doubtnut
India's Number 1 Education App

MATHS

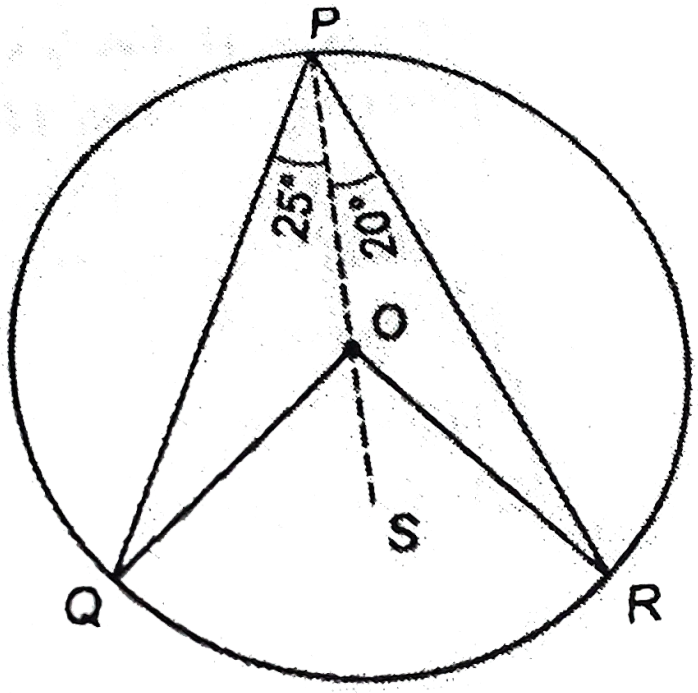
BOOKS - NAGEEN PRAKASHAN

ENGLISH

CIRCLE

Solved Examples

1. In the adjoining figure $\angle QPO = 24^\circ$ and $\angle SPR = 20^\circ$, find the value of $\angle QOR$.



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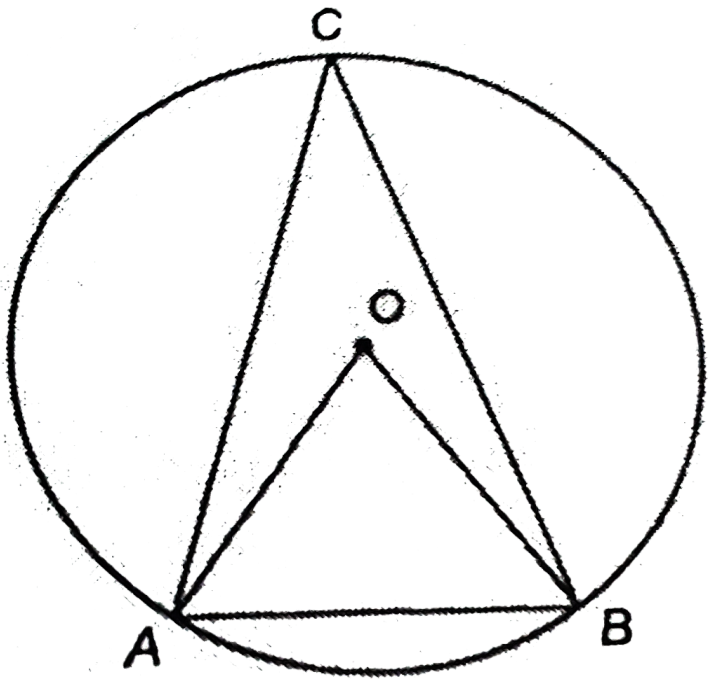
2. In the adjoining figure O is the centre of the circle . If chord $AB = 2$ cm radius $OA = 2$

cm, then find the value of $\angle ACB$.



A. $= 60^\circ$

B. $= 45^\circ$

C. $= 30^\circ$

D. $= 50^\circ$

Answer: C

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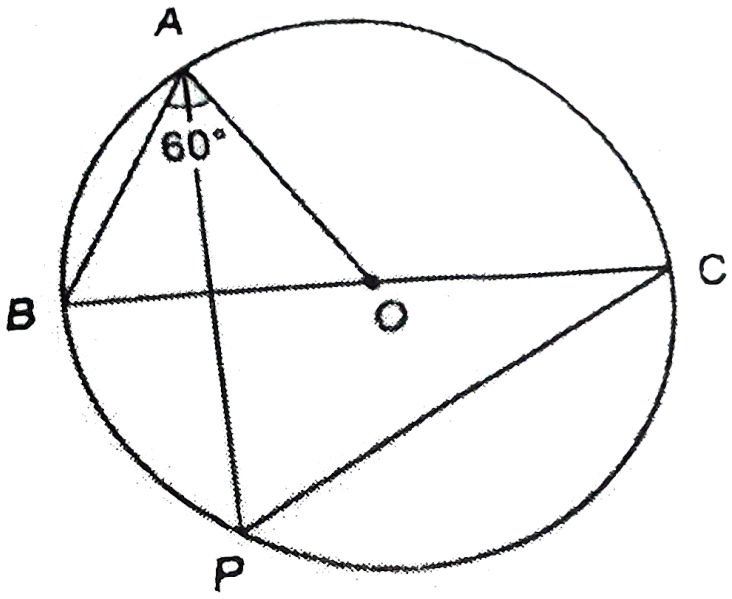
3. In the adjoining figure , O is the centre of the circle and $\angle OAB = 60^\circ$. Find $\angle APC$.



A. $= 60^\circ$

B. $= 45^\circ$

C. $= 30^\circ$

D. $= 50^\circ$

Answer: A

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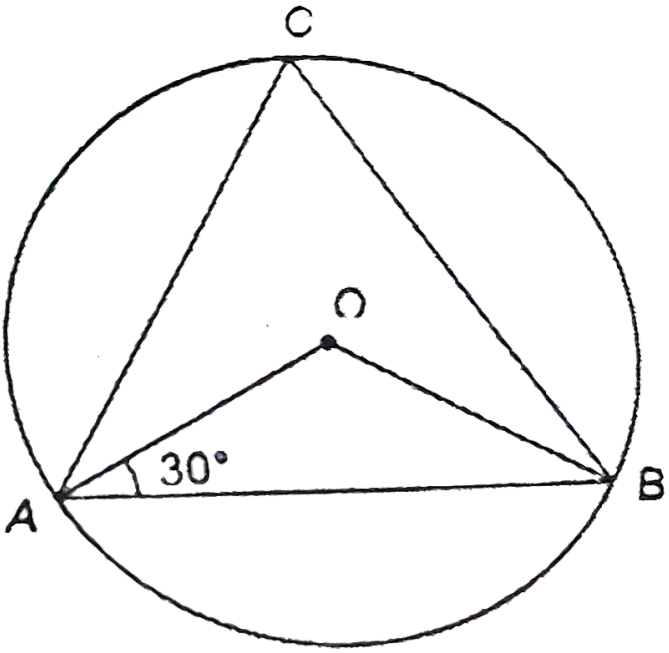
4. In the adjoining , O is the centre of the circle. ACB is a segment. If $\angle OAB = 30^\circ$,

then find the value of $\angle ACB$.



A. $= 60^\circ$

B. $= 45^\circ$

C. $= 30^\circ$

D. $= 50^\circ$

Answer: A

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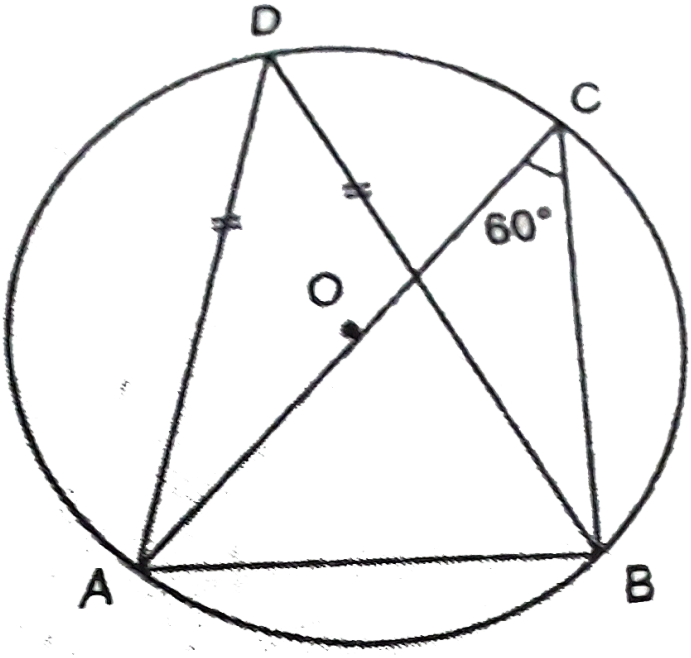
5. In the following figure O is the centre of the circel. If $\angle ACB = 60^\circ$ and $DA = DB$ then

prove that ΔADB is an equilateral triangle.



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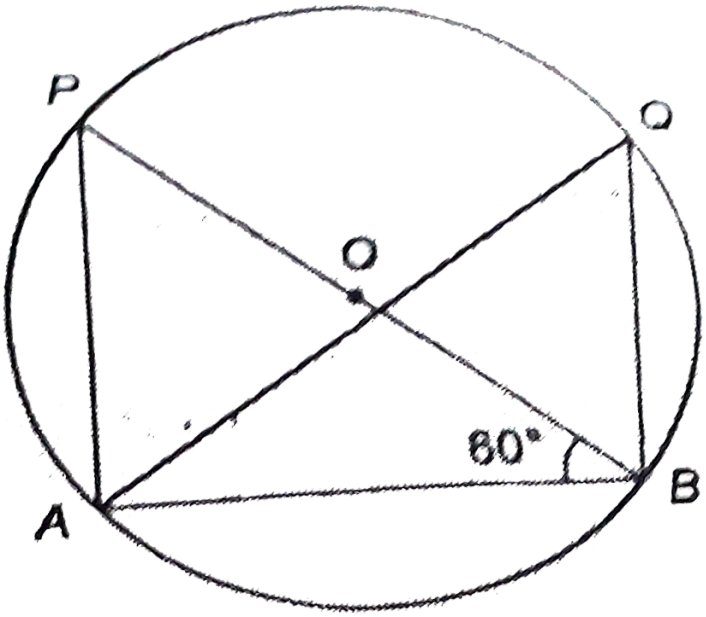
6. In the adjoining figure, BP is the diameter of the circle. If $\angle ABP = 60^\circ$, then find $\angle AQB$.



A. 60°

B. 45°

C. 30°

D. 50°

Answer: C

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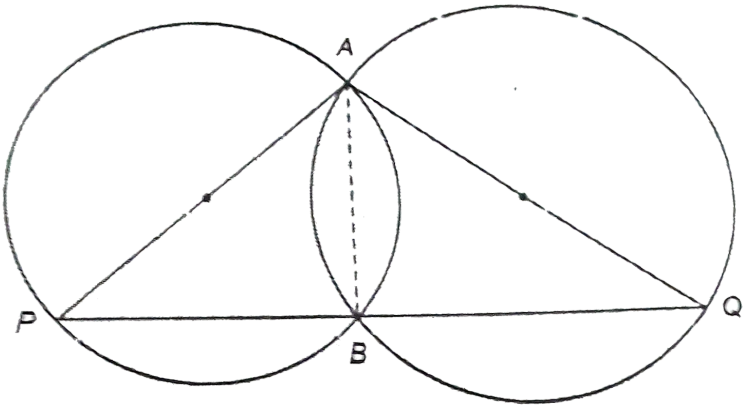
7. In the figure, two circles intersect each other at points A and B. AP and AQ are the diameters of these circels. Prove that PBQ is a straight line.



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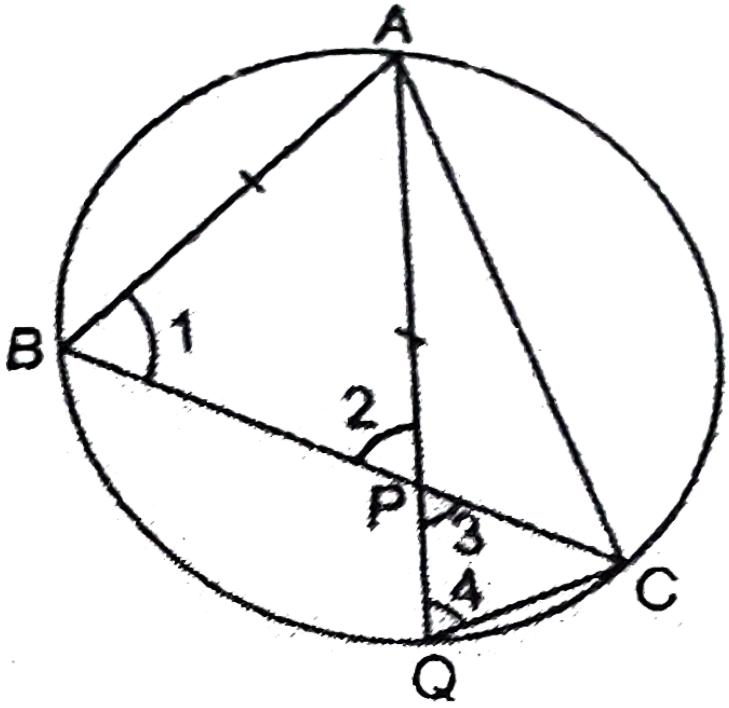
8. In given figure , ABC is a triangle produced meets the circumcircle of ΔABC at Q, prove that $CP = CQ$



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9. D is a point on the circumcircle of ΔABC in which $AB = AC$ such that B and D are on opposite sides of line AC. If CD is proudced to a point E such that $CE = BD$, prove that $AD = AE$.

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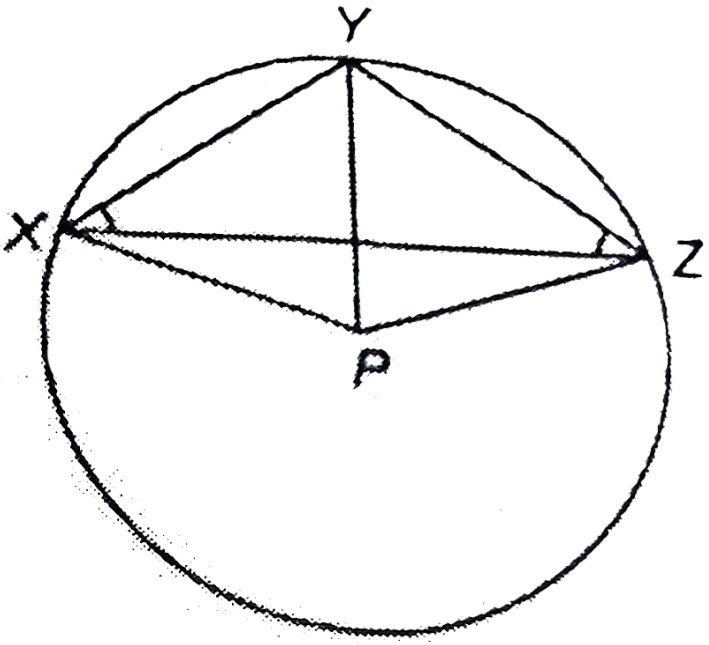
10. In the figure, P is the centre of the circel.

Prove that : $\angle XPZ = 2(\angle XZY + \angle YXZ)$.



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11. Prove that the circle drawn on any one of the equal sides of an isosceles triangle as diameter bisects the base.

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12. In a circle with centre O, chords $AB\ and\ CD$ intersect inside the circumference at E. Prove that $\angle AOC + \angle BOD = 2\angle AEC$

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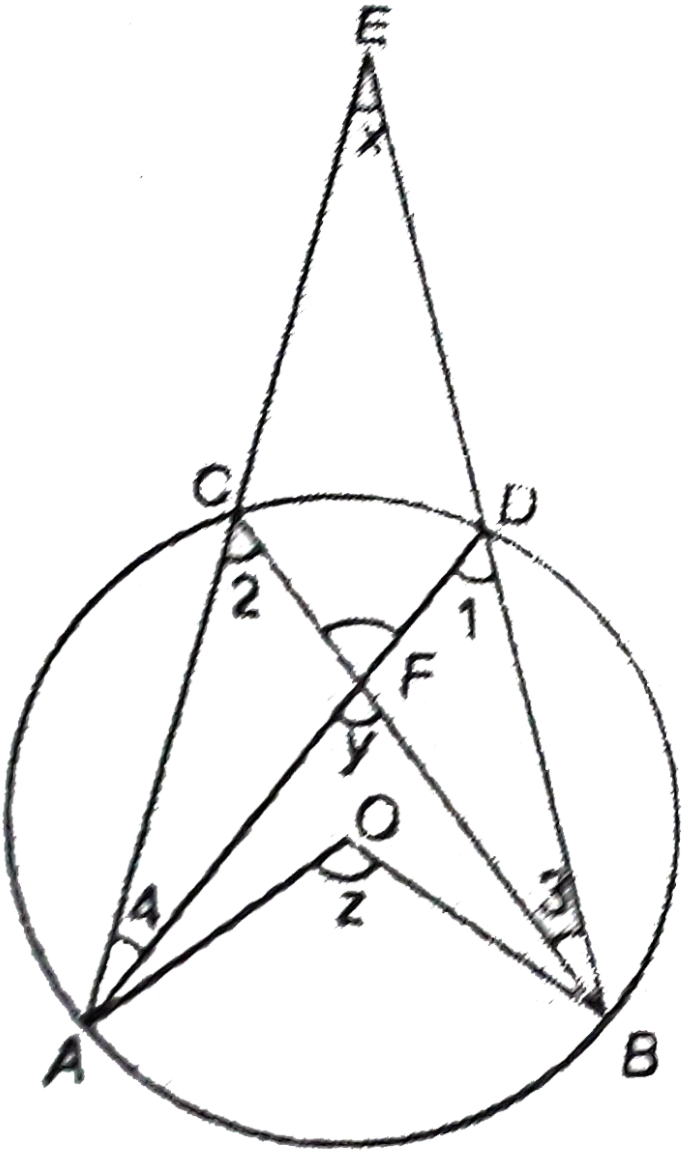
13. In figure O is the centre of the circle, prove that $\angle z = \angle x + \angle y$.



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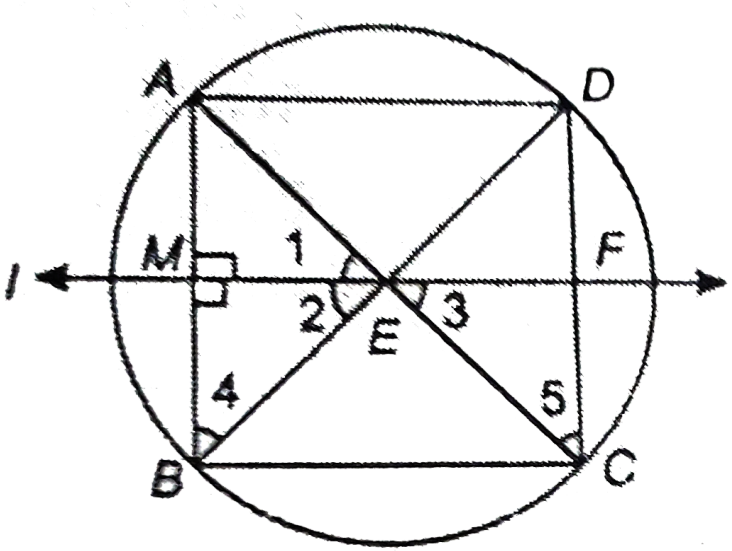
14. The diagonals AC and BD of a cyclic quadrilateral $ABCD$ interest at right angles at E (figure). A line l drawn through E and perpendicular to AB meets CD at F. Prove that F is the mid-point of CD.



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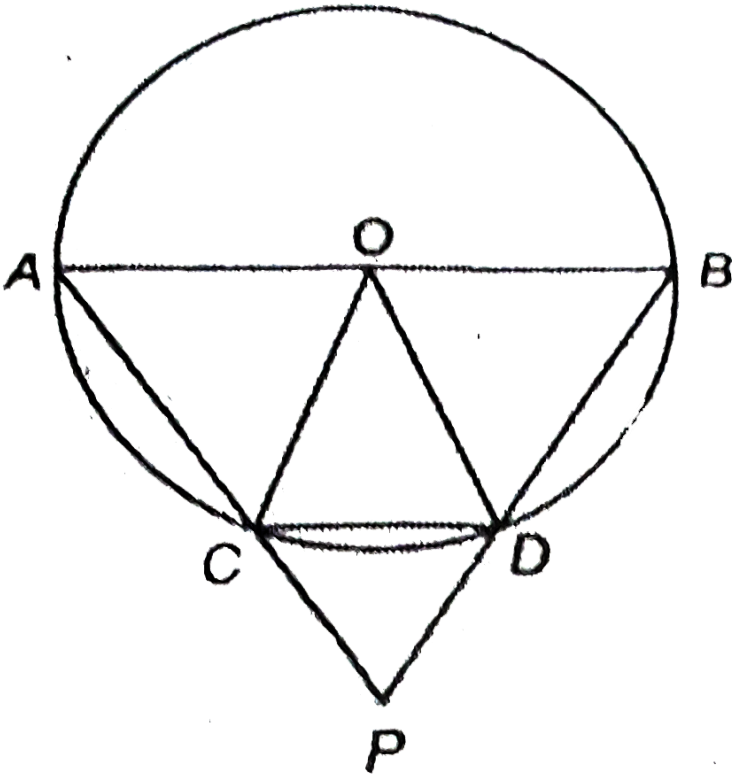
15. AB is a diameter of the circle with centre O and chord CD is equal to radius OC (fig). AC and BD proudced meet at P. Prove that $\angle CPD = 60^\circ$.



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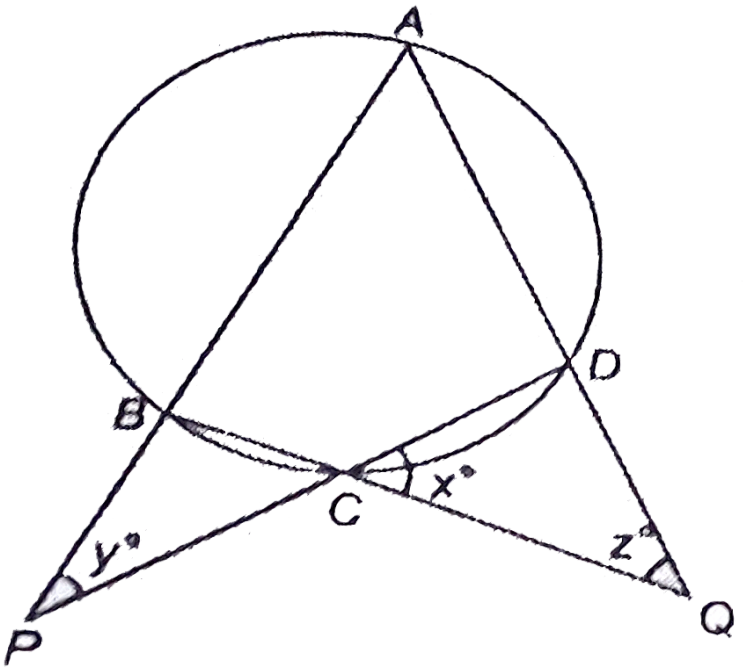
16. In given fig., if $\frac{x}{3} = \frac{y}{4} = \frac{z}{5}$, then calculate the values of x,y and z.



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17. Prove that any four vertices of a regular pentagon are concyclic.

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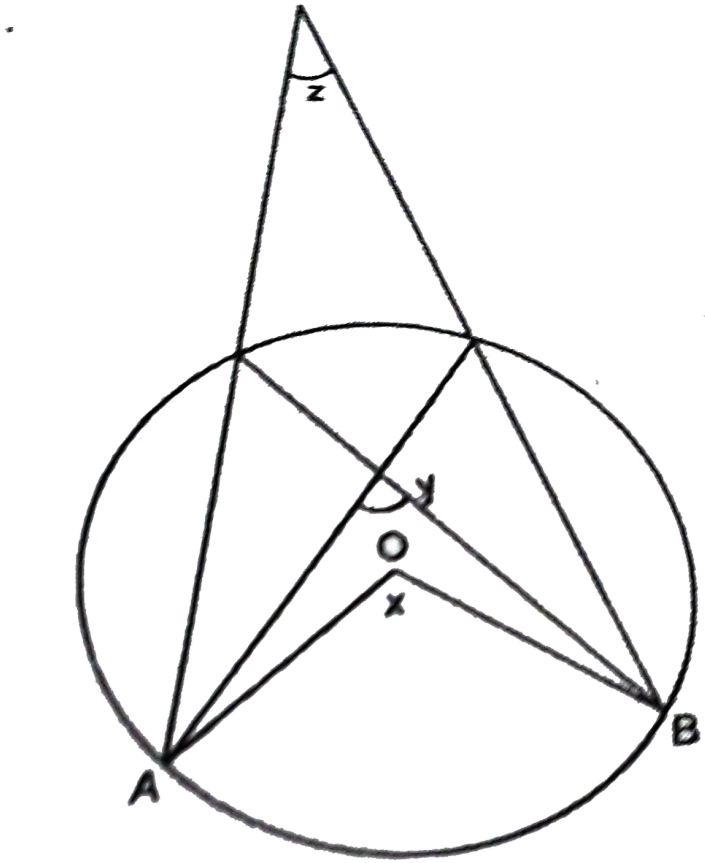
18. In the adjoining figure, O is the centre of the circle, Prove that $\angle x = \angle y + \angle z$.



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19. $PQ\ and\ RQ$ are chords of a circle equidistant from the centre. Prove that the

diameter passing through Q visects $\angle PQR \, and \, \angle PSR$

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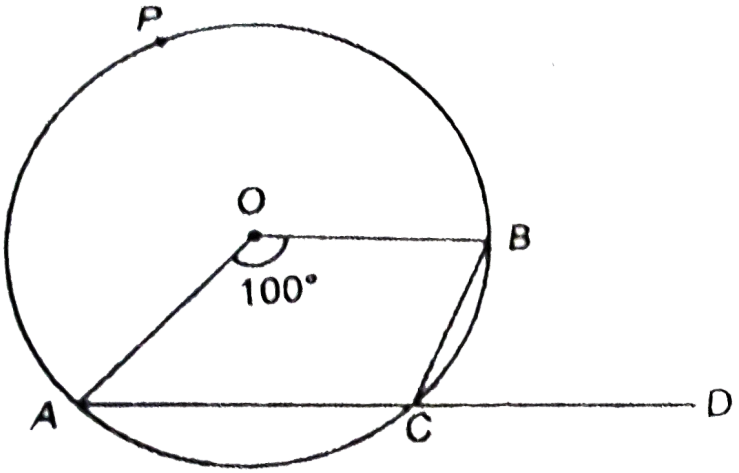
20. In the adjoining figure O is the centre of the circle and $\angle AOB = 100^\circ$. Find the value

of $\angle BCD$.



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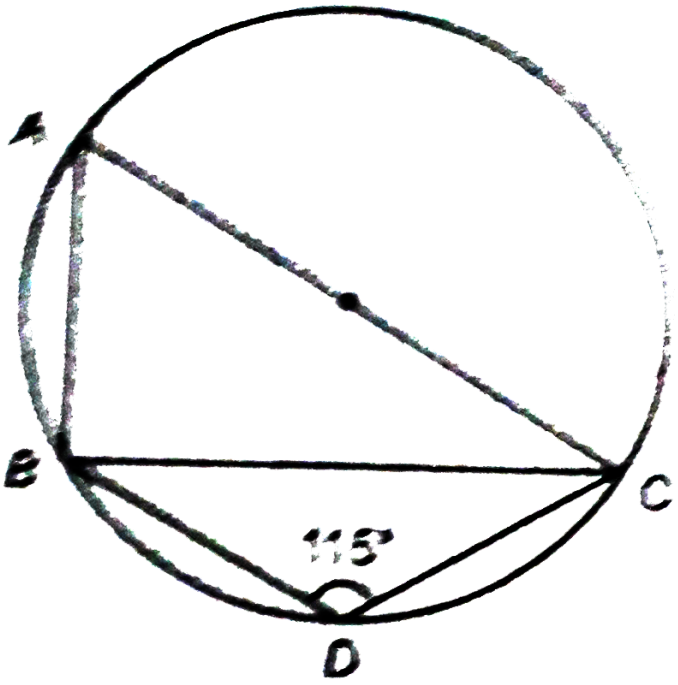
21. In the adjoining figure, AC is the diameter of the circle. If $\angle BDC = 115^\circ$, then find the

value of $\angle ACB$.



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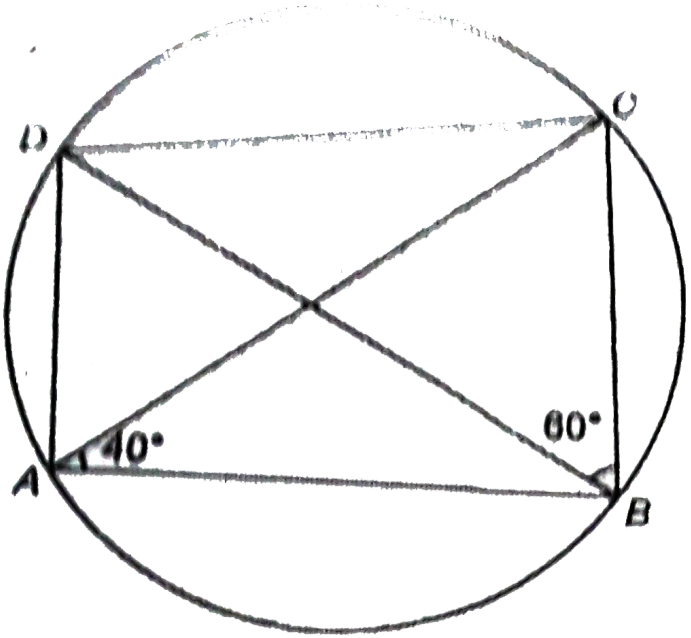
22. In the adjoining figure, ABCD is a cyclic quadrilateral. If $\angle DBC = 60^\circ$ and

$\angle BAC = 40^\circ$, then find the value of $\angle BCD$

.



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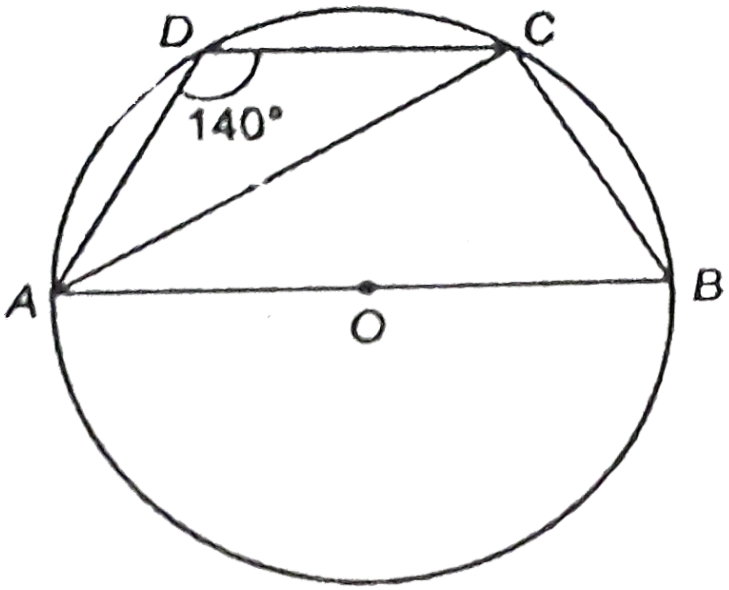
23. In the adjoining figure, ABCD is a cyclic quadrilateral whose side AB is the diameter of the circle . If $\angle ADC = 140^\circ$, then find the value of $\angle BAC$.



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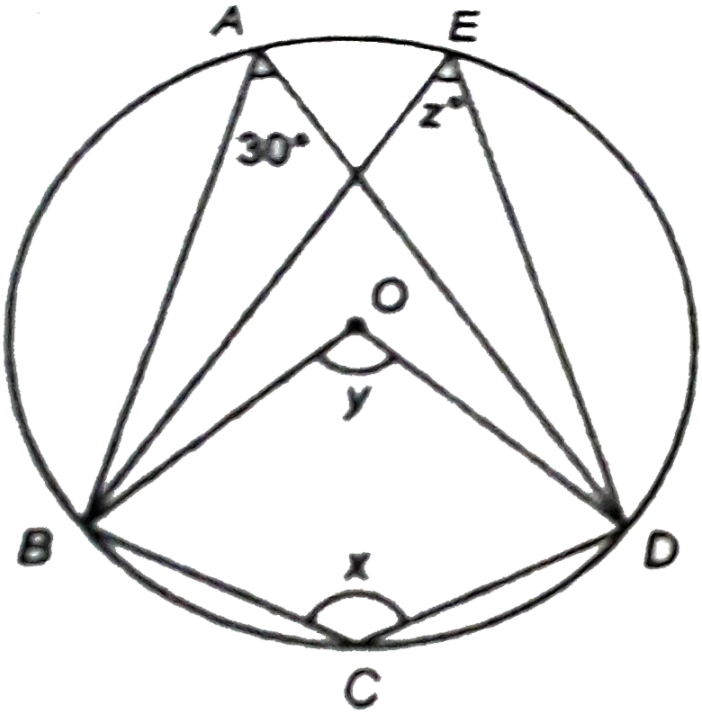
24. In the adjoining figure , O is the center of the circle. If $\angle BAD = 30^\circ$, then find the values of x,y and z.



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25. In a cyclic trapezium ABCD,side AB is parallel to side DC. Prove that :

side AD =side BC.

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26. If the two sides of a pair of opposite sides of a cyclic quadrilateral are equal, prove that its diagonals are equal.

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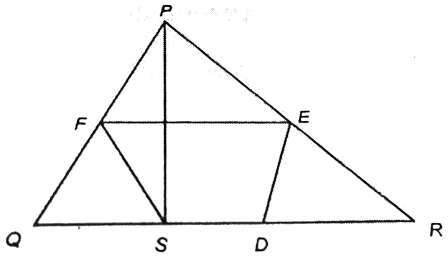
27. In the adjoining figure, D,E and F are the mid- points of the sides of ΔPQR and 'S' is the fooot of perpendicualar form P to side S.

Prove that:

(i) $FQ = FS$ and $\angle FQS = \angle FSQ$.

(ii)$\angle FQS = \angle FED$.

(iii) square $FSDE$ is a cyclic quadrilateral.



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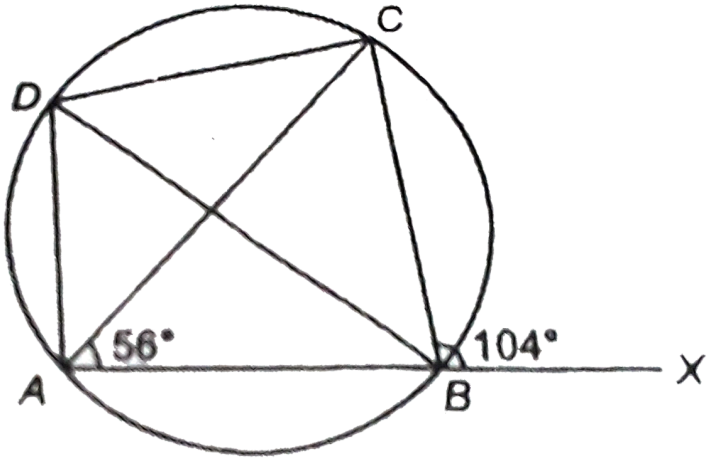
28. In the adjoining figure, ABCD is a cyclic quadrilateral . If $\angle CBX = 104^\circ$ and $\angle CAB = 56^\circ$, then find the value of $\angle ADB$.



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29. ABCD is a cyclic trapezium m, in which $AB \mid\mid DC$. If $\angle B = 75^\circ$, then find other

angles.

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30. The sides AB and DC of a cyclic quadrilateral ABCD when produced meet at E and the sides DA and CB when produced meet at F. Given $\angle BEC = 38^\circ, \angle BAD = 102^\circ$. Find the values of $\angle AFB$ and $\angle ADC$.

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31. ABCD is a parallelogram . The circle passing through the vertices. A, B and C intersects CD (or CD produced) at E. Prove that $AE = AD$.

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32. Using vector method, prove that the altitudes of a triangle are concurrent.

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33. A circle intersects the side AD of a parallelogram $ABCD$ at P and BC produced at Q. Prove that square $PDQC$ is cyclic .

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34. The line joining the foot of perpendicular drawn from a point lying on the circumcircle. Of a triangle to the sides of a triangle is a straight line.

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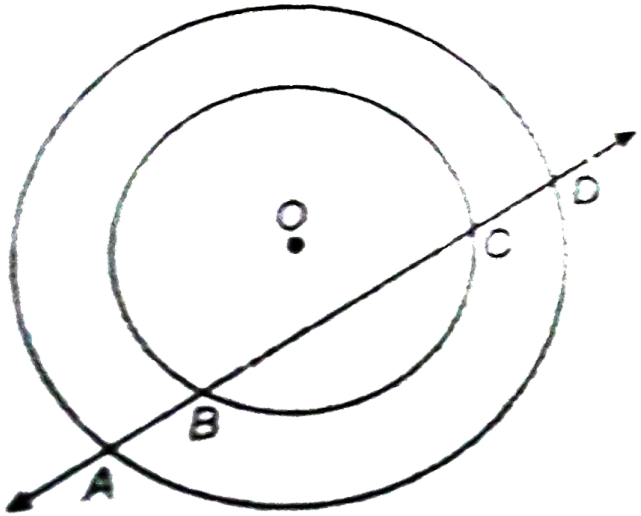
35. If a line intersects two concenteric circles (circles with the same centre) with center O at A,B,C and D, prove that AB=CD (see figure).



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36. Three girls Reshma, Salma and Mandip are playing a game by standing on a circle of radius 5m drawn in a park. Reshma throws a ball to Salma, Salma to Mandip, Mandip to Reshma. If the distance between Reshma and Salma and between Salma and Mandip

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37. A circular park of radius 20m is situated in a colony. Three boys Ankur, Syed and David are

sitting at equal distance on its boundary each having a toy telephone in his hands to talk each other. Find the length of the string of each phone.

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38. If non-parallel sides of a trapezium are equal, prove that it is cycli.

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39. Two circles intersect at two points B and C. Through B, two line segments ABD and PBQ are drawn to intersect the circles at A, D and P, Q respectively (see Fig. 10.40). Prove that $\angle ACP = \angle QCD$.

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40. The circumcentre of the triangle ABC is O . Prove that $\angle OBC + \angle BAC = 90^\circ$.

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41. P, Q and R are, respectively, the mid points of sides BC, CA and AB of a triangle ABC

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42. If bisectors of opposite angles of a cyclic quadrilateral ABCD intersect the circle, circumscribing it at the points P and Q, prove that PQ is a diameter of the circle.

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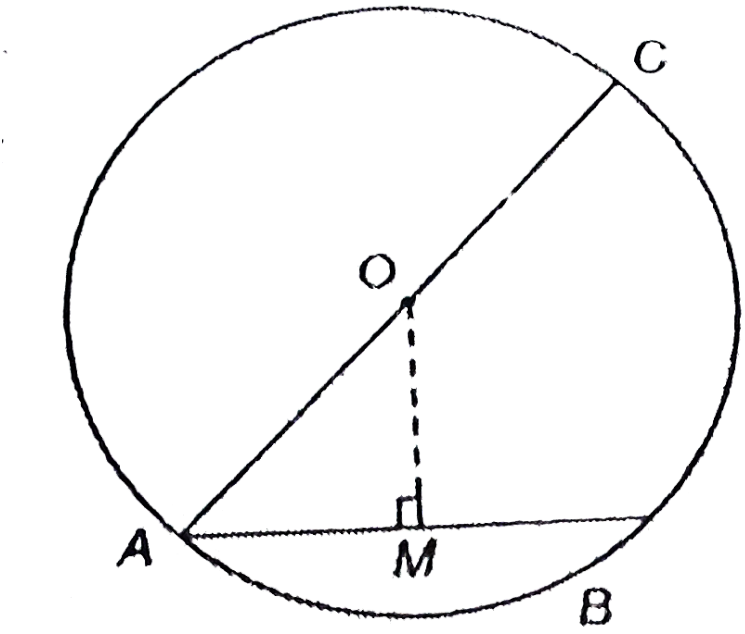
43. In the adjoining figure, O is the centre of the centre of the circle. If diameter AC=26cm and chord AB=10cm, then find the distances of the chord AB from the centre of the circle.



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44. A chord 16 cm long is 6 cm distant form the centre of the circle . Find the diameter of the circle.

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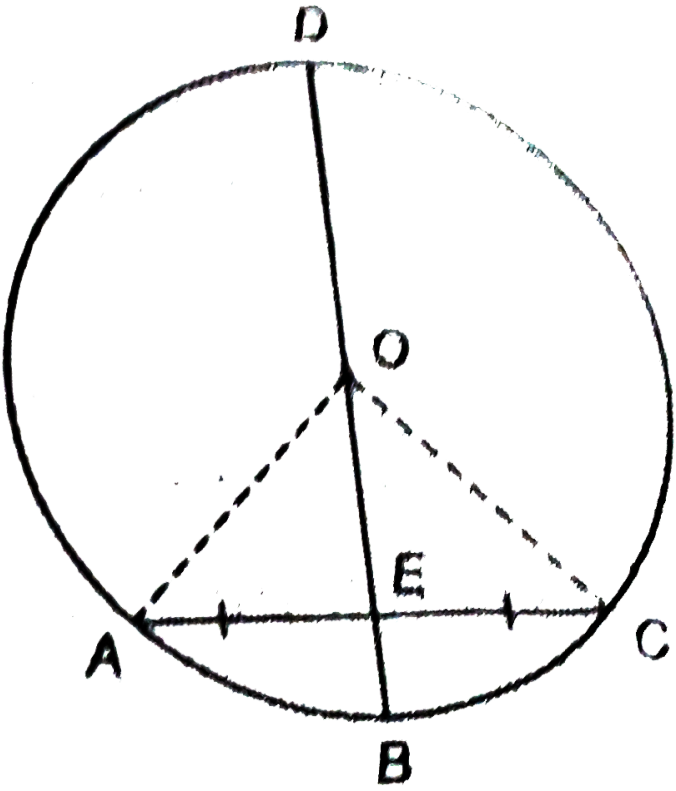
45. In the adjoining figure, BD is the diameter of the circle which bisects the chord AC at point E. If $AC = 8cm$, $BE = 2cm$, then find

the radius of the circle.



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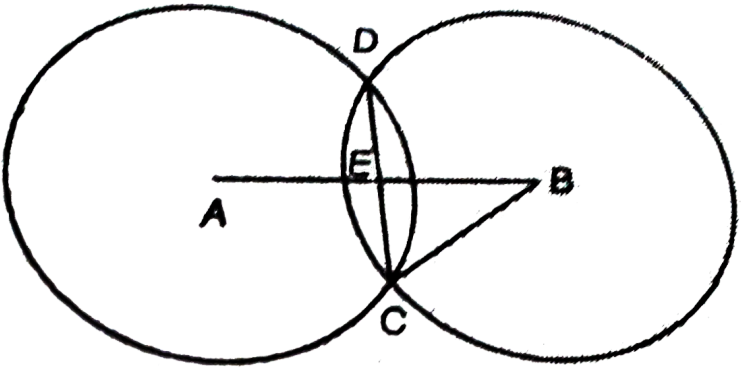
46. In the adjoining figure, A and B are the centres of two circles. If CB=17cm, EB=15cm, then find the length of common chord.



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47. If a line segment joining mid-points of two chords of a circle passes through the centre of the circle, prove that the two chords are parallel.

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48. Prove that the line joining the mid-points of two parallel chords of a circle passes through the centre.

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49. In an equilateral triangle prove that the centroid and the centre of the circumcircle (circumcentre) coincide.

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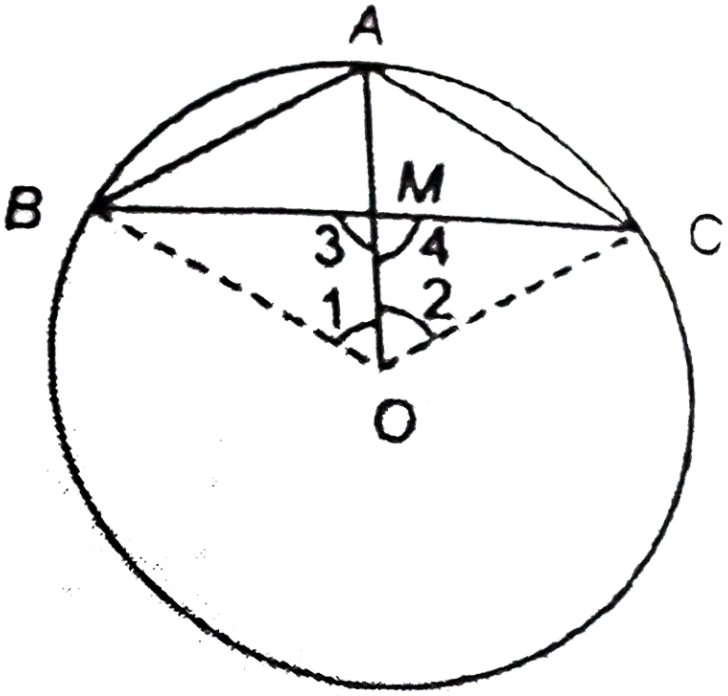
50. In figure, $\overset{\frown}{AB} \cong \overset{\frown}{AC}$ and O is the centre of the circle,Prove that OA is the perpendicualr

bisector of BC.



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51. AB and CD are two chords such that AB = 10 cm , CD = 24 cm and AB // CD The distance between the chords is 17 cm . Find the radius of the circle.

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52. A point P lies outside the circle with centre O. two lines PAOB and PDC are drawn on the circle from P. if PD =OD, then prove that arc $BC = 3 \times ArcAD$.

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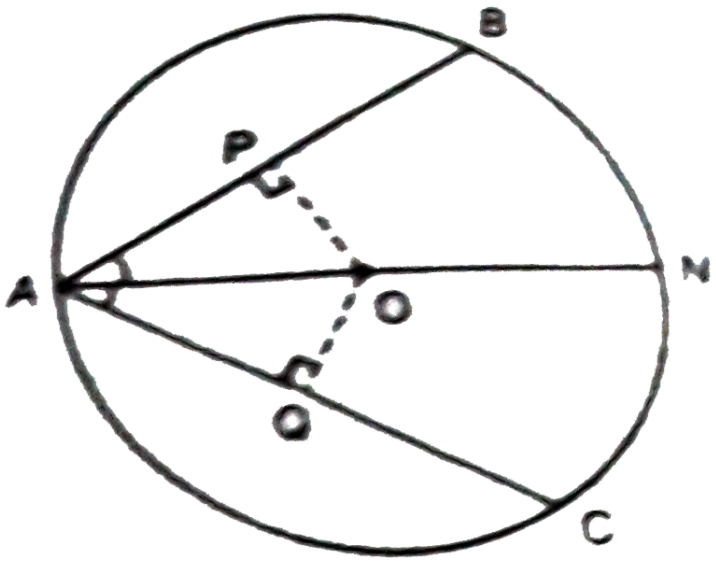
53. Prove that the chords inclined on the same angle to the radius or diameter of a circle are equal in length.



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54. In the figure, OD is perpendicular to the chord AB of a circle whose centre is O. If BC is a diameter, show that $CA = 2OD$.

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55. $AB \text{ and } CD$ are two parallel chords of a circle whose diameter is AC . Prove that $AB = CD$

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56. Two circles with centres O and O' intersect at two points A and B. A line PQ is drawn parallel to OO' through A (or B) intersecting the circles at P and Q. Prove that PQ=200'.

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57. prove that the line joining the mid-point of two equal chords of a circle subtends equal angles with the chord.

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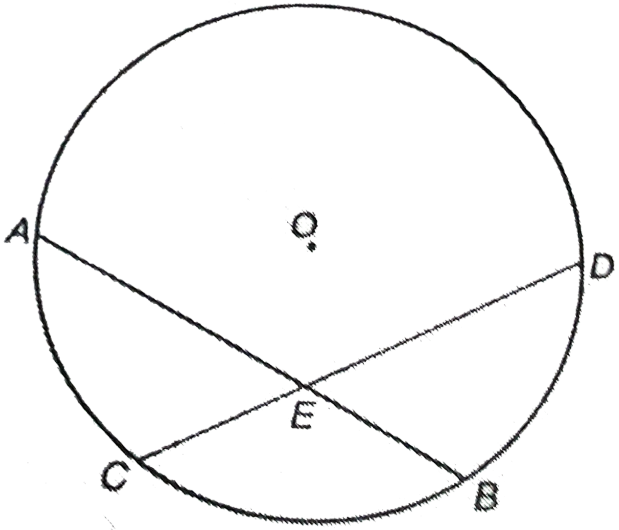
58. In the adjoining figure. If two equal chords AB and CD of a circle intersect each other at E. then prove that chords AC and DB are equal.



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59. AB is the chord of a circle with centreO. AB is produced to C, such that BC =OB, CO is joined and produced to meet the circle in D. If $\angle ACD = Y^\circ$ and $\angle AOD = x^\circ$, Prove that $x = 3y$.

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60. Two circles of radil $5cm$ and $3cm$ intersect at two points and the distance between their

centres is $4cm$. Find the length of the common chord.

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61. In the figure, two circles with centres A and B and of radii $5cm$ and $3cm$ touch each other intermally. If the perpendicular bisectors of segment AB meets the bigger circle in P and Q. Find the length of PQ.

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62. Prove that , Of any two chords of a circle, show that the one which is nearer to the centre is larger.

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Exercise 10 A

1. In a circle 10 cm long chord is at a distance of 12 cm form the centre. Find the length of a chord at a distance of 5cm from the centre.

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2. The radius of a circle is 15cm. Find the length of its longest chord.

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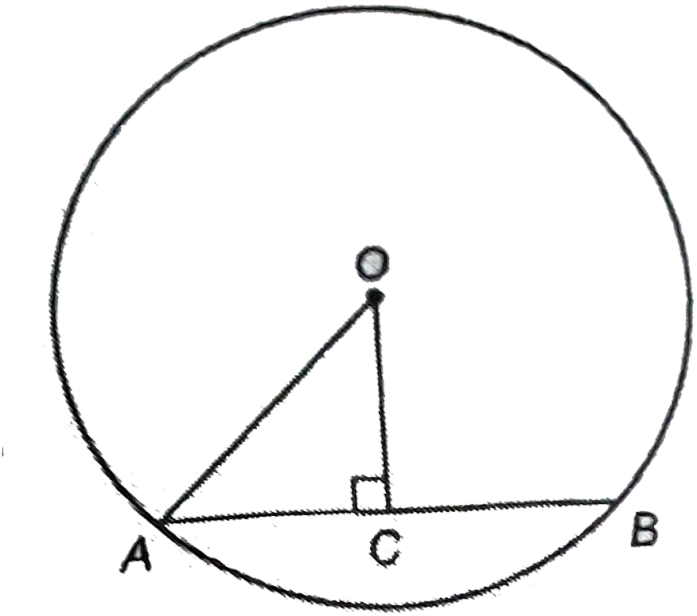
3. In the adjoining figure O is the centre of circle and c is the mid point. the radius of circle is 17 cm . if OC=8cm, then find the length

of chord AB.



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4. (i) Find the length of a chord which is at a distance of 12 cm from the centre of a circle of

radius 13cm.

(ii) The length of a chord is 16 cm of a circle of diameter 2 cm. find the perpendicular distance of this chord from the centre of the circle.

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5. A chord of length 24 cm is at a distance of 5 cm form the centre of the circle. Find the length of another chord of circle which is at a distance of 12 cm from the centre.

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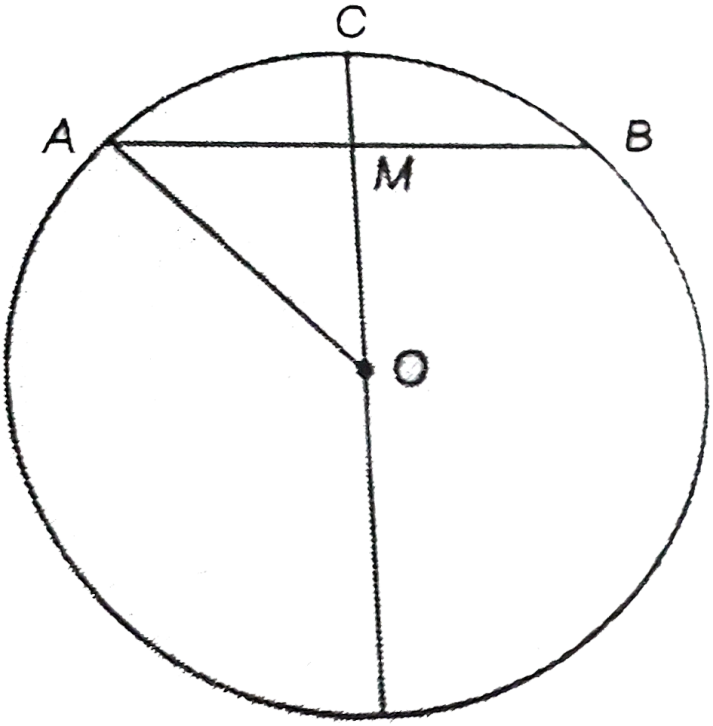
6. In the adjoining figure, AP=8cm, BP=2cm and $\angle CPA = 90^\circ$. Find the length of chord CD.



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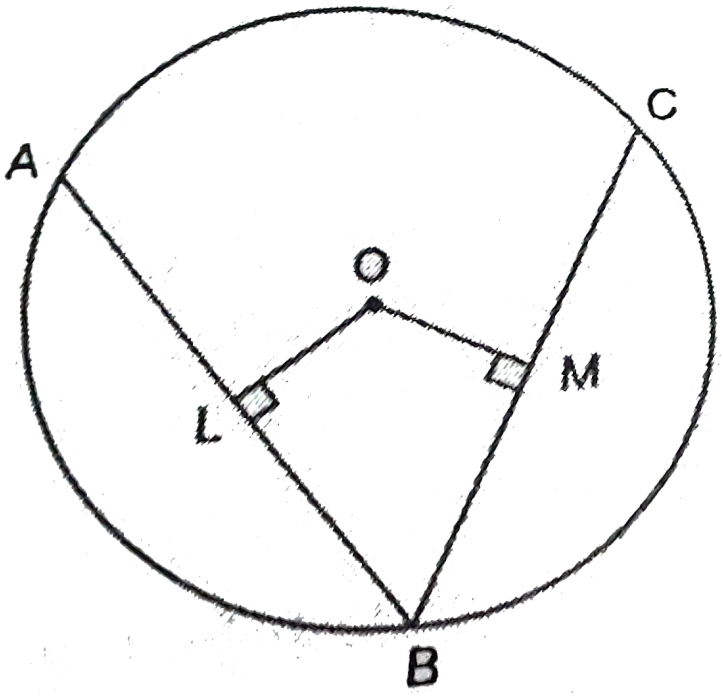
7. The height of circular arc ACB is 0.6 m. if the radius of circle is 3m , then find the length of the corresponding chord.



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8. In the adjoining figure, 'O' is the centre of the circle. OL and OM are perpendiculars from O to the chords AB and CD respectively. If $OL = OM$ and $AB = 16cm$, then find the length of CD.

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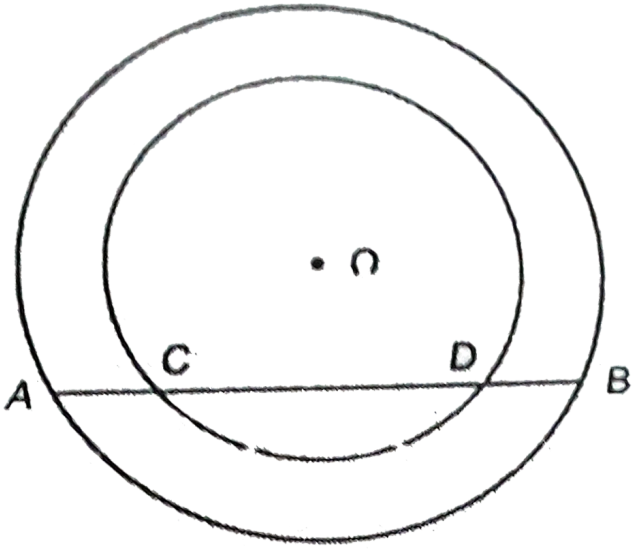
9. In the adjoining figure,O is the centre of two concentric circles. The chord AB of larger circle intersects the smaller circle at C and D.

(i) Find $AC : BD$.

(ii) If $AC = 2cm$, then find the length of BD.



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10. The length of common chord of two intersecting circles is 30 cm. If the diameters

of these two circles be 50 cm and 34 cm, calculate the distance between their centres.

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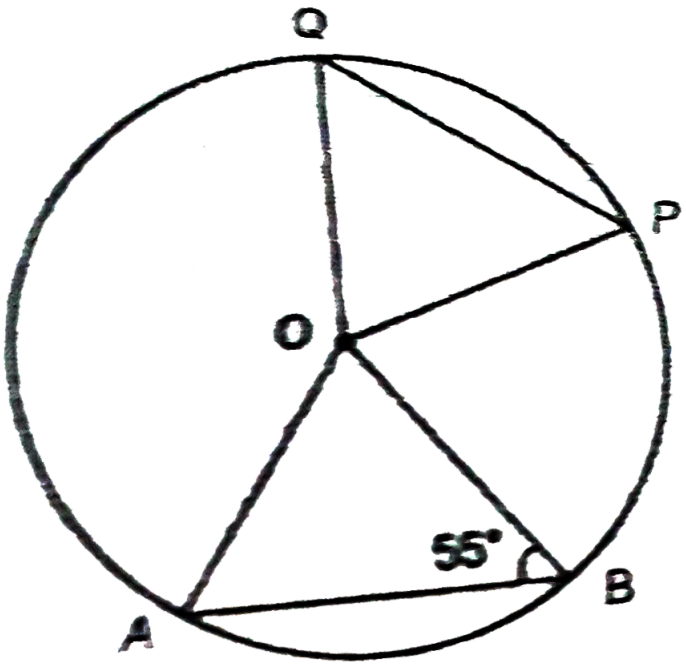
11. In the adjoining figure, chord $AB =$ chord PQ. If $\angle OBA = 55^\circ$, then find $\angle POQ$.



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12. Show that if two chords of a circle bisect one another they must be diameters.

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13. Two congruent circles intersect each other at points A and B. Through A any linesegment PAQ is drawn so that P, Q lie on the two circles. Prove that $BP = BQ$.

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14. If the two equal chords of a circle intersect :

(i) inside

(ii) on

(iii) outside

the circle, then show that the line segment joining the point of intersection to the centre of the circle will bisect the angle between the chords.

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15. prove that the line joining the mid-point of two equal chords of a circle subtends equal angles with the chord.

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16. If two circles intersect in two points, prove that the line through the centres is the perpendicular bisector of the common chord.

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17. Two parallel chords of a circle , 12 cm and 16 cm long are on the same of the centre. The distance between them is 2 cm. Find the radius of the circle.

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18. The diameter of a circle is 20 cm. There are two parallel chords of length 16 cm . And 12 cm. Find the distance between these chords if chords are on the:

(i) same side

(ii) opposite side of the centre.

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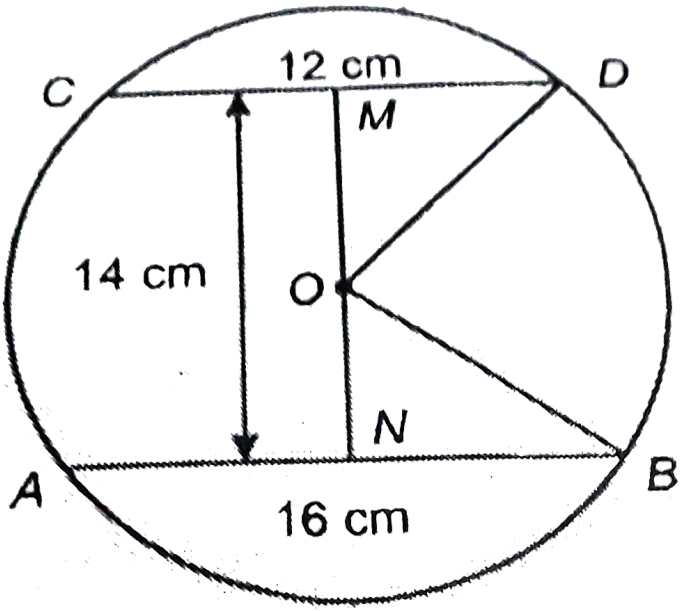
19. In the adjoining figure ,AB and CD are two parallel chords of a circle with centre O , whose length are 16 cm and 12 cm respectively. Find the radius of the circle if the distance between them is 14 cm.



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20. The length of two parallel chords of a circle are 6 cm and 8 cm . The radius of the circle is 5 cm. Find the distance btween them if :

(i) chords are on the same side of the centre.

(ii) chords are on the opposite side of the centre.

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21. What happen to area of circle, if its radius is doubled?

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22. Name the shape shown in centre of our national flag. In how many parts it is divided ? Also explain the value shown.

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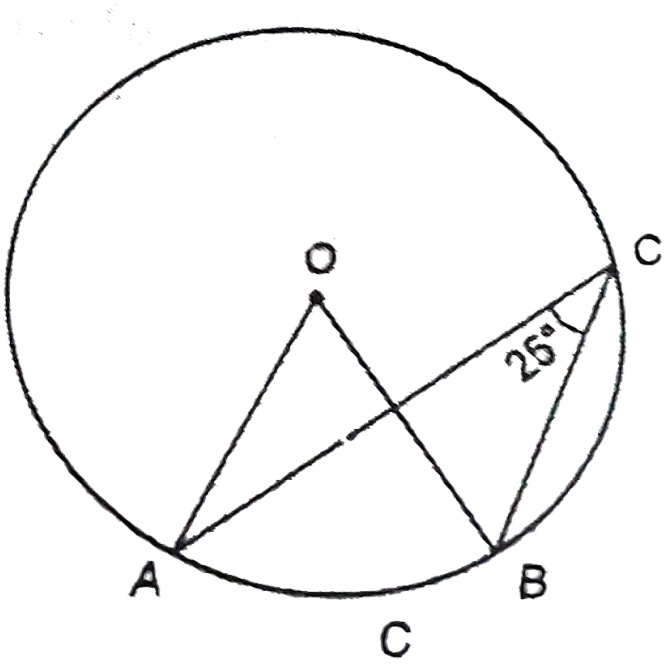
Exercise 10 B

1. In the adjoining figure , O is the centre of the circle. If $\angle ACB = 25^\circ$, then find $\angle AOB$.



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2. O is the centre of a circle and an equilateral ΔABC is inscribed in it. Find the value of $\angle BOC$.

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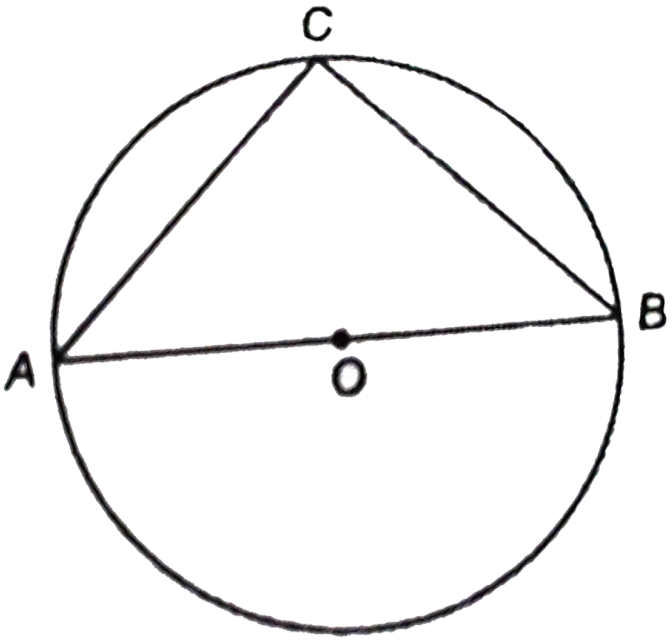
3. O is the centre of a circle of diameter AB. If chord $AC =$ chord BC, then find the value of

$\angle ABC$.



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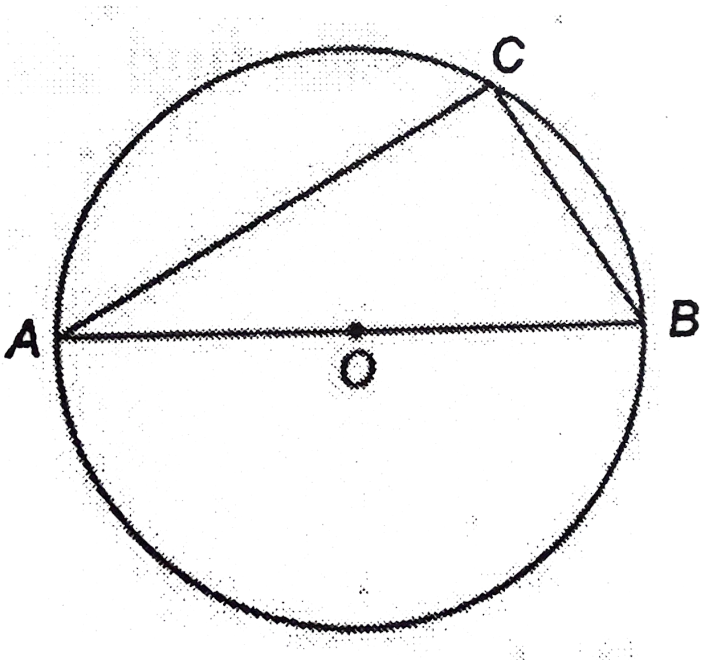
4. In the adjoining figure, O is the centre of the circle and AB is its diameter. If AC=8 cm

and BC= 6cm, then find the radius of the circle.



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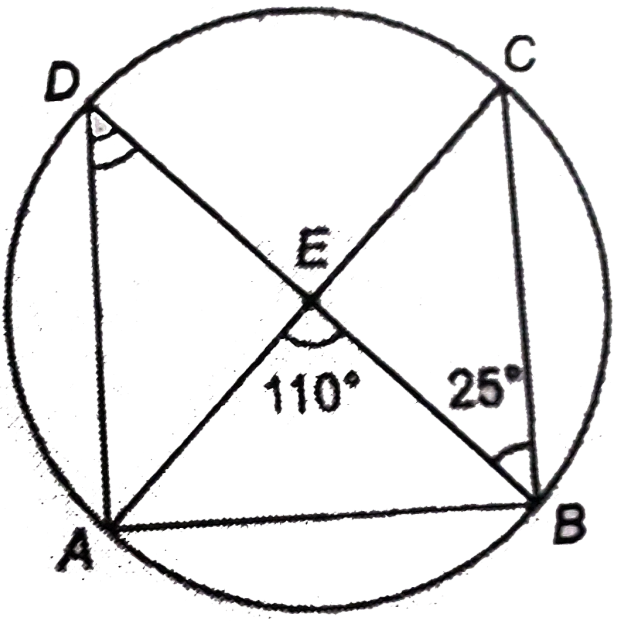
5. In the adjoining figure, AB is a chord of the circle. If $\angle AEB = 110^\circ$ and $\angle EBC = 25^\circ$

,then find the value of $\angle ADB$.



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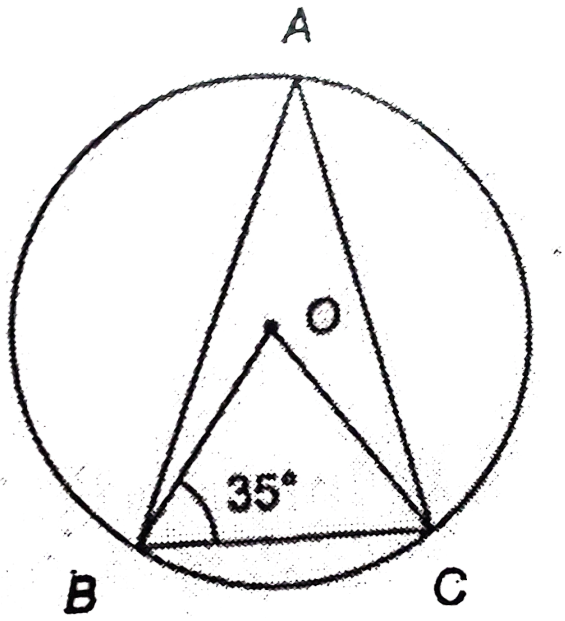
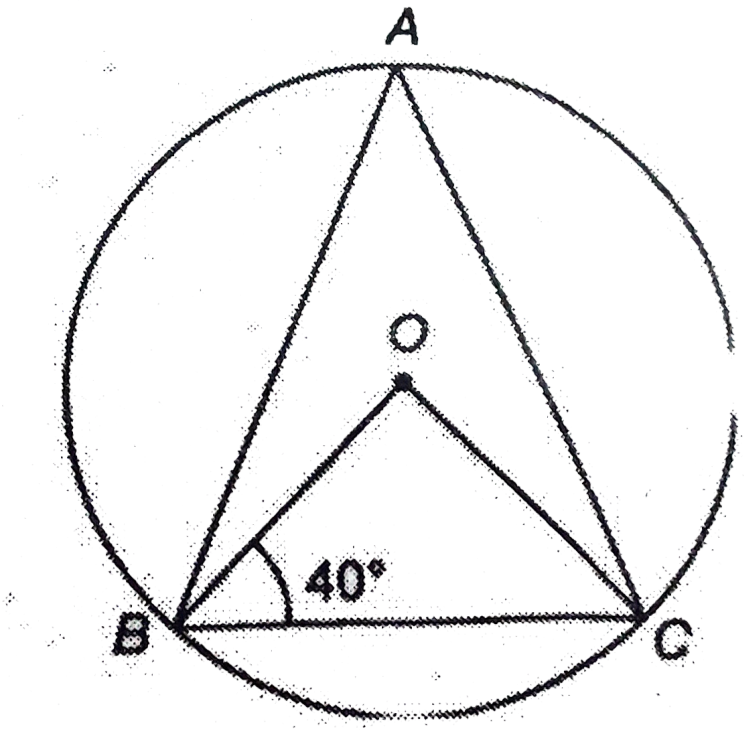
6. (i) In the adjoining figure, O is the centre of the circle. If $\angle OBC = 35^\circ$, then find the value

of $\angle BAC$.



(ii) In the adjoining figure, O is the centre of the circle. If $\angle OBC = 40^\circ$, then find the value

of $\angle BAC$.



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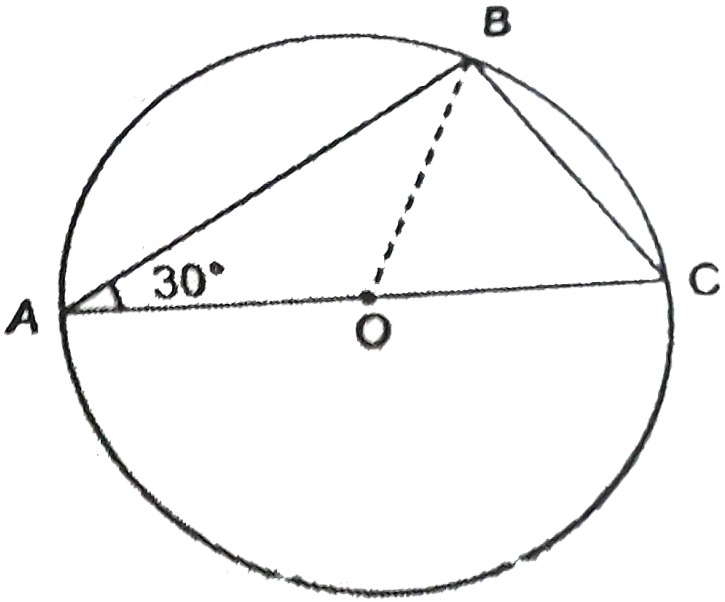
7. In the adjoining figure, O is the centre of the circle and AC is its diameter. If $\angle BAC = 30^\circ$, then find $\angle BOC$.



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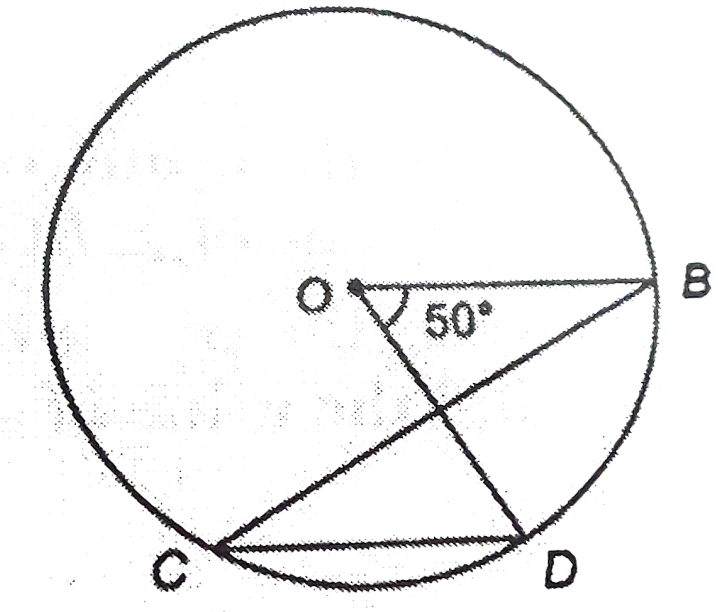
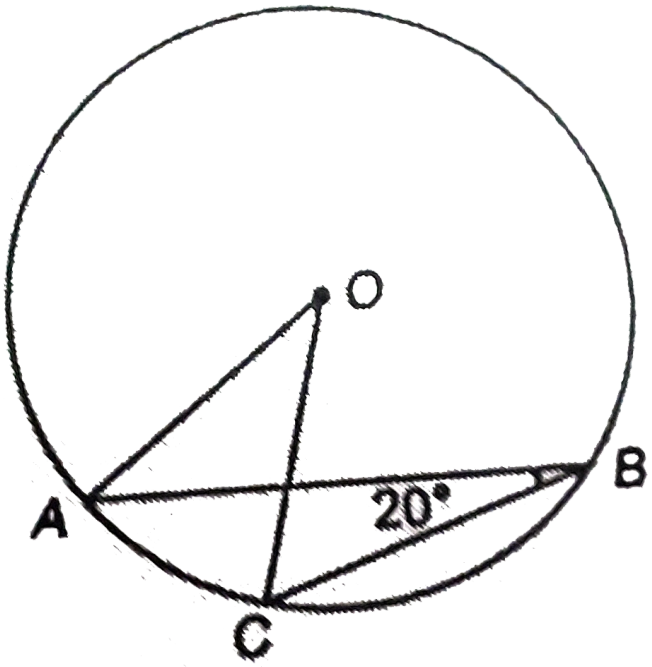
8. In the adjoining figure, O is the centre of the circle. If $\angle BOD = 50^\circ$, then find $\angle BCD$.



(ii) In the adjoining figure,O is the centre of

the circle. If $\angle ABC = 20^\circ$, then find $\angle AOC$.



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9. A rectangle in inscribed in a circle of radius 5 cm. if the breadth of the rectangle is 6 cm.

then find the length of the rectangle.

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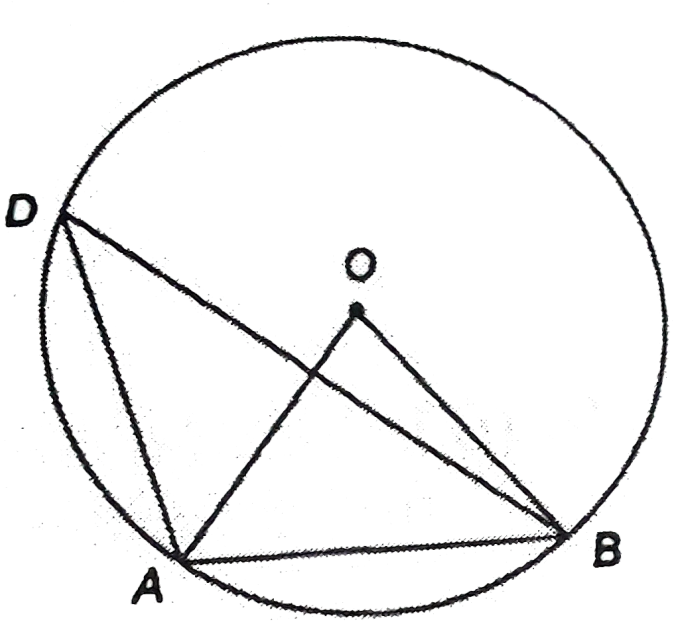
10. In the adjoining figure, O is the centre of the circle. If the chord AB is equal to the radius

of the circle, then find the value of $\angle ADB$.



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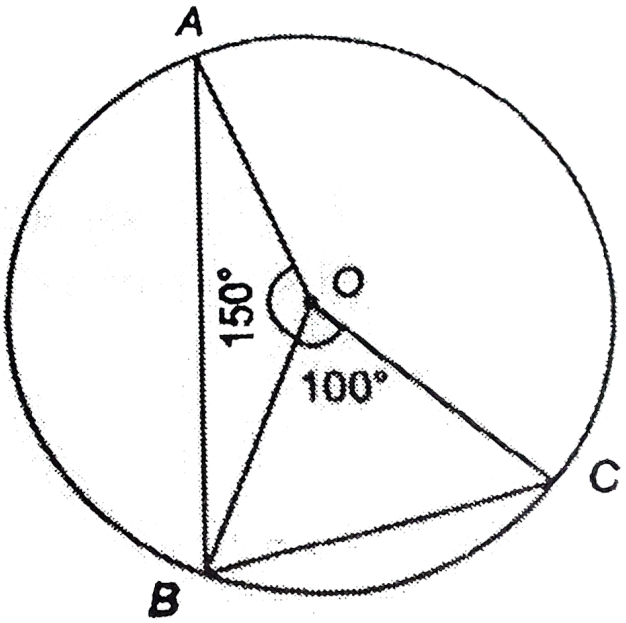
11. In the adjoining figure, O is the centre of the circle. If $\angle AOB = 150^\circ$ and

$\angle BOC = 100^\circ$, then find the value of $\angle ABC$.



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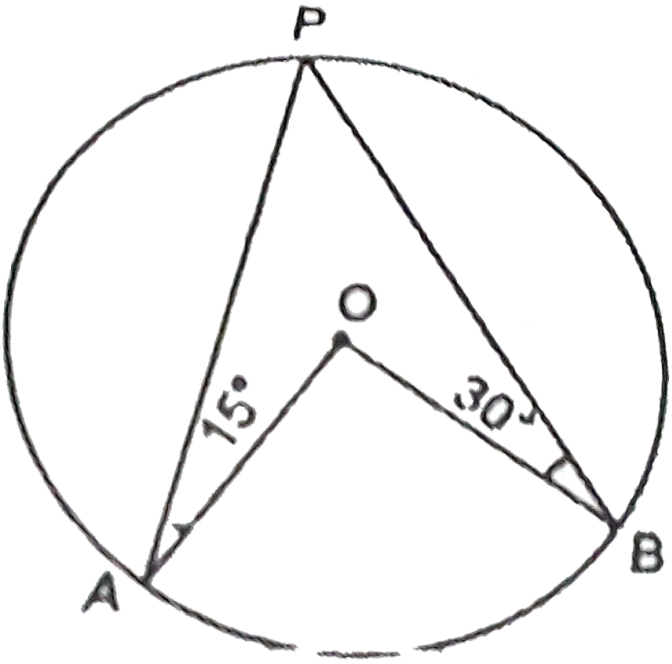
12. In the adjoining figure, O is the centre of the circle. If $\angle PAO = 15^\circ$ and $\angle PBO = 30^\circ$

, then find the value of $\angle AOB$.



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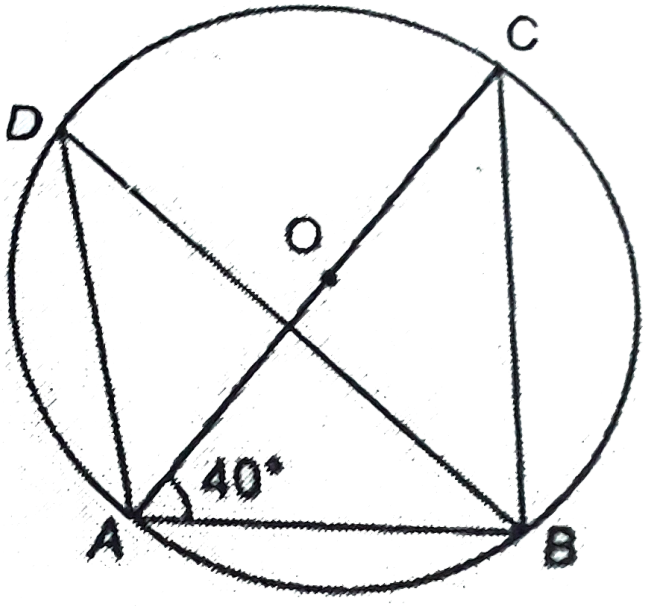
13. In the adjoining figure, $\angle ADB$ and $\angle ACB$ are the angles in the same segment and chord AC passes through the centre O. If $\angle CAB = 40^\circ$ then find the value of $\angle ADB$.



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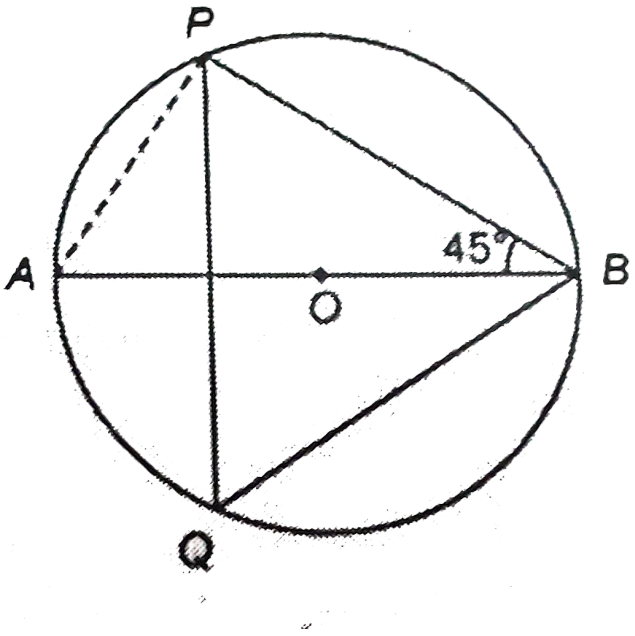
14. In the adjoining figure, AOB is the diameter of the circle. If $\angle ABP = 45^\circ$, then find the value of $\angle PQB$.



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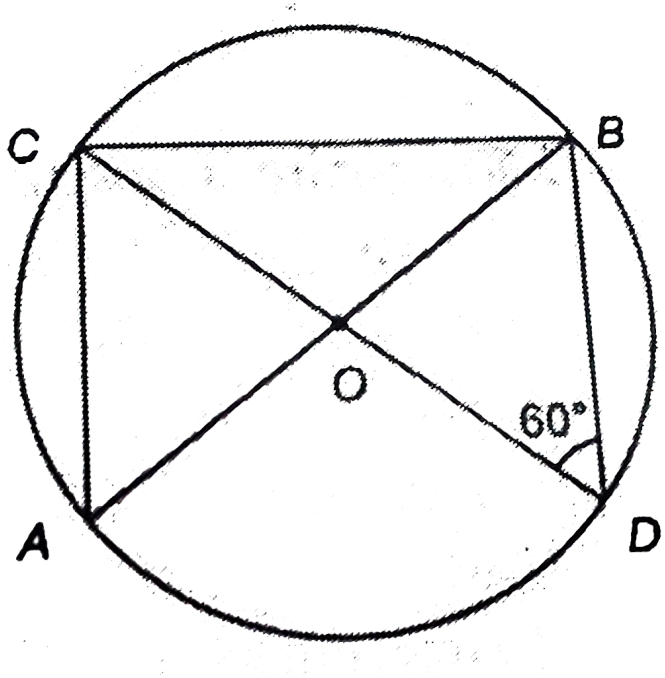
15. In the adjoining figure, AOB is the diameter and O is the centre of the circle. If $\angle BDC = 60^\circ$, then find the value of $\angle ABC$.



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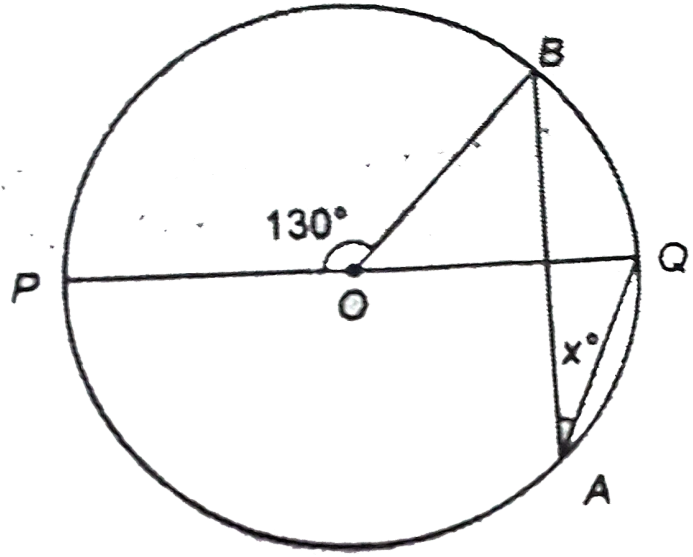
16. In the adjoining figure, O is the centre of the circle. If $\angle BOP = 130^\circ$, then find the value of x.



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17. Prove that the circle drawn on any one of the equal sides of an isosceles triangle as diameter bisects the base.

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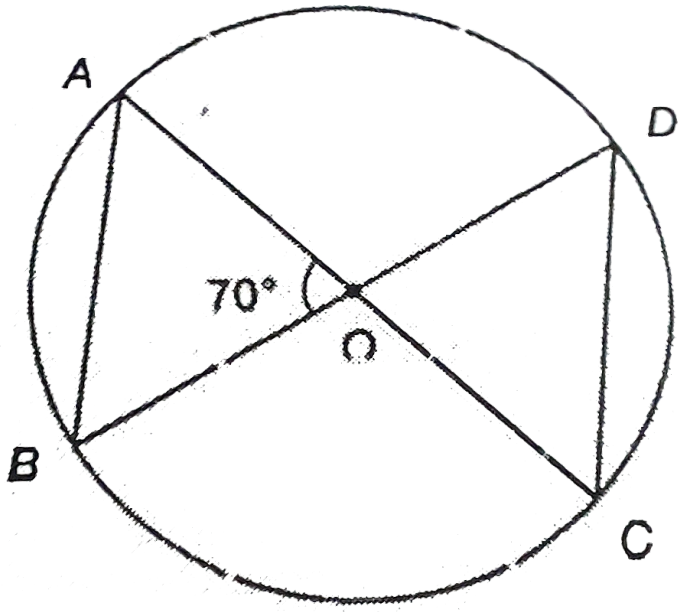
18. In the adjoining figure, O is the centre of the circle. If $\angle AOB = 70^\circ$, then find the value

of $\angle OCD$.



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19. Two diameters of a circle intersect each other at right angles. Prove that the

quadrilateral formed by joining their end-points is a square.

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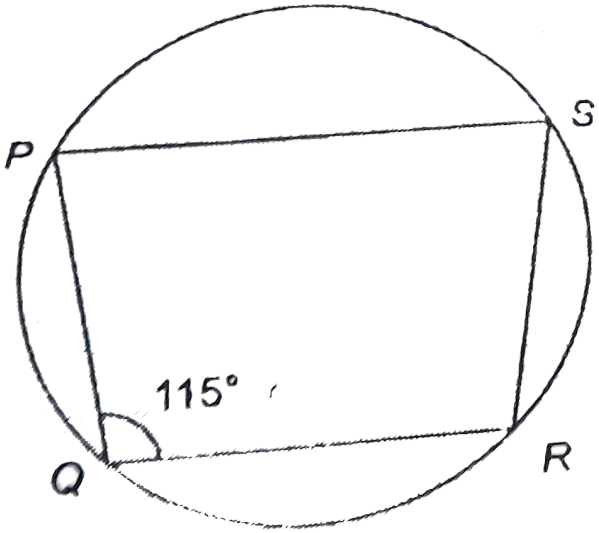
Exercise 10 C

1. In the adjoining figure, $PS \| QR$ and $\angle Q = 115^\circ$, then find the values of $\angle P$,

$anl \geq R$ and $\angle S$.



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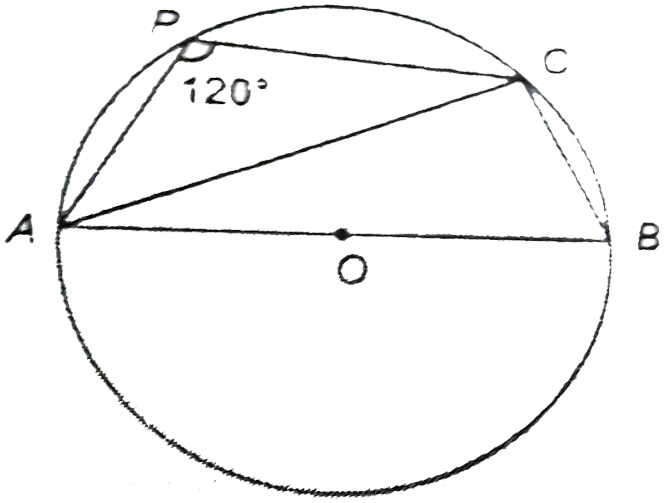
2. In the adjoining figure, ABCD is a cyclic quadrilateral and AB is the diameter of the circle. If $\angle APC = 120^\circ$, then find the value of

$\angle CAB$.



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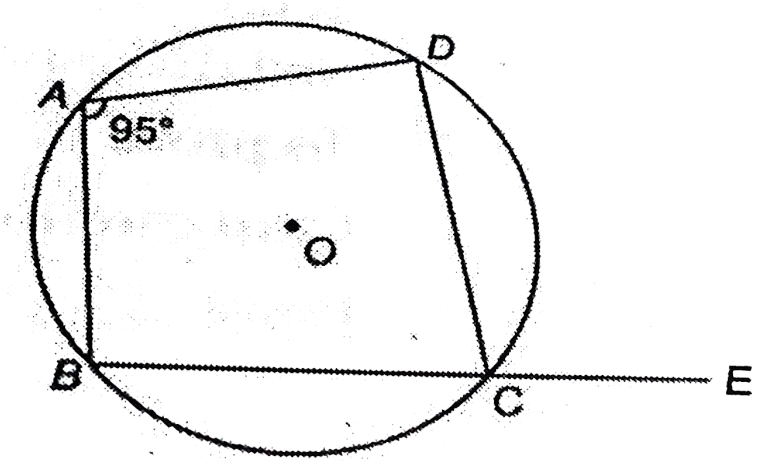
3. In the adjoining figure, ABCD is a cyclic quadrilateral.If side BC is produced upto point E and $\angle DAB = 95^\circ$, then find the value of

$\angle DCE$.



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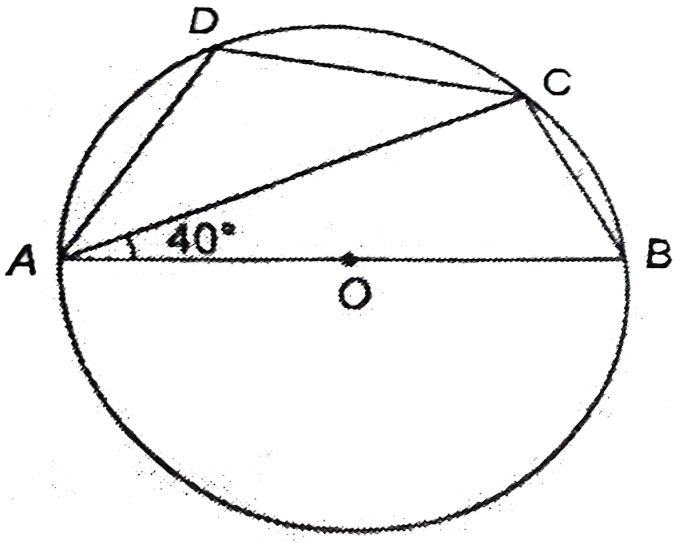
4. In the adjoining figure, O is the centre of the circle.If $\angle BAC = 40^\circ$, then find the value

of $\angle ADC$.



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5. ABCD is a cyclic trapezium in which, $AD||BC$ and $\angle B = 70^\circ$. Find its remaining angles,

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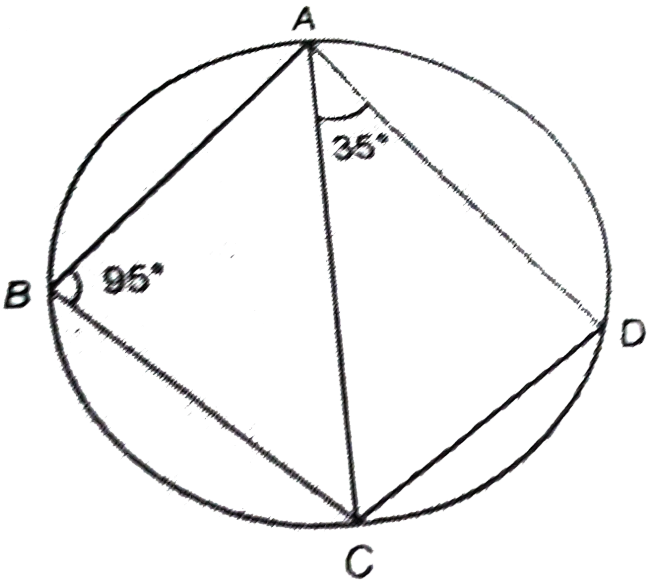
6. In the adjoining figure, $\angle ABC = 95^\circ$ and $\angle DAC = 35^\circ$, then find the value of $\angle ACD$.



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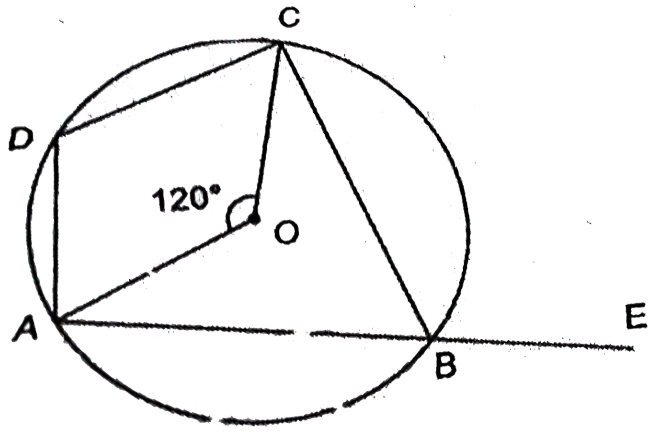
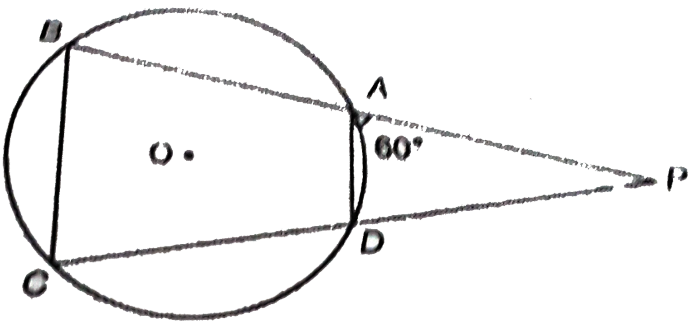
7. (i) In the adjoining figure, find the value of $\angle CBE$.



(ii) In the adjoining figure, two lines PAB and PDC cut a circle at points A,B,C and D. if

$\angle PAD = 60^\circ$,then find the value of $\angle BCD$.



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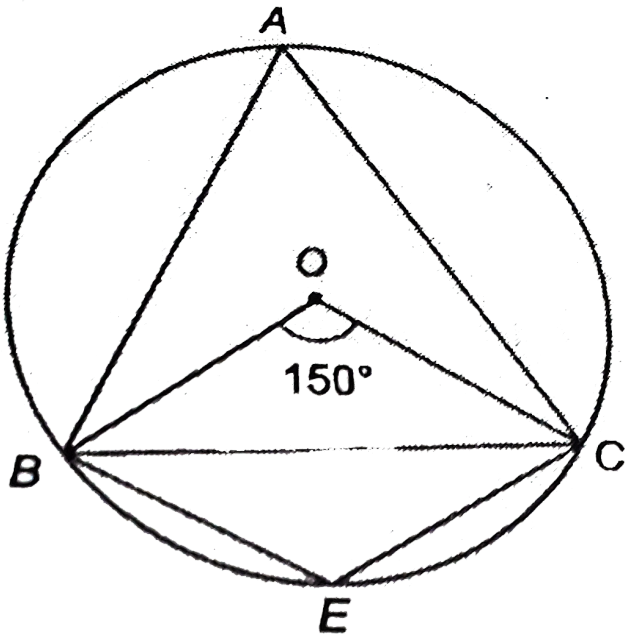
8. In the adjoining figure, O is the centre of the circle. Find the value of $\angle BEC$.



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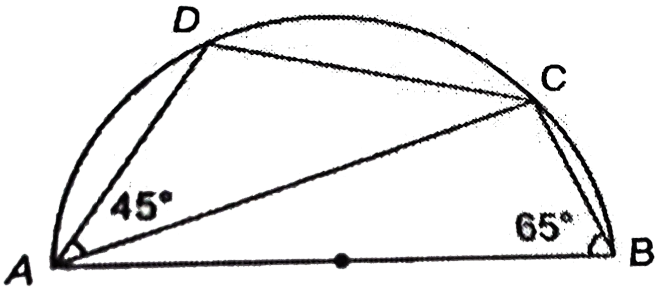
9. In the adjoining figure, AB is the diameter of the circle and two points C and D are on the circle. If $\angle CAD = 45^\circ$ and $\angle ABC = 65^\circ$,

then find the value of $\angle DCA$.



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10. In the adjoining figure,AB is the diameter of the circle of centre O & the chord CD is equal to radius. If P is an external point, then find the value of $\angle APB$.

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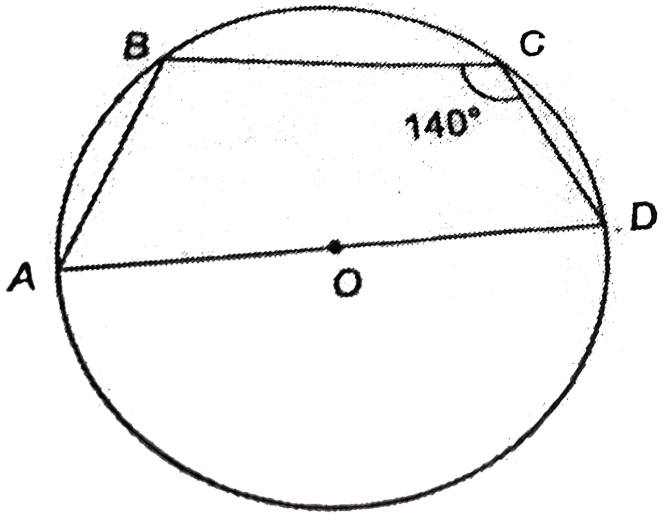
11. In the adjoining figure, AD is the diameter of the circle and $\angle BCD = 140^\circ$. Find the value of $\angle ADB$.



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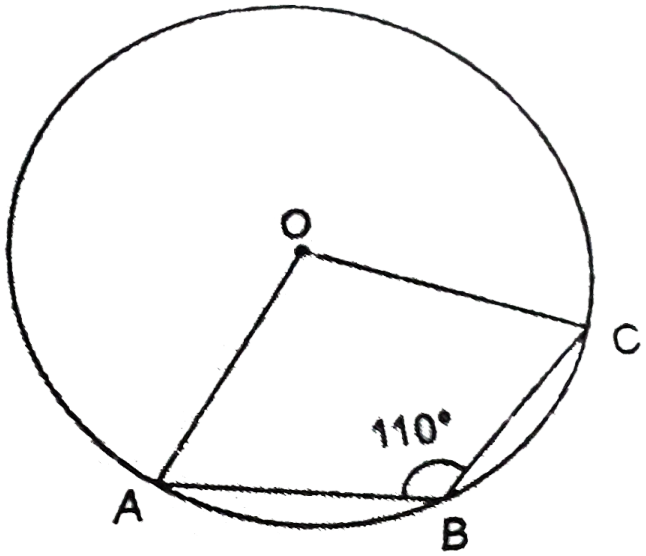
12. In the adjoining figure,O is the centre of the circle. If $\angle ABC = 110^\circ$, then find the value of $\angle AOC$.



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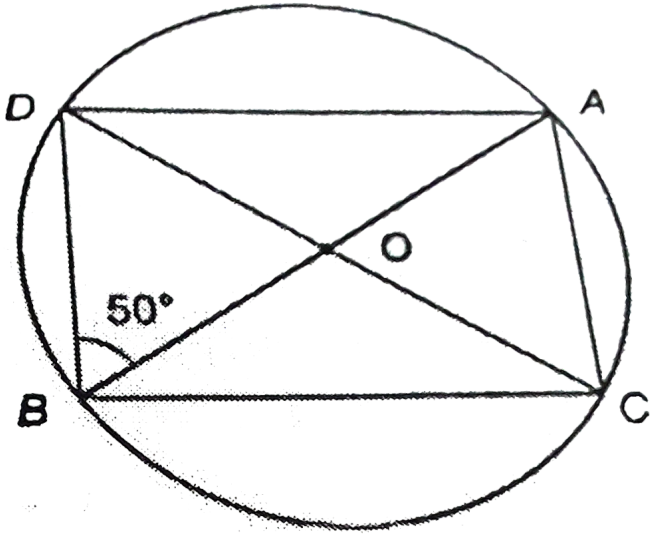
13. In the adjoining figure, O is the centre of a circle in which AB and CD are two diameters. Prove that $AC||BD$ and $AD||BC$. If $\angle OBD = 50^\circ$, then find the value of $\angle AOC$.



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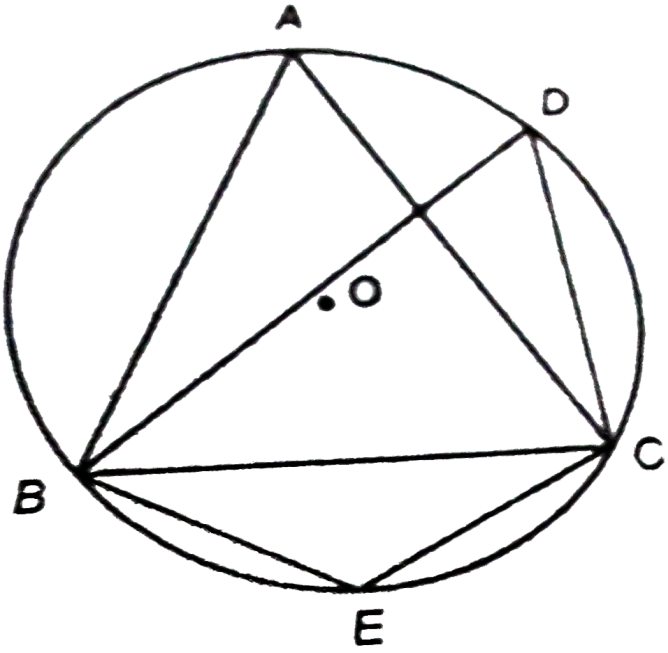
14. In the adjoining figure, ΔABC is an isosceles triangle. Find the value of $\angle BDC$ and $\angle BEC$.



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15. The quadrilateral formed by angle bisectors of a cyclic quadrilateral is also cyclic.

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16. If the exterior angle of a quadrilateral formed by producing one of its sides is equal to the interior opposite angle, prove that the quadrilateral is cyclic.

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17. An angle of a cyclic trapezium is twice the other angle. Find the value of the smaller angle.

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

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19. A cyclic trapezium is isosceles and its diagonals are equal.

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20. If two opposite sides of a cyclic quadrilateral are equal, then the other two sides are parallel.

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Revision Exercise Very Short Answer Question

1. If O is the centreof a circle of radius r and AB is a chord of the circle at a distance $\frac{r}{2}$ from O, then $\angle BAO =$ 60^0 (b) 45^0 (c) 30^0 (d) 15^0

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2. The chord of a circle is equal to its radius, find the angle subtended by this chord at the centre.

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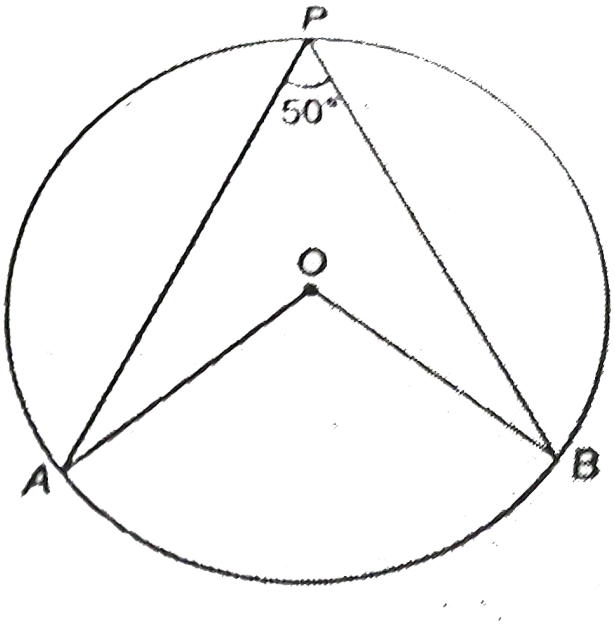
3. Find $\angle AOB$ in the given figure.



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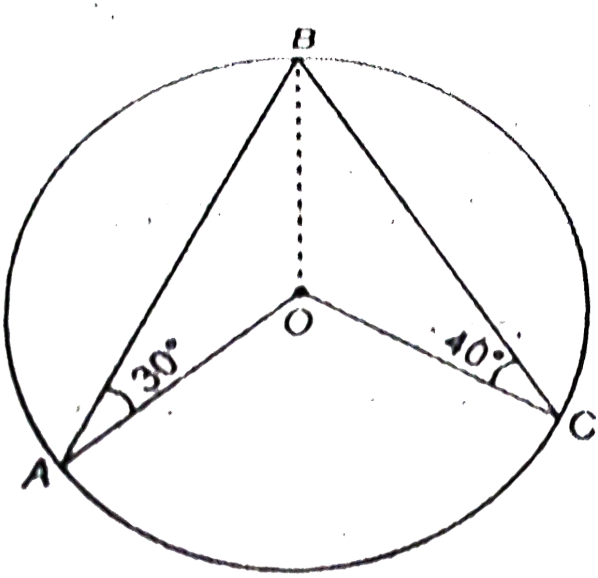
4. In the given figure, find $\angle ABC$.



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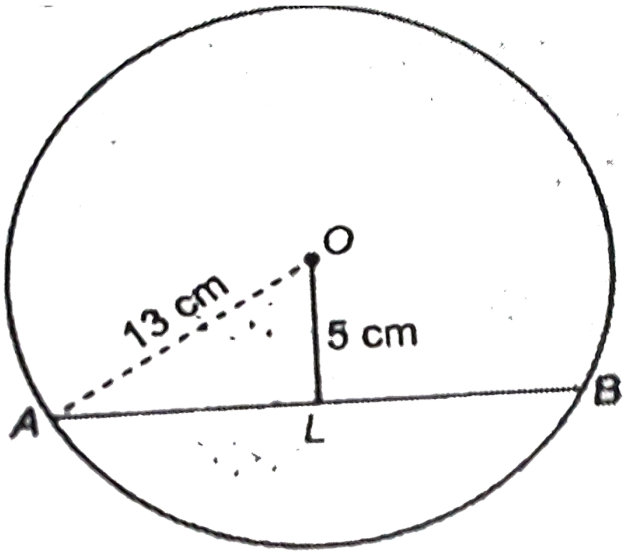
5. In the given figure , find the length of chord AB .



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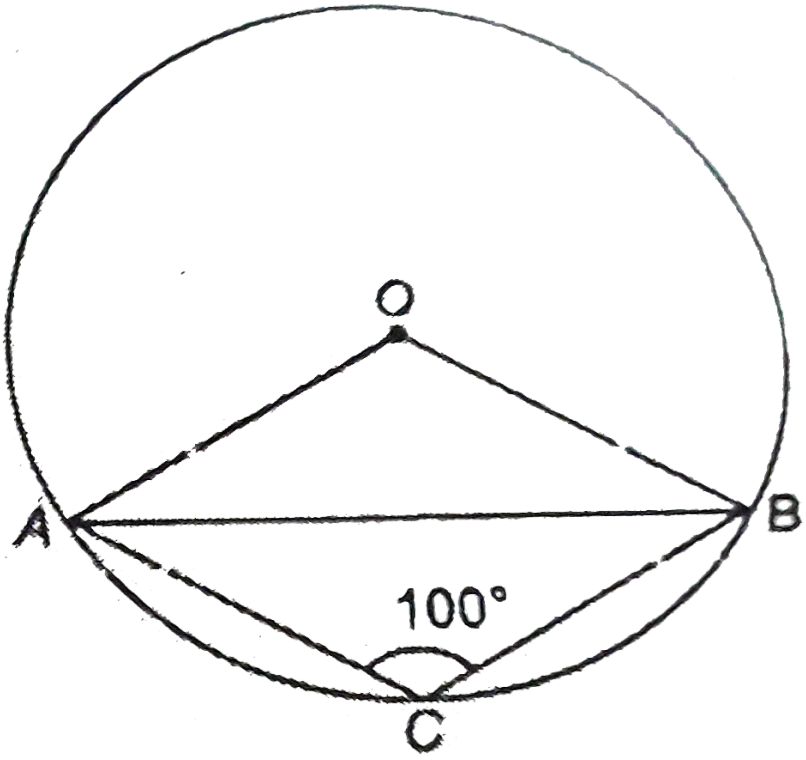
6. In the given figure, find $\angle AOB$.



A. 140°

B. 120°

C. 150°

D. 160°

Answer: D

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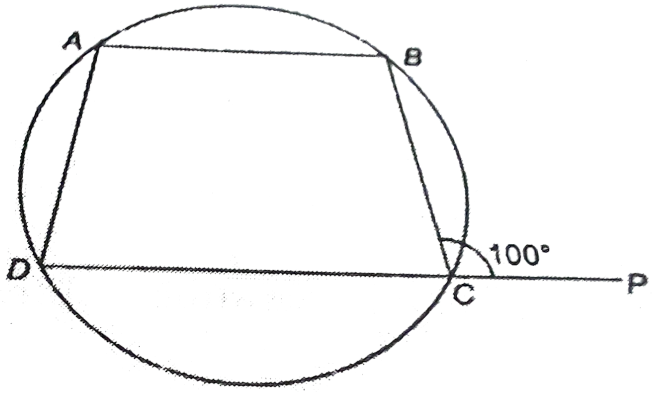
7. Find $\angle A$ in the given figure.



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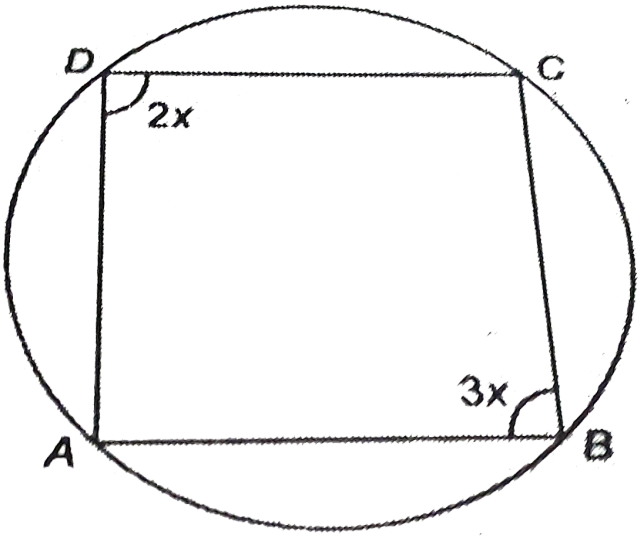
8. In the given figure, find $\angle D$ and $\angle B$.



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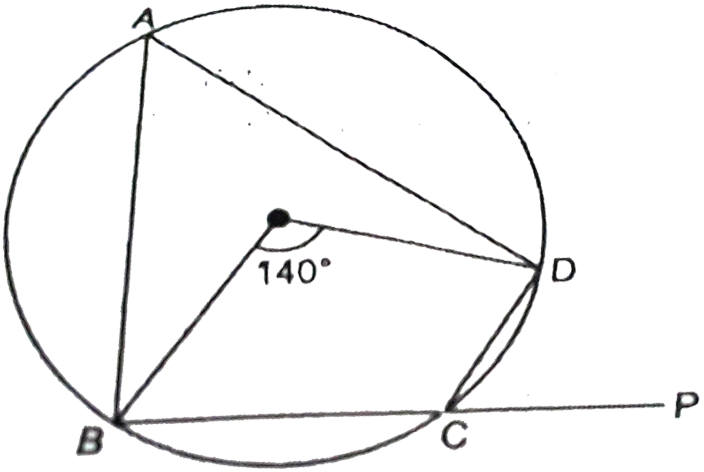
9. In the given figure , find $\angle DCP$.



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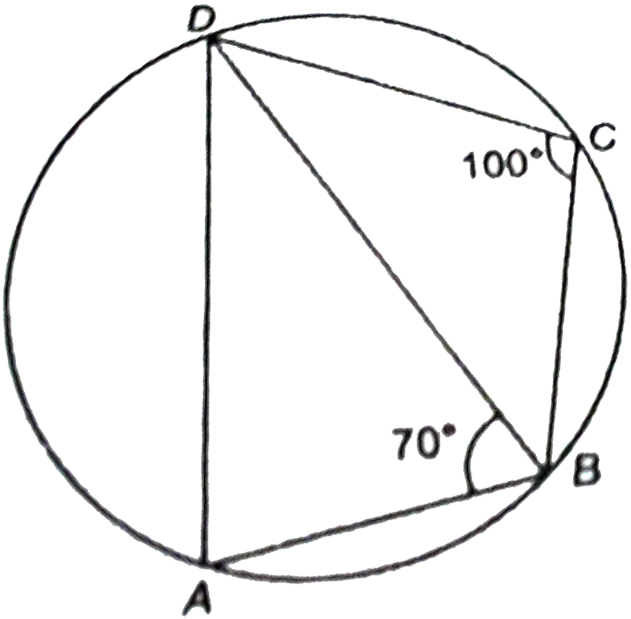
10. In the given figure, find $\angle ADB$, if $\angle DCB = 100^\circ$ and $\angle DBA = 70^\circ$.



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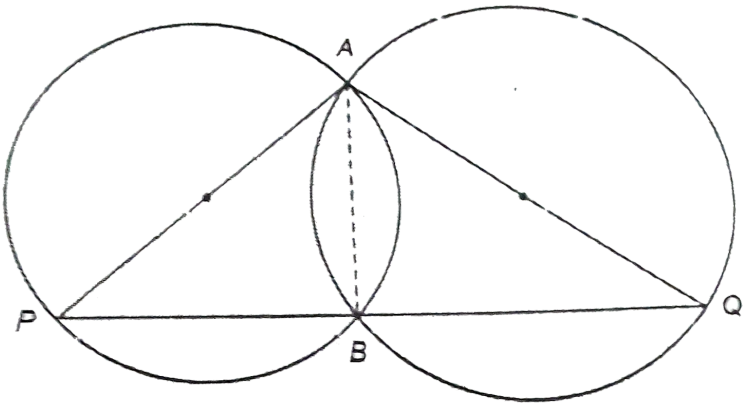
Revision Exercise Short Answer Questions

1. In the figure, two circles intersect each other at points A and B. AP and AQ are the diameters of these circels. Prove that PBQ is a straight line.



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2. AB and CD are two parallel chords of a circle which are on opposite sides of the centre such that $AB = 10cm$, $CD = 24cm$ and the distance between AB and CD is $17cm$. Find the radius of the circle.

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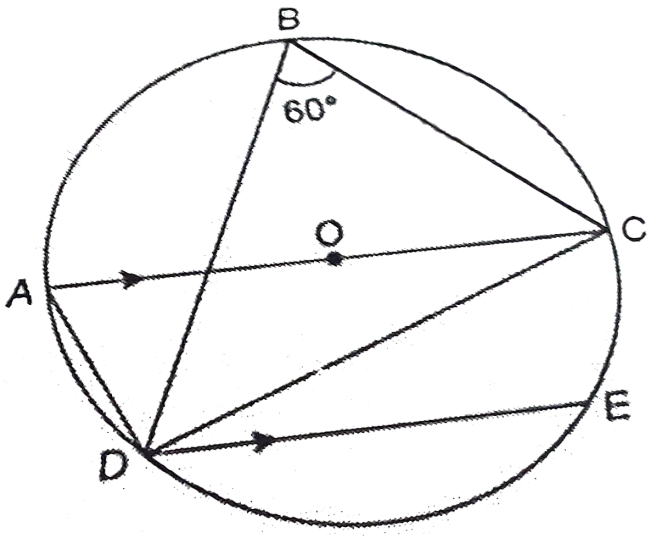
3. In the adjoining figure, DE is a chord parallel to diameter AC to the circle with centre. O if

$\angle CBD = 60^\circ$. Calculate $\angle CDE$.



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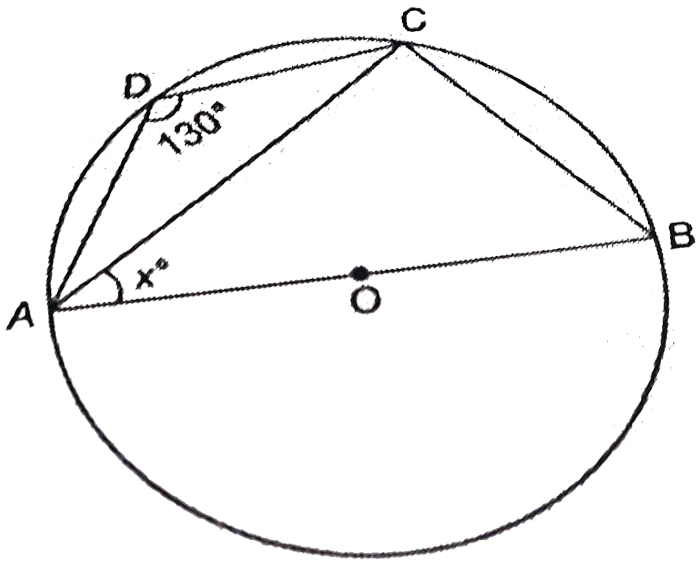
4. In the given figure, O is the centre of a circle and $\angle ADC = 130^\circ$.If $\angle BAC = x^\circ$, Find the

value of x.



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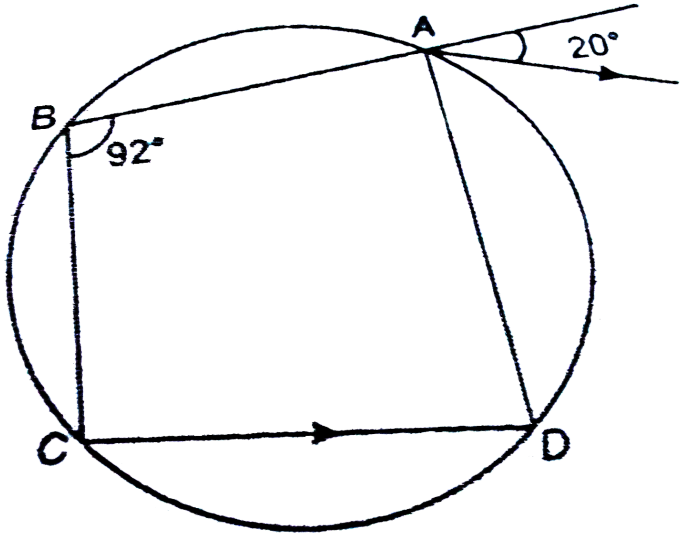
5. In the given figure ABCD is a cyclic quadrilateral in which AE is drawn parallel to CD and BA is produced. If $\angle ABC = 92^\circ$ and

$\angle FAE = 20^\circ$, Find $\angle BCD$.



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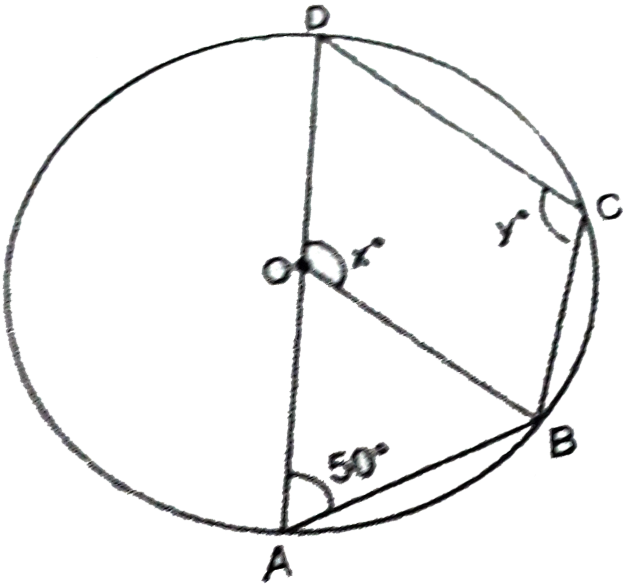
6. In the adjoining figure, O is the centre of circle. If $\angle DAB = 50^\circ$ find the values of x and

y.



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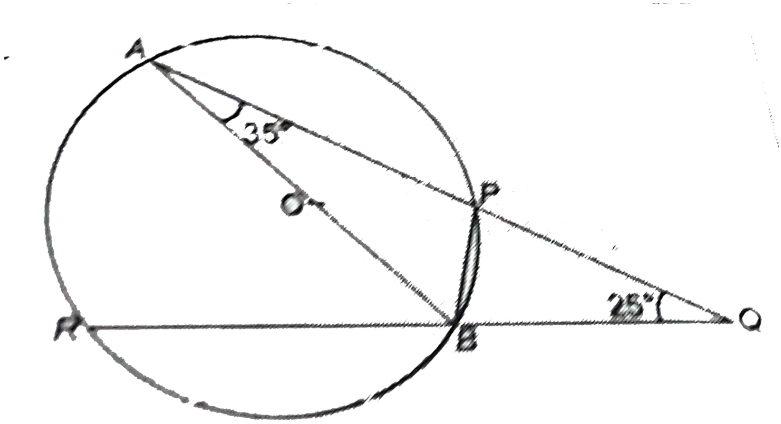
7. In the adjoining figure, AB is a diameter of the circle such that $\angle A = 35^\circ$ and $\angle Q = 25^\circ$,

find $\angle PBR$.



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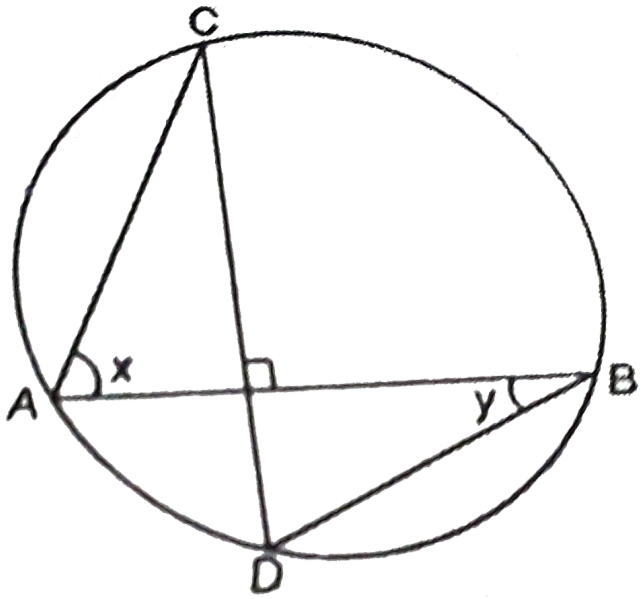
8. In the adjoining figure, if chords AB and CD of the circle intesect each other at right

angles, then find the value of $x + y$.



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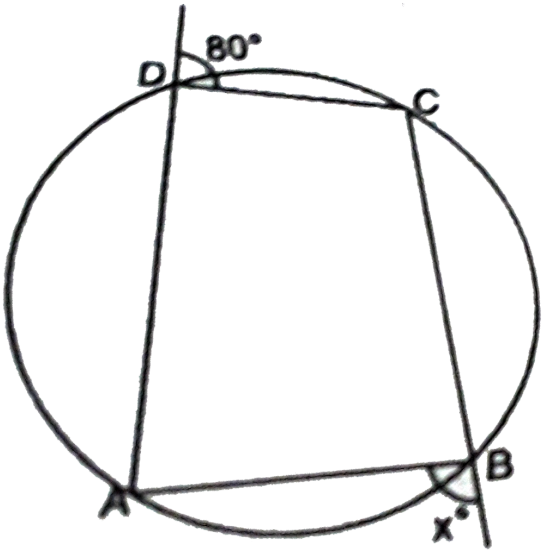
9. In the adjoining figure, if ABCD is a cyclic quadrilateral, find the value of x.



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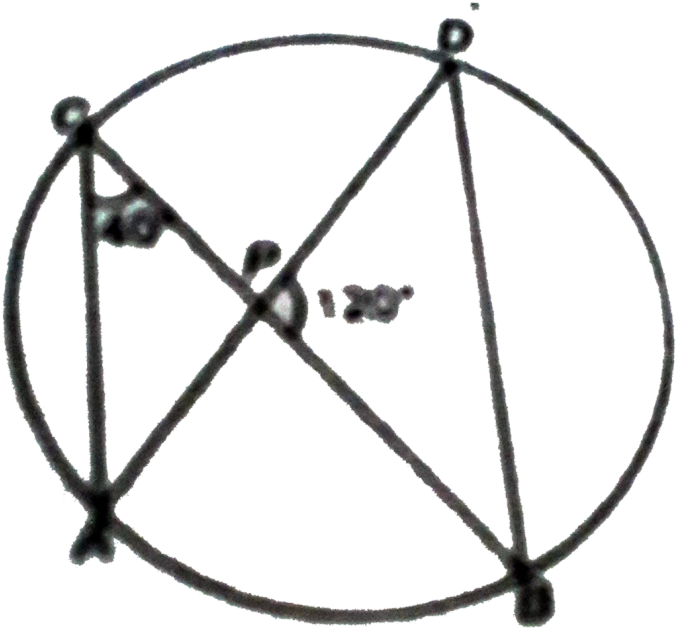
10. In the adjoining figure, if $\angle ACB = 40^\circ$, $\angle DPB = 120^\circ$, then find $\angle CBD$.



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Revision Exercise Long Answer Questions

1. AB *and* CD are two chords of a circle such that $AB = 6\,cm,\ CD = 12\,cm$ If the distance between AB and CD is $3cm$ find the radius of the circle.

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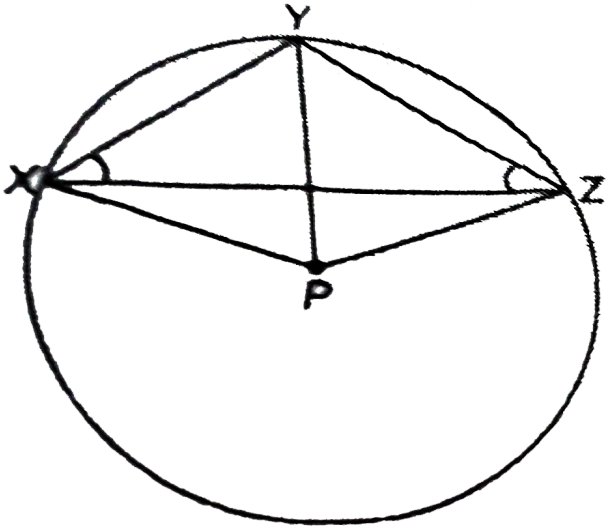
2. In the adjoining figure, P is the centre of the circle. Prove that

$\angle XPZ = 2(\angle XZY + \angle YXZ)$.



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3. Bisectors of angles A, B and C of a triangle ABC intersect its circumcircle at D, E and F respectively. Prove that the angles of the

triangle DEF are $90^\circ - \frac{1}{2}A, 90^\circ - \frac{1}{2}B$ and $90^\circ - \frac{1}{2}C$

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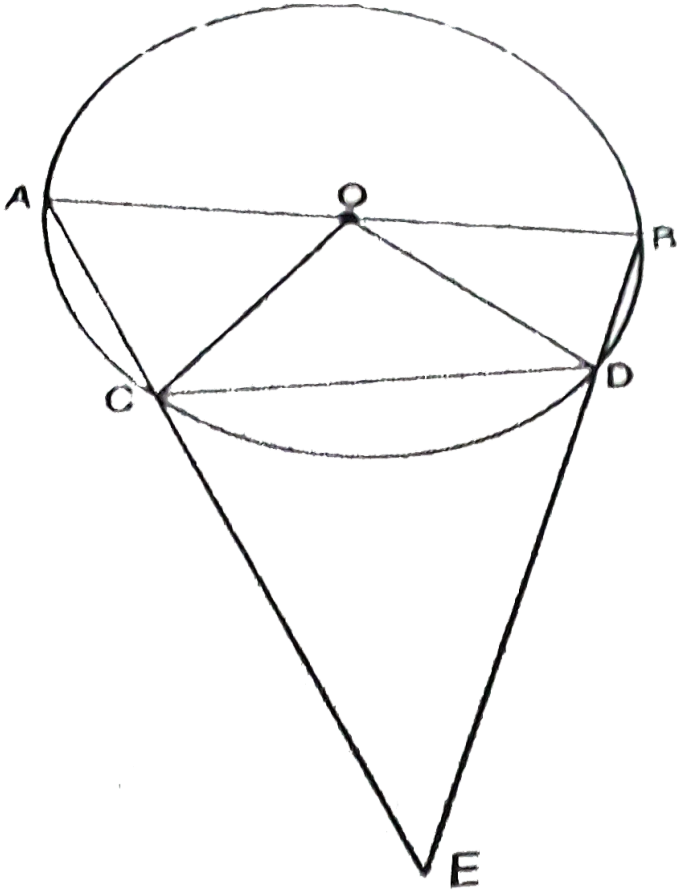
4. In the adjoinig figure, AB is a diameter of the circle, CD is a chord equal to the radius of the circle. AC and BD when extended intersect

at a point E. Prove that $\angle AEB = 60^\circ$.



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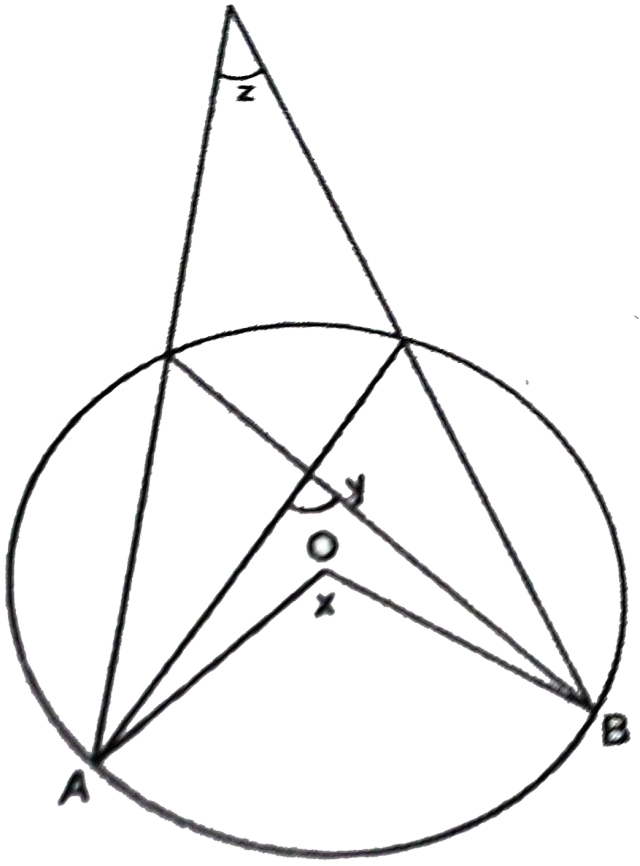
5. In the adjoining figure, O is the centre of the circle, Prove that $\angle x = \angle y + \angle z$.



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