MATHEMATICS : *Circles*

Exercise: 10.1

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 PQ is:

(A) 12 cm (B) 13 cm
(C) 8.5 cm (D) √119 cm

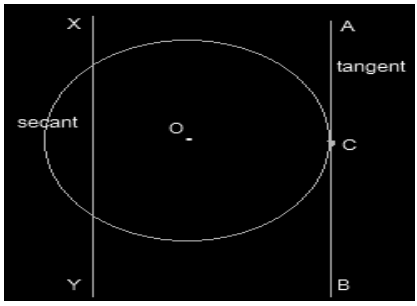
Ans:- (….Contd)

$OQ^2 = OP^2 + PQ^2$
$(12)^2 = 5^2 + PQ^2$
$PQ^2 = 144 - 25$
$PQ^2 = 119$
$PQ = \sqrt{119}$ cm

So, **option D,** i.e., √119 cm, is the length of PQ.

4. Draw a circle and two lines parallel to a given line such that one is a tangent and the other, a secant to the circle.

Ans:



In the above figure, XY and AB are two parallel lines. Line segment AB is the tangent at point C, while line segment XY is the secant.

Exercise: 10.2

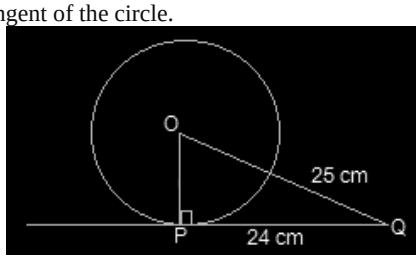
In Q.1 to 3, choose the correct option and give a justification.

1. From 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

Ans:

First, draw a perpendicular from the centre O of the triangle to a point P on the circle, which is touching the tangent. This line will be perpendicular to the tangent of the circle.



So, OP is perpendicular to PQ, i.e., OP ⊥ PQ

From the above figure, it is also seen that △OPQ is a right-angled triangle.

It is given that

OQ = 25 cm and PQ = 24 cm

By using Pythagoras' theorem in △OPQ,

$OQ^2 = OP^2 + PQ^2$
$(25)^2 = OP^2 + (24)^2$
$OP^2 = 625 - 576$
$OP^2 = 49$
OP = 7 cm

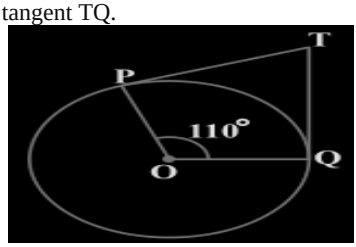
So, option A, i.e., 7 cm, is the radius of the given circle.

2. In Fig. 10.11, if TP and TQ are the two tangents to a circle with centre O so that ∠POQ = 110°, then ∠PTQ is equal to

(A) 60° (B) 70°
(C) 80° (D) 90°

Ans:

From the question, it is clear that OP is the radius of the circle to the tangent PT, and OQ is the radius to the tangent TQ.



So, OP ⊥ PT and TQ ⊥ OQ

∴ ∠OPT = ∠OQT = 90°

Now, in the quadrilateral POQT, we know that the sum of the interior angles is 360°.

So, ∠PTQ + ∠POQ + ∠OPT + ∠OQT = 360°

Now, by putting the respective values, we get

∠PTQ + 90° + 110° + 90° = 360°

∠PTQ = 70°

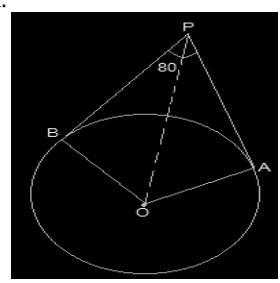
So, ∠PTQ is 70° which is option B.

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

(A) 50° (B) 60°
(C) 70° (D) 80°

Ans:

First, draw the diagram according to the given statement.



Now, in the above diagram, OA is the radius to tangent PA, and OB is the radius to tangent PB.

So, OA is perpendicular to PA, and OB is perpendicular to PB, i.e., OA ⊥ PA and OB ⊥ PB.

So, ∠OBP = ∠OAP = 90°

Now, in the quadrilateral AOBP,

The sum of all the interior angles will be 360°.

So, ∠AOB+∠OAP+∠OBP+∠APB = 360°

Putting their values, we get

∠AOB + 260° = 360°

∠AOB = 100° (Contd……)