EXERCISE 9.1

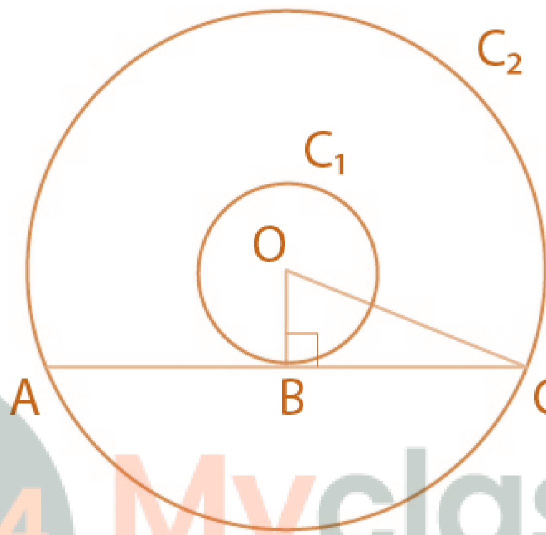
Choose the correct answer from the given four options in the following questions:

1. If radii of two concentric circles are 4 cm and 5 cm, then the length of each chord of one circle which is tangent to the other circle is

(A) 3 cm **(B) 6 cm**

(C) 9 cm **(D) 1 cm**

Solution:



According to the question,

OA = 4cm, OB = 5cm

And, OA ⊥ BC

Therefore, $OB^2 = OA^2 + AB^2$

⇒ $5^2 = 4^2 + AB^2$

⇒ AB = √(25 – 16) = 3cm

⇒ BC = 2AB = 2 × 3cm = 6cm

2. In Fig. 9.3, if AOB = 125°, then COD is equal to

(A) 62.5° **(B) 45°**

(C) 35° **(D) 55°**

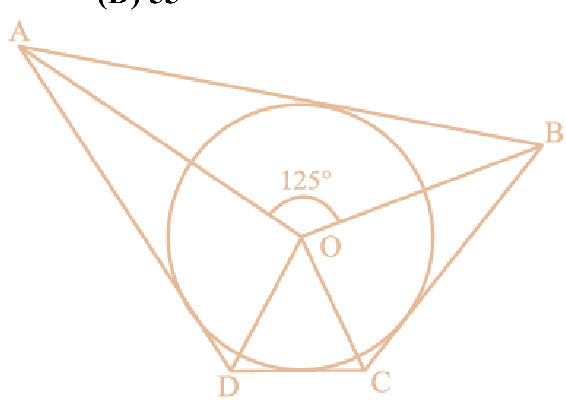


Fig. 9.3

Solution:

ABCD is a quadrilateral circumscribing the circle
We know that, the opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the center of the circle.
So, we have
$\angle AOB + \angle COD = 180°$
$125° + \angle COD = 180°$
$\angle COD = 55°$

3. In Fig. 9.4, AB is a chord of the circle and AOC is its diameter such that ACB = 50°. If AT is the tangent to the circle at the point A, then BAT is equal to

(A) 65° **(B) 60°**
(C) 50° **(D) 40°**

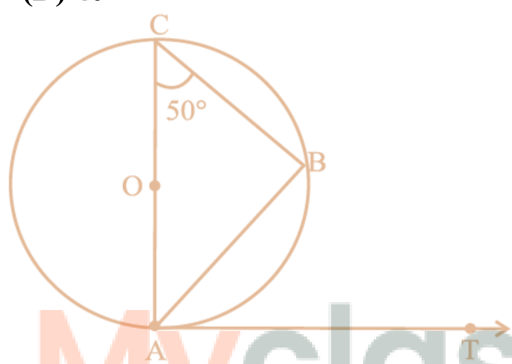


Fig. 9.4

Solution:

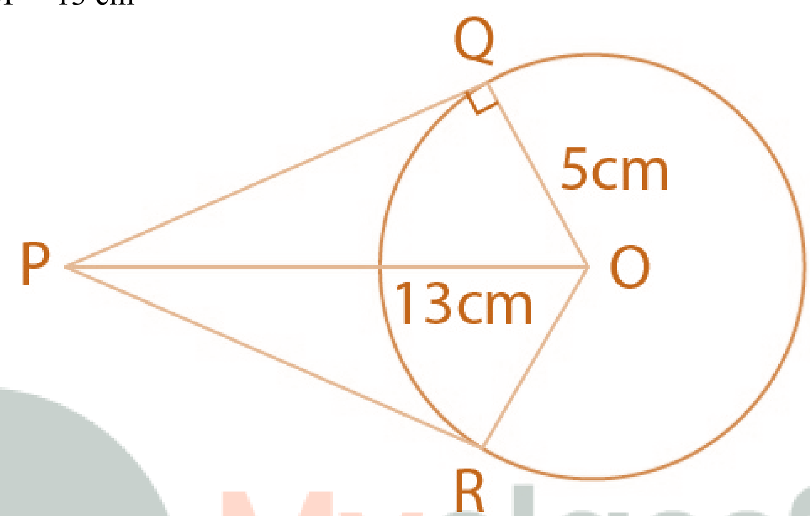
According to the question,
A circle with centre O, diameter AC and $\angle ACB = 50°$
AT is a tangent to the circle at point A
Since, angle in a semicircle is a right angle
$\angle CBA = 90°$
By angle sum property of a triangle,
$\angle ACB + \angle CAB + \angle CBA = 180°$
$50° + \angle CAB + 90° = 180°$
$\angle CAB = 40°$ … (1)
Since tangent to at any point on the circle is perpendicular to the radius through point of contact,
We get,
$OA \perp AT$
$\angle OAT = 90°$
$\angle OAT + \angle BAT = 90°$
$\angle CAT + \angle BAT = 90°$
$40° + \angle BAT = 90°$ [from equation (1)]
$\angle BAT = 50°$

4. From a point P which is at a distance of 13 cm from the centre O of a circle of radius 5 cm, the pair of tangents PQ and PR to the circle are drawn. Then the area of the quadrilateral PQOR is

(A) 60 cm^2 **(B) 65 cm^2**
(C) 30 cm^2 **(D) 32.5 cm^2**

Solution:

Construction: Draw a circle of radius 5 cm with center O.
Let P be a point at a distance of 13 cm from O.
Draw a pair of tangents, PQ and PR.
OQ = OR = radius = 5cm …equation (1)
And OP = 13 cm

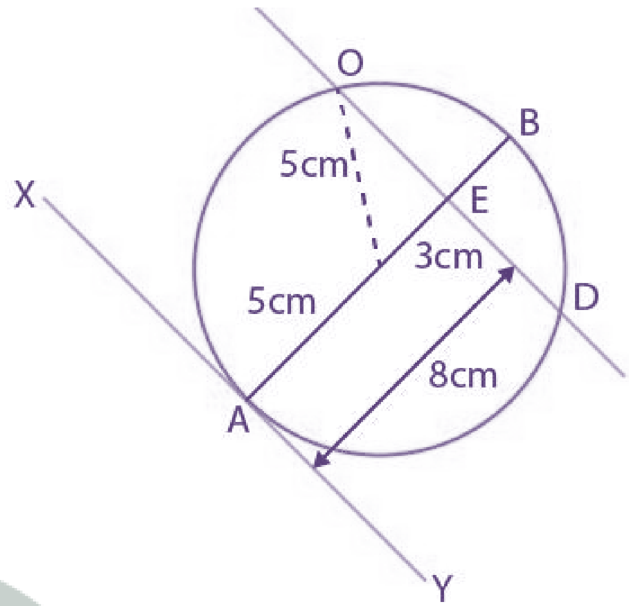


We know that, tangent to at any point on the circle is perpendicular to the radius through point of contact,
Hence, we get,
OQ ⊥ PQ and OR ⊥PR
△POQ and △POR are right-angled triangles.
Using Pythagoras Theorem in △PQO,
$(\text{Base})^2 + (\text{Perpendicular})^2 = (\text{Hypotenuse})^2$
$(PQ)^2 + (OQ)^2 = (OP)^2$
$(PQ)^2 + (5)^2 = (13)^2$
$(PQ)^2 + 25 = 169$
$(PQ)^2 = 144$
PQ = 12 cm
Tangents through an external point to a circle are equal.
So,
PQ = PR = 12 cm … (2)
Therefore, Area of quadrilateral PQRS, A = area of △POQ + area of △POR
Area of right angled triangle = ½ x base x perpendicular
A = (½ x OQ x PQ) + (½ x OR x PR)
A = (½ x 5 x 12) + (½ x 5 x 12)
A = 30 + 30 = 60 cm^2

5. At one end A of a diameter AB of a circle of radius 5 cm, tangent XAY is drawn to the circle. The length of the chord CD parallel to XY and at a distance 8 cm from A is

(A) 4 cm **(B) 5 cm**
(C) 6 cm **(D) 8 cm**

Solution:



According to the question,
Radius of circle, AO=OC = 5cm
AM=8CM
AM=OM+AO
OM =AM-AO
Substituting these values in the equation,
OM= (8-5) =3CM
OM is perpendicular to the chord CD.
In ΔOCM <OMC=90°
By Pythagoras theorem,
$OC^2=OM^2+MC^2$
Therefore,
CD= 2 ×CM = 8 cm