MATHS

BOOKS - CALCUTTA BOOK HOUSE MATHS (BENGALI ENGLISH)

THEOREMS RELATED TO ANGLES IN A CIRCLE

Examples Very Short Answer Type Questions Mcqs

1. In the given figure, O is the centre of the circle and PQ is one of its diamtere, then the value of x is

A. 140

B. 40

C. 80

D. 20

Answer: D

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2. In the given, if O is the centre of the circle, then the value of x is

A. 70

B. 60

C. 40

D. 200

Answer: A

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3. In the given figure, If O is the centre of the circle BC be any diameter of it then the value of x is

A. 60

B. 50

C. 100

D. 80

Answer: B

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4. O is the circumecentre of triangle ABC. If $\angle OAB = 50^\circ$, ten the value of $\angle ACB$ is

A. 50°

B. 100°

C. 40°

D. 80°

Answer: C

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5. In the given figure if O is the center of the cricle then the vlaue of $\angle POR$ is

A. 20°

B. 40°

C. 60°

D. 80°

Answer: C

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6. In the adjoining figure,O is centre of the circle , If $\angle ACB = 30^\circ, \angle ABC = 60^\circ, \angle DAB = 35^\circ$ and $\angle DBC = x^\circ$, then the value of x is

A. 35

B. 40

C. 65

D. 55

Answer: D

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7. In the adjoining firgure, O is the centre of the circle, if $\angle BAD = 65^\circ$, $\angle BDC = 45^\circ$ then the value of $\angle CBD$ is

A. 65°

B. 45°

C. 40°

D. 20°

Answer: D

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8. In the adjoining figure, O is the centre of the circle. If $\angle AEB = 110^\circ$, $\angle CBE = 30^\circ$, then the value of $\angle ADB$ is

A. 70°

B. 60°

C. 80°

D. 90°

Answer: C

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9. In the adjoining figure, O is the centre of circle. If $\angle BCD = 28^\circ$, $\angle AEC = 38^\circ$, then the value of $\angle AXB$ is-

A. 56°

B. 94°

C. 38°

D. 28°

Answer: B

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10. In the adjoining firgure, O is the centre of the circle and AB is its diamter. If $AB \mid\mid CD \angle ABC = 25^\circ$, then the value of $\angle CED$ is

A. 80°

B. 50°

C. 25°

D. 40°

Answer: d

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11. If PQ be a diamter of a circle with centre at O and if PR= RQ, then the value of $\angle RPQ$ is

A. 30°

B. 90°

C. 60°

D. 45°

Answer: D

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12. QR is a chord of the circle with centre at O and POR is a diamter of it. OD is perpendicular to QR. If OD= 4 cm , then the length of PQ is

A. 4 cm

B. 2 cm

C. 8 cm

D. None of these

Answer: C

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13. AOB is a diamter of a circle. When the chords AC and BD are extended they meet at the point E. if $\angle COD = 40^\circ$, then the value of $\angle CED$ is

A. 40°

B. 80°

C. 20°

D. 70°

Answer: D

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14. AOB is diamter of a circle, If AC=3 cm and BC=4 cm then the length of AB is

A. 3 cm

B. 4 cm

C. 5 cm

D. 8 cm

Answer: C

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Examples True Or False

1. The number of angles in a circle produced by an fixed arc is infinte.

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2. The vertex of angle in circle does not always lie on the circumference of the circle.

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Examples Fill In The Blanks

1. On the same circular arc, the angle in circle is _____ of its central angle.

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2. The lengths of the chords AB and AC of the circle with cenrtre at are equal. If $\angle APB$ and $\angle AQC$ are two of its angle in circle, the a values of the angles are _____

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3. If O be ithe circum- centre of an equilateral triangle, then the value front central angle produced by any one of its sides is equal to _____

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4. All angles in the same segment of a circle are _____

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5. If the line segment joining two points subtends equal at two other points on the same side, then the four points are _____

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

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7. Semicircular angle is a _____ angle.

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8. The angle in the segment of a circle which is less than a semi-circle is an _____ angle.

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9. The circle drawn with hypotenuse of a right angled triangle as diamter passes through the _____

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Examples Short Answer Type Questions

1. In the adjacent figure O is the centre of the circle. If $\angle OAB = 30^\circ, \angle ABC = 120^\circ, \angle BCO = y^\circ$ and $\angle COA = x^\circ$, then the find value sof x and y.

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2. O is the circumecentre of ΔABC and D is the mid point of BC. If $\angle BAC = 40^\circ$, then find the value of $\angle BOD$.

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3. Three points A, B and C lie on circle with centre of O in such a way that AOCB is a parallelogeram.Find the value of $\angle AOC$.

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4. The circumcentre of the isoceles triangle ABC is on and $\angle ABC = 120^\circ$. If the radius of the circle be 5 cm, then determine the length of AB.s

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5. Two circles with centres A and B inrtersect each other at the points C and D. The centre B of the other circle lies on the

circle with centre A. if $\angle CQD = 70^\circ$, then find the value of $\angle CPD$.

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Examples Long Answer Type Questions

1. In the isosceles $\Delta ABC, AB = AC$. The circumcentre of ΔABC is the centre O lies on the opposite side of BC in which a lies. If $\Delta BOC = 100^\circ$, then find the value of $\angle ABC \angle ABO$.

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2. In the adjoining firgure, if O is the centre of circumeircle of ΔABC and $\angle AOC = 110^\circ$, find the value of $\angle ABC$

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3. O is centre of the cricle. If $\angle AOD = 40^\circ$ and $\angle ACB = 35^\circ$, then the find the value of $\angle BCO$ and $\angle BOD$.

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4. Like the adjoining figure, draw two circles with centres C and D which intersect each other at the points A and B . Draw a straight line through A which intersects the circle C at the point P and the circle with centre D at the point Q. Prove that (i) $\angle PBQ = \angle CAD (ii) \angle BPC = \angle BQD$.

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5. Each of the two equal circles passes through the centre of the other and the two circles intersect each other at the points. A and B.If a straight ine through the point A intersects the two circles at points C and D prove that ΔBCD is an equilateral triangle.

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6. S is the centre of the circumcircle of ΔABC and if $AD \perp BC$, prove that $\angle BAD = \angle SAC$.

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7. Two chords AB and CD of a circle with centre O intersect each other at the point P. prove that $AOD + \angle BOC = 2\angle PBC$. If

$\angle BOC$ are supplementary to each other, then prove that the two chords are perpendicular to each other.

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8. If two chords AB and CD of a circle with centre, O, when producd intersect each other at the point P, prove that $\angle AOC - \angle BOD = 2\angle BPC$.

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9. Draw a circle with the point a of quadrilateral ABCD as centre which passes through the points B,C and D.Prove that $\angle CBD + \angle CDB = \frac{1}{2}\angle BAD$.

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10. O is the circumcentre of ΔABC and OD is perpendicular on the side BC, prove that $\angle BOD = \angle BAC$

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11. O is the orthocentre of ΔABC and $AD \perp BC$. If AD is produced it interect the circumcircle of ΔABC at the point G. Prove that $OD = DG$.

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12. I is the centre of the incircle of ΔABC, produced AI intersects the circumercile of that triangle at the point P. Prove that $PB = PC = PI$

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13. Ankita drew two circles which intersect each other at the points P and Q. Through the point P two straight lines are draw so that they intersect one of the circle at the points. A and B and the ohte circle at the points C and D respectively. Prove that $\angle AQC = \angle BQD$.

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14. Two chords AB and CD of a circle are perpendicular to each other. If perpendicular drawn to AD from the point of intesection of those two chords AB and CD is produced to meet BC at the point E prove that the point E is the mid- point of BC.

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15. If in a cyclic quadrilateral $ABCD$, $AB = DC$, then prove that AC=BD

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16. OA is the radius of a circle with centre at Q, AQ is its chrod and C is any point on the circle. A circle passes through the point O,A,C intesect the chrod AQ at the point P. Prove that CP=PQ

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17. The triangle ABCis inscribed in a circle, AX, BY and CZ of the angles $\angle BAC, \angle ABC$ and $\angle ACB$, intersect at the point

X,Y,Z on the circle respectively. Prove that AX is perpendicular to XZ.

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18. ΔABC is inscirbed in a circle, the bisector of the angles $\angle BAC, \angle ABC$ and $\angle ACB$ intersect at the point X,Y,Zon the circle repectively. Prove that in $\Delta XYZ, \angle YXZ = 90^\circ - \frac{1}{2}\angle BAC$

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19. The isosceles triangle ABC is inscribed in the circle with centre at O.If AP be a diamtere passing through A, then show that AP is internal bisector of $\angle BPC$.

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20. In ΔABC, $AB = AC$ and E is any point on the extended BC. The circumeircel of ΔABC intersects AE at the point D. Prove that $\angle ACD = \angle AEC$.

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21. The angle B of the ΔABC is a right angle. If a cicrle is drawn with AC as diameter, then in it intersec AB at a point . D then which one of the following is correct ?

A. $AB > AD$

B. $AB = AD$

C. $AB < AD$

D. $AB \neq AD$

Answer:

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22. Prove that the circle drawn with any one of the equal sides of an isosceles triangle as diameter bisects the unequal side.

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23. Parama drew to circles intersect each other at the points P and Q . If the diameter of the two ircels are PA and PB resepctively , then prove that A,Q,B are collinear.

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24. Debanjan drew a line segment PQ of which mid-point is R and two circles are drawn with PR adn PQ as diameter . Deberatee drew a straight line through the point which interects the first circle at the point S and the second circle at the point T. Prove that PS=ST

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25. Three points P,Q ,R lie on a circle. The two perpendiculars PQ and PR and the point P intersect the circle at the points S and T respectively. Prove that $RQ = ST$

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26. ABC is an acute-angled triangle .AP is the diameter of the circumcircle of the triangle ABC, EB and CF are perpendiculars on AC and AB respectiely and they intersect each other at the point other at the point Q. Prove that BPCQ is a parallelogram.

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27. The internal and external bisectors of the vertical angle of a triangle intersect the circumcircle of the triangle at the points P and Q. Prove that PQ is a diameter of the circle.

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28. AB and CD are two diameters of a circle. Prove that ADBC is a rectangle

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29. AB is a diameter and AC is a chord of the circle with centre at Q. the radius parallel to AC intersect the circle at D. Prove that D is the mid-point of the are BC.

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30. Two circles intersect each other at the points P and Q. A straight line passing through P intersects one circle at A the other circle at .A straight line passing through Q intersect the first circle at C and the second circle at D. Prove that $AC \| \| BD.$

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31. ABC is a cyclic equailateral triangle. If D be any point on the circular are BC on the oppsite side of the point A, then prove that $DA = DB + DC$

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Examples True Or False

1. In the adjoining figure AD and BE are perpendicular ot BC and AC respectively of the ΔABC. The four points A, B, D, E are concylic.

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2. In $\Delta ABC, AB = AC, BE$ and CF are resepectively the bisectors of $\angle ABC$ and $\angle ACB$ and itersect the sides AC and AB at the points E and F resepectively. Then four points B,C,E,F are not concylic.

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3. The angle in circle produced by a minor arc is an obtuse angle.

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4. O is the mind-point of AB in ΔABC and $OA = OB = OC$, if a circle is drawn y taking AB as a diameter then the circle will pass through the point. C

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Examples Short Answer Type Questions Mcqs

1. In the adjoining figure, O is the centre of the circle AC is a diameter and chord DE is parallel to the diameter AC. If $\angle CBD = 60^\circ$, find the value of $\angle CDE$

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2. In the adjoining figure, QS is the bisector of an angle $\angle PQR$, if $\angle SQR = 35^\circ$ and $\angle PRQ = 32^\circ$, then find the value of $\angle QSR$.

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3. In the adjoining figur, O is the centre of the circle and AB is a diamter. If AB and CD are mutually perpendicualr to each other and $\angle ADC = 50^\circ$, then the value of $\angle CAD$

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4. In the adjoining figure, O is the centre of the circle and AB= AC , if $\angle ABC = 32^\circ$, then find the value $\angle BDC$

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5. In the adjoining figure, BX and CY are the bisectors of $\angle ABC$ and $\angle ACB$ respectively. If $AB = AC$ and BY=4 cm, then find the lengths of AX.

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Examples Short Answer Type Questions

1. In the adjoining firgure O is the centre of the centre and AB is the diameter. If $\angle BCE = 20^\circ$, $\angle CAE = 25^\circ$, then find the value of $\angle AEC$.

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2. In the isosceles triangle $ABC, AB = AC,$ if a circle is drawn with the side AB as diamter then the circle intersects the side BC at the point D. When BD=4 cm , find the the length of CD.

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3. Two chords AB and AC of a circle are perpendicular to each other. If AB =4 cm and AC =3 cm , then find the radius of the circle.

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4. Two chord PQ and PR of the circle are perpendicular to each other. If the radius of the circle be r and then find the length of the chord QR.

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5. AOB is a diameter of a circle , C is a point on the circle. If $\angle OBC = 60^\circ$, then find the value of $\angle OCA$

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6. In the adjoining figure, O is the centre of a circle and AB is one of its diameters. The legth of the chrod CD is equal to the radius of the circle. When AC and BD are extended, they intersect each other at a point P. find the value of $\angle APB$

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Exercise 2 1 Very Short Answer Type Questions Mcqs

1. Area of a circle is 5544square meter ,then calculated the radius of the circle.

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2. Area of a circle is 616square meter ,then calculated the radius of the circle.

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3. If the ratio of circumference of two circle is $4:3$ and difference between the radius is $2cm$, find the diameter of two circle.

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4. In a cyclic quadrilateral ABCD, twice the measure of $\angle A$ is thrice the measure of $\angle C$. Find the measure of $\angle C$?

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Exercise 2 1 True Or False

1. The front angle produced by an are of the circle is called the central angle.

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2. The front angle formed at the centre of a circle by an are is half of the angle fromed by the same are at any point on the circle.

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Exercise 2 1 Fill In The Blanks

1. The central angle of an arc is _____ of the angle in circle of the same are.

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2. The lenghts of the chords PQ and RS of a circle with centre O are equal. If $\angle ROS$ be the central angle and $\angle RQS$ be the angle in circle, then $\angle ROS$= _____

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3. ABC is an isoscles triangle in which AB =AC. If O be the centre of the circle and $\angle OBC = 30^\circ$ then the value of $\angle ABC$ is _____

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Exercise 2 1 Short Answer Type Questions

1. A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q so that OQ = 12 cm. Length PQ is :

A. 12cm

B. 13 cm

C. 8.5 cm

D. $\sqrt{119}$ cm

Answer: D

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2. From a outer point T, if TP and TQ are the two tangents to a circle with centre O so that $\angle POQ = 110$, then $\angle PTQ$ is equal to

A. 60^o

B. 70^o

C. 80^o

D. 90^o

Answer:

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3. If the ratio of circumference of two circle is $2:3$ and difference between the radius is $2cm$, find the diameter of two circle.

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4. If the length of a half circular area is $36cm$,then find the diameter of the circular area.

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5. Two circles of radii 5.5 cm and 3.3 cm respectively touch each other. What is the distance between their centres?

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6. The length of the tangent to a circle from a point P, which is 25 cm away from the centre, is 24 cm. What is the radius of the circle?

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Exercise 2 1 Long Answer Type Questions

1. ABC is cyclic triangle. The bisectors of the angles of the triangle intersect the circumeference of the circle at X,Y and Z. Prove that the measuremnts of the angles of the ΔXYZ are $90^\circ - \frac{A}{2}, 90^\circ - \frac{C}{2}$ respectively.

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2. ABC is a cyclic equilaterla triangle. If P be any point on the are BC opposite to the point A, then prove that $AP = BP + CP$

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3. AB and CD are two parallel chords of a cricle and AD and BC intersects each other at a point O inside the circle. Prove that AO=BO

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4. ABC is a cyclic triangle and the bisectors of its angles intersect the circumference of the circle at X,Y and Z. prove that AX is perpendicular to YZ.

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5. Two circles of equal radii intersec each othe at the points P and Q . Two straight line APBand CPd have been drawn through

P upto the circumference of the circles. Prove that the circular arc AC and BD will produce equal front angles at the point O.

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6. Two circles of equal radii intersect each other at the point A and B. A straight line passing throught A intersects the two circles at the points P and Q , where Q are on the opposite sides of AB. Prove that PB=PQ

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7. ABCD is cyclic quadrilaral PO being the centre of the circle. The side DC is produced upto P. If $\angle BCP = 108^\circ$ then find the valu of $\angle BOD$

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8. O is the circumcentre of the traiangle ABC prove that $\angle OBC + \angle BAC = 90^\circ$

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Exercise 2 2 Very Short Answer Type Questions Mcqs

1. Two circles intersect each other such that each circle passes through the centre of the other. If the distance between their centres is 12, what is the radius of each circle?

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2. Length of a tangent segment drawn from a point which is at a distance 12.5 cm from the centre of a circle is 12 cm, find the diameter of the circle.

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3. O is the circumcentre of the ΔABC. A and BC lie on the opposite of the centre O. If $\angle BOC = 120^\circ$, then $\angle BAC$=

A. 30°

B. 45°

C. 60°

D. 120°

Answer: C

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4. AB is diametr of the circle with centre at O and P is any point on the circle. If $\angle AOP = 120^\circ$ then $\angle PBO$=

A. 60°

B. 30°

C. 45°

D. 0°

Answer: A

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Exercise 2 2 True Or False

1. Angles in the same segment of a circle are equal

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2. If aline segment joining two points subtendes two angles at two other points on the same side of it then, point are not concylic.

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Exercise 2 2 Fill In The Blanks

1. Angles in circle produced by a major arc is an _____ angle.

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2. Angles in circle produced by a minor arc is an _____ angle.

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Exercise 2 2 Short Answer Type Questions

1. O is the circumcentre of ΔABC. If $\angle ABC = \alpha^\circ$ and $\angle BCA = \beta^\circ$, then the find value of $\angle BOC$.

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2. ∠ACB is inscribed in arc ACB of a circle with centre O. If ∠ACB = 65°, find m(arc ACB).

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3. If the radius of the circumcenter of a right angle triangle is $8cm$, then calculate the hypotenuse of the triangle.

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4. Chords AB and CD of a circle intersect inside the circle at point E. If AE = 5.6, EB = 10, CE = 8, find ED.

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5. If the radius of the circumcenter of a right angle triangle is $12cm$, then calculate the hypotenuse of the triangle.

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6. If the radius of the circumcenter of a right angle triangle is $10cm$, then calculate the hypotenuse of the triangle.

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7. AB and AC are two such chords of the circle with centre at O that each is perpendicular..., r to the other. If AB=4 cm and AC=3 cm, then find the radiu of the circle.

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Exercise 2 2 Longanswer Type Questions

1. O is the circumcentre of the triangle ABC and $AD \perp BC$. Prove that $\angle BAD = \angle OAC$

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2. O is the circumcentre of ΔABC and $OD \perp BC$. Prove that $\angle BOD = \angle BAC$

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3. AB and CD are two chords of a circle . If BA and DC are produced, then they intersect each other at the point P. Prove that $\angle PCB = \angle PAD$.

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4. The isosceles triangle ABC is inscribed in a circle with centre at O. If AP is a diameter of the circle. Then prove that AP is the

bisetors of $\angle BPC$.

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5. Two equal circles pass through the centre of each other and they intersect each other at the points A and B. the straight line passing through P in tersect thw two circles at C and D. Prove that BCD is an equilateral triangle.

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6. The equilateral triangle ABC is inscribed in a circle. If P is any point on the ar BC, then prove that $AB = PB + PC$.

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7. Prove that the bisectors of the angles in the segment of a circle pass through a common point.

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8. ABC is an isoscles triangle and the straight line XY is parallel to BC intersects the other two sides at the points X and Y. Prove the points B,C,X,Y are cyclic.

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9. ABCD is a quadrilateral, the opposite angles of which are supplementary. If Ac is the bisector of $\angle BAD$. Then prove that $BC = CD$

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10. D,E,F are the mid-point of the three sides of a triangle and if P be the pedal-point of the perpendicular drawn fron one of its vertices to its opposite side, then prove that D,P,E and F are concylic.

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Exercise 2 3 Very Short Answer Type Questions Mcqs

1. Find the radius of the incircle of the equilateral triangle having each side 12 cm

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2. Area of a circle is 154 square meter,then calculated the radius of the circle.

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3. Find the radius of the incircle of the equilateral triangle having each side 9 cm

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4. Find the radius of the circle which is circumcircle of the triangle with side $13cm$, $10cm$ and $17cm$.

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5. Find the radius of the circle which is circumcircle of the triangle with side $6cm$, $8cm$ and $10cm$.

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6. Find the radius of the circle which is circumcircle of the triangle with side $3cm$, $4cm$ and $5cm$.

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7. Find the radius of the circle which is circumcircle of the triangle with side $9cm$, $12cm$ and $15cm$.

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8. If the length of a circular area is 108 meter ,then determine the area of the place.

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9. If the length of a circular area is 144 meter ,then determine the area of the place.

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10. If the length of a circular area is 44 meter ,then determine the area of the place.

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Exercise 2 3 True Or False

1. If the circumcenrtre of the equilateral triangle ABC be P then

$\angle BPC = 120^\circ$

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2. Semi-circular angle may or not right angle

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Exercise 2 3 Fill In The Blanks

1. Centre of circle is _____ from its equal chords.

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2. The bigger segement of a circle is know as _____

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3. Angle subtended in a circle by the arc less than a semi-circle is an _____ angle.

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Exercise 2 3 Short Answer Type Questions

1. If the length of a circular area is 264 meter ,then determine the area of the place.

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2. Area of a circle is 1 square meter 54 square desi meter ,then calculated the radius of the circle.

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3. Area of a circle is 1386 square meter,then calculated the radius of the circle.

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4. Diameter of a circle is $42cm$,then find the area of the circle.

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5. Diameter of a circle is $14cm$,then find the area of the circle.

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6. Diameter of a circle is $98cm$,then find the area of the circle.

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7. Diameter of a circle is $28cm$,then find the area of the circle.

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8. If a point P is 17 cm from the centre of a circle of radius 8 cm, then find the length of the tangent drawn to the circle from point P.

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Exercise 2 3 Long Answer Type Questions

1. Prove that angle in the segment of a circle which is greater than a semi-circle is an acute angle.

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2. Prove that angle in the segment of a circle which is smaller than a semi-circle is an obtuse angle.

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3. Prove that the m id- point of the hypotenuse of a right-angled triangle is equidistant from its three vertices.

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4. Prove that if a circle is a drawn iwht the hypotenus of right-angled triangle as its diameter, then the circle will pass through the angular point of the triangle.

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5. Prove that if two circles are drawn with two smaller sides of sacalene triangle as their diameter, then the points of c intersection of the two circles lie in the third side.

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6. AC is the common hypotneus of the right-angled triangels ABC and ADC. Prove that $\angle CAD = \angle CBD$

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7. The opposite angles of quadrilateral ABCD are supplementary. If AC bisects $\angle BAD$, then show an that $BC = CD$

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8. D,E,F are the mid-point of the sides of a triangle and if P the foot of the perpendicular drawn from any vertex of the triangle to its opposite side, then prove that D,P,E,F are concylic.

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9. Prove that if the external angle obtained by producing the side of a quadrilateral is equal to the internally oppoiste angle, then the quadrilatera wil be cyclic.

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10. Prove that an isosceled trapeqium is a cyclic quqdrilatral.

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11. Two parallel straight lines are drawn through the points of intersection of two circles upto their circumference. Then prove that two straight lines are equal.

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12. Two oppsite angles of the quadrilateral ABCD are supplementary and aC bisects $\angle BAD$. Prove that BC Cand CD are equal.

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13. ABCD is a cyclic quadrilaterla. BC is produced to E. The bisectors of $\angle ABD$ and $\angle DCE$ intersect at the points P. Prove that $\angle ADC = \angle APC$

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14. Two chords AB and CD of the circle with centre at O intersect each other at an internal point P of the centre. Prove that $\angle AOD + \angle BOC = 2\angle BPC$

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