



MATHS

BOOKS - CALCUTTA BOOK HOUSE

MATHS (BENGALI ENGLISH)

**THEOREMS RELATED TO CYCLIC
QUADRILATERAL**

Example Very Short Answer Type Questions Mcq

1. In the adjoining figure, O is the centre of the circle and AB is one of its diameter . If $\angle ADC = 120^\circ$, then the value of $\angle BAC$ is

A. 50°

B. 60°

C. 30°

D. 40°

Answer:



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2. In the adjoining figure, O is the centre of the circle and AB is a diameter. ABCD IS A CYCLIC QUADRILATERAL . If

$\angle ABC = 65^\circ$, $\angle DAC = 40^\circ$, then the value of $\angle BCD$ is

A. 75°

B. 105°

C. 115°

D. 80°

Answer:



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3. In the adjoining figure, O is the center of the circle and AB is one of its diameters. $ABCD$ is a cyclic quadrilateral in which $AB \parallel DC$ and if $\angle BAC = 25^\circ$, then the value of $\angle DAC$ IS

A. 50°

B. 25°

C. 130°

D. 40°

Answer:



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4. In the adjoining figure, ABCD is a cyclic quadrilateral. BA is produced to F. If $AE \parallel CD$, $\angle ABC = 92^\circ$ and $\angle FAE = 20^\circ$, then the value of $\angle BCD$ is

A. 20°

B. 88°

C. 108°

D. 72°

Answer:



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Write True Or False

1. In the adjoining figure AD and BE are the perpendiculars on side BC and CA respectively of the $\triangle ABC$, Then , A, B, D, E are concyclic.



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2. In $\triangle ABC$, $AB = AC$, BE and CF are the bisectors of the angles $\angle ABC$ and $\angle ACB$ and they intersect AC and AB at the points E and F respectively. Then four points B, C, E, F are not concyclic.



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3. If the opposite angles of any quadrilateral be supplementary, then the vertices of the quadrilateral are concyclic.



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4. If one side of a cyclic quadrilateral is produced , then the external angle thus obtained is not equal to its internally opposite angle.



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Fill In The Blanks

1. All angles in the same segment are.



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2. If the line segment joining two points subtends equal angles at two other points on the same side, then the points are



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3. If two angles on the circle formed by two arcs are equal , then the lengths of arcs are



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4. The opposite angles of a cyclic quadrilateral are



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5. If the four vertices of a quadrilateral lie on the circumference of a circle, then it is called a quadrilateral.



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6. If the degree measure of the sum of any two opposite angles of a quadrilateral is , then it is a cyclic quadrilateral.



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Example Short Answer Type Questions

1. In the adjoining figure, if $\angle BAD = 60^\circ$, $\angle ABC = 80^\circ$, then find the values of $\angle DPC$ and $\angle BQC$.



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2. In the adjoining figure, two circles with centres P and Q intersect each other at the points B and C, ACD is a line segment. If

$\angle ARS = 150^\circ$ and $\angle BQC = x^\circ$, then find the value of x .



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3. In the adjoining figure, two circles intersect each other at the points P and Q . If $\angle QAD = 80^\circ$ and $\angle PDA = 84^\circ$, then find the value of $\angle QBC$ and $\angle BCP$



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4. In the adjoining figure, O is the center of the circle and AC is a diameter of it. If $DC \parallel EB$, $\angle AOB = 80^\circ$ and $\angle ACE = 10^\circ$, then find the value of $\angle BED$.



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5. In the adjoining figure, O is the center of the circle and AB is a diameter. If $\angle AOD = 140^\circ$ and $\angle CAB = 50^\circ$, then find value of $\angle BED$





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Example Long Answer Type Questions

1. In the adjoining figure, the diagonals of the cyclic quadrilateral PQRS intersect each other at the point X in such a way that $\angle PRS = 65^\circ$ and $\angle ROS = 45^\circ$. Find the values of $\angle SQP$ and $\angle RSP$.



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2. The side AB of the cyclic quadrilateral ABCD is extended to X. If $\angle XBC = 82^\circ$ and $\angle ADB = 47^\circ$ Find the value of $\angle BAC$.



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3. If the length of diagonal of a square is $\sqrt{32}$ cm, then calculate the area of the square.



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4. Two circles intersect each other at the points P and Q. Two straight lines through P and Q intersect on circle at the points A and C and the other circle at B and D . Prove that $AC \parallel BD$.



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5. Two straight lines are drawn through any point X and exterior to a circle to intersect the circle at points A, B and points C, D

respectively . Prove that ΔXAC and ΔXBD are equiangular.



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6. Two circles intersect each other at the points G and H . A straight line is drawn through the point G which intersect two circles at the points P and Q and the straight line through the point H parallel to PQ intersects the two circles at the points R and S . Prove that $PQ=RS$.



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7. In triangle ABC , $AB = AC$ and E is any point on the extended BC . If the circumcircle of $\triangle ABC$ intersects AE at the point D then that $\angle ACD = \angle AEC$.



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8. $ABCD$ is a cyclic quadrilateral. The chord DE is the external bisector of $\angle BDC$. Prove that

AE (or extended AE), is the external bisector of $\angle BAC$.



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9. BE and CF are perpendicular on sides AC and AB of triangles ABC respectively . Prove that four points B , C ,E , F are concyclic. Also prove that the two angles of each of $\triangle AEF$ and $\triangle ABC$ are equal.



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10. ABCD is parallelogram A circle passing through the points A and B intersect the sides AD and BC at the points E and F respectively . Prove that the four points E, F , C ,D are concyclic.



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11. ABCD is a cyclic quadrilateral. The two sides AB and CD are produced to meet in the point P and other two sides AD and BC are produced to meet in the point R . The two circumcircle of

ΔBCP and ΔCDR intersect at the point T .

Prove that points P , T , R are collinear.



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12. O is the orthocentre of the ΔABC . Prove that O is also the incentre of its pedal triangles .



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13. ABCD is a cyclic quadrilateral such that AC bisects $\angle BAD$. AD is produced to E in such a way that $DE = AB$. Prove that $CE = CA$.



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14. In two circles, one circle passes through the centre O of the other circle and they intersect each other at the points A and B. A straight line passing through A intersects the circle passing through O at the point P and

the circle with centre at O at the point R . BY joining P , B and R , B prove that $PR = PB$.



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15. Prove that cyclic parallelogram must be a rectangle.



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16. Prove that any four vertices of regular pentagon are concyclic .



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17. $ABCD$ is a cyclic quadrilateral. The side BC of it is extended to E . Prove that the two bisectors of $\angle BAD$ and $\angle DCE$ meet on the circumference of the circle.



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18. AB is a diameter of a circle. PQ is such a chord of the circle that it is neither a diameter

of the circle nor a interceptor of AB. By joining the points A, P and B, Q it is found that ABQP is a quadrilateral of wich $\angle BAP = \angle ABQ$. Prove that ABQP is a cyclic trapezium.



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19. ABCD is a cyclic quarilateral. The bisectors of $\angle a$ and $\angle C$ in tersect the circle at the points E and F respectively . Prove that EF is a diameter of the circle.



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20. $\triangle ABC$ is an acute angle triangle inscribed in a circle in a circle .AD is a diameter of the circle . Two perpendiculars BE and CF are drawn from B and C to AC and AB respectively , which intersect each other at the point G . Prove that BDCG is a parallelogram.



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Exercise 3 Very Short Answer Type Questions Mcq

1. If the length of diagonal of a square is $\sqrt{72}$ cm, then calculate the area of the square.



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2. If the length of diagonal of a square is $\sqrt{18}$ cm, then calculate the area of the square.



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3. If the length of diagonal of a square is $7\sqrt{2}$ m, then calculate the area of the square.



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4. If the length of diagonal of a square is $2\sqrt{2}$ m, then calculate the area of the square.



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Short Answer Type Question S A

1. If the length of diagonal of a square is $12\sqrt{2}m$, then calculate the area of the square.



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2. If the length of diagonal of a square is $\sqrt{12}$ cm, then calculate the area of the square.



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Long Answer Type Questions L A

1. In a cyclic quadrilateral, the ratio of three consecutive angle is $1 : 2 : 3$ Find the value of first and third angles.



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2. Prove that a cyclic parallelogram must be a rectangle.



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3. ABCD is a cyclic trapezium in which the sides AD and BC are parallel . If $\angle ABC = 75^\circ$ then find the value of $\angle BCD$.



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4. Prove that the slant sides of a cyclic trapezium are equal.



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5. ABCD is a cyclic quadrilateral in which $\angle C = 2\angle A$ and $\angle B = 3\angle D$. Find the values of the internal angles of the quadrilateral.



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6. In the cyclic quadrilateral ABCD, $AB = CD$.
Prove that $AC = BC$



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7. If in the cyclic quadrilateral $AB||CD$, then prove that $AD =BC$ and $AC=BD$.



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8. Prove that the bisectors of the four angles of quadrilateral produce jointly a cyclic quadrilateral.



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9. Prove that an isosceles trapezium is always cyclic.



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10. ABCD is a cyclic quadrilateral. The side BC is extended to E. The bisectors of the angles $\angle BAD$ and $\angle DCE$ intersect at the point P. Prove that $\angle ADC = \angle APC$.



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11. Two opposite angles of the quadrilateral ABCD are supplementary to each other and AC bisects the angle $\angle BAD$, Prove that $BC=CD$.



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12. Prove that the internal bisector of any angle of a cyclic quadrilateral and the external bisector of its opposite angle intersect each other on the circumference of the circle.



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