^\circ$

Angle  $DEC = 100^\circ$

$$\angle DAC = 35^\circ$$

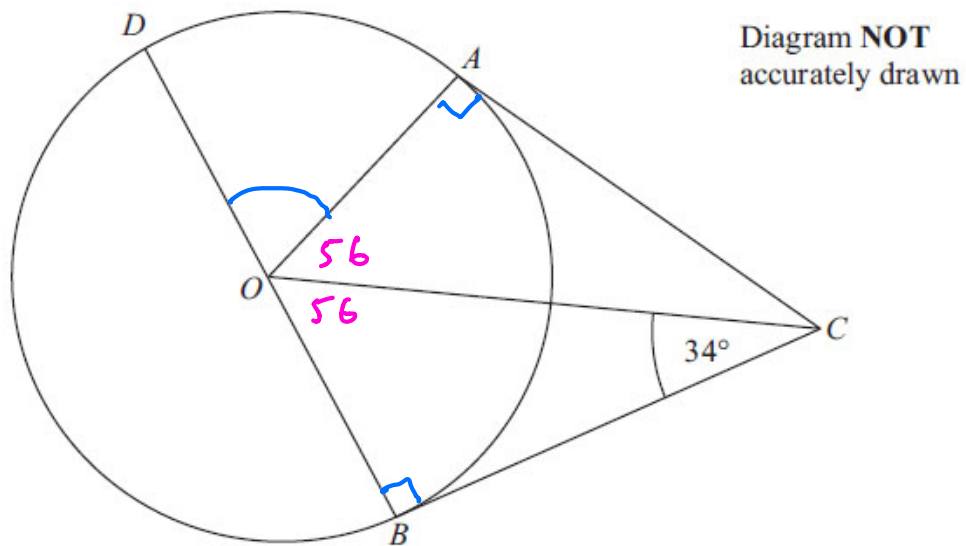
( $\angle$  s in same segment)

Work out the size of angle  $DAC$ .  
You must show all your working.

.....°

(Total for question = 4 marks)

Q4.



$A$ ,  $B$  and  $D$  are points on the circumference of a circle, centre  $O$ .  
 $BD$  is a diameter of the circle.  
 $BC$  and  $AC$  are tangents to the circle.  
Angle  $OCB = 34^\circ$ .

Work out the size of angle  $DOA$ .

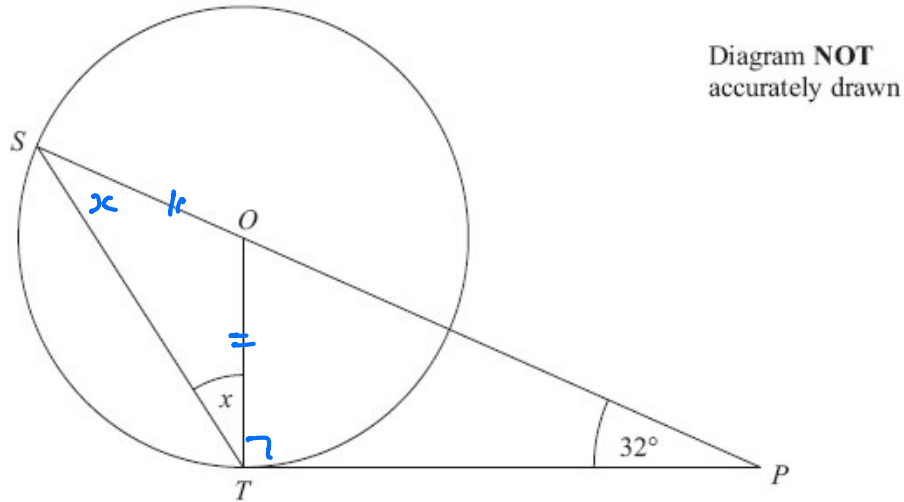
$$\begin{aligned}\angle DOA &= 180 - 56 - 56 \\ \angle DOA &= 68^\circ\end{aligned}$$

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.....°

(Total for Question is 3 marks)

\*



Sand Tare points on the circumference of a circle, centre  $O$ .

$PT$  is a tangent to the circle.

*SOP* is a straight line.

Angle  $OPT = 32^\circ$

Work out the size of the angle marked  $x$ .

Give reasons for your answer.

$$\angle TSO = x$$

(Base CS of  $\text{isos } \Delta$ )

$$\angle PTO = 90^\circ \text{ (tgt - radius)}$$

$$x + x + 90 + 32 = 180 \quad (\angle \text{ sum of } \Delta)$$

$$2x + 122 = 180$$

$$2x = 180 - 122$$

$$2x = 58$$

$$x = 29^\circ$$

.....○

**(Total for Question is 5 marks)**

Q6.

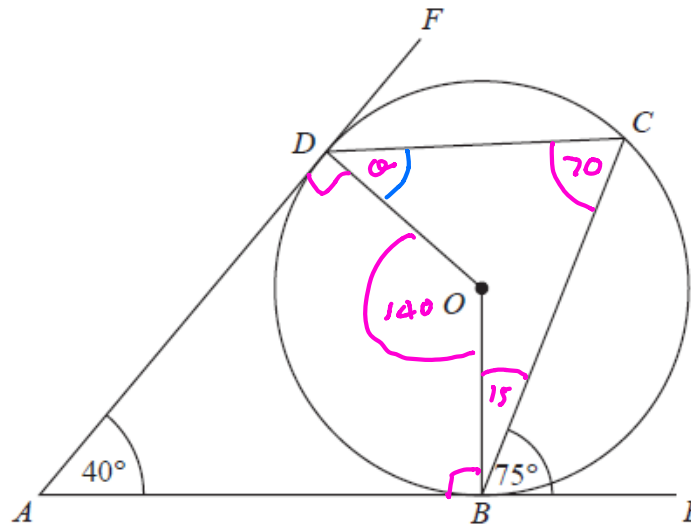


Diagram NOT  
accurately drawn

$B$ ,  $C$  and  $D$  are points on the circumference of a circle, centre  $O$ .  
 $ABE$  and  $ADF$  are tangents to the circle.

Angle  $DAB = 40^\circ$   
Angle  $CBE = 75^\circ$

Work out the size of angle  $ODC$ .

Quadrilateral  $ABCD$

$$\angle ODC = x = 55$$

$$40 + 90 + x + 70 + 15 + 90 = 360$$

$$x = 360 - 305 = 55^\circ$$

(Total for Question is 3 marks)

Q7.

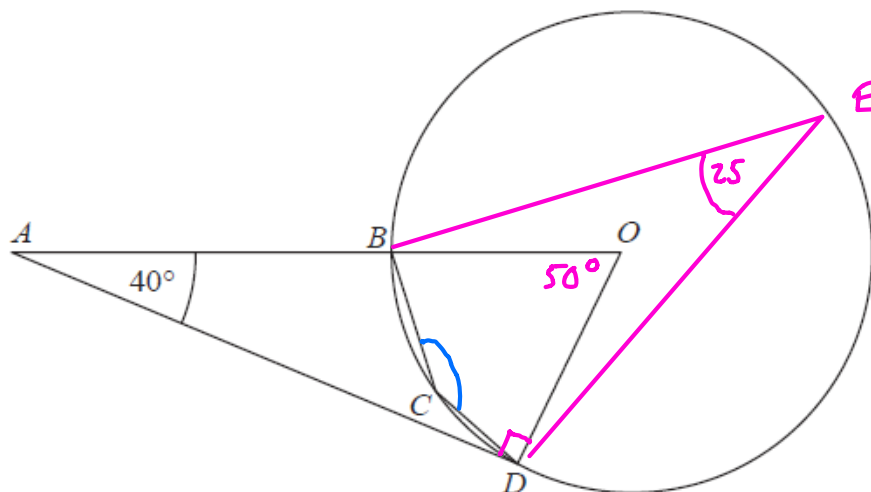


Diagram NOT  
accurately drawn

\* $B$ ,  $C$  and  $D$  are points on the circumference of a circle, centre  $O$ .  
 $ABO$  is a straight line.  
 $AD$  is the tangent at  $D$  to the circle.  
Angle  $DAO = 40^\circ$

( $\angle$  at centre twice  
 $\angle$  at circ)

$$\angle BCD = 155^\circ$$

(opp  $\angle$ s of cyclic quad  
add to  $180^\circ$ )

Work out the size of angle  $BCD$ .  
Give a reason for each stage of your working.

$$\angle BCD = 155^\circ$$

(Total for question = 5 marks)

Q8.

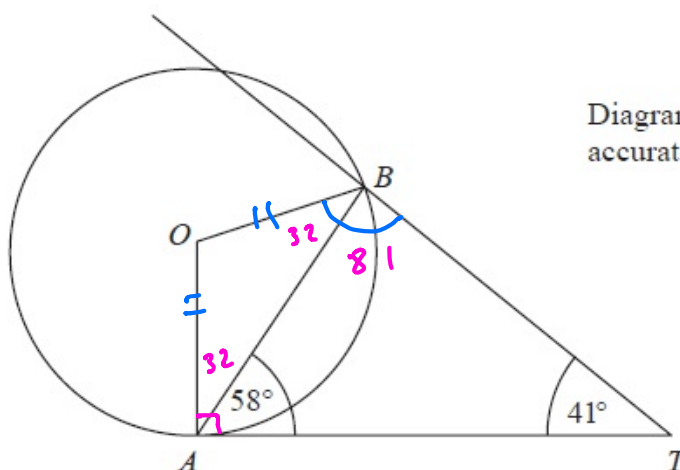


Diagram NOT  
accurately drawn

$$\begin{aligned}\angle OAT &= 90^\circ \\ &(\text{tgt} - \text{radius}) \\ \angle OAB &= 32^\circ \\ \angle OBA &= 32^\circ \\ &(\text{base angles of isos } \Delta) \\ \angle ABT &= 81^\circ \\ &(\angle \text{sum of } \Delta ABT)\end{aligned}$$

$A$  and  $B$  are points on the circumference of a circle, centre  $O$ .

$AT$  is a tangent to the circle.

Angle  $TAB = 58^\circ$ .

Angle  $BTA = 41^\circ$ .

Calculate the size of angle  $OBT$ .

You must give reasons at each stage of your working.

$$\begin{aligned}\angle OBT &= 32 + 81 \\ \angle OBT &= 113^\circ\end{aligned}$$

(Total for Question is 5 marks)

Q9.

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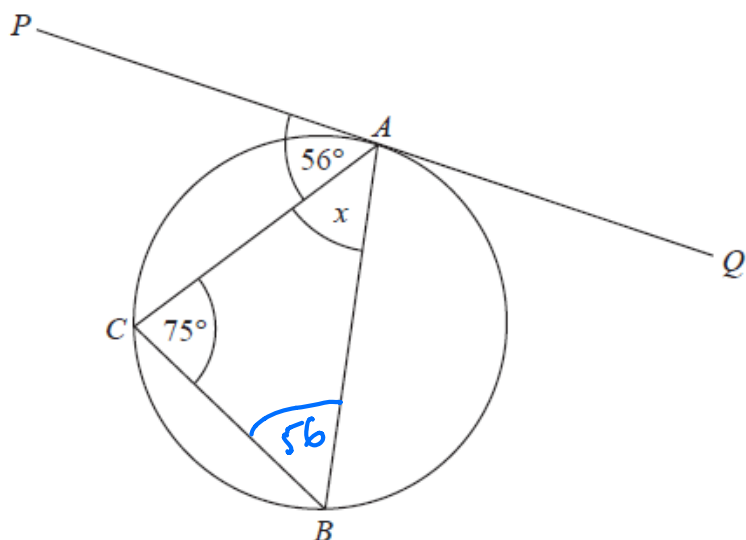


Diagram NOT  
accurately drawn

$$\angle ABC = 56^\circ$$

(alternate segment theorem)

$$x = 180 - 56 - 75$$

$$x = 49^\circ$$

$$(\angle \text{sum of } \triangle)$$

A, B and C are points on the circumference of a circle.  
The straight line PAQ is a tangent to the circle.  
Angle PAC =  $56^\circ$   
Angle ACB =  $75^\circ$

Work out the size of the angle marked x.  
Give reasons for each stage of your working.

$$\underline{x = 49^\circ}$$

(Total for question = 3 marks)

Q10.

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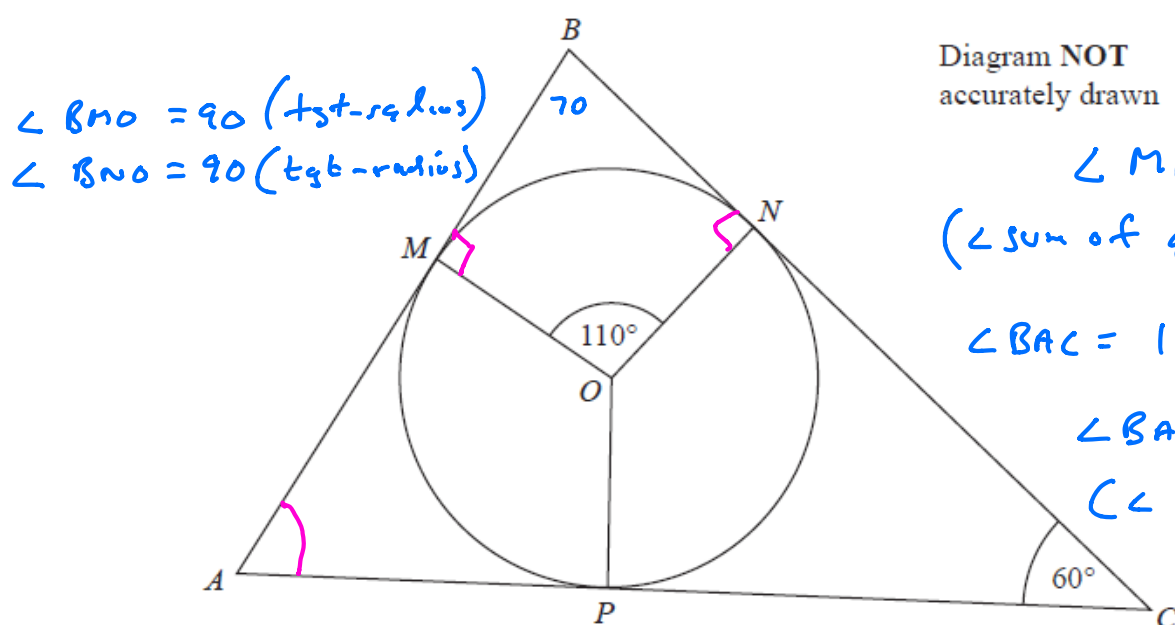


Diagram NOT  
accurately drawn

$$\angle BMO = 90 \text{ (tgt - radius)}$$

$$\angle BNO = 90 \text{ (tgt - radius)}$$

$$\angle MBN = 70^\circ$$

( $\angle$  sum of quad)

$$\angle BAC = 180 - 60 - 70$$

$$\angle BAC = 50^\circ$$

( $\angle$  sum of  $\triangle$ )

M, N and P are points on the circumference of a circle, centre O.  
AMB, BNC, and CPA are tangents to the circle.

$$\underline{\angle BAC = 50^\circ}$$

Angle  $MON = 110^\circ$

Angle  $BCA = 60^\circ$

Work out the size of angle  $BAC$ .

Give reasons for each stage of your working.

**(Total for question = 4 marks)**