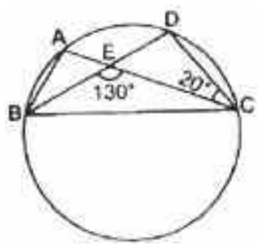
CLASS NOTES

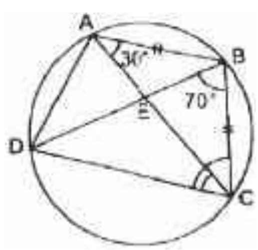
Class: IX	Topic: Circles EX.10.5
Subject: MATHEMATICS	

Q.5 In the figure, A, B, C and D are four points on a circle. AC and BD intersect at a point E such that ∠BEC = 130° and ∠ECD = 20°.
Find ∠BAC.



Solution: In ΔCDE,
Exterior ∠BEC = {Sum of interior opposite angles}
[BD is a straight line.]
130° = ∠EDC + ∠ECD
130° = ∠EDC + 20°
⇒ ∠EDC = 130° − 20° = 110°
⇒ ∠BDC = 110°
Since, angles in the same segment are equal.
∠BAC = ∠BDC
⇒ ∠BAC = 110°

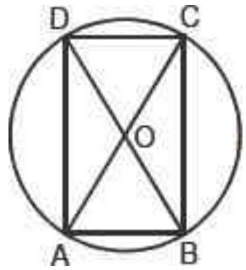
Q.6 ABCD is a cyclic quadrilateral whose diagonals intersect at a point E. If ∠DBC = 70°, ∠BAC is 30°, find ∠BCD. Further, if AB = BC, find ∠ECD.



Solution: ∠BAC = ∠BDC
⇒ 30° = ∠BDC
∠DBC = 70° (given)
In ΔBCD
∠BCD + ∠DBC + ∠CDB = 180° (ASP)
⇒ ∠BCD + 70° + 30° = 180°
⇒ ∠BCD = 180° − 70° − 30° = 80°
Now, in ΔABC,
AB = BC
⇒ ∠BCA = ∠BAC [Angles opposite to equal sides of a triangle are equal]
⇒∠BCA = 30°
Now, ∠BCA = ∠ECD = ∠BCD
⇒ 30° + ∠ECD = 80°
⇒ ∠ECD = 80° − 30° = 50

Q.7 If diagonals of a cyclic quadrilateral are diameters of the circle through the vertices of the quadrilateral, prove that it is a rectangle.

Solution:



AC and BD are diameters.

∴ AC = BD

Since a diameter divides a circle into equal parts.

∠ABC = 90°

∠BCD = 90°

and ∠CDA = 90°

Now, in right ΔABC and right ΔBAD,

AC = BD [From (1)]

AB = AB [Common]

∴ ABC ≅ ΔBAD [RHS criterion]

⇒ BC = AD [c.p.c.t.]

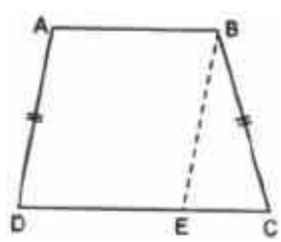
Similarly, AB = CD

Thus, the cyclic quadrilateral ABCD is such that its opposite sides are equal and each of its angle is right angle.

Q.8 If the nonparallel sides of a trapezium are equal, prove that it is cyclic.

Solution: We have a trapezium ABCD such that AB || CD and AD = BC.

Let us draw BE || AD such that ABED is a parallelogram.



∵The opposite angles of a parallelogram are equal.

∴ ∠BAD = ∠BED ... (1)

and AD = BE [Opposite sides of a parallelogram] ... (2)

But AD = BC [Given] ... (3)

∴ From (2) and (3), we have

BE = BC

⇒ ∠BEC = ∠BCE [Angles opposite to equal sides of a triangle Δ are equal] ... (4)

Now, ∠BED + ∠BEC = 180° [Linear pairs]

⇒ ∠BAD + ∠BCE = 180° [Using (1) and (4)]

i.e., A pair of opposite angles of quadrilateral ABCD is 180°.

∴ ABCD is cyclic.

⇒ The trapezium ABCD is a cyclic.

ASSIGNMENT : PRACTICE SIMILAR SUMS FROM R.S.AGRAWAL.

NOTE: THE STUDENTS ARE ADVISED TO WRITE THIS CONTENT IN THEIR MATHS FAIR NOTEBOOK.

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