ACTIVITY

Property Of Cyclic Quadrilateral

Objective

To verify that the opposite angles of a cyclic quadrilateral are supplementary by paper folding activity.

Material Required

White paper sheet, compass, glazed papers, pencil, a pair of scissors, gluestick.

Theory

1. A quadrilateral whose all four vertices lies on the circle is known as cyclic quadrilateral.
2. Concept of opposite angles of a quadrilateral.
3. Concept of Supplementary angles.

Procedure

1. Draw a circle of radius 2 cm on a white glazed paper with centre O.
2. Cut this circle with centre O and draw one more circle of same radius.
3. Take any four points A, B, C, D on the circumference of both the circles.
4. Join AB, BC, CD, DA by paper folding on both the circles.

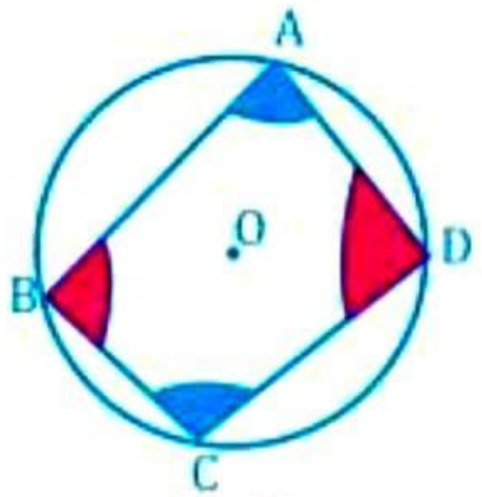


fig. (i)

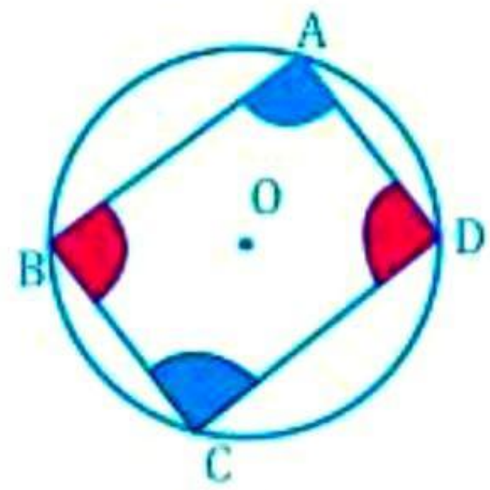


fig. (ii)

5. We get a cyclic quadrilateral ABCD on both the circles [fig. (i) and fig. (ii)].Take ∠A and ∠C of blue color and ∠B and ∠D of pink color in both circles.
6. From the second circle, using transparent sheets makes cut outs of ∠A, ∠B, ∠C, ∠D. [fig. (iii)]. Take ∠A and ∠C of blue color and ∠B and ∠D of pink color.

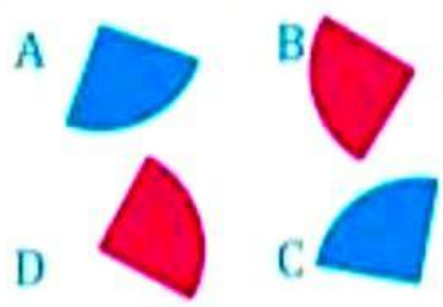


fig. (iii)

7. Make a straight line on a white paper sheet. Place cut outs of ∠A and ∠C adjacent to each other on a straight line and paste them [fig. (iv)].
8. Take cut outs of ∠B and ∠D and place them adjacent to each other on another straight line and paste

them [fig. (iv)].

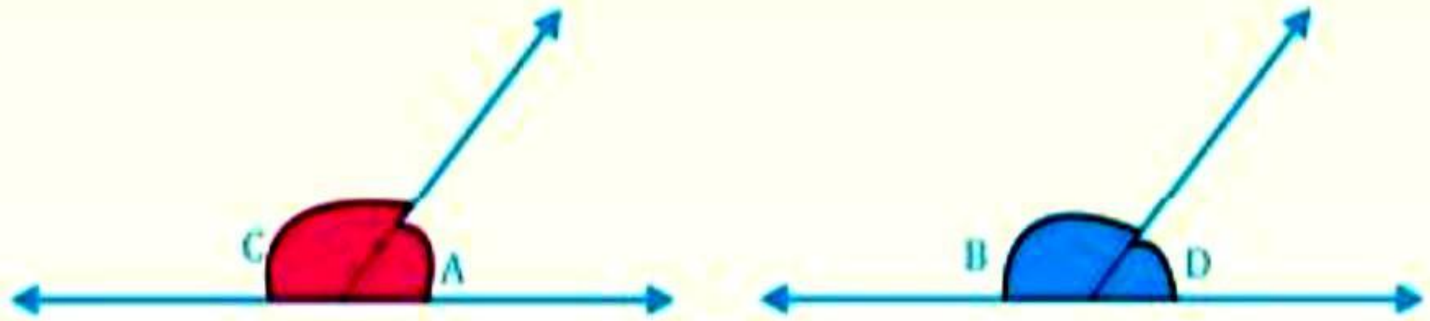


Fig. (iv)

Observation

As $\angle A$ and $\angle C$ forms a linear pair.

$\therefore$ $\angle A + \angle C = 180^\circ$

Similarly, $\angle B + \angle D = 180^\circ$

Result

Hence, it is verified that in a cyclic quadrilateral, the sum of opposite angles is 180°.

Learning Outcome

If a cyclic quadrilateral is a parallelogram, then it becomes a rectangle, this can be proved by the paper folding and cutting method.

Activity Time

Verify that the exterior angle of a cyclic quadrilateral is equal to the opposite interior angle.

Viva Voce

Q1. What do you understand by the term a cyclic quadrilateral?

Ans: A quadrilateral having all the vertices on the boundary of the circle is called a cyclic quadrilateral.

Q2. What is the type of quadrilateral formed by the internal angle bisectors of cyclic quadrilateral?

Ans: Cyclic quadrilateral.

Q3. If one of the angles of a cyclic quadrilateral is 40°, then what will be the value of its opposite angle?

Ans: 140°

Q4. If a cyclic quadrilateral is a parallelogram, then what is the type of parallelogram?

Ans: Rectangle.

Q5. Is the sum of adjacent angles of a cyclic quadrilateral 180° ?

Ans: No, only the sum of opposite angles of a cyclic quadrilateral is 180°.

Q6. What is the name of quadrilateral if each pair of opposite angles is supplementary?

Ans: Cyclic quadrilateral.

Q7. Which property has to be added in a trapezium for making it a cyclic quadrilateral?

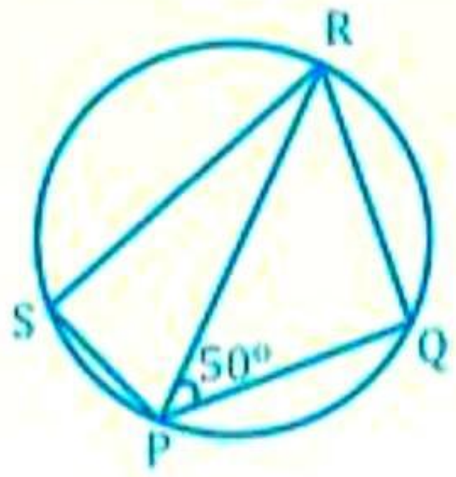
Ans: Non-parallel sides of a trapezium should be equal.

Q8. What is the sum of each pair of opposite angles of a cyclic quadrilateral?

Ans: 180°

Multiple Choice Questions

Q 1. ABCD is a cyclic quadrilateral in which AC and BD are its diagonals. If $\angle DBC = 59^\circ$ and $\angle BAC = 45^\circ$, then $\angle BCD = ?$

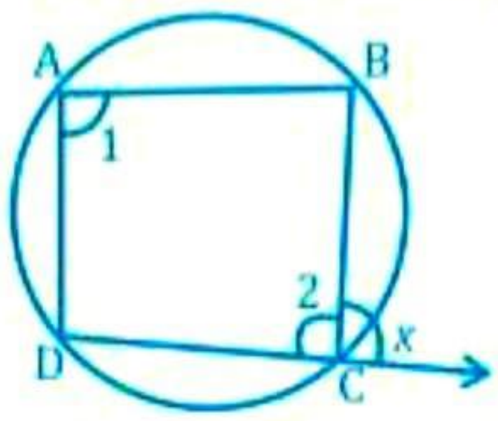


(a) 60° (b) 70° (c) 76° (d) 75°

Q 2. ABCD is a cyclic quadrilateral in which AC and BD are its diagonals. If $\angle DBC = 50^\circ$ and $\angle BAC = 40^\circ$, then $\angle BCD = ?$

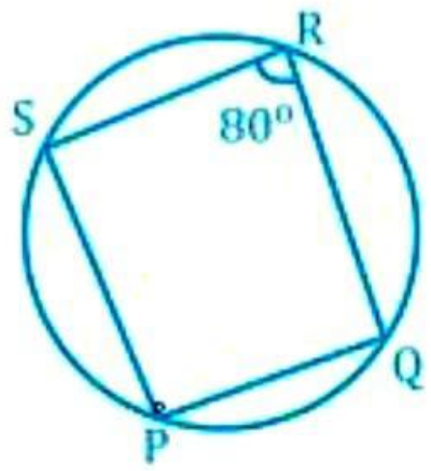
(a) 60° (b) 90° (c) 75° (d) 80°

Q 3. Find the value of x if ABCD is a cyclic quadrilateral if $\angle 1 : \angle 2 = 3 : 6$.



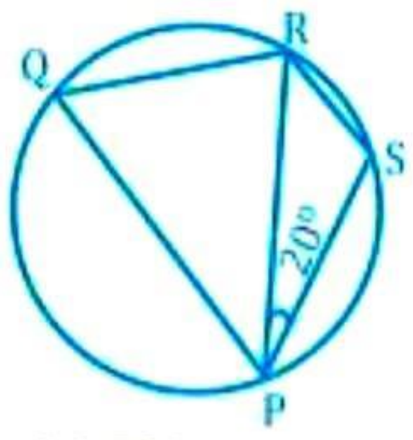
(a) 90° (b) 45° (c) 60° (d) 20°

Q 4. What is the value of $\angle PRQ$ if $\angle PSR : \angle PQR = 1 : 2$?



(a) 50° (b) 10° (c) 90° (d) 45°

Q 5. What is the value of $\angle PQR$ if PQRS is cyclic quadrilateral and PS = SR?



(a) 90° (b) 70° (c) 40° (d) 30°

Q 6. Find the value of $\angle PQR$ if PS ∥ RQ and PQRS is cyclic quadrilateral.

(a) 45° (b) 50° (c) 80° (d) 90°

Q 7. ABCD is a cyclic trapezium in which AD ∥ BC, if $\angle B = 70°$, find the value of $\angle A$:

(a) 70° (b) 110° (c) 35° (d) None of these

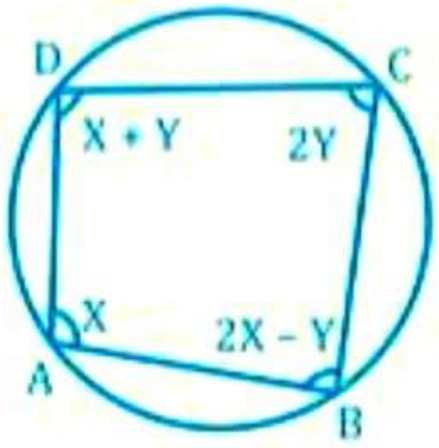
Q 8. If ABCD is a cyclic quadrilateral, in which $\angle DBC = 70°, \angle BAC = 40°$, find $\angle BCD$:

(a) 100° (b) 40° (c) 70° (d) None of these

Q 9. ABCD is a cyclic quadrilateral. Side CD is produced on both sides such that $\angle BCP = 110°$, the value of $\angle A$ is:

(a) 100° (b) 110° (c) 80° (d) None of these

Q 10. Find the value of x and y if ABCD is cyclic quadrilateral.



(a) 60°, 60° (b) 50°, 60° (c) 45°, 45° (d) 80°, 90°

ANSWER KEY

1.(c)	2.(b)	3.(d)	4.(b)	5.(c)	6.(a)	7.(b)	8.(c)	9.(c)	10.(a)