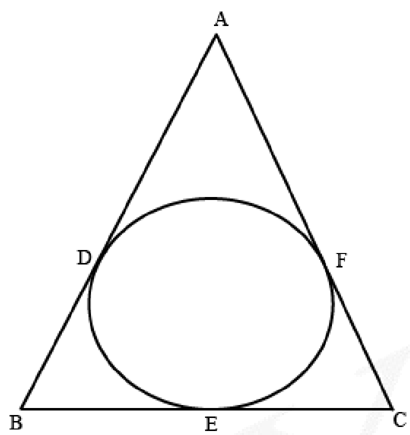
Practice Challenge - Objective

Subject: Mathematics

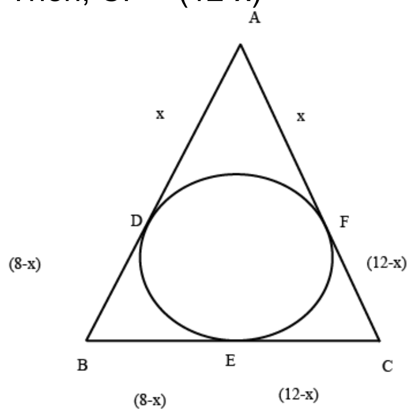
Topic : Circles Exam Prep 1 Class: X

1. A Circle is inscribed in triangle ABC having sides 8 cm, 10 cm, and 12 cm as shown in the given figure. Find AD?



- A. 2.5 cm
- B. 3 cm
- C. 5 cm ✔
- D. 4 cm

AB= 8 cm, AC = 12 cm and BC = 10 cm
Let AD = x then BD = (8-x)
And also, AD = AF = x [Tangents drawn from the same external points are equal to each other.]
Then, CF = (12-x)



Similarly,
BD = BE = (8-x) and
CE = CF =(12 -x)

As we know,
BC = BE +CE
10 = (8-x) +(12-x)
10 = 20-2x
2x=10
x=5
AD = x = 5
Hence, c is the correct option.

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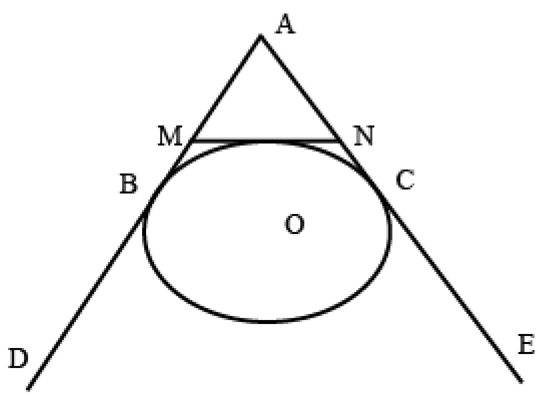
2. ABD and ACE are the two tangents to the circle having centre O, then AB + AC equals _______ of triangle AMN.



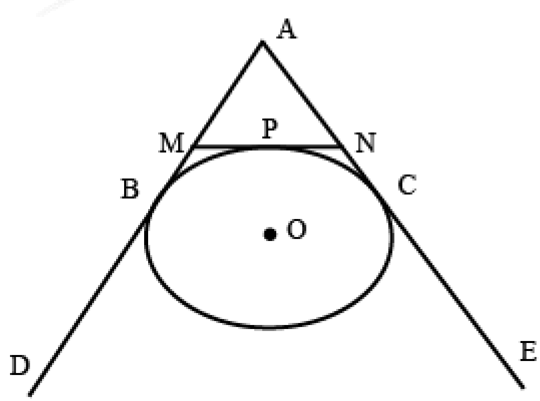
A. 2s

B. s

C. s/2

D. 3s

Let P be the point of contact of tangent MN to the circle.
AB = AC [Tangents drawn from the same external point are always equal to each other]



Similarly,
MP= MB and NP = NC
So,
AB + AC = AM + MB +AN+ NC
= AM+ MP + AN + NP
[MP= MB and NP = NC]
= AM + AN + (MP + NP)
= AM + AN + MN
=2s
Hence, a is the correct option.

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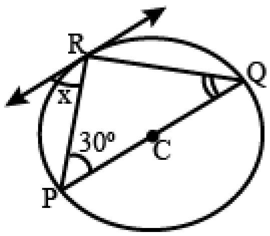
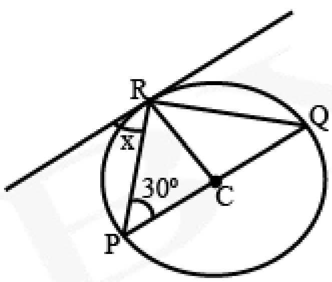
3. In the given figure, if PQ is the diameter, then x is equal to ?



- **A.** 30^0
- **B.** 45^0
- **C.** 70^0
- **D.** 60^0



$\angle RPC = \angle PRC = 30^0$ [Equal angles opp to equal radii of the circle]
$x + \angle PRC = 90^0$ [Radius of the circle is always perpendicular to the tangent.]
$X + 30 = 90$
$X = 90 - 30 = 60^0$
Hence, d is the correct option.

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4. From a point outside a given circle, the maximum number of tangents drawn from that point to the circle is/are

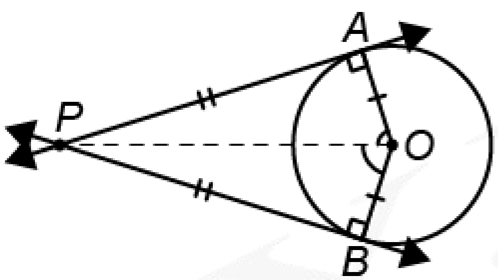
   A. 4

   B. 1

   C. Infinite

   D. 2 ✔

Let P be the point outside a circle having centre O.



Clearly, PA and PB are the only tangents that can be drawn from the external point to the circle.

Thus, the maximum number of tangents that can be drawn from an external point to a circle is two.

Hence, the correct answer is option d.

5. If radii of two concentric circles are 13 cm and 5 cm, then the length of each chord of one circle which touches the other circle is

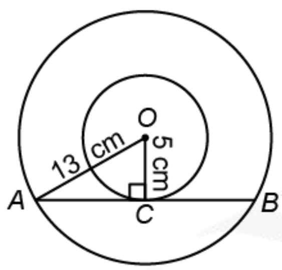
A. 6 cm

B. 12 cm

C. 24 cm

D. 36 cm

Let O be the centre of two concentric circles. AB be the chord of the bigger circle that is tangent to the inner circle.



$In\ \Delta\ ACO,$

Apply pthagoras theroem,

$\Rightarrow AO^2 = OC^2 + AC^2$

$\Rightarrow 13^2 = 5^2 + AC^2$

$\Rightarrow AC = \sqrt{169 - 25}$

$\Rightarrow \quad AC = 12\ cm$

The perpendicular from the centre of a circle to a chord bisects the chord. Thus, OC bisects AB.

$\Rightarrow AB = 2AC = 24cm$

Hence, the correct answer is option c.

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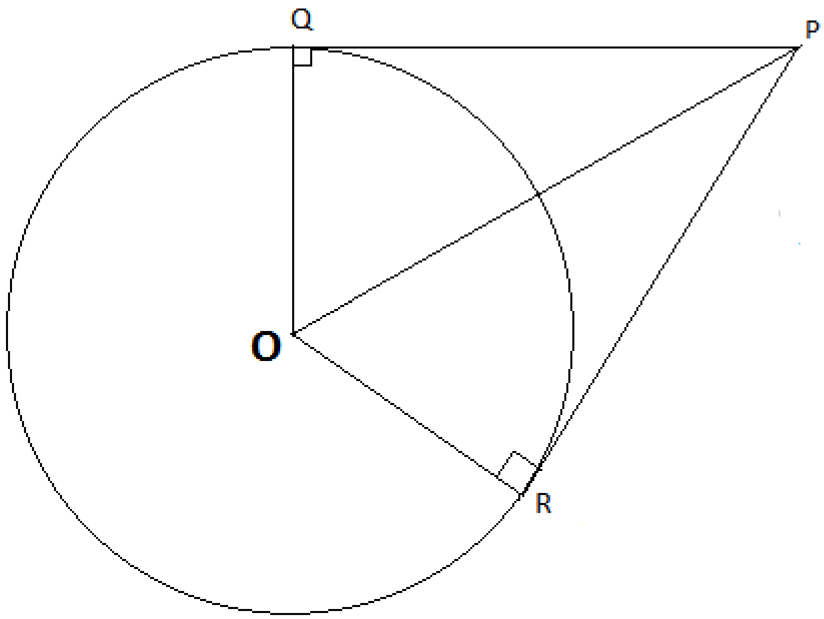
6. From an external point P, two tangents are drawn that touch the circle at points Q and R. The centre of the circle is O. Points O and P are joined. The ratio of $\angle OPR\ and\ \angle OPQ$ is ______.



- A. 1 : 1
- B. 2 : 1
- C. 3 : 1
- D. 4 : 1

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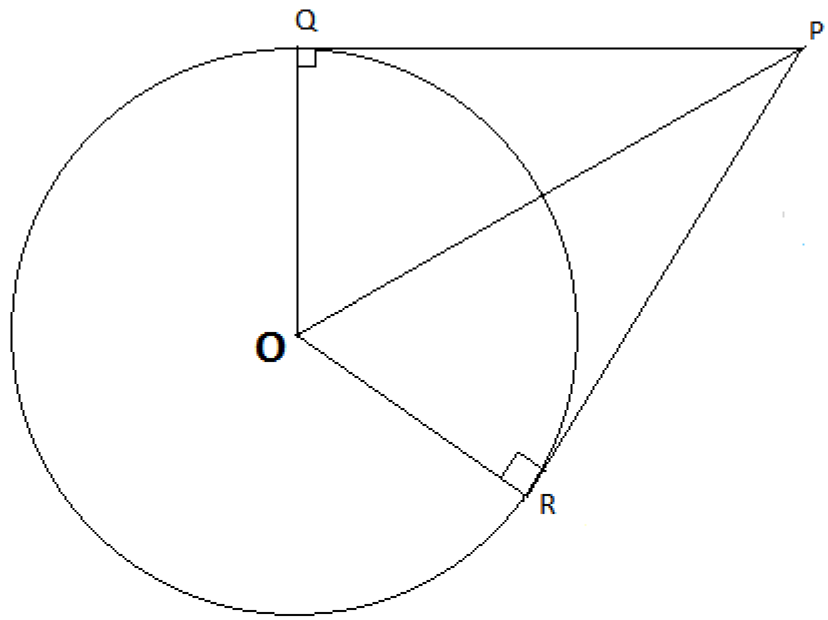

Join the points OP, OQ and OR.

Consider $\Delta OPQ \; and \; \Delta OPR$
OP = OP (common side)
OQ = OR (radii)
$\angle OQP = \angle ORP = 90^\circ$ (Tangent is perpendicular to the radius)
Hence,
$\Delta OQP \cong \Delta ORP$ (RHS congruency)

Hence,
$\angle OPQ = \angle OPR \, (CPCT)$

So,
$\frac{\angle OPR}{\angle OPQ} = \frac{1}{1}$

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7. Which of the following statements are true?
   1) No tangents can be drawn to a circle from an interior point.
   2) Only two tangents, at most, can be drawn to a circle from an exterior point.

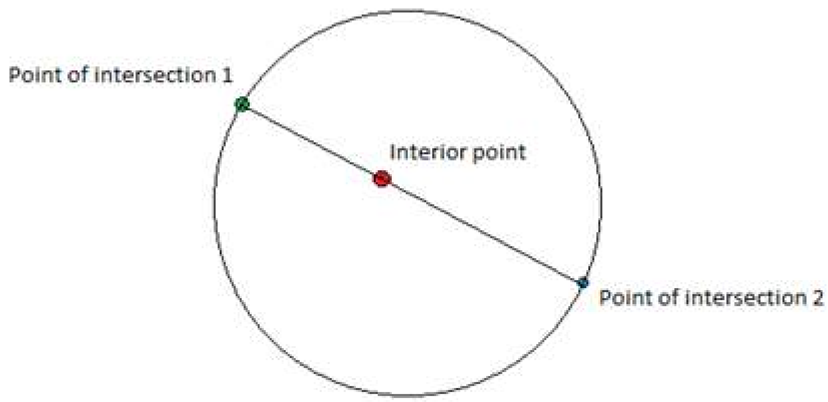
A. Only 1

B. Only 2

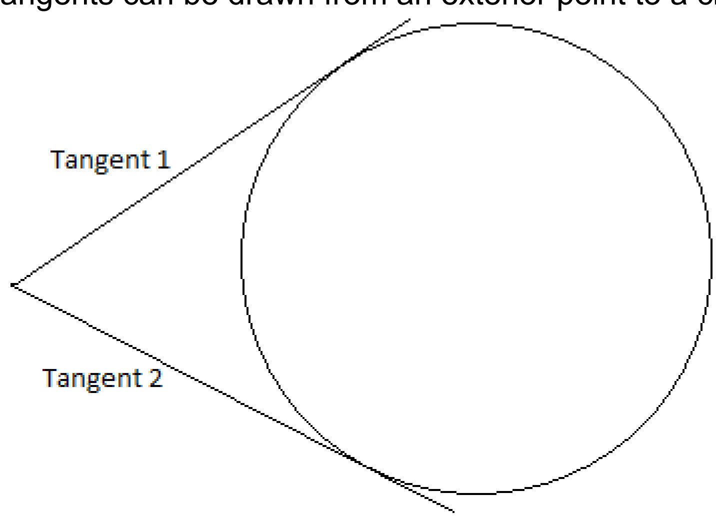
C. Both 1 and 2 ✔

D. Neither 1 nor 2

An interior point is a point that lies inside the circle. Since a tangent has to touch the circle at only one point no matter how long it is extended on either side, a tangent is not possible from an interior point; as any line through an interior point will cut the circle in two distinct points.



An exterior point is a point that lies outside the circle. A maximum of two tangents can be drawn from an exterior point to a circle.



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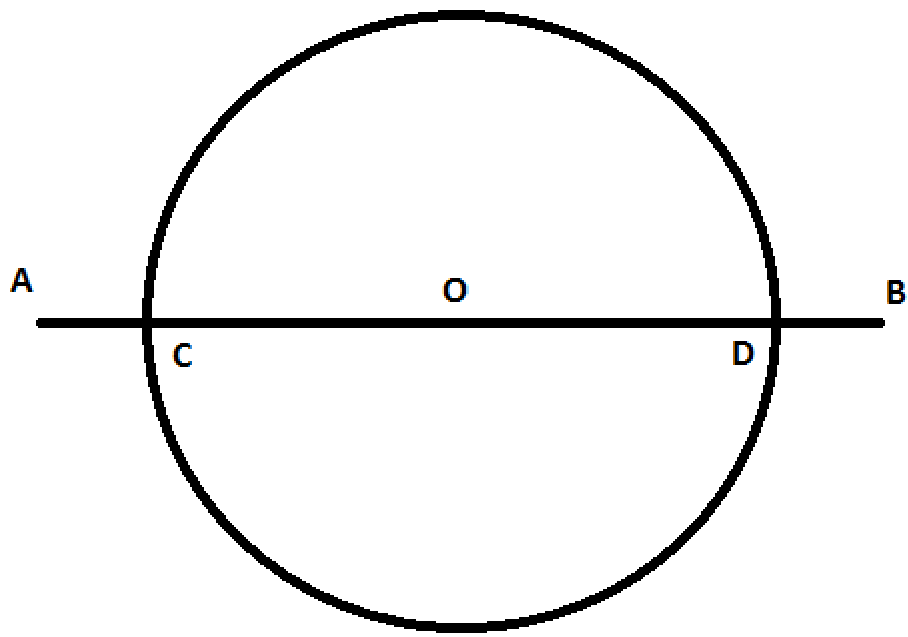
8. A line segment AB intersects a circle at two distinct points C and D as it passes through its centre, as shown in the figure. The line, whose segment is AB, is a:



- ✔ **A.** Secant
- ✘ **B.** Chord
- ✘ **C.** Diameter
- ✘ **D.** Tangent

Any line that intersects the circle at two distinct points is called a secant. The line, whose segment is AB, intersects the circle at two points C and D as it passes through the centre. Hence, it is a secant.
The segment of the secant that lies within the circle and whose endpoints lie on the circle is called a chord. In this case, the chord, which is CD passes through the centre. Hence, it is the diameter.

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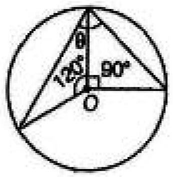
9. If O is the center of the circle, then the value of θ in the adjoining figure is



A. 45°

B. 60°

C. 90°

D. 75°

Angle made in full circle $= 360^\circ$
So, $120^\circ + 90^\circ$ +Angle at centre $=360^\circ$
$\Rightarrow$ Angle at centre $= 360^\circ - 210^\circ = 150^\circ$
$\therefore$ Angle at circumference of a circle
$= \frac{1}{2}(\text{Angle at the centre}) = \frac{150^\circ}{2} = 75^\circ$

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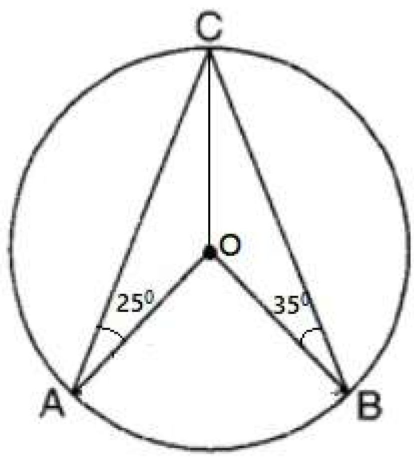
10. In the adjoining figure 'O' is the center of circle, $\angle$CAO = 25° and $\angle$CBO = 35°. What is the value of $\angle$AOB?



- **A.** 55°
- **B.** 110°
- **C.** 120°
- **D.** Data insufficient

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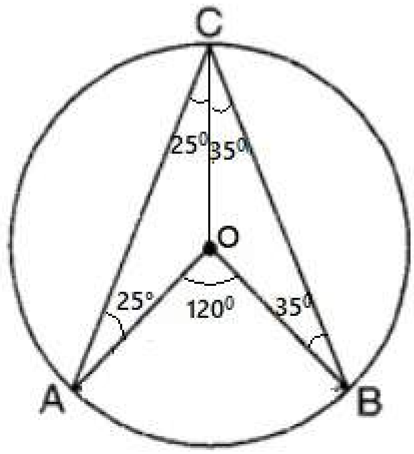

In ΔAOC,

OA=OC --------(radii of the same circle)

$\therefore \Delta AOC$ is an isosceles triangle

$\rightarrow \angle OAC = \angle OCA = 25^{\circ}$----- (base angles of an isosceles triangle)

In ΔBOC,

OB=OC --------(radii of the same circle)

$\therefore \Delta BOC$ is an isosceles triangle

$\rightarrow \angle OBC = \angle OCB = 35^{\circ}$ -----(base angles of an isosceles triangle)

$\angle ACB = 25^{\circ} + 35^{\circ} = 60^{\circ}$

$\angle AOB = 2 \times \angle ACB$ ----(angle at the center is twice the angle at the circumference)

= $2 \times 60^{\circ}$

=120°