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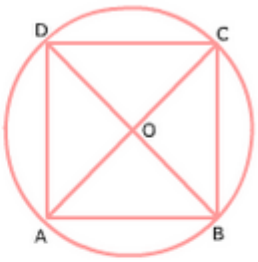
Subject:Mathematics

Class-IX ST:-Prabhat Ranjan

Solve this question-----

If diagonals of a cyclic quadrilateral are diameters of the circle through the vertices of the quadrilateral, prove that it is a rectangle.

Solution:



In Δ OAB and Δ OCD,
OA = OC | Radii of a circle
OB = OD | Radii of a circle
∠ AOB = ∠ COD | Vertically Opposite Angles
D OAB @ D OCD | SAS Rule
AB = CD | CPCT
⇒ arc AB=arc CD ..(1)
Similarly, we can show that
arc AD = arc CB ….(2)
Adding (1) and (2), we get
Arc AB + Arc AD = Arc CD + Arc CB
⇒ Arc BAD = Arc BCD
⇒ BD divides the circle into two equal parts (each a semicircle)

∴ ∠ A = 90°, ∠ C = 90° | Angle of a semi-circle is 90°
Similarly, we can show that
∠ B = 90°, ∠ D = 90°
∠ A = ∠ B = ∠ C = ∠ D = 90°
∴ ABCD is a rectangle.