Circle Questions for SSC Exam.

Circle Quiz 6

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

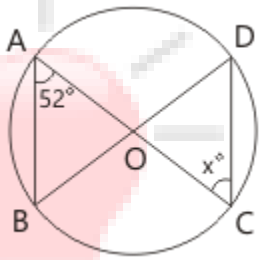
1. Two circles touch each other externally at P. AB is a direct common tangent to the two circles, A and B are points of contact and ∠PAB = 35° . Then ∠ABP is is

A. 35° B. 55° C. 75° D. 65°

2. In a circle with centre O, AB and CD are two diameters perpendicular to each other. The length of chord AC is :

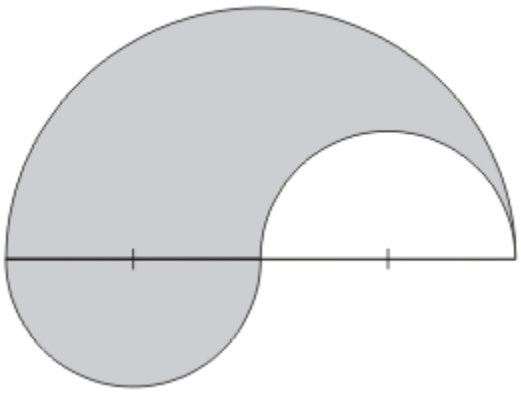
A. 2 AB B. $\sqrt{2}$ AB C. $\frac{1}{2}$ AB D. $\frac{1}{\sqrt{2}}$ AB

3. O is the centre of the circle. if ∠BAC = 52°, then ∠OCD is equal to



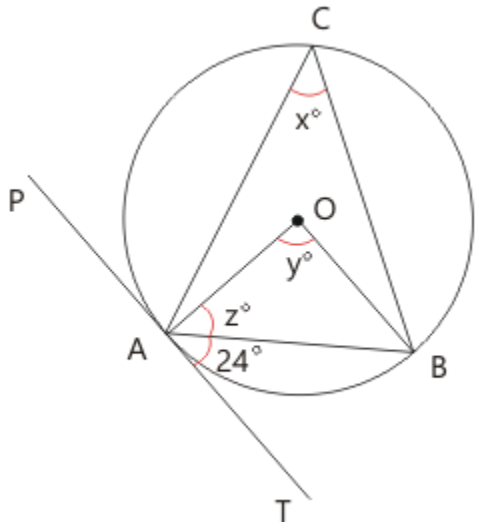
A. 52° B. 104° C. 128° D. 76°

4. What is the area (in cm^2) of shaded portion bounded by three semicircle as shown in the figure? (It is given that the radius of two smaller semicircle is 1 cm)



A. 4π B. $8\pi - \frac{1}{2}$ C. $4\pi - \frac{1}{2}$ D. None of these

5. In the given figure 'O' is the centre of the circle and PAT is the tangent at point A. Find the measures of x°, y°, and z° respectively.



A. 66°, 66°, 66° B. 66°, 24°, 72° C. 24°, 24°, 96° D. 24°, 48°, 66°

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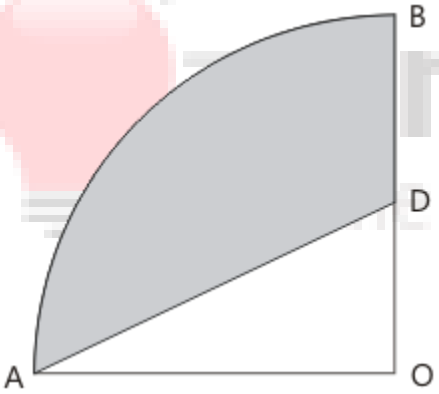
6. AOB is quadrant of a circle with centre O and radius 4.2 cm. If OD = 2 cm, find the area of the shaded region.



A. 8.25 cm^2 B. 7.50 cm^2 C. 9.66 cm^2 D. 6.125 cm^2

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7. The length of the common chord of two intersecting circles is 24. If the diameters of the circles are 30 cm and 26 cm, then the distance between the centers of the circles (in cm) is

A. 13 B. 14 C. 15 D. 16

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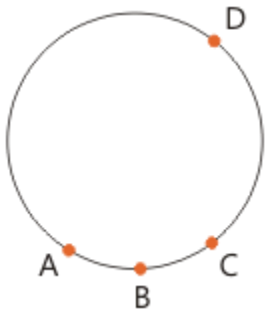
8. The points A, B and C lie on a circle that has radius 4. If the length of arc ABC is 4π/3. What is the length of line segment AC?

A. $\frac{4}{3}$ B. $\frac{8}{3}$ C. 3 D. 4

9. Given that ∠ADB and ∠BDC measure 30° and 40° respectively, what will be the measure (in degrees) of ∠ABC in the given diagram?



A. 70 B. 90 C. 110 D. 140

10. A rectangle of area 48 cm^2 is inscribed inside a circle of radius 5 cm. What will be the perimeter (in cm) of the rectangle?

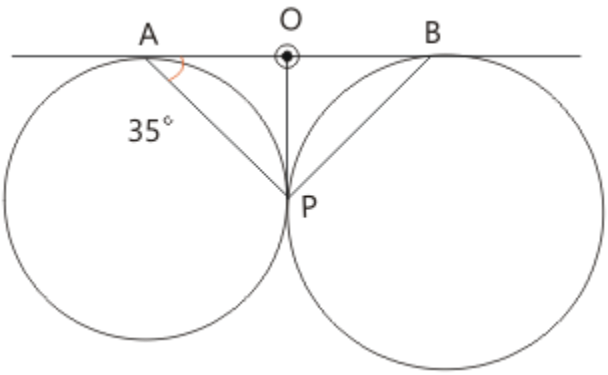
A. 20 B. 24 C. 25 D. 28

Correct Answers:

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

Explanations:

1.



Here, ΔAOP,

AO = OP

⇒ ∠PAO = ∠APO = 35°

⇒ ∠AOP = 180° – (2 × 35°) = 110°

⇒ ∠POB = 180° – 110° = 70°

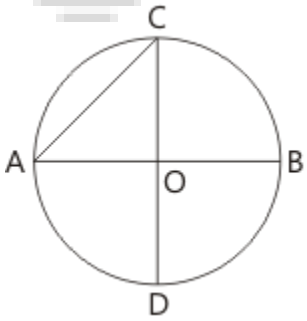
Also, In ΔPOB, BO = OP

$\Rightarrow \angle PBO = \angle OPB = \frac{180° - 70°}{2} = 55°$

⇒ ∠ABP = 55°

Hence, option B is correct.

2.



$OC = OA = \frac{1}{2} AB.$

$AC^2 = OA^2 + OC^2 = 2\ OA^2$

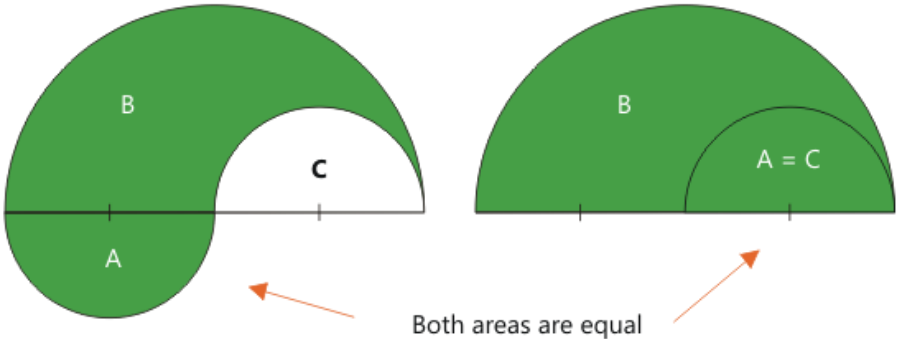
$= 2 \times \left(\frac{1}{2} AB\right)^2 = \frac{1}{2} (AB)^2$

$\therefore AC = \frac{1}{\sqrt{2}} AB.$

Hence, option D is correct.

3. ∠ODC = ∠BAC = 52° (∠ s in the same segment).
But OC = OD ⇒ ∠OCD = ∠ODC = 52°.
Hence, option A is correct.

4.



Area of the shaded portion (A + B) = Area of the bigger semicircle (B + C) as the two smaller semicircle 'A' and 'C' will have equal area
Radius of the smaller semicircle = 1cm
Now, Radius of the bigger semicircle = Diameter of the smaller semicircle
∴ Radius of the bigger semicircle = 2 cm
Area of shaded region = $\frac{1}{2} \times \pi \times 2^2 = 2\ \pi\ cm^2$
Hence, option D is correct.

5. ∵ x° is an angle in the alternate segment for ∠BAT.
∴ ∠BAT = x = 24°
∵ y° is the angle at the centre and x° is angle on the arc
∴ y° = 2x = 2 × 24 = 48°
∵ In ΔOAB, ∠OBA = z° = ∠OAB
∴ z° + 48° + z° = 180°
or, 2z° = (180° – 48°)
or, z = $\frac{132}{2}$ = 66°

∴ x, y, z = 24°, 48°, 66°

Approach II: OA is perpendicular on PT at A.
⇒ ∠z° = 90 – 24 = 66°
⇒ ∠y° = 180 – (66° + 66°) = 48°
⇒ ∠x° = $\frac{48°}{2}$ = 24°
Hence, option D is correct.

6.

Area of the quadrant = $\frac{\pi r^2}{4}$

$= \frac{22}{7} \times \frac{4.2 \times 4.2}{4} = 13.86$ sq cm

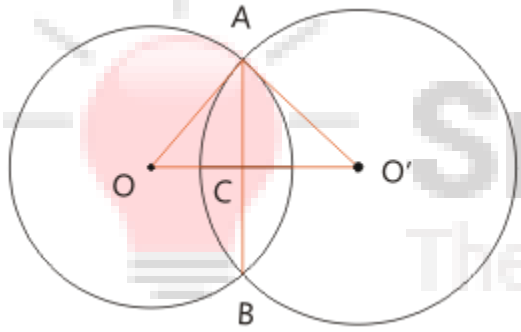
Area of Δ = $\frac{1}{2}$ × base × height

Area of ΔAOD = $\frac{1}{2} \times 4.2 \times 2 = 4.2$ sq cm

∴ Area of shaded region = 13.86 – 4.2 = 9.66 sq cm

Hence, option C is correct.

7.



If AB = 24 cm, therefore, AC = CB = 12 cm

And the radius will be 15 cm & 13 cm

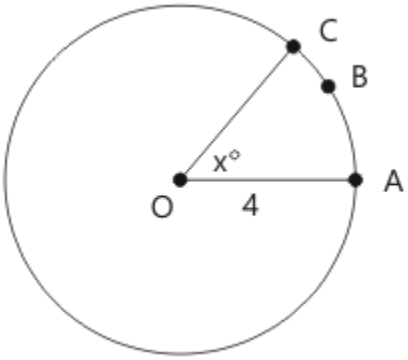
OC = $\sqrt{15^2 - 12^2} = \sqrt{225 - 144} = \sqrt{81} = 9$ cm

O'C = $\sqrt{13^2 - 12^2} = \sqrt{169 - 144} = \sqrt{25} = 5$ cm

∴ OO' = 9 + 5 = 14 cm

Hence, option B is correct.

8.



In the given figure, O is the center of the circle that contains A, B and C and x is the degree measure of ∠AOC. Since the circumference of the circle is 2π(4) = 8π and there are 360° in the circle, the ratio of the length of arc ABC to the circumference of the circle is the same as the ratio of x to 360. Therefore,

$\frac{\frac{4\pi}{3}}{8\pi} = \frac{x}{360}$. Then

$x = \frac{\frac{4\pi}{3}360}{8\pi} = \frac{480\pi}{8\pi} = 60.$

This means that ΔAOC is an isosceles triangle with side lengths OA = OC = 4 and vertex angle measuring 60°.

The base angles of must have equal measures and the sum of their measures must be 180° – 60° = 120°. Therefore, each base angle measure 60°, ΔAOC is equilateral, and AC = 4.

Hence, option D is correct.

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9. m ∠ADC = m ∠ADB + m ∠BDC = 30° + 40° = 70°

∴ m ∠ABC = 180 – m ∠ADC = 180 – 70 = 110°

(∵ Angles subtended by a chord at distinct points on the circumference, in alternate segments, are supplementary.

Or if we join AB, BC, CD and AD then the resulting quadrilateral is a cyclic quadrilateral. Opposite angles of cyclic quadrilateral are supplementary angles.)

Hence, option C is correct.

10. Let the length of the rectangle be L cm and the breadth be B cm.

Area of the rectangle = 48 cm^2

$\therefore$ L × B = 48

Also, the diagonal of the rectangle will coincide with a diameter of the circle, because the angle in a semicircle will be a right angle.

As all four angles of a rectangle are right angles, the diagonals of the rectangle must also be diameters of the circle.

$\therefore$ Diagonal of a rectangle = 2 × R = 10 cm

Now, the diagonal of a rectangle = $\sqrt{L^2 + B^2}$

$\therefore$ $L^2 + B^2 = 100$

We know that $L^2 + B^2 = 100$ and that L × B = 48

$\therefore$ $L^2 + B^2 + 2 \times L \times B = 100 + 2 \times 48 = \sqrt{196} = (L + B)^2$

The positive root of (L + B) is therefore 196 = 14 cm

$\therefore$ The perimeter of the rectangle is equal to 2 × (L + B) = 28 cm

Hence, option D is correct.