

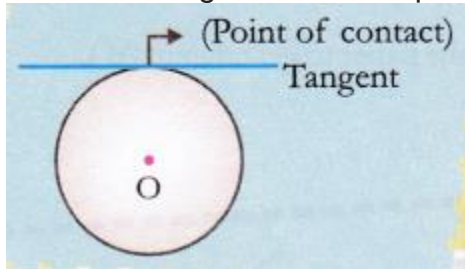
Tangents drawn from an External Point

Objective

To verify experimentally that lengths of tangents drawn from an external point to a circle are equal.

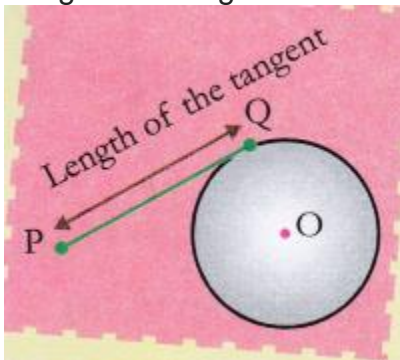
Tangent

A line touching the circle at a point is called a tangent to the circle.



Prerequisite Knowledge

1. Tangent to a circle.
2. Length of a tangent.

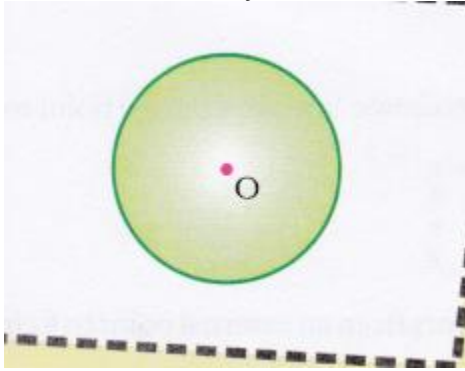


Materials Required

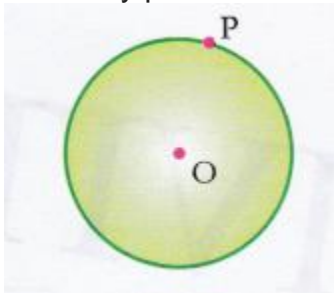
Glazed papers, a white chart paper, sketch pens, a pair of scissors, geometry box, fevicol.

Procedure

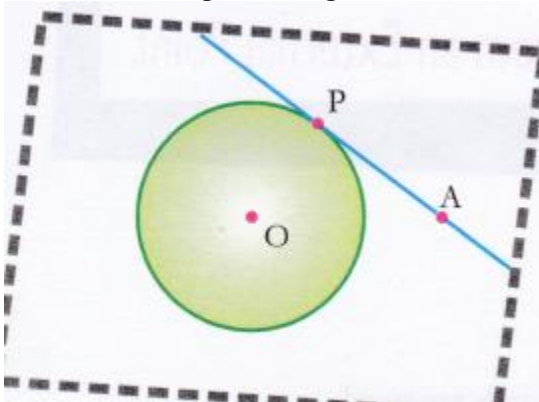
1. Cut a circle of any radius from a glazed paper and paste it on a white chart paper.



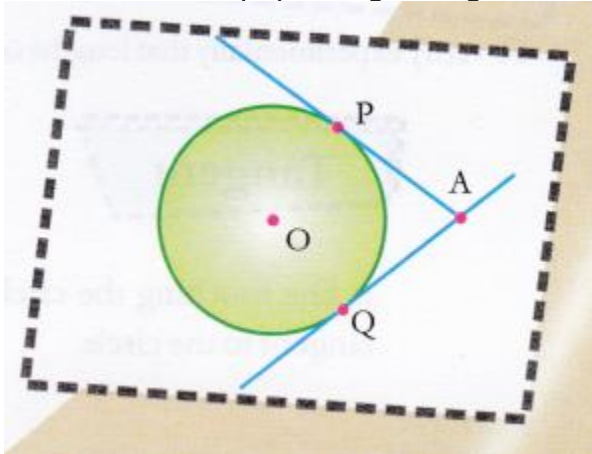
2. Take any point P on the circle.



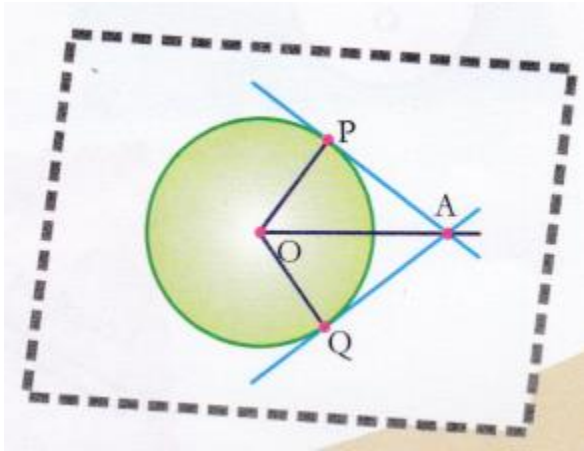
3. From P, fold the paper in such a way that it just touches the circle at P. Press it and unfold to get a tangent PA.



4. From A, fold the paper to get tangent AQ.



5. Fold the circle along OA.
6. Join OP, OA, OQ.



Observation

Students observe that point P coincide with Q
 $\therefore AP = AQ$

Result

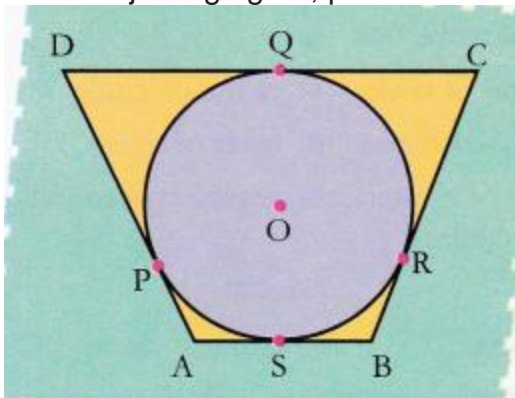
Thus it is verified that lengths of tangents drawn from an external point to a circle are equal.

Learning Outcome

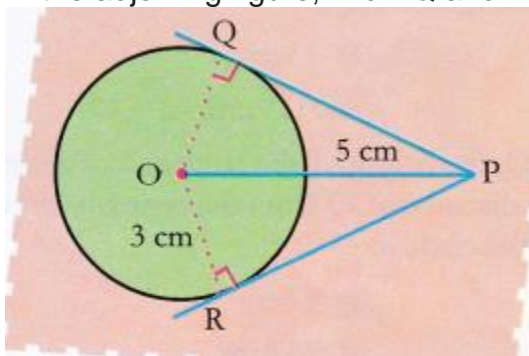
Students will learn how to measure tangents from an external point to a circle by using paper folding.

Activity Time

1. Draw two tangents from a point P to a circle of radius 3 cm. If its distance from the centre is 10 cm, measure the lengths of the tangents. Are they equal ?
2. In the adjoining figure, prove that $AD+BC = AB+CD$



3. In the adjoining figure, find PQ and PR.



Viva Voce

Question 1.

Define tangent to a circle.

Answer:

A line touching the circle at one point is called a tangent to that circle.

Question 2.

Is it possible that a line can touch the circle at more than one point ?

Answer:

No

Question 3.

How many tangents can be drawn to a circle from a common point outside the circle ?

Answer:

Two

Question 4.

Is it possible to draw a tangent from a point inside the circle ?

Answer:

No

Question 5.

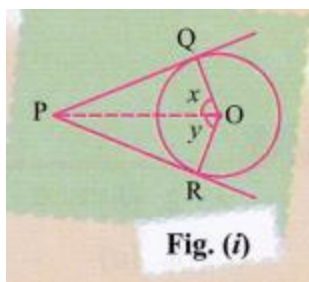
Is it possible to draw two tangents of different lengths from a common external point ?

Answer:

No

Question 6.

In the fig. (i), is $\triangle POQ \cong \triangle POR$?



Answer:

Yes.

Question 7.

Is a tangent at any point of a circle perpendicular to the radius through the point of contact ?

Answer:

Yes.

Question 8.

In the fig. (i), is $\sqrt{x} = \sqrt{y}$?

Answer:

Yes

Multiple Choice Questions

Question 1.

The distance between two parallel tangents drawn to a circle is equal to the

- (a) diameter of circle
- (b) radius of circle
- (c) twice of diameter
- (d) none of these

Question 2.

At the point of contact, the angle between radius and tangent to a circle is

- (a) 180°
- (b) 90°
- (c) acute angle
- (d) none of these

Question 3.

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 of PQ is

- (a) 12 cm
- (b) 13 cm

- (c) 8.5 cm
- (d) $\sqrt{119}$ cm

Question 4.

From a point Q, the length of the tangent to a circle is 24 cm and the distance of Q from the centre is 25 cm. The radius of the circle is

- (a) 7 cm
- (b) 12 cm
- (c) 15 cm
- (d) 24.5 cm

Question 5.

TP and TQ are two tangents to a circle with centre O, so that $\angle POQ = 110^\circ$, then $\angle PTQ$ is equal to

- (a) 60°
- (b) 70°
- (c) 80°
- (d) 90°

Question 6.

If tangent PA and PB from a point P to a circle with centre O are inclined to each other at an angle of 80° , then $\angle POA$ is equal to

- (a) 50°
- (b) 60°
- (c) 70°
- (d) 80°

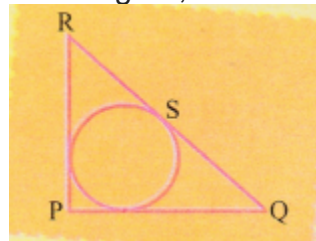
Question 7.

Two concentric circles are of radii 5 cm and 3 cm. The length of the chord of the larger circle which touches the smaller circle is

- (a) 5 cm
- (b) 4 cm
- (c) 6 cm
- (d) 8 cm

Question 8.

In the figure, If $PQ = PR$, then which is correct



- (a) $QS = SR$

- (b) $QS = 2RS$
- (c) $QS \neq RS$
- (d) none of these

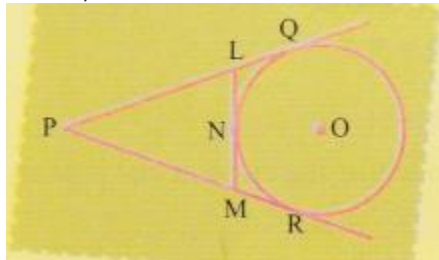
Question 9.

AB and AC are two tangents drawn to the circle with centre O. If $\angle BAC = 85^\circ$ then $\angle BOC$ is

- (a) 95°
- (b) 85°
- (c) 90°
- (d) 80°

Question 10.

PQ and PR are tangents from point P to the circle with centre O. N is a point on the circle, then choose the correct-relation



- (a) $PL + MN = PM - LN$
- (b) $PL + MN = PM + LN$
- (c) $PL + PM = LN + MN$
- (d) $PL + LN = PM + MN$

Answers

- 1. (a)
- 2. (b)
- 3. (d)
- 4. (a)
- 5. (b)
- 6. (a)
- 7. (d)
- 8. (a)
- 9. (a)
- 10. (d)