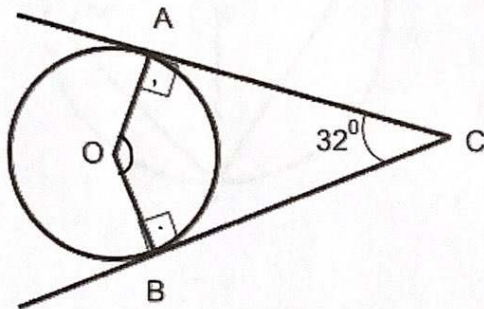




## QT Circle Theorems

1. A and B are points on a circle, centre O.  
AC and BC are tangents to the circle.  
Angle  $ACB = 32^\circ$   
Calculate the angle AOB.  
You must show your working.

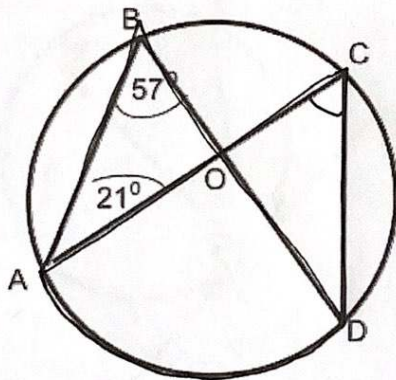


$$\text{Quadrilateral} = 360^\circ$$

$$\begin{array}{r} 90 + \\ 90 \\ 32 \\ \hline 212 \end{array} \qquad \begin{array}{r} 360 \\ 212 \\ \hline 148^\circ \end{array}$$

$$\angle AOB = 148^\circ$$

2. A, B, C and D are points on a circle.  
Find the size of angle ACD.  
Give a reason for your answer.



$$\angle ACB = 57^\circ$$

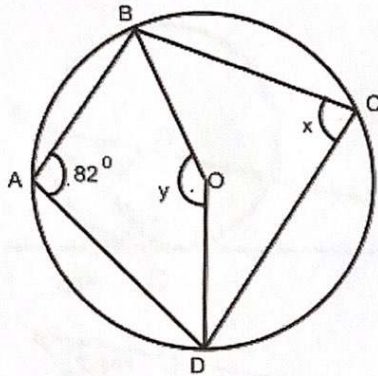
Angles are subtended by  
same arc AD



3. In the diagram, A, B, C and D are points on the circle centre O.

(a) Work out the size of the angle marked x. Give a reason for your answer.

(b) Work out the size of the angle marked y. Give a reason for your answer.



(a) Angle x

Opp. angles cyclic quadrilateral  
add to  $180^\circ$

$$\therefore x = 180 - 82 = \underline{\underline{98^\circ}}$$

(b) Angle y

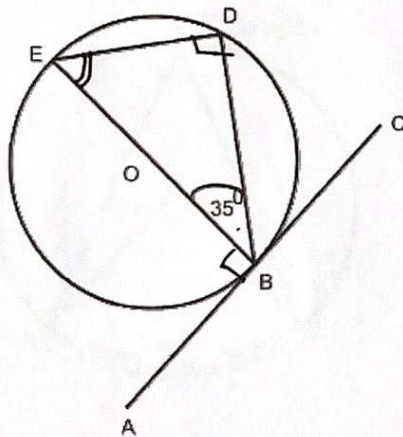
Angles at centre twice  
circumference

$$\therefore y = 2x = 2(98) = \underline{\underline{196^\circ}}$$

4. In the diagram, B, D and E are points on the circle with centre O. ABC is a tangent to the circle. BE is the diameter of the circle.

(a) Work out the size of angle ABD. Give a reason for your answer.

(b) Work out the size of angle DEB. Give a reason for your answer.



(a)  $\angle ASD = \angle ASB + 35^\circ$

$\therefore \angle ASB = 90^\circ$  (Tangent)

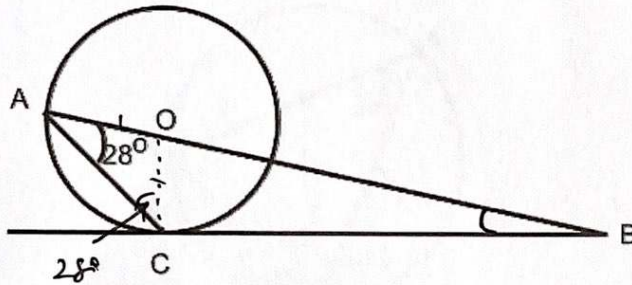
$\therefore \angle ASD = 90 + 35 = \underline{\underline{125^\circ}}$

(b)  $\angle EDB = 90^\circ$   
angles in a semicircle.

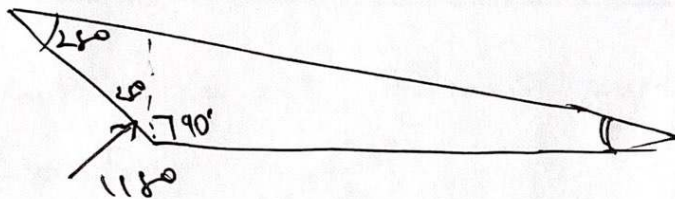
$\therefore \angle DEB = 180 - 90 - 35$   
 $= \underline{\underline{55^\circ}}$



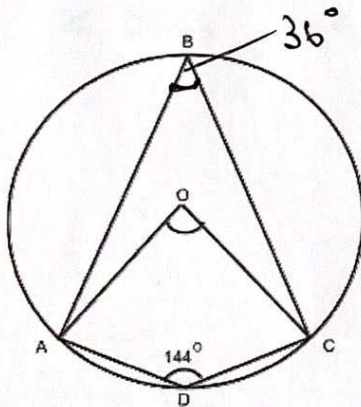
5. A and C are points on the circumference of a circle, centre O.  
BC is a tangent to the circle. Angle BAC =  $28^\circ$   
Find the size of angle ABC.  
You must show all your working.



$$\begin{aligned} \therefore \angle ABC &= 180 - 28 - 118 \\ &= \underline{\underline{34}} \end{aligned}$$



6. A, B, C and D are points on the circumference of a circle, centre O.  
Angle ADC =  $144^\circ$   
Work out angle AOC.  
You must show your working, and give a reason for each stage of your working.



Cyclic quad opp angles  
add to  $180^\circ$

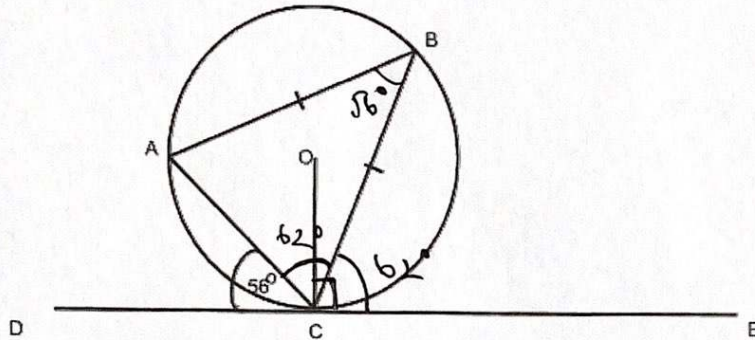
$$\therefore \angle ABC = 180 - 144 = 36^\circ$$

Angle at centre twice circumference

$$\begin{aligned} \angle AOC &= 2 \times 36 \\ &= \underline{\underline{72}} \end{aligned}$$

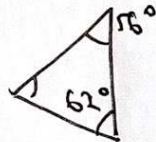


7. A, B and C are points on the circumference of a circle centre O. The line DCE is a tangent to the circle.  $AB = BC$ .  
Work out the size of the angle OCB.  
Give reasons for your answer.



$\angle ABC = 56^\circ$  Alternate segment theorem,

Isosceles



$$\angle BCE = 180^\circ - 56 - 62 = 62^\circ$$

$$\angle OCB = 90 - 62 = \underline{\underline{28^\circ}}$$