

Q) In the figure below E is the mid-point of the arc \widehat{ABC} . and the segment ED is \perp to chord BC at D. Length of the chord AB is 5cm and that of segment BD is 3cm. Determine the length of DC.

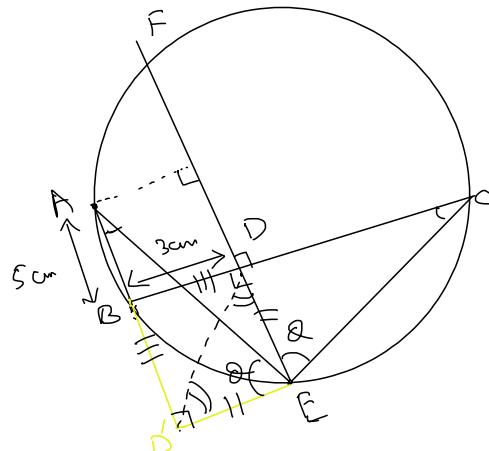
Ans:- $\angle AEC = \angle ABC$, $AE = EC$

Construction
EDC is rotated about E such that EC falls on AE D falls on D'.

$$\angle D'AE = \angle DCE = \angle BCE = \angle BAE \\ \Rightarrow D', B, A \text{ are collinear}$$

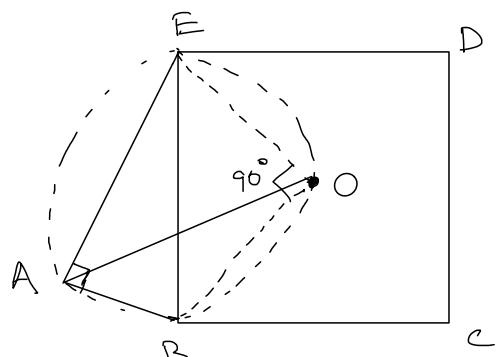
$$\Rightarrow DC = AD' \quad \text{and } \angle BDE = \angle BD'E = 90^\circ \\ \text{Also, } D'E = DE \quad \Rightarrow BD = BD' = 3\text{cm} \quad (\text{as } \angle D'DE = \angle DDE' \text{ and } D'D'E \text{ is isosceles } \triangle)$$

$$\Rightarrow DC = AD' = AB + BD' = AB + BD = (5 + 3)\text{ cm} = 8\text{ cm}$$



Q) Let ABCDE be a convex pentagon such that \widehat{BCDE} is a square with centre O and $\angle A = 90^\circ$. Prove that \overline{AO} bisects $\angle BAE$.

Ans:- $ABOE$ is a cyclic quadrilateral
 $\Rightarrow \angle OEB = \angle OAB = 45^\circ$
 $\Rightarrow \angle OAE = \angle OBE = 45^\circ$
 $\Rightarrow \overline{AO}$ bisects $\angle BAE$



Homework

Q) Let ABCD be a cyclic quadrilateral. Let I_1 and I_2 be two minor non-overlapping triangles drawn

→ Q) Let $ABCD$ be a cyclic quadrilateral. Let I_1 and I_2 be the incentres of $\triangle ABC$ and $\triangle DBC$ respectively. Prove that $I_1 I_2 \perp BC$ is also cyclic.