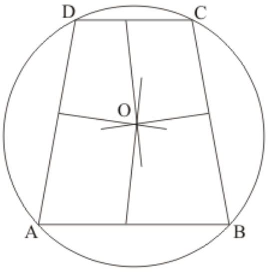
Circles Ex 16.5 Q19

Answer :

Here, ABCD is a cyclic quadrilateral; we have to prove that the perpendicular bisectors of all the sides are concurrent.

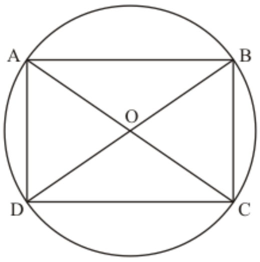


Let O be the center of the circle.
Sides AB, BC, CD and Ad are four chords of the circle, and we know that the perpendicular bisector of any chord passes through the center of the circle, therefore, all the perpendicular bisectors of AB, BC, CD and AD will pass through the center O.
Hence, all the perpendicular bisectors of four sides of cyclic quadrilateral are concurrent.

Circles Ex 16.5 Q20

Answer :

Here, ABCD is a cyclic rectangle; we have to prove that the center of the center of the corresponding circle is the intersection of the diagonals.

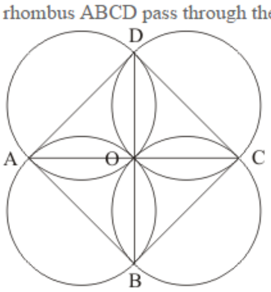


Let O be the center of the circle.
We know that the angle formed in semi circle is of 90°.
Since, ABCD is a rectangle, so
$\angle ADC = \angle DCB = \angle ABC = \angle BAD = 90^0$
Therefore, AC and BD are diameter of the circle.
We also know that the intersection of any two diameter is the center of the circle.
Hence, the center of the circle circumscribing the cyclic rectangle ABCD is the point of intersection of its diagonals.

Circles Ex 16.5 Q21

Answer :

Here, ABCD is a rhombus; we have to prove the four circles described on the four sides of any rhombus ABCD pass through the point of intersection of its diagonals AC and BD.



Let the diagonals Ac and BD intersect at O.
We know that the diagonals of a rhombus intersect at right angle.

Therefore,

$\angle AOB = 90^0$

$\angle BOC = 90^0$

$\angle COD = 90^0$

$\angle AOD = 90^0$

Now, $\angle AOB = 90$ means that circle described on AB as diameter passes through O

Similarly the remaining three circles with BC, CD and AD as their diameter will also pass through O

Hence, all the circles with described on the four sides of any rhombus ABCD pass through the point of intersection of its diagonals AC and BD.

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