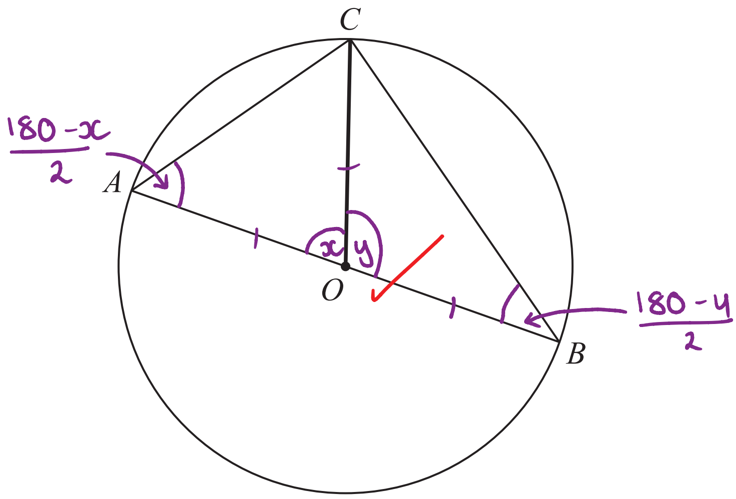
1.



A, *B* and *C* are points on the circumference of a circle, centre *O*.
AOB is a diameter of the circle.

Prove that angle *ACB* is 90°
You must **not** use any circle theorems in your proof.

Angles on straight line add to 180°

$\therefore x + y = 180°$

$2 \times \angle CAO + x = 180$
$(-x) \quad (-x)$
$2 \times \angle CAO = 180 - x$
$(\div 2) \quad (\div 2)$
$\angle CAO = \frac{180 - x}{2}$

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

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

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

$180 - \frac{1}{2}(x + y) + \angle ACB = 180$

If $x + y = 180$

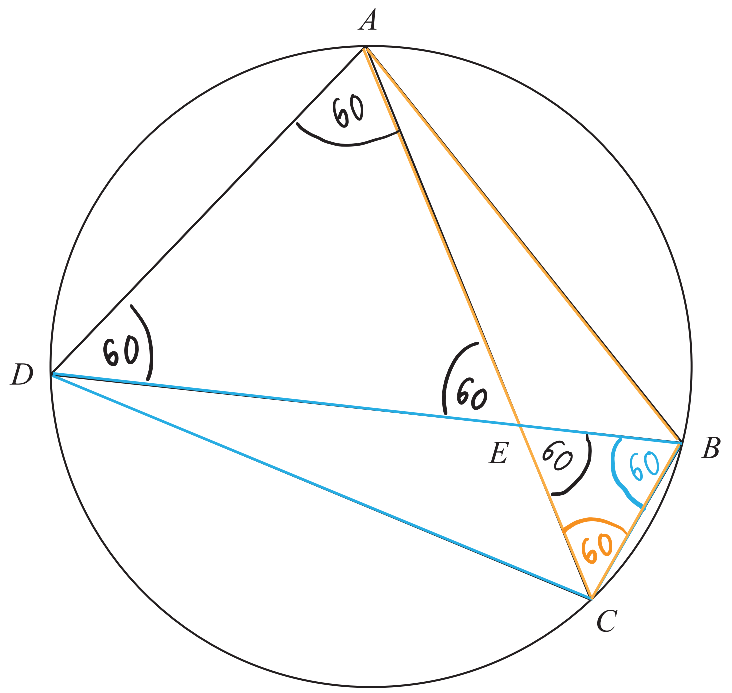
$180 - \frac{1}{2}(180) + \angle ACB = 180$

$180 - 90 + \angle ACB = 180$

$\angle ACB = 90°$

(Total for Question is 4 marks)

2. A, B, C and D are four points on a circle.



AEC and DEB are straight lines.

Triangle AED is an equilateral triangle. SSS, ASA, SAS, RHS.

Prove that triangle ABC is congruent to triangle DCB.

Line BC is shared by both triangles. (1)

AED is equilateral $\therefore \angle AED = \angle ADE = \angle DAE = 60^\circ$ (1)

$\angle DAC = \angle DBC$ because angles in the same segment are equal.

$\angle ADB = \angle ACB$ because angles in the same segment are equal.

$\therefore \angle ACB = \angle DBC$ (1)

$\angle CEB = 60 \therefore \Delta EBC$ is equilateral

$AC = AE + EC = DE + EB = DB$. $\therefore AC = DB$ (1)

$\boxed{\Delta ABC \text{ is congruent to } \Delta DCB \text{ because they meet the SAS criteria.}}$

(Total for Question is 4 marks)