Circles Questions for CDS, SSC & Railways Exams

Circle Quiz 3

Directions: Kindly study the following questions carefully and choose the right answer:

1. Two parallel chords are drawn in a circle of diameter 30 cm. The length of one chord is 24 cm and the distance between the two chords is 21 cm. The length of the other chord is

A. 10 cm B. 18 cm C. 12 cm D. 16 cm

2. If two equal circles whose centres are O and O', intersect each other at the point A and B, OO' = 12 cm and AB = 16 cm, then the radius of the circle is

A. 10 cm B. 8 cm C. 12 cm D. 14 cm

3. Chords AB and CD of a circle intersect externally at P. If AB = 6 cm, CD = 3 cm and PD = 5 cm, then the length of PB is

A. 5 cm B. 7.35 cm C. 6 cm D. 4 cm

4. A circle (with centre at O) is touching two intersecting lines AX and BY. The two points of contact A and B subtend an angle of 65° at any point C on the circumference of the circle. If P is the point of intersection of the two lines, then the measure of ∠APO is

A. 25° B. 65° C. 90° D. 40°

5. AB and CD are two parallel chords on the opposite sides of the centre of the circle. If AB = 10 cm, CD = 24 cm and the radius of the circle is 13 cm, the distance between the chords is

A. 17 cm B. 15 cm C. 16 cm D. 18 cm

6. AB and CD are two parallel chords of a circle such that AB = 10 cm and CD = 24 cm. If the chords are on the opposite sides of the centre and distance between them is 17 cm, then the radius of the circle is :

A. 11 cm B. 12 cm C. 13 cm D. 10 cm

7. The length of the common chord of two circles of radii 30 cm and 40 cm whose centres are 50 cm apart, is (in cm)

A. 12 B. 24 C. 36 D. 48

8. Two circles of same radius 5 cm, intersect each other at A and B. If AB = 8 cm, then the distance between the centre is :

A. 6 cm B. 8 cm C. 10 cm D. 4 cm

9. In a circle of radius 17 cm, two parallel chords of length 30 cm and 16 cm are drawn. If both the chords are on the same side of the centre, then the distance between the chords is

A. 9 cm B. 7 cm C. 23 cm D. 11 cm

10. Two circles touch each other internally. Their radii are 2 cm and 3 cm. The biggest chord of the greater circle which is outside the inner circle is of length

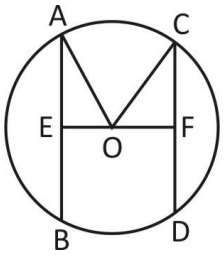
A. 22cm B. 32cm C. 23cm D. 42cm

Correct Answers:

1	2	3	4	5	6	7	8	9	10
B	A	B	A	A	C	D	A	B	D

Explanations:

1.



Given, one chord AB = 24 cm

Then, AE = EB = 12 cm

Diameter = 30 cm ⇒ radius, AO = OC = 15 cm

From ΔAOE, By pythagoras theorem

OE = $\sqrt{OA^2 - AE^2}$ = $\sqrt{15^2 - 12^2}$ = $\sqrt{81}$ = 9 cm

Distance between two chords, EF = 21 cm (given)

∴ OF = EF – OE = 21 – 9 = 12 cm

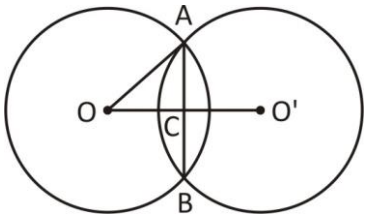
From ΔCOF, By pythagoras theorem

CF = $\sqrt{OC^2 + OF^2}$ = $\sqrt{15^2 + 12^2}$ = $\sqrt{81}$ = 9 cm

∴ CD = 2 × 9 = 18 cm

Hence, option B is correct.

2.



Given, AB = 16 cm and OO' = 12 cm

∴ AC = CB = 8 cm and OC = CO' = 6 cm

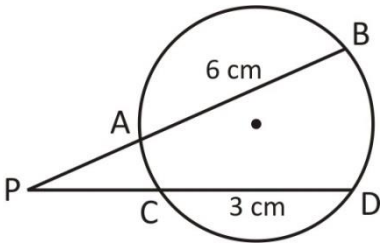
From ΔAOC, By pythagoras theorem

∴ OA = $\sqrt{OC^2 + AC^2}$

= $\sqrt{6^2 + 8^2}$ = $\sqrt{100}$ = 10 cm

Hence, option A is correct.

3.



Given, PD = 5 cm Then, PC = PD – CD = 5 – 3 = 2 cm

Similarly, PA = (PB – 6) cm

Note : If two chords AB and CD of a circle intersect inside or outside the circle when produced at a point P, then

PA × PB = PC × PD ⇒ (PB – 6) × PB = 2 × 5 ⇒ PB2 – 6PB – 10 = 0

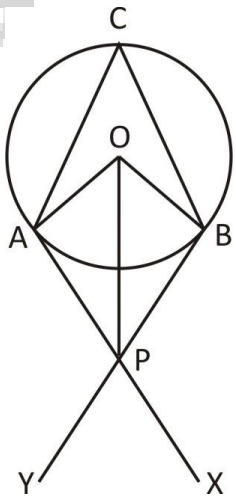
By Sridharacharya formula,

$\frac{-b \pm \sqrt{b^2-4ac}}{2a}$, There a = 1, b = –6 , c = –10

⇒ PB = $\frac{6 \pm \sqrt{36+40}}{2} = \frac{6 \pm \sqrt{76}}{2} = \frac{6+8.7}{2}$ = 7.35

Hence, option B is correct.

4.



Given, ∠ACB = 65°

Note : The angle subtended by an arc of a circle at the centre is double the angle subtended by it at any point on the remaining part of the circle.

∴ ∠AOB = 2 × 65° = 130°

Note : A tangent at any point of a circle is perpendicular to the radius through the point of contact.

∴ ∠OAP = 90°

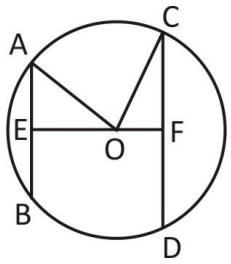
∠AOP = 65° $\left[\because \angle AOP = \frac{\angle AOB}{2} \right]$

We know that, the sum of the three angles of a triangle is 180°.

∴ ∠APO = 180° – 90° – 65° = 25°

Hence, option A is correct.

5.



Given, Chords AB = 10 and CD =24 cm

∴ AE = EB = 5 cm and CF = FD = 12 cm

Radius AO = OC = 13 cm

From ΔAOE, By pytharoas theorem

OE = $\sqrt{AO^2 - AE^2}$

= $\sqrt{13^2 + 5^2}$ = $\sqrt{144}$ = 12 cm

From ΔCOF, By pytharoas theorem

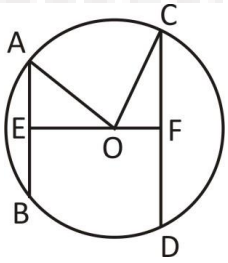
OF = $\sqrt{OC^2 - CF^2}$

= $\sqrt{13^2 - 12^2}$ = $\sqrt{25}$ = 5 cm

∴ EF = OE + OF = 12 + 5 = 17 cm

Hence, option A is corret.

6.



AB = 10 cm and CD = 24 cm

∴ AE = EB = 5 cm and CF = FD = 12 cm

EF = 17 cm

Let, EO = x cm, then OF = (17 – x) cm

In ΔAOE, By pythagoras theorem

OA = $\sqrt{AE^2 + OE^2}$ = $\sqrt{5^2 + x^2}$

In ΔCOF, By pythagoras theorem

OC = $\sqrt{CF^2 + OF^2}$ = $\sqrt{12^2 + (17 - x)^2}$

OA = OC (radius)

52 + x2 = 122 + (17 – x)2

25 + x2 = 144 + 289 – 34x + x2

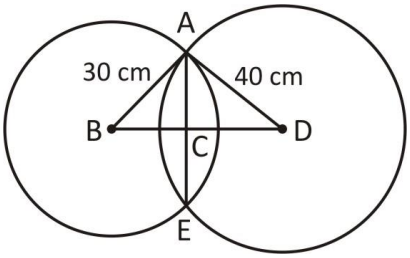
34x = 408

x = 12

∴ OA = $\sqrt{5^2 + 12^2}$ = $\sqrt{25 + 144}$ = $\sqrt{169}$ = 13 cm

Hence, option C is correct.

7.



BD = 50 cm

Let, BC = x cm, then CD = (50 – x) cm

In ΔABC, By pythagoras theorem

AC = $\sqrt{AB^2 - BC^2}$ = $\sqrt{30^2 - x^2}$

In ΔACD, By pythagoras theorem

AC = $\sqrt{AD^2 + CD^2}$ = $\sqrt{40^2 - (50 - x)^2}$

$\sqrt{30^2 - x^2} = \sqrt{40^2 - (50 - x)^2}$ [∵ AC is common for both triangles]

⇒ 900 – x^2 = 1600 – 2500 + 100x – x^2

⇒ 100x = 1800

⇒ x = 18

∴ AC = $\sqrt{30^2 - 18^2}$

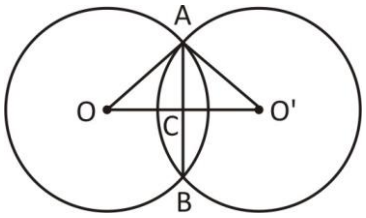
= $\sqrt{900 - 324}$

= $\sqrt{576}$ = 24 cm

∴ AE = 2 × AC = 2 × 24 = 48 cm

Hence, option D is correct.

8.



AB = 8 cm ⇒ AC = 4 cm

OA = 5 cm

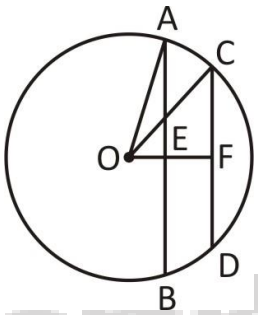
In ΔAOC, By pythagoras theorem

OC = $\sqrt{5^2 - 4^2}$ = $\sqrt{9}$ = 3 cm

OO' = 2 × OC = 2 × 3 = 6 cm

Hence, option A is correct.

9.



AB = 30 cm and CD = 16 cm

∴ AE = EB = 15 cm and CF = FD = 8 cm

Radii, OA = OC = 17 cm

In ΔAOE, By pythagoras theorem

OE = $\sqrt{OA^2 - AE^2}$= $\sqrt{17^2 - 15^2}$= 64= 8 cm

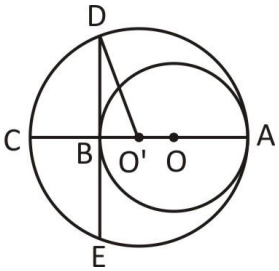
Again In ΔCOF, By pythagoras theorem

$\mathrm{OF} = \sqrt{\mathrm{OC}^2 - \mathrm{CF}^2} = \sqrt{17^2 - 8^2} = \sqrt{225} = 15\ \mathrm{cm}$

Distance between chords, EF = OF – OE = 15 – 8 = 7 cm

Hence, option B is correct.

10.



O'A = O'C = O'D = 3 cm [∵ radii of a circle]

OA = OB = 2 cm

AC = 2 × OA' = 2 × 3 = 6 cm

AB = 2 × OA = 2 × 2 = 4 cm

BC = AC – AB = 6 – 4 = 2 cm

∴ O'B = O'C – BC = 3 – 2 = 1 cm

In ΔBDO', By pythagoras theorem

$$\mathrm{BD} = \sqrt{\mathrm{O'D^2} - \mathrm{O'B^2}} = \sqrt{3^2 - 1^2} = 2\sqrt{2\mathrm{cm}}$$

∴ DE = 2 × BD = 2 × $2\sqrt{2}$ = $4\sqrt{2}$ cm

Hence, option D is correct.