EXERCISE 10.1 - Question No. 1

Fill in the blanks: (i) The centre of a circle lies in of the circle. (exterior/ interior) (ii) A point, whose distance from the centre of a circle is greater than its radius lies in of the circle. (exterior/ interior) (iii) The longest chord of a circle is a_____ of the circle. (iv) An arc is a _____when its ends are the ends of a diameter. (v) Segment of a circle is the region between an arc and_____ of the circle. (vi) A circle divides the plane, on which it lies, in_____ parts.

EXERCISE 10.1 - Question No. 2

Write True or False: Give reasons for your answers. (i) Line segment joining the centre to any point on the circle is a radius of the circle. (ii) A circle has only finite number of equal chords. (iii) If a circle is divided into three equal arcs, each is a major arc. (iv) A chord of a circle, which is twice as long as its radius, is a diameter of the circle. (v) Sector is the region between the chord and its corresponding arc. (vi) A circle is a plane figure.

EXERCISE 10.2 - Question No. 1

Recall that two circles are congruent if they have the same radii.

Prove that equal chords of congruent circles subtend equal angles at their centres.

EXERCISE 10.2 - Question No. 2

Prove that if chords of congruent circles subtend equal angles at their centres, then the chords are equal.

EXERCISE 10.3 - Question No. 1

Draw different pairs of circles. How many points does each pair have in common? What is the maximum number of common points?

EXERCISE 10.3 - Question No. 2

Suppose you are given a circle. Give a construction to find its centre.

EXERCISE 10.3 - Question No. 3

If two circles intersect at two points, prove that their centres lie on the perpendicular bisector of the common chord.

EXERCISE 10.4 - Question No. 1

Two circles of radii 5 cm and 3 cm intersect at two points and the distance between their centres is 4 cm. Find the length of the common chord.

EXERCISE 10.4 - Question No. 2

If two equal chords of a circle intersect within the circle, prove that the segments of one chord are equal to corresponding segments of the other chord.

EXERCISE 10.4 - Question No. 3

If two equal chords of a circle intersect within the circle, prove that the line joining the point of intersection to the centre makes equal angles with the chords.

EXERCISE 10.4 - Question No. 4

If a line intersects two concentric circles (circles with the same centre) with centre O at A, B, C and D, prove that AB = CD (see Fig. 10.25).

EXERCISE 10.4 - Question No. 5

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 is 6m each, what is the distance between Reshma and Mandip?

EXERCISE 10.4 - Question No. 6

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.

EXERCISE 10.5 - Question No. 1

In Fig. 10.36, A,B and C are three points on a circle with centre O such that $\angle BOC = 30^o$ and $\angle AOB = 60^o$. If D is a point on the circle other than the arc ABC, find $\angle ADC$.

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EXERCISE 10.5 - Question No. 2

A chord of a circle is equal to the radius of the circle. Find the angle subtended by the chord at a point on the minor arc and also at a point on the major arc

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EXERCISE 10.5 - Question No. 3

In Fig. 10.37, $\angle PQR = 100o$, where P, Q and R are points on a circle with centre O. Find $\angle OPR$.

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EXERCISE 10.5 - Question No. 4

In Fig. 10.38, $\angle ABC = 69$, $\angle ACB = 31$, find $\angle BDC$

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EXERCISE 10.5 - Question No. 5

In Fig. 10.39, A, B, C and D are four points on a circle. AC and BD intersect at a point E such that $\angle BEC = 130o$ and

$\angle ECD = 20 \odot$ Find $\angle BAC$.

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EXERCISE 10.5 - Question No. 6

ABCD is a cyclic quadrilateral whose diagonals intersect at a point E. If $\angle DBC = 70^o$, $\angle BAC \, is \, 30^o$, find $\angle BCD$. Further, if $AB = BC$, find$\angle ECD$.

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EXERCISE 10.5 - Question No. 7

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

EXERCISE 10.5 - Question No. 8

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

EXERCISE 10.5 - Question No. 9

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 $\angle ACP = \angle QCD$.

EXERCISE 10.5 - Question No. 10

If circles are drawn taking two sides of a triangle as diameters, prove that the point of intersection of these circles lie on the third side

EXERCISE 10.5 - Question No. 11

ABC and ADC are two right triangles with common hypotenuse AC. Prove that $\angle CAD = \angle CBD$.

EXERCISE 10.6 - Question No. 1

Prove that the line of centres of two intersecting circles subtends equal angles at the two points of intersection

EXERCISE 10.6 - Question No. 2

Two chords AB and CD of lengths 5 cm and 11 cm respectively of a circle are parallel to each other and are on opposite sides of its centre. If the distance between AB and CD is 6 cm, find the radius of the circle.

EXERCISE 10.6 - Question No. 3

The lengths of two parallel chords of a circle are 6 cm and 8 cm. If the smaller chord is at distance 4 cm from the centre, what is the distance of the other chord from the centre?

EXERCISE 10.6 - Question No. 4

Let the vertex of an angle ABC be located outside a circle and let the sides of the angle intersect equal chords AD and CE with the

circle. Prove that $\angle ABC$ is equal to half the difference of the angles subtended by the chords AC and DE at the centre

EXERCISE 10.6 - Question No. 5

Prove that the circle drawn with any side of a rhombus as diameter, passes through the point of intersection of its diagonals

EXERCISE 10.6 - Question No. 6

ABCD is a parallelogram. The circle through A, B and C intersect CD (produced if necessary) at E. Prove that $AE = AD$.

EXERCISE 10.6 - Question No. 7

AC and BD are chords of a circle which bisect each other. Prove that (i) AC and BD are diameters, (ii) ABCD is a rectangle

EXERCISE 10.6 - Question No. 8

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 $90o - \frac{1}{2}A$,$90o - \frac{1}{2}B$ and $90o - \frac{1}{2}C$

EXERCISE 10.6 - Question No. 9

Two congruent circles intersect each other at points A and B.

Through A any line segment PAQ is drawn so that P, Q lie on the

two circles. Prove that $BP = BQ$.

EXERCISE 10.6 - Question No. 10

In any triangle ABC, if the angle bisector of $\angle A$ and perpendicular

bisector of BC intersect, prove that they intersect on the

circumcircle of the triangle ABC

SOLVED EXAMPLES - Question No. 1

Given an arc of a circle, complete the circle.

SOLVED EXAMPLES - Question No. 2

If two intersecting chords of a circle make equal angles with the diameter passing through their point of intersection, prove that the chords are equal

SOLVED EXAMPLES - Question No. 3

In Fig. 10.32, 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 $\angle AEB = 60$

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SOLVED EXAMPLES - Question No. 4

In Fig 10.33, ABCD is a cyclic quadrilateral in which AC and BD are its diagonals. If $\angle DBC = 55o$ and $\angle BAC = 45o$, find BCD

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SOLVED EXAMPLES - Question No. 5

Two circles intersect at two points A and B. AD and AC are diameters to the two circles (see Fig.10.34). Prove that B lies on the line segment DC.

SOLVED EXAMPLES - Question No. 6

Prove that the quadrilateral formed (if possible) by the internal angle bisectors of any quadrilateral is cyclic