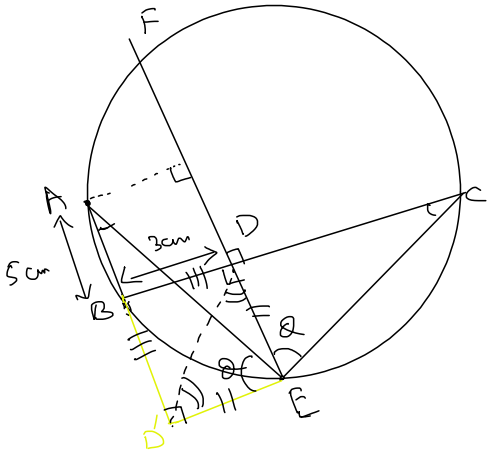
Q) In the figure below E is the midpoint of the arc ABEC and the segment ED is ⊥ to chord BC at D. Length of the chord AB is 5 cm and that of segment BD is 3 cm. Determine the length of DC.



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

Construction: ΔEDC 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 are collinear

$\Rightarrow DC = AD'$ and $\angle BDE = \angle BD'E = 90^\circ$

Also, $D'E = DE$ $\Rightarrow BD = BD' = 3$ cm (as $\angle D'DE = \angle DD'E$ as $DD'E$ is isosceles Δ)

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

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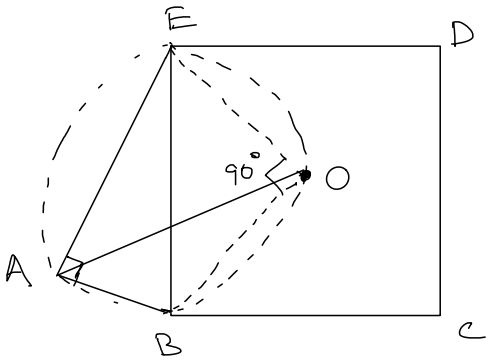
Q) Let ABCDE be a convex pentagon such that BCDE is a square with centre O and $\angle A = 90^\circ$. Prove that $\overline{AO}$ bisects $\angle BAE$.



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 the [illegible] of ΔABC and ΔDBC respectively. Prove

Q) Let ABCD be a cyclic quadrilateral. Let I_1 and I_2 be the incentres of ΔABC and ΔDBC respectively. Prove that $I_1 I_2 BC$ is also cyclic.