Verify that the Angles In the Same Segment Of a Circle Are Equal

OBJECTIVE

To verify that the angles in the same segment of a circle are equal

Materials Required

1. Coloured glazed papers
2. Scissors
3. Drawing sheet
4. Geometry box
5. Sketch pens
6. Adhesive

Prerequisite Knowledge

1. All basic information's related to a circle.
2. Knowledge about the segment of a circle and angles subtended on it.

Theory

1. For basic information related to circle refer to Activity 23.
2. The region between a chord and either of its arcs is called a segment of the circular region or simply a segment of the circle. This chord is called the base of the segment.

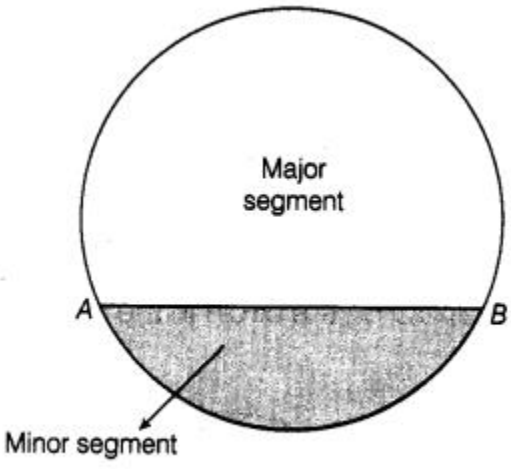

Fig. 24.1

The segment formed by minor arc along with chord, is called minor segment and

the segment formed by major arc is called the major segment.
If O is the centre of the circle, AB is an arc and P and O are two points on the remaining part of circle. Arc AB subtends ∠APB and ∠AQB in the same segment of the circle. (see Fig. 24.2)

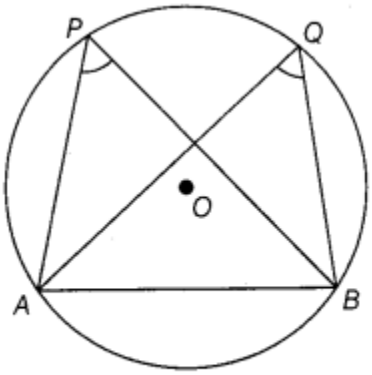

Fig. 24.2

Procedure

3. Take a piece of cardboard of suitable size and paste a drawing sheet on it.
4. From the sheet of glazed paper, cut a circle of radius x units with centre O. (see Fig. 24.3)

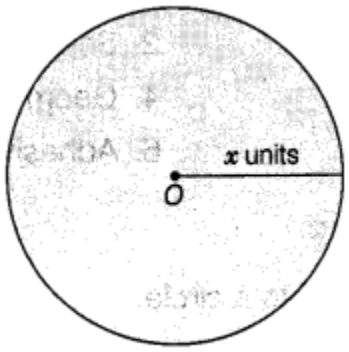

Fig. 24.3

5. Paste the cut out circle on cardboard
6. To form chord PQ, take two points P and 0 on the circle and join them, (see Fig. 24.4)

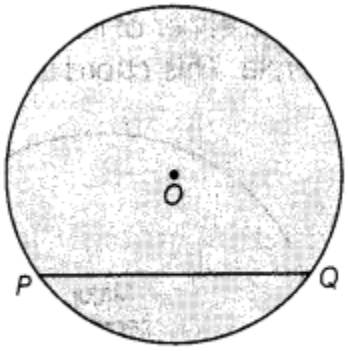

Fig. 24.4

7. Take a pair of points R and S on the circle in the same segment and join RP,RQ, SQ and SP. (see Fig. 24.5)

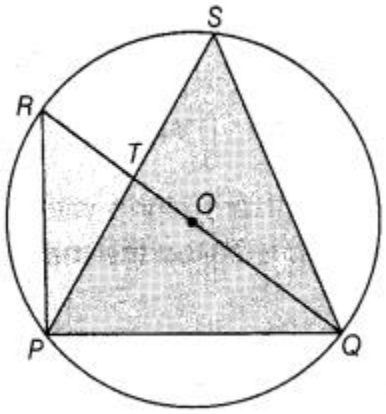

Fig. 24.5

8. Now, taking replicas of the ∠PRQ and ∠PSQ. (see Fig. 24.6)

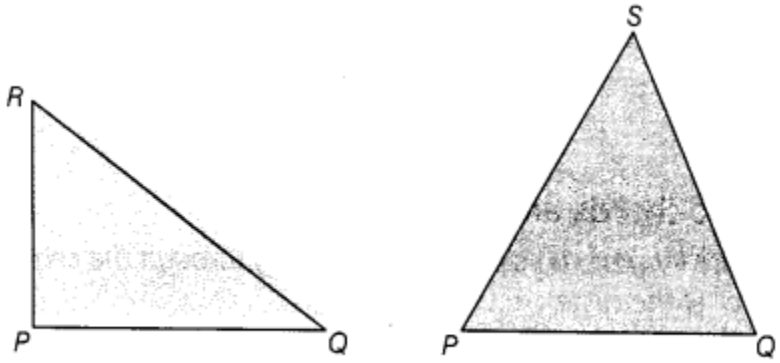

Fig. 24.6

Demonstration

Put the cut outs of ∠PRQ and ∠PSQ on each other such that vertex R falls on vertex S (see Fig. 24.7). We find, ∠PRQ covers ∠PSQ completely, so ∠PRQ = ∠PSQ.

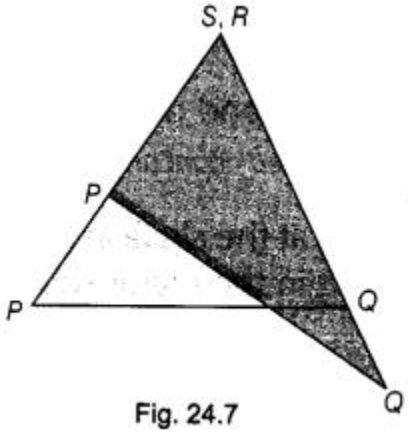

Fig. 24.7

Observation

On actual measurement, we get
∠PRQ = …… ,
∠PSQ = …… ,
So, ∠PRQ = ∠PSQ.
Hence, the angles in the same segment are …… .

Result

We have verified that the angles are equal in the same segment of a circle.

Application

This result can be used in proving other theorems/problems of geometry related to circles.

Viva Voce

Question 1:
"The line drawn through the centre of a circle to bisect a chord is perpendicular to the chord". Is this statement true?
Answer:
Yes

Question 2:
How many longest chords are there in a circle?
Answer:
There are infinite longest chords in a circle passing through the centre and each of them is equal to the diameter of the circle.

Question 3:
What do you mean by the minor segment of a circle?
Answer:
A chord divides a circle into two parts and the smaller part is called the minor segment.

Question 4:
How will you define the major segment of a circle?
Answer:
A chord divides a circle into two parts and the larger part is called the major segment.

Question 5:
How will you relate the angles in the same segment of a circle?
Answer:
Angles will be equal.

Question 6:
Does equal chords of a circle subtend different angles at the centre?
Answer:
No, because equal chords subtended equal angles at the centre.

Question 7:
The angle subtended by an arc at the circle in minor segment is obtuse angle. What is value of angle subtended by it in the major segment?
Answer:
Acute angle

Question 8:
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 point P and Q?
Answer:
Chord AB subtended an angle of 40° at both points.

Suggested Activity

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