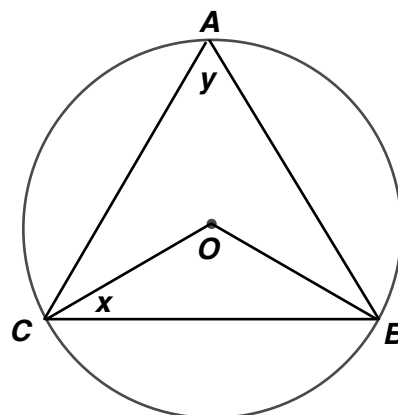


Circle Theorems Proof

Starter

1. O is the centre of the circle. Prove that $x + y = 90^\circ$.



Notes

Proof of angle at the centre is twice the angle at the circumference from the same chord.

E.g. 1 Use the diagram to prove that the angle at the centre is twice the angle at the circumference from the same chord. Let $\angle CAO = x$ and $\angle BAO = y$.

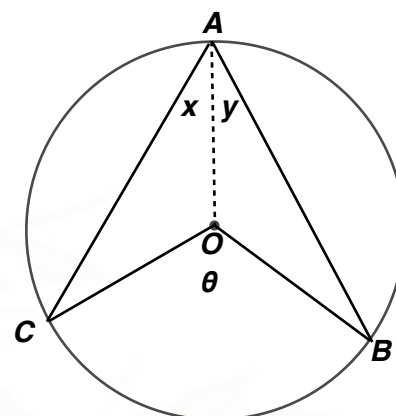
Hint: We need to prove that $\theta = \angle COB = 2x + 2y$

Working: Since $\triangle ACO$ is isosceles, $\angle ACO = x$.
So $\angle AOC = 180 - 2x$

Similarly, since $\triangle ABO$ is isosceles, $\angle ABO = y$.
So $\angle AOB = 180 - 2y$

There are 360° in a full circle so $\angle COB + \angle AOC + \angle AOB = 360^\circ$
Substituting gives $\angle COB + 180 - 2x + 180 - 2y = 360^\circ$
Rearranging gives $\angle COB = 2x + 2y$
 $= 2(x + y)$
 $= 2\angle CAB$

i.e. the angle at the centre is twice the angle at the circumference from the same chord.



- [Video: Angle in a semi circle proof](#)
- [Video: Angles at the centre and circumference proof](#)
- [Video: Angles at the circumference proof](#)
- [Video: Cyclic quadrilateral proof](#)
- [Video: Angle between radius and tangent proof](#)
- [Video: Alternate segment theorem proof](#)

[Solutions to Starter and E.g.s](#)

Exercise

- 9-1 class textbook: p85 E3.5 Qu 1-7, 8*
A*-G class textbook: p78 E3.5 Qu 1-7, 8*
9-1 homework book: p85 E3.5 Qu 1-5
A*-G homework book: p18 E3.5 Qu 1-4

[Homework book answers \(only available during a lockdown\)](#)