Objective

To show that the angles subtended by the chord of a circle in the same segment are equal, experimentally.

Material Required

Glazed papers, sketch pens, a pair of scissors, glue stick, geometry box, whitesheet.

Theory

1. Concept of a circle.
2. Concept of the angle subtended by an arc/chord.

Procedure

1. Take red color glazed paper and draw a circle of any radius say 2.5 cm on the white side of the paper.
2. Cut this circle with centre O and radius 2.5 cm.
3. Mark any point P on the circumference of the circle.
4. Mark two other points A and B on the circumference of the circle.

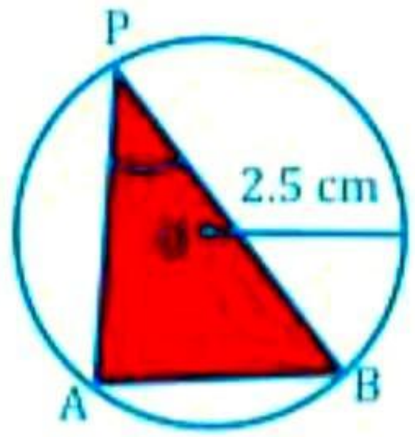

Fig. (i)

5. Fold and press the circle along AB to get a crease which is a chord of the circle.
6. Join PA and PB to get ∠APB as shown in fig. (i).
7. Take another colored glazed paper say, yellow, cut circle of same radius.
8. Draw a chord CD on the second circle with centre O', such that AB = CD.
9. Mark a point R on the circumference of the second circle. Join RC and RD fig (ii).

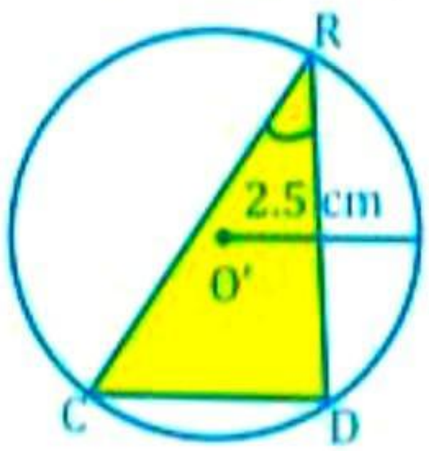

Fig. (ii)

10. Cut out ΔRCD and paste it on the first circle such that R lies on P and RD lies on PB and RC lies on PA as shown in fig. (iii).

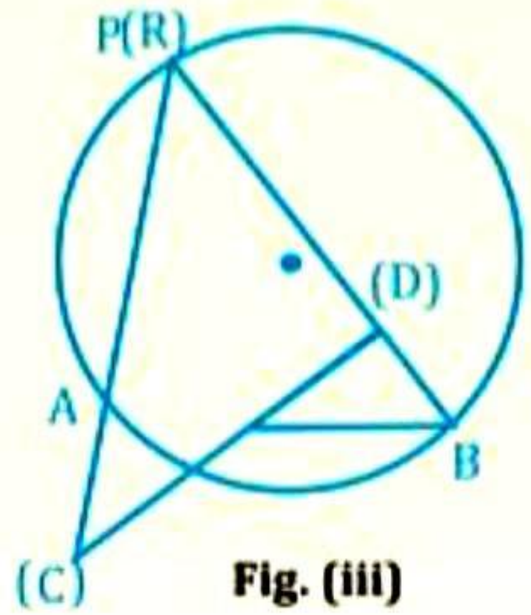

Fig. (iii)

∠APB superimposes ∠DRC.

Observation

Since the chord AB = chord CD and ∠APB super imposes ∠DRC, their arcs are same. When two angles super impose each other, it means their two arms lie on one another. This verifies that angles in the same segments are equal.

Result

We verified that two angles subtended by the chord of a circle in the same segment are equal.

Learning Outcome

We learnt that two or more angles subtended by same chord in the same segment of a circle are equal.

Activity Time

To verify experimentally that the angles in the same segment of a circle of radius 6 cm are equal.

Viva Voce

Q1. How will you relate the angles in the same segment of a circle?

Ans: Angles will be equal.

Q2. How many longest chords are there in a circle?

Ans: There are infinite longest chords in a circle passing through the centre and each of them is equal to the diameter of the circle.

Q3. What do you mean by the minor segment of a circle?

Ans: A chord divides a circle into two parts and the smaller part is called the minor segment.

Q4. How will you define the major segment of a circle?

Ans. A chord divides a circle into two parts and the larger part is called the major segment.

Q5. Do equal chords of a circle subtend different angles at the centre?

Ans: No, because equal chords subtended equal angles at the centre.

Q6. The angle subtended by an arc at the circle in the minor segment is an obtuse angle. What is the value of the angle subtended by it in the major segment?

Ans: Acute angle.

Q7. If a chord AB subtended an angle 80° at centre, then what will be the measure of angles

subtended by same chord in the same segment of the circle at points P and Q?

Ans: Chord AB subtended an angle of 40° at both points.

Q8. The line is drawn through the centre of a circle to bisect a chord is perpendicular to the chord. is this statement true?

Ans: Yes.

Multiple Choice Questions

Q 1. Any angle whose vertex is at the centre of the circle is called:

(a) Reflex angle (b) Straight angle (c) Central angle (d) Right angle

Q 2. If the angles subtended by the chords of a circle at the centre are equal, then the chords are:

(a) Not equal to each other (b) Parallel to each other
(c) Equal to each other (d) Perpendicular to each other

Q 3. In a circle with centre O and a chord BC, points D and E lie on the same side of BC. Then, if $\angle BDC = 80^\circ$, then $\angle BEC = ?$

(a) 80° (b) 20° (c) 160° (d) 40°

Q 4. In a circle with centre O and a chord BC, the point D lies on the same side BC as O. If $\angle BOC = 50^\circ$, then $\angle BDC = ?$

(a) 25° (b) 100° (c) 75° (d) 150°

Q 5. A regular octagon is inscribed in a circle. The angle that each side of the octagon subtends at the centre is:

(a) 45° (b) 75° (c) 90° (d) 60°

Q 6. An equilateral triangle ABC is inscribed in a circle with centre O. Angle BOC will be:

(a) 130° (b) 150° (c) 120° (d) 180°

Q 7. Chord AB subtends $\angle AOB = 60^\circ$ at centre. If OA = 5 cm then the length of AB (in cm) is:

(a) 6 cm (b) 5 cm (c) 7 cm (d) 8 cm

Q 8. If chords AB and CD of congruent circles subtend equal angles at their centre's, then:

(a) AB = CD (b) AB > CD (c) AB < AD (d) None of the above

ANSWER KEY

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