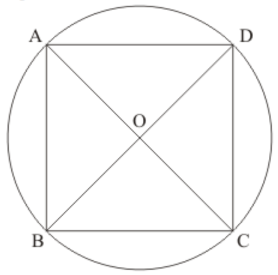
Circles Ex 16.5 Q22

Answer :

We have to prove that if a pair of opposite sides of a cyclic quadrilateral is equal, then its diagonals are equal.



Let AD = BC

Since, AD = BC, so

$\overset{\frown}{AD} = \overset{\frown}{BC}$

$\Rightarrow \overset{\frown}{AD} + \overset{\frown}{CD} = \overset{\frown}{BC} + \overset{\frown}{CD}$

$\Rightarrow \overset{\frown}{ADC} = \overset{\frown}{BCD}$

$\Rightarrow AC = BD$

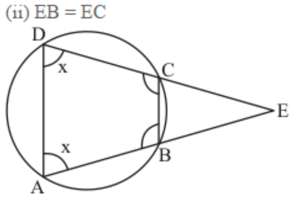
Hence, if a pair of opposite sides of a cyclic quadrilateral is equal, then its diagonals are equal.

Circles Ex 16.5 Q23

Answer :

(i) If ABCD is a cyclic quadrilateral in which AB and CD when produced meet in E such that EA= ED, then we have to prove the following, AD || BC

(ii) EB = EC



Solution:

(i) It is given that AE = ED, so

$\angle DAB = \angle ADE = x$

Since, ABCD is cyclic, so

$x + \angle ABC = 180 \Rightarrow \angle DAB = 180 - x$

And; $x + \angle BCD = 180 \Rightarrow \angle BCD = 180 - x$

Now,

$\angle DAB + \angle ABC = x + 180 - x = 180$

Therefore, the adjacent angles $\angle DAB$ and $\angle ABC$ are supplementary

Hence, AD || BC

(ii) Since, AD and BC are parallel to each other, so,

$\angle ECB = \angle ADC = x$ (corresponding angles)

And,

$\angle EBC = \angle ADC$ (corresponding angles)

$\Rightarrow \angle ECB = \angle EBC$

Therefore, triangle ECB is isosceles.

Hence, EC= EB

*********** END **********