MATHS

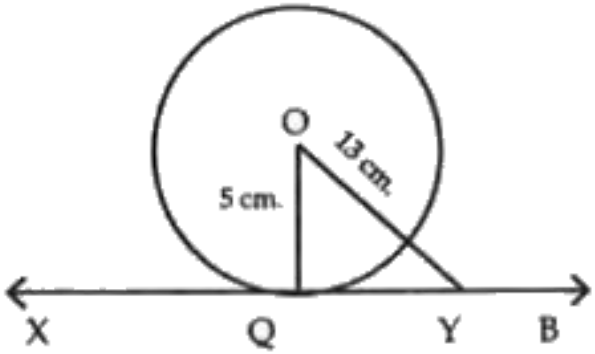
BOOKS - ZEN MATHS (KANNADA ENGLISH)

CIRCLES

Illustrative Example

1. A tangent XY at the point Q of a circle of radius 5 cm meets a line through the centre O

at the point Y, such that $OY = 13cm$. What is the length of QY?



A.

B.

C.

D.

Answer: 12 cm

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Textual Exercise 4 1

1. How many tangents can a circle have ?

A.

B.

C.

D.

Answer:

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2. A tangents to a circle intersects it in only one points (s)

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3. A line intersecting a circle in two points is called a secant .

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4. Fill in the blanks

(iii) A circle can have .....parallel tangents at the most.

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5. Fill in the blanks

(iv) The common point of a tangent to a circle and the circle is called .....

A.

B.

C.

D.

Answer: point of contact

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6. 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. 12cm

B. 13 cm

C. 8.5 cm

D. $\sqrt{119}$cm

Answer: D

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

A.

B.

C.

D.

Answer:

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Textual Exercise 4 2

1. Prove that the tangents drawn at the ends of a diameter fo a circle are parallel .

A.

B.

C.

D.

Answer:

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2. Prove that the perpendicular at the point of contact to the tangent to a circle passes through the centre .

A.

B.

C.

D.

Answer:

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3. The length of a tangent from a point A at distance 5 cm from the centre of the circle is 4 cm . Find the radius of the circle .

A.

B.

C.

D.

Answer: 3 cm

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4. Two concentric circle of radii 5 cm and 3cm are drawn. Find the length of the chord of the larger circle which touches the smaller circles.

A.

B.

C.

D.

Answer: 8 cm

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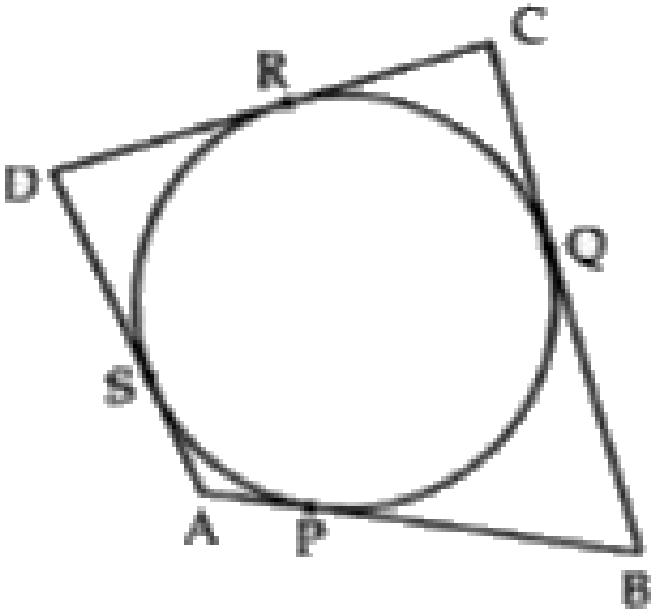
5. Quadrilateral ABCD is drawn to circumscribe a circle. Prove that $AB + CD = AD + BC$.



A.

B.

C.

D.

Answer:

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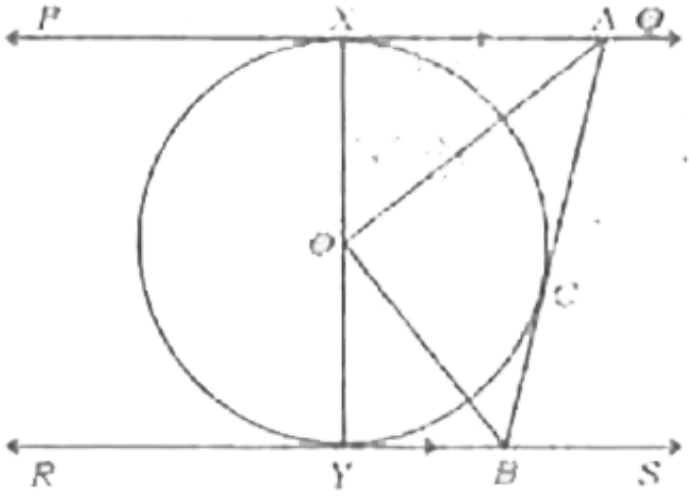
6. In the given figure PQ & RS are two parallel tangents to a circle o and another tangent AB with point of contact C intersecting PQ at A

and RS at B. Prove that $\angle AOB = 90^\circ$



A.

B.

C.

D.

Answer:

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7. Prove that the angle between the two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line-segment joining the points of contact at the centre.

A.

B.

C.

D.

Answer:

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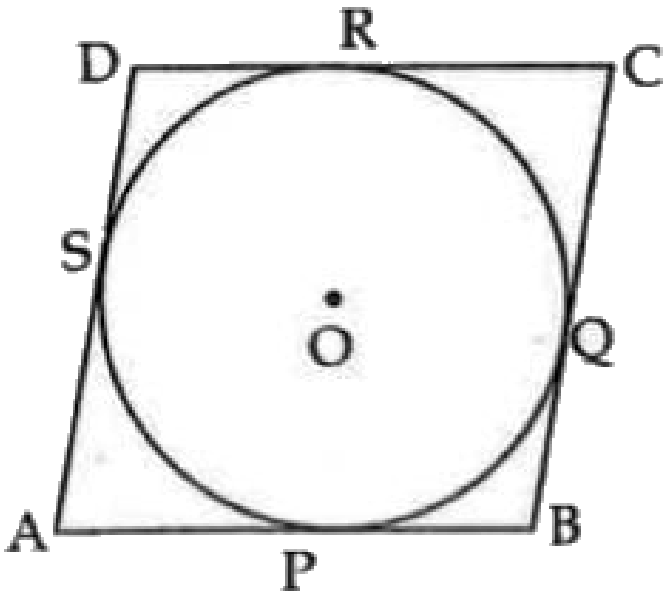
8. Prove that the parallelogram circumscribing a circle is a rhombus.



A.

B.

C.

D.

Answer:

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9. A triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC into which BC is divided by the point of contact D are lengths 6 cm and 8 cm respectively. Find the sides AB and AC.

A.

B.

C.

D.

Answer:

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Zen Additional Questions Mcqs

1. Length of an arc of a sector of a circle of radius r and angle 0 is

A. $\frac{\theta}{360^\circ} \times \pi r^2$

B. $\frac{\theta}{360^\circ} \times 2\pi r^2$

C. $\frac{\theta}{180^\circ} \times 2\pi r$

D. $\frac{\theta}{360^\circ} \times 2\pi r$

Answer: A::B::C::D

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Zen Additional Questions Very Short Answer Vsa Type Questions

1. From an external point P, tangents PA and PB are drawn to a circle with centre O. If $\lfloor PAB = 50^\circ$, find $\lfloor AOB$.

A.

B.

C.

D.

Answer: $\lfloor AOB = 100^\circ$.

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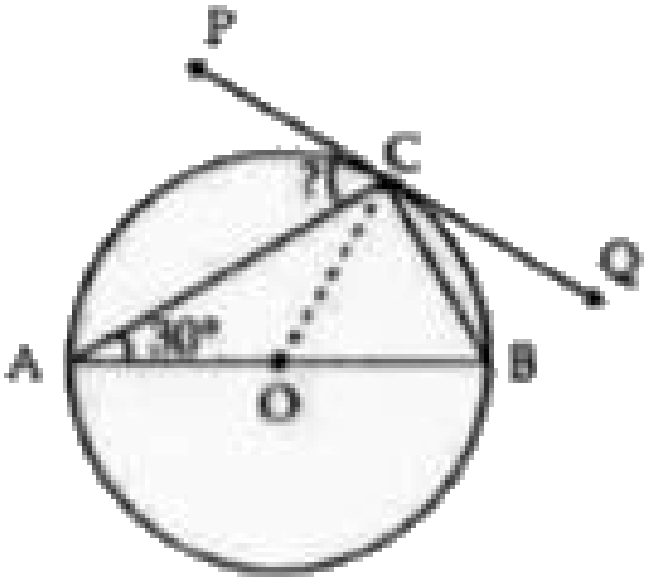
2. In the given figure, PQ is the tangent at a point C on a circle with centre O. If AB is a

diameter and $\lfloor CAB = 30^\circ$, find $\lfloor PCA$.



A.

B.

C.

D.

Answer: $\lfloor PCA = 60^\circ$.

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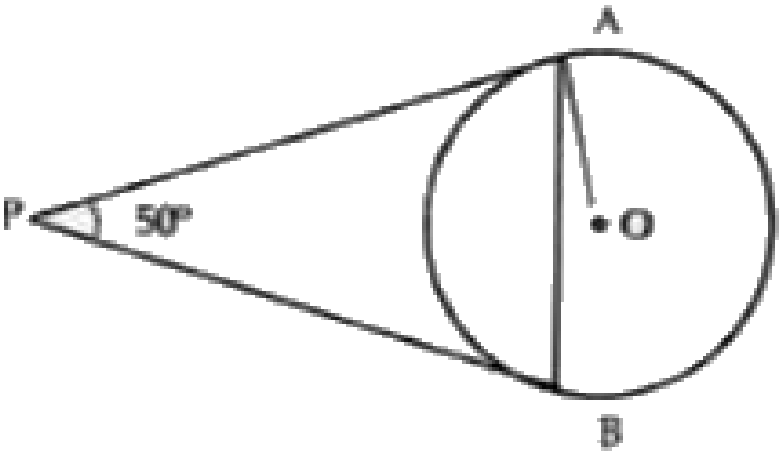
3. In the figure, PA and PB are tangents to the circle with centre O such that $\lfloor APB = 50^\circ$. Find $\lfloor OAB$.



A.

B.

C.

D.

Answer: $25^\circ = \lfloor OAB$.

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4. Two concentric circles of radii a and $b(a > b)$ are given. Find the length of the

chord of the larger circle which touches the smaller circle.

A.

B.

C.

D.

Answer: $PQ = 2\sqrt{a^2 - b^2}$ **units.**

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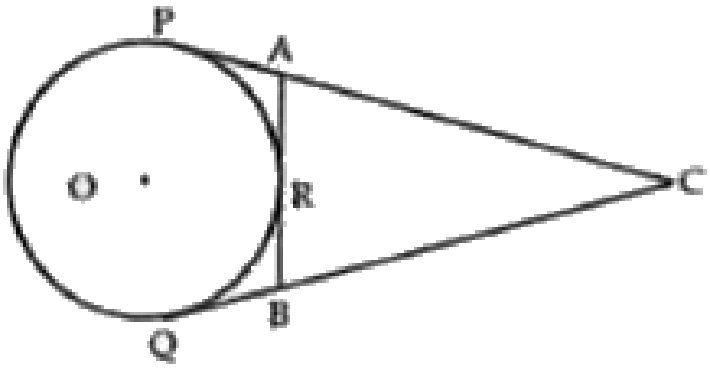
5. In the figure, CP and CQ are tangents from an external point C to a circle with centre O. AB is another tangent which touches the circle at R. If $CP = 11cm$ and $BR = 4$ cm. Find BC.



A.

B.

C.

D.

Answer: $Bc = 7cm$

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6. A tangent PQ at a point P on a circle of radius 5 cm meets a line through the centre O at a point Q so that $OQ = 13$ cm. Find PQ.

A.

B.

C.

D.

Answer: $PQ = 12cm.$

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7. Find the distance between two parallel tangents of a circle of radius 3 cm.

A.

B.

C.

D.

Answer: 6 cm

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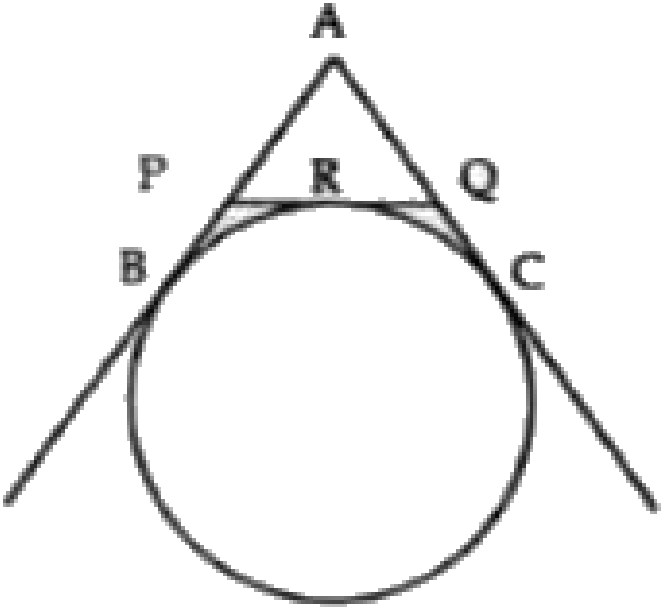
8. In the given figure AB, AC, and PQ are tangents. If $AB = 5cm$, find the perimeter of

APQ.



A.

B.

C.

D.

Answer: 10 cm

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9. Two concentric circles with centre O are of radius 3 cm and 5 cm. From an external point P, two tangents PB and PA are drawn to these circles respectively. If $PA = 12$cm, find PB.

A.

B.

C.

D.

Answer: $PB = 4\sqrt{10}cm$.

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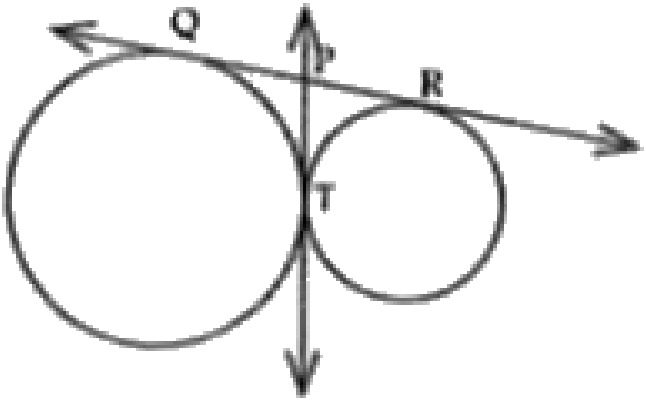
10. In the figure, PT is a common tangent to the given circles touching externally at T. The tangents at T meets QR at P. If $PT = 3.8$ cm,

find QR (in cm).



A.

B.

C.

D.

Answer: 7.6 cm

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11. If the angle between two radii of a circle is 130°, what is the angle between the tangents at the end of the radii ?

A.

B.

C.

D.

Answer: $\lfloor BPA = 50^\circ$

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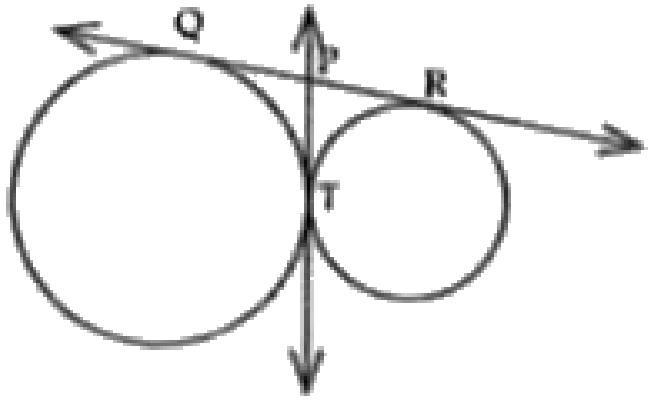
12. If a chord AB subtends an angle of 60° at the centre of a circle, the angle between the tangents at A and B is also 60°. Write 'True' or 'False' and justify.



A.

B.

C.

D.

Answer: $\lfloor BQA = 120^\circ$

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13. Write the formula to find area of a sector of a circle, if angle at the centre is $'\theta'$ degrees.

A.

B.

C.

D.

Answer: $\frac{\pi r^2}{360} \times \theta$ **OR** $\frac{\theta}{360} \times \pi r^2$

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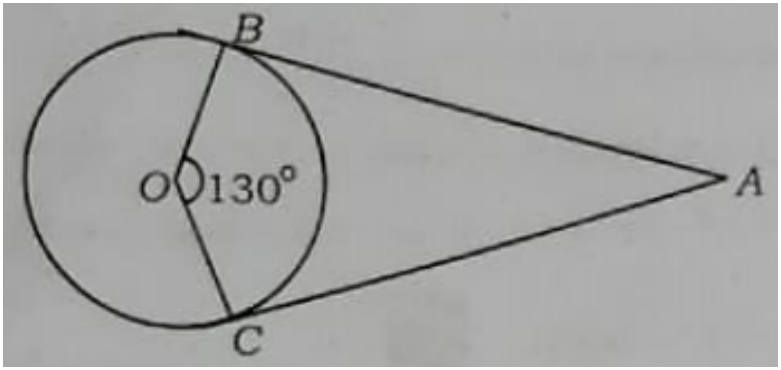
14. In the figure AB and AC are the two tangents drawn from the point A to the circle with centre O, If AngleBỌC = 130* then find

AngleBAC



A.

B.

C.

D.

Answer: 50°

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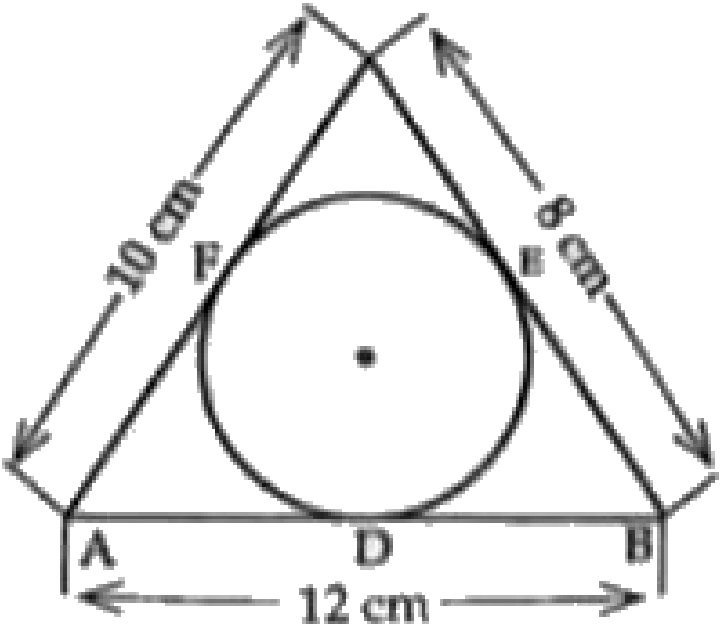
Zen Additional Questions Short Answer Sa Type 1 Questions

1. In the given figure, a circle is inscribed in a ΔABC such that it touches the sides AB, BC, and CA at points D, E, and F respectively. If the lengths of the sides AB, BC, and CA are 12 cm, 8 cm, and 10 cm respectively, find the lengths of

AD, BE, and CF.



A.

B.

C.

D.

Answer: $AD = 7cm, BE = 5cm, CF = 3cm.$

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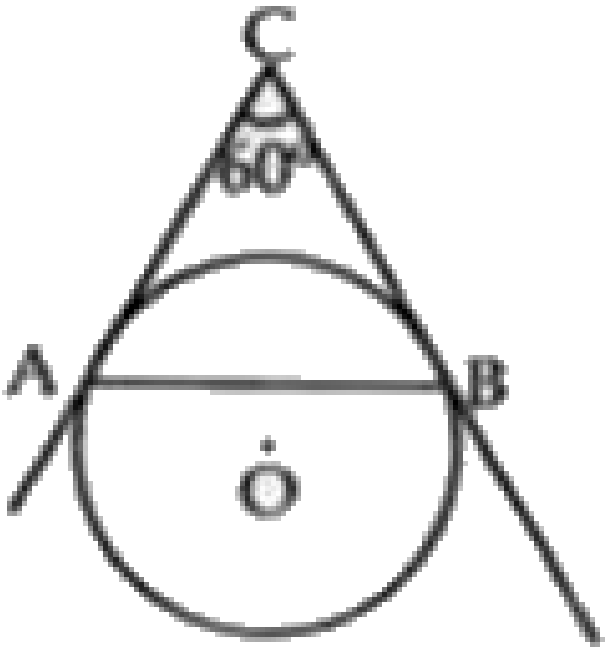
2. In the given figure, AP and BP are tangents to a circle with centre O such that $AP = 5cm$ and $\angle APB = 60^\circ$. Find the length of chord

AB.



A.

B.

C.

D.

Answer: $AB = 5cm$.

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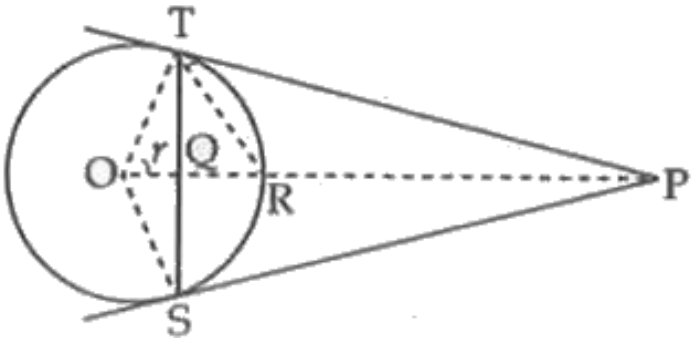
3. In the given figure, from an external point P, two tangents PT and PS are drawn to the circle with centre O and radius r. If $PO = 2r$, show that $\lfloor OTS = \lfloor OST = 30^\circ$.



A.

B.

C.

D.

Answer: $\lfloor OTS = \lfloor TSO = 30^\circ$.

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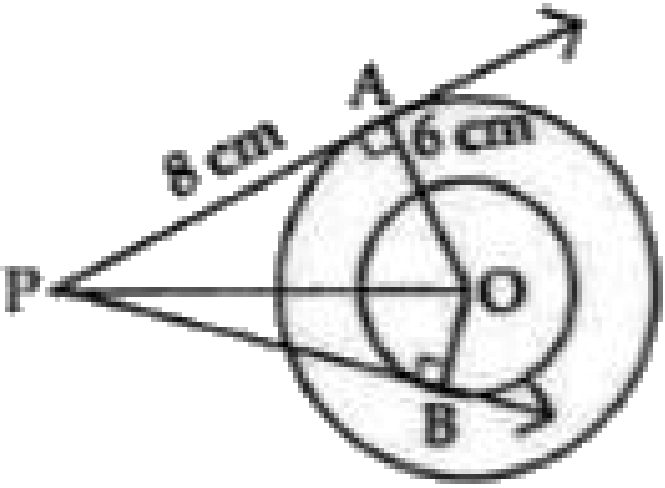
4. In the given figure, there are two concentric circles of radii 6 cm and 4 cm with centre O. If AP is a tangent to the larger circle and BP to

the smaller circle and the length of $AP = 8cm$, find BP



A.

B.

C.

D.

Answer: $PB = 2\sqrt{21}cm.$

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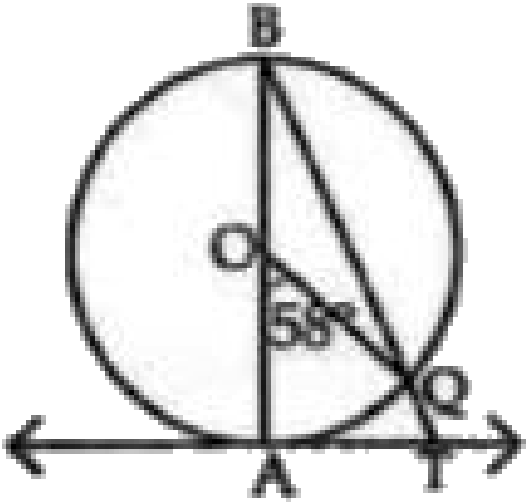
5. In the figure, AB is the diameter of a circle with centre O and AT is a tangent. If $\angle AOQ = 58^\circ$, find $\angle ATQ$.



A.

B.

C.

D.

Answer: $\lfloor ATB = 61^\circ$.

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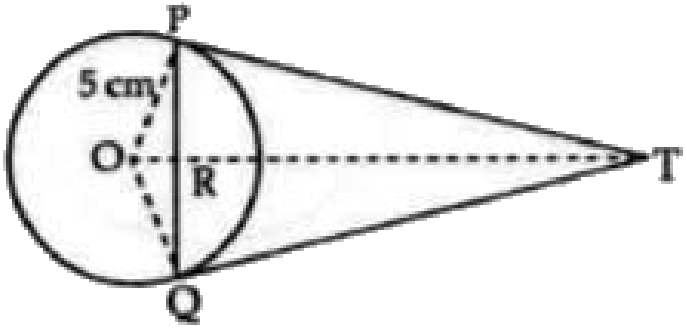
6. In the figure, PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q

intersect at T. Find TP and TQ.



A.

B.

C.

D.

Answer: $PT = QT = 20/3cm.$

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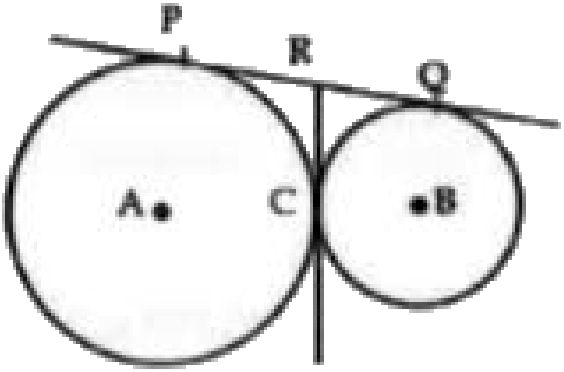
7. In the given figure, two circles touch each other externally at the point C. Prove that the common tangent to the circle at C bisects the common tangents at P and Q.



A.

B.

C.

D.

Answer:

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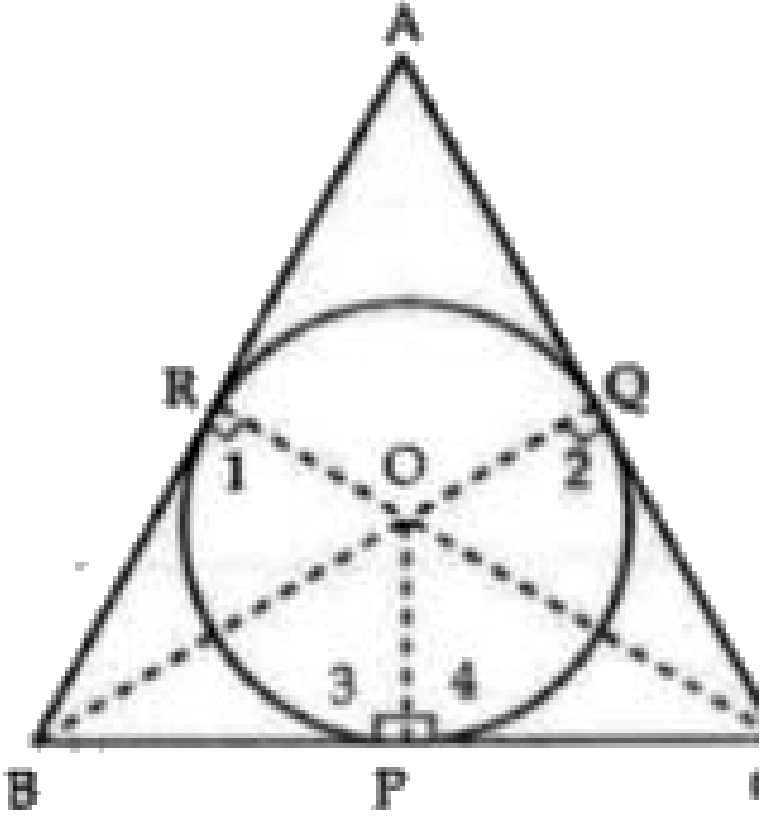
8. In the figure, an isosceles triangle ABC with $AB = AC$ circumscribes a circle. Prove that

the point of contact P bisects the base BC.



A.

B.

C.

D.

Answer:

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9. If d_1 and $d_2(d_2 > d_1)$ be the diameters of two concentric circles and c be the length of a chord of a circle which is tangent to the other circle, prove that $d_2^2 = c^2 + d_1^2$.

A.

B.

C.

D.

Answer:

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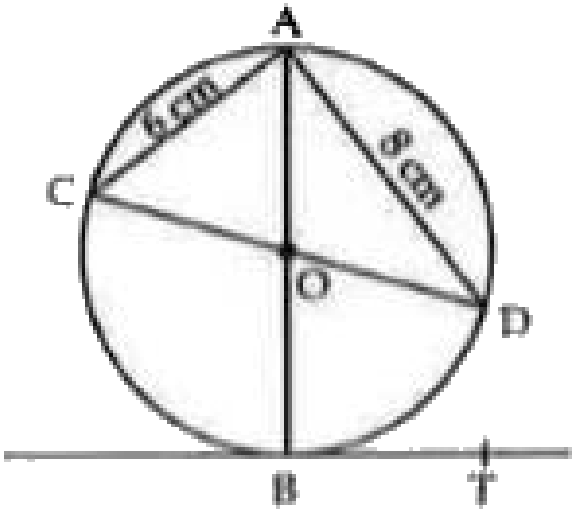
10. In the adjoining figure, $AD = 8cm$, $AC = 6cm$, and TB is the tangent at B to the circle with centre O. Find

OT if BT is 4 cm



A.

B.

C.

D.

Answer: $OT = \sqrt{41}cm$**.**

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11. The incircle of an isosceles triangle ABC in which $AB = AC$, touches the sides BC, CA, and AB at D, E, and F respectively. Prove that $BD = DC$.

A.

B.

C.

D.

Answer:

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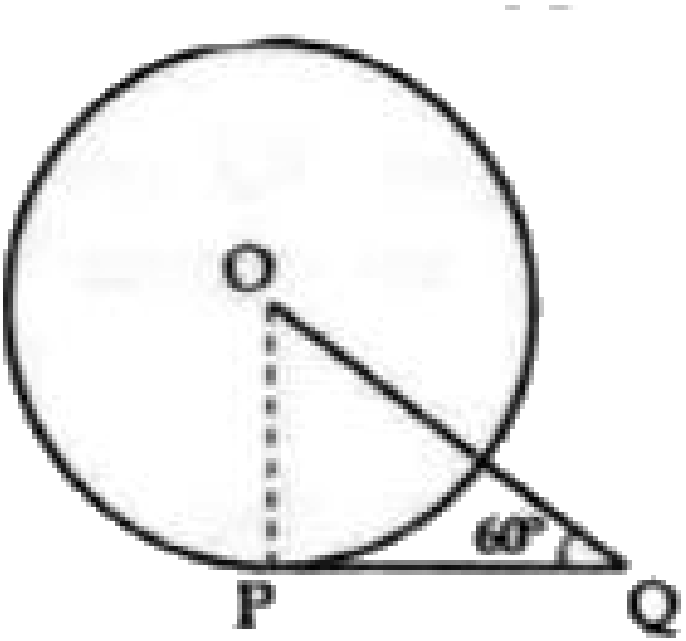
12. In the figure, PQ is a tangent of length 6 cm to the circle with centre O and $\lfloor OQP = 60^\circ$.

Find OQ.



A.

B.

C.

D.

Answer: $OQ = 12cm$

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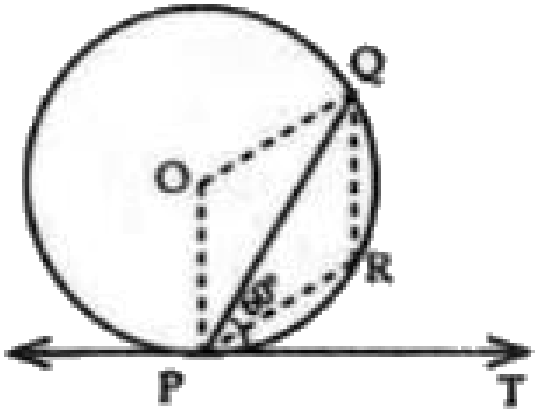
13. In the figure, PQ is a chord of a circle and PT is the tangent at P such that $\angle QPT = 60^\circ$. Find $\angle PRQ$.



A.

B.

C.

D.

Answer: $\lfloor PRQ = 120^\circ$.

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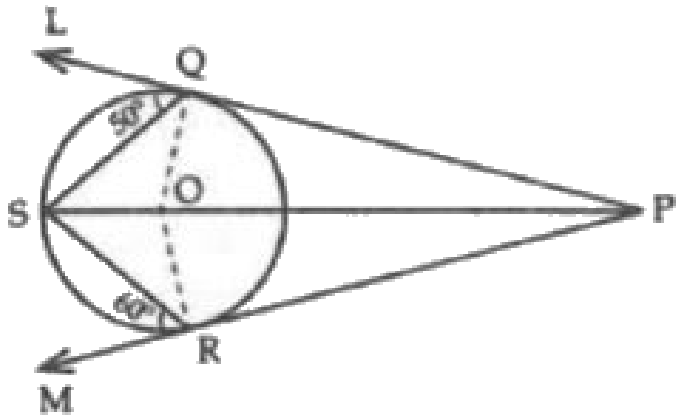
14. In the figure, PQL and PRM are tangents to the circle with centre O at the points Q and R respectively and S is a point on the circle such

that $\lfloor SQL = 50^\circ$ and $\lfloor SRM = 60^\circ$. Find $\lfloor QSR$.



A.

B.

C.

D.

Answer: $\lfloor QSR = 70^\circ$.

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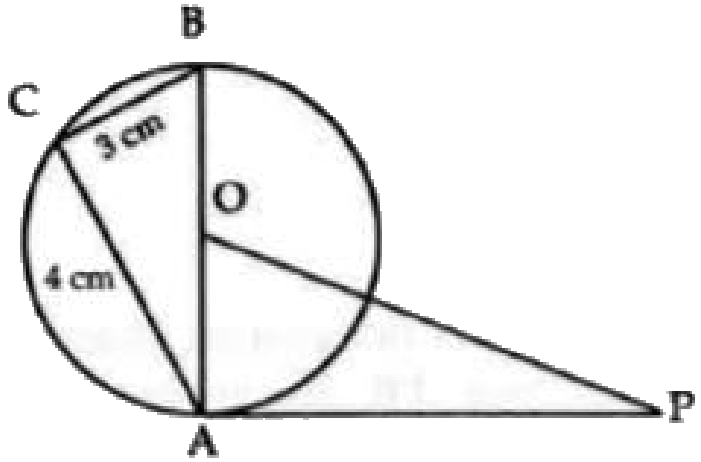
15. PA is a tangent to the circle with centre O. If $BC = 3cm$, $AC = 4cm$, and $\Delta ACB = \Delta PAO$, find OA and $\frac{OP}{AP}$.



A.

B.

C.

D.

Answer: $OA = 2.5cm$ **and** $\frac{OP}{AP} = \frac{5}{4}$.

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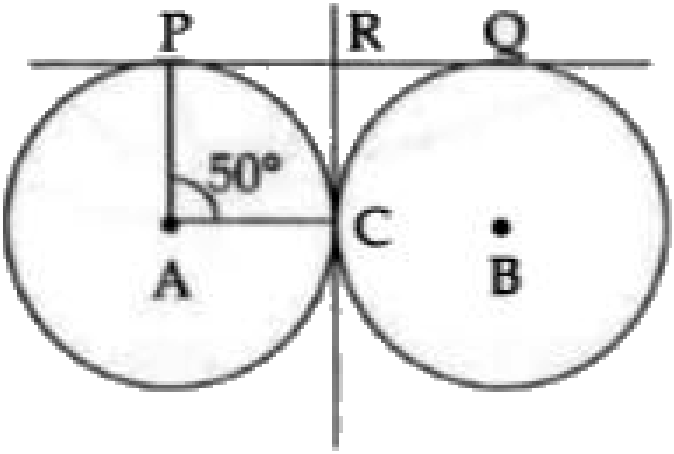
16. Two circles with centre at A and B touch each other at C. Common tangents PQ and RC are drawn. If $\angle PAC = 50^\circ$, find $\angle PRC$ and

$\lfloor CBQ.$



A.

B.

C.

D.

Answer: 130°.

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Zen Additional Questions Short Answer Sa Type 2 Questions

1. Prove that "the lengths of tangents drawn from an external points to a circle are equal ".

A.

B.

C.

D.

Answer:

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2. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\lfloor PTQ = 2\lfloor OPQ$.

A.

B.

C.

D.

Answer:

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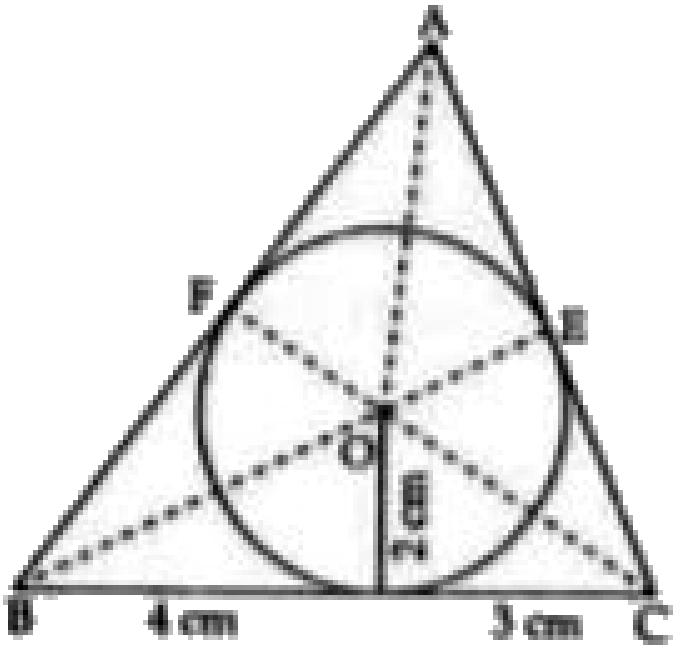
3. In the figure, a triangle ABC is drawn to circumscribe a circle of radius 2 cm such that the segments BD and DC into which BC is divided by the point of contact are the lengths 4 cm and 3 cm respectively. If the area of $\Delta ABC = 21cm^2$, find the length of sides AB

and AC.



A.

B.

C.

D.

Answer: $AB = 7.5cm$

$AC = 6.5cm.$

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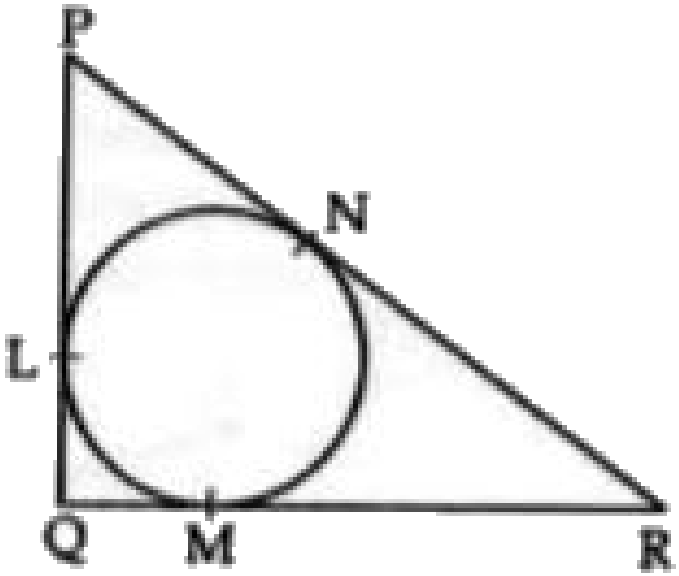
4. In the figure, a circle is inscribed in a triangle PQR with $PQ = 10cm, QR = 5cm,$ and $PR = 12$ cm. Find the lengths QM, RN

and PL.



A.

B.

C.

D.

Answer: $QM = 3cm, RN = 5cm,$ **and** $PL = 7cm.$

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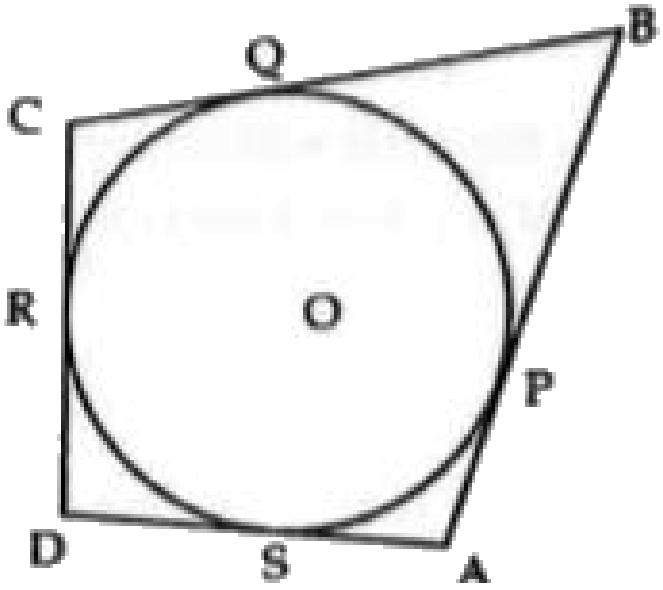
5. In the given figure, $\lfloor ADC = 90^\circ BC = 38cm, CD = 28cm,$ and

$BP = 25cm$. Find the radius of the circle.



A.

B.

C.

D.

Answer: $RD = OS = 15cm.$

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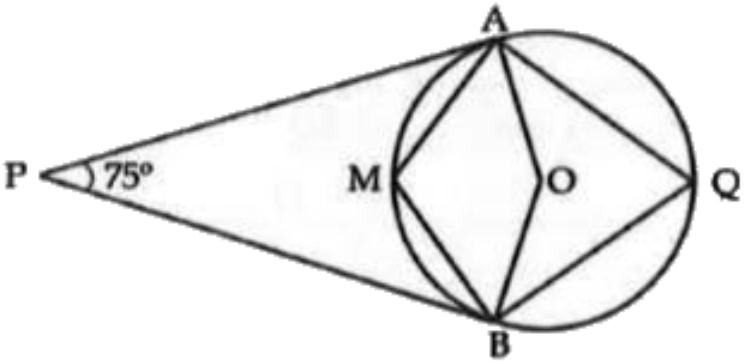
6. In the given figure, O is the centre of the circle. Determine $\lfloor AQB$ and $\lfloor AMB$, if PA and PB are tangents and $\lfloor APB = 75^\circ$.



A.

B.

C.

D.

Answer: $\left| AQB = 52\frac{1}{2}^{\circ} \right.$

$\left| AMB = 127\frac{1}{2}^{\circ}. \right.$

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7. The lengths of three consecutive sides of a quadrilateral circumscribing a circle are 4 cm,

5 cm, and 7 cm respectively . Determine the length of the fourth side.

A.

B.

C.

D.

Answer: $AD = 6cm$.

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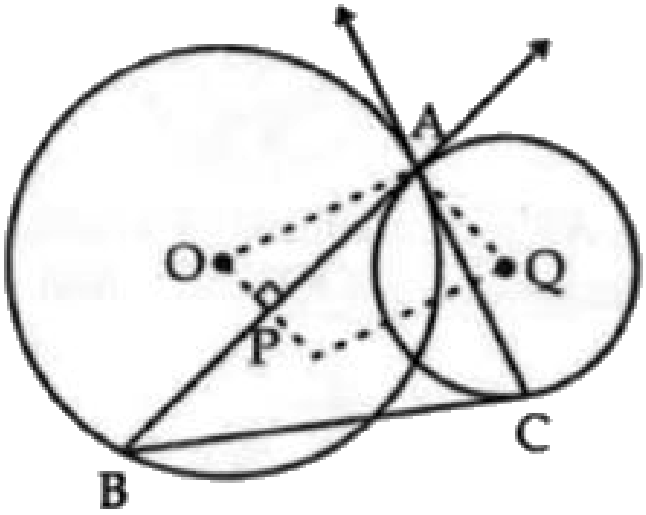
8. Let A be one point of intersection of two intersecting circles with centres O and Qd . The tangents at A to the two circles meet the circles again at B and C respectively. Let the point P be located so that AOPQ is a parallelogram. Prove that P is the circumcentre of the triangle ABC.



A.

B.

C.

D.

Answer:

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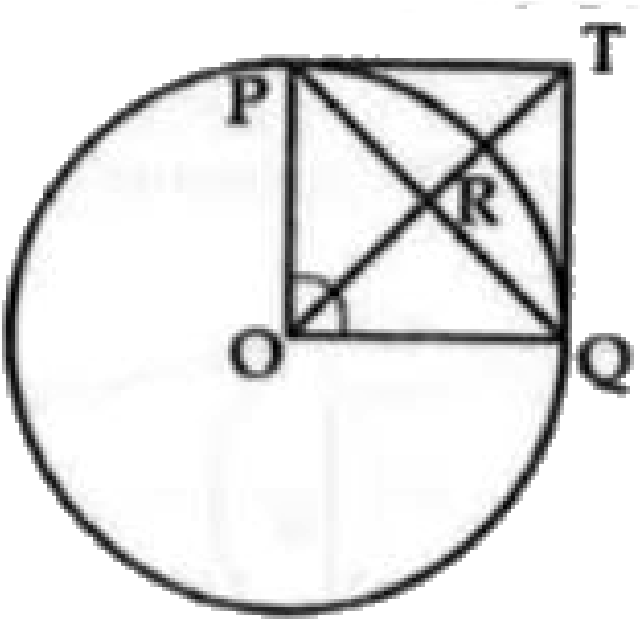
9. In the figure $PO \perp QO$. The tangents to the circle at P and Q intersect at a point T. Prove that PQ and OT are right bisectors of

each other.



A.

B.

C.

D.

Answer:

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10. Let s denote the semi-perimeter of ΔABC where $BC = a, CA = b,$ and $AB = c.$ If a circle touches the sides BC, CA, and AB at D, E, and F respectively, prove that $BD = s - b.$

A.

B.

C.

D.

Answer:

Watch Video Solution

11. In a right-triangle ABC in which $\angle B = 90^\circ$, a circle is drawn with AB as diameter intersecting the hypotenuse AC at P. Prove that the tangent to the circle at P bisects BC.

A.

B.

C.

D.

Answer:

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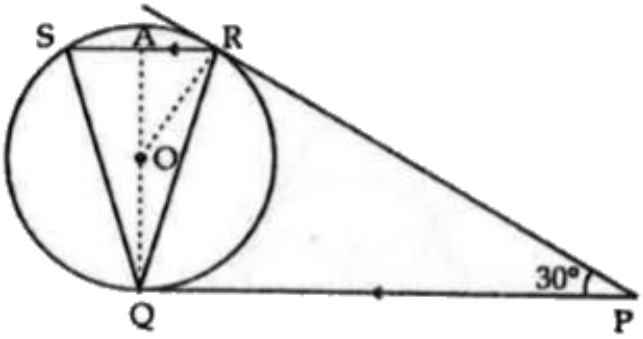
12. In the figure, tangents PQ and PR are drawn to the circle . Such that $\lfloor RPQ = 30^\circ$ A chord RS is drawn parallel to tangents PQ. Find the

$\lfloor RQS.$



A.

B.

C.

D.

Answer: $\lfloor RQS = 30^\circ.$

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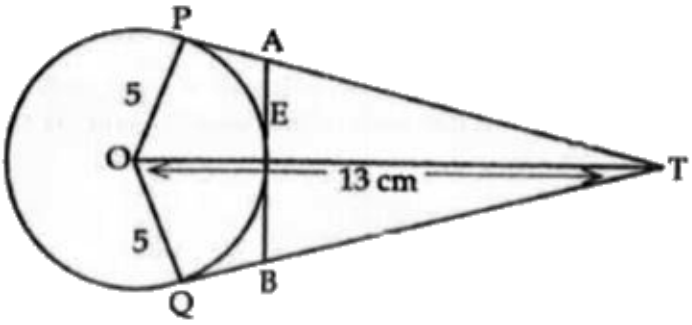
13. In the figure, O is the centre of a circle of radius 5 cm. T is the point such that $OT = 13cm$ and OT intersects the circle at E. If AB is the tangent to the circle at E, find the length of AB.



A.

B.

C.

D.

Answer: $x = 3.3$ **cm**

$AB = 6.6$ **cm.**

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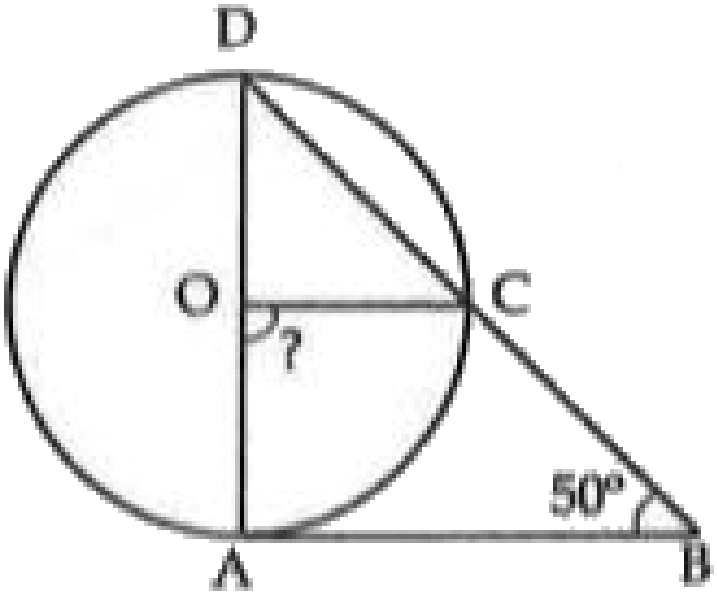
Zen Additional Questions Long Answer La Type Questions

1. In the given figure, AD is a diameter of a circle with centre O and AB is a tangent at A. C

is a point on the circle such that DC produced intersects the tangent at B and $\lfloor ABD = 50^\circ$. Find $\lfloor COA$.



A.

B.

C.

D.

Answer: $\lfloor COA = 80^\circ$.

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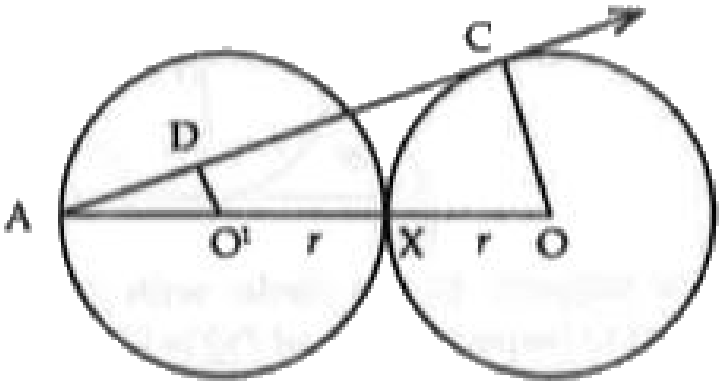
2. In the given figure, two equal circles with centres O and O' touch each other at X. OO' produced meets the circle with centre O' at A. AC is a tangent to the circle with centre O at the point C. O'D is perependicular to AC. Find

the value of $\frac{DO'}{CO}$.



A.

B.

C.

D.

Answer: $\frac{DO'}{CO} = \frac{1}{3}$

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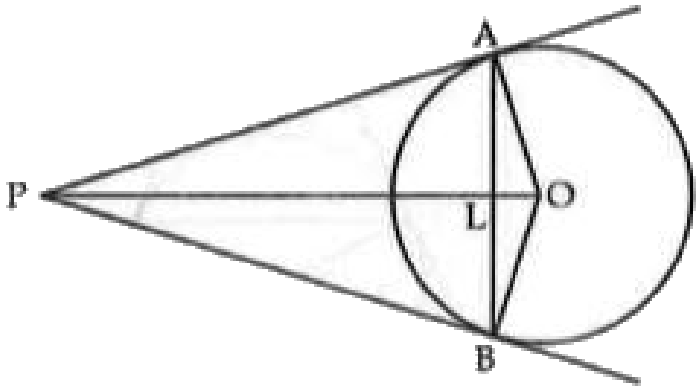
3. In the given figure, AB is a chord of a circle with centre O such that $AB = 16cm$ and radius of the circle is 10 cm. Tangent at A and B intersect each other at P. Find PA.



A.

B.

C.

D.

Answer: $PA = 13.33cm$.

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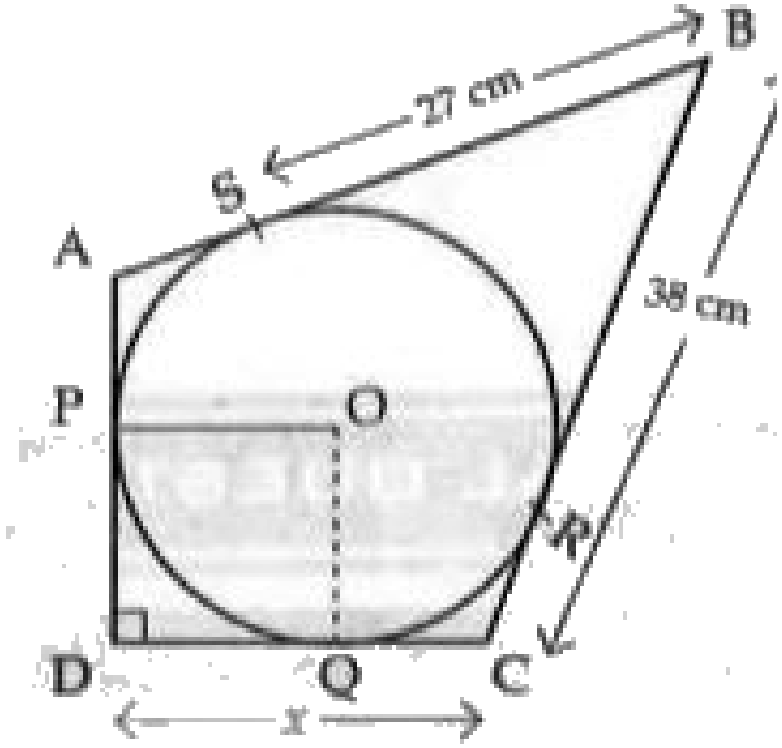
4. In the adjoining figure, quadrilateral ABCD is circumscribed. If the radius of the incircle with centre O is 10 cm and AD is perpendicular to

DC, find x.



A.

B.

C.

D.

Answer: $DC = 21cm$.

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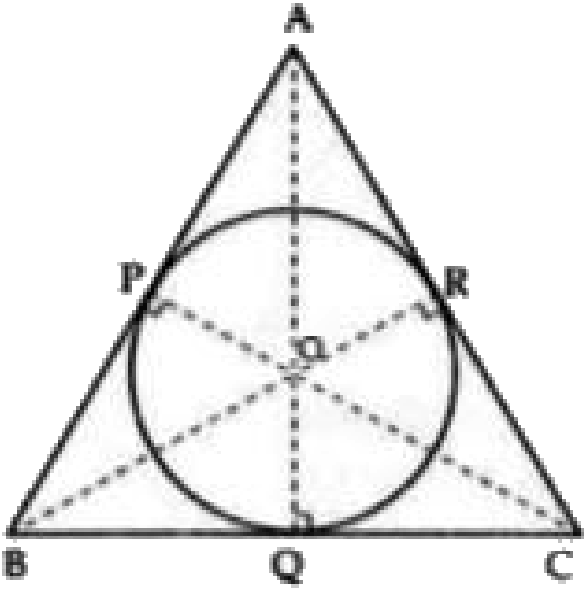
5. In the figure, the sides AB, BC and CA of triangle ABC touch a circle with centre O and radius r at P, Q , and R respectively. Prove that

(i) $AB + CQ = AC + BQ$

(ii) Area

$$(\Delta ABC) = \frac{1}{2}(\text{Perimeter of}\Delta ABC) \times r$$



A.

B.

C.

D.

Answer:

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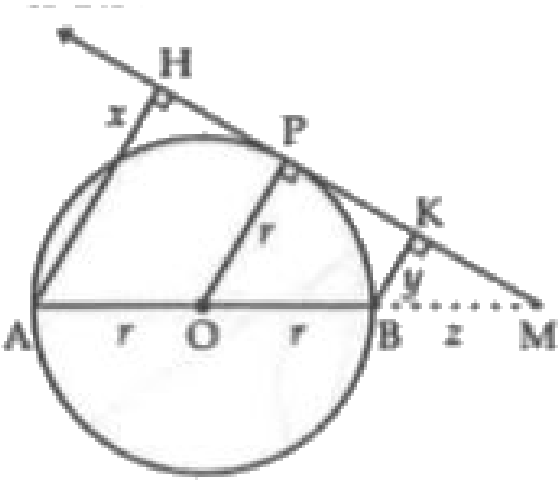
6. AB is a diameter of circle. P is a point on the semicircle APB. AH and BK are perpendiculars from A and B respectively to the tangents at P.

Prove that $AH + BK = AB$.



A.

B.

C.

D.

Answer:

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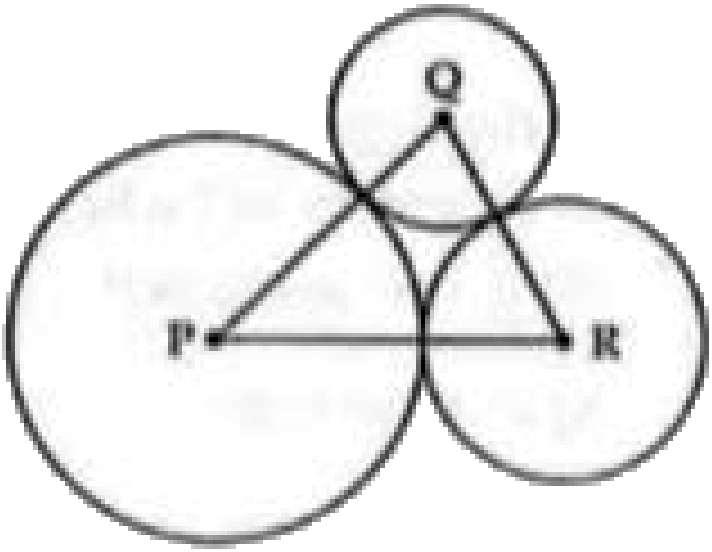
7. PQR is a triangle with $PQ = 10cm, QR = 8cm$ and $PR = 11cm$. Three circles are drawn touching with each other such that the vertices as their centres.

Find the radii of each circle.



A.

B.

C.

D.

Answer: 4.5 cm

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8. If an isosceles ΔABC in which $AB = AC = 6cm$ is inscribed in a circle of radius 9 cm, find the area of the triangle.

A.

B.

C.

D.

Answer: $8\sqrt{2}cm^2$.

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Zen Additional Questions Hot Higher Order Thinking Skills Questions

1. If a, b, and c, are the sides of a right-angled triangle where C is the hypotenuse, prove that the radius r of the circle which touches the sides of the triangle is given by $r = \frac{a+b-c}{2}$ units.

A.

B.

C.

D.

Answer:

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2. The radii of two concentric circles are 13 cm and 8 cm. AB is a diameter of the bigger circle.

BD is a tangent to the smaller circle touching it at D. Find AD.

A.

B.

C.

D.

Answer: $AD = 19cm$

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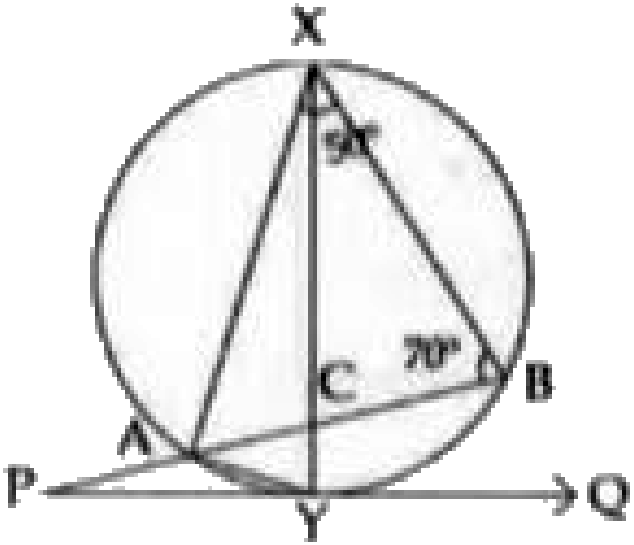
Zen Additional Questions Hot Higher Order Thinking Skills Questions Iit And Imo

1. In the adjoining figure, XY is a diameter of the circle and PQ is a tangent to the circle at Y. Given that $\lfloor AXB = 50^\circ$ and $\lfloor ABX = 70^\circ$, calculate $\lfloor BAY$ and $\lfloor APY$.



A.

B.

C.

D.

Answer: 10°

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2. Two circles of radius 25 cm and 9 cm touch each other externally. Find the length of the direct common tangent.

A.

B.

C.

D.

Answer: 30 cm

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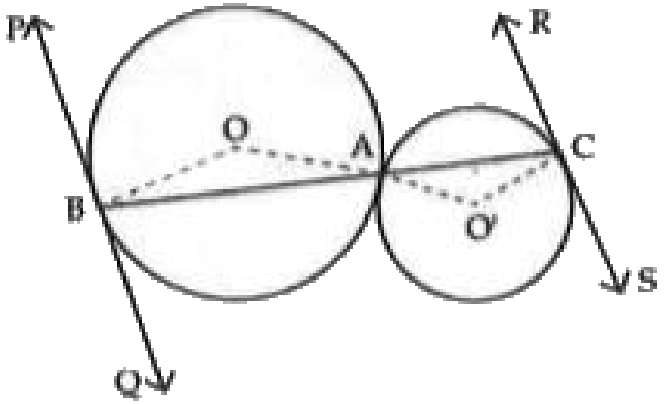
3. In the given figure, two circles with centres O and O' touch externally at a point A. A line through A is drawn to intersect these circles

at B and C. Prove that the tangents at B and C are parallel.



A.

B.

C.

D.

Answer:

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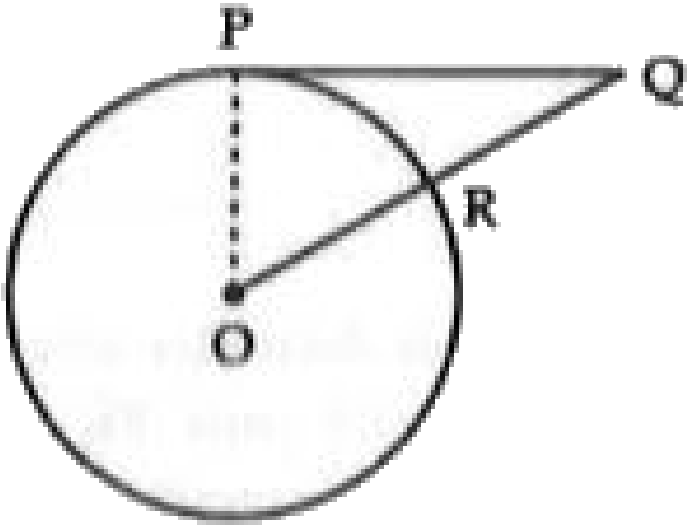
4. In the figure, PQ is a tangent to a circle with centre O. $QR = RO$. If $PQ = 3\sqrt{3}$ cm and ORQ is a line segment, find the radius of the

circle.



A.

B.

C.

D.

Answer: Radius of the circle is 3 cm.

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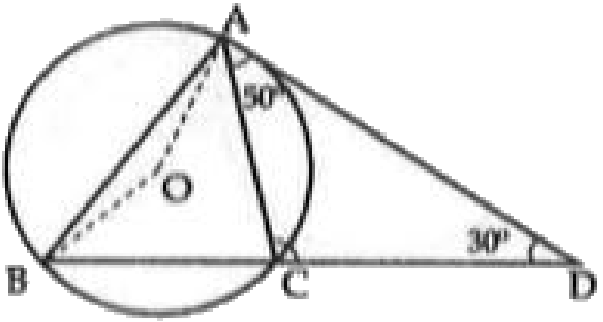
5. In the given figure, O is the centre of the circle and AD is a tangent to the circle at A. If $\angle CAD = 50^\circ$ and $\angle ADC = 30^\circ$, find $\angle ABO$.



A.

B.

C.

D.

Answer: $\lfloor OBA = 10^\circ$.

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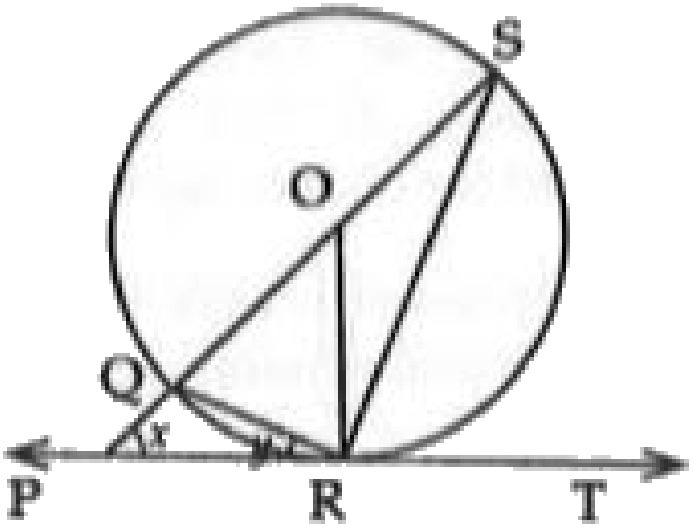
6. In the figure, PT touches the circle at R whose centre is O. Diameter SQ when produced meets PT and P. Given $\lfloor SPR = x^\circ$

and $\lfloor QRP = y^\circ$ then,



A. $x^\circ + 2y^\circ = 90^\circ$

B. $2x^\circ + y^\circ = 90^\circ$

C. $x^\circ + y^\circ = 120^\circ$

D. $3x^\circ + 2y^\circ = 120^\circ$

Answer: A

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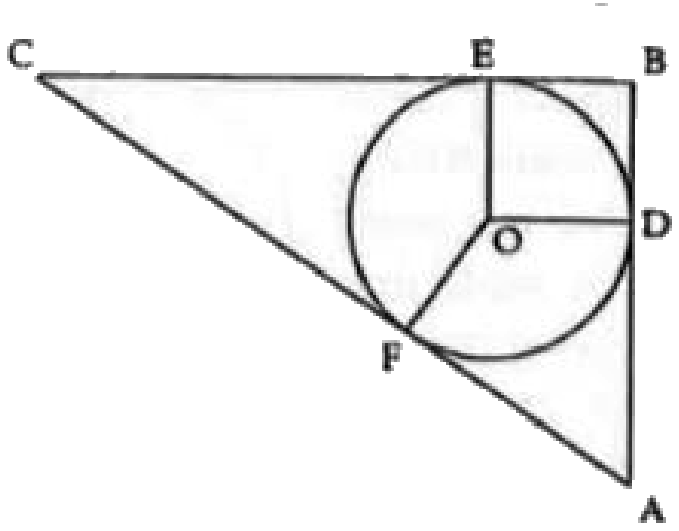
7. ΔABC is right-angled at B. $BC = 6cm$ and $AB = 8cm$. The radius of the incircle is _____cm.



A. 2 cm

B. 3 cm

C. 1 cm

D. 4 cm

Answer: A

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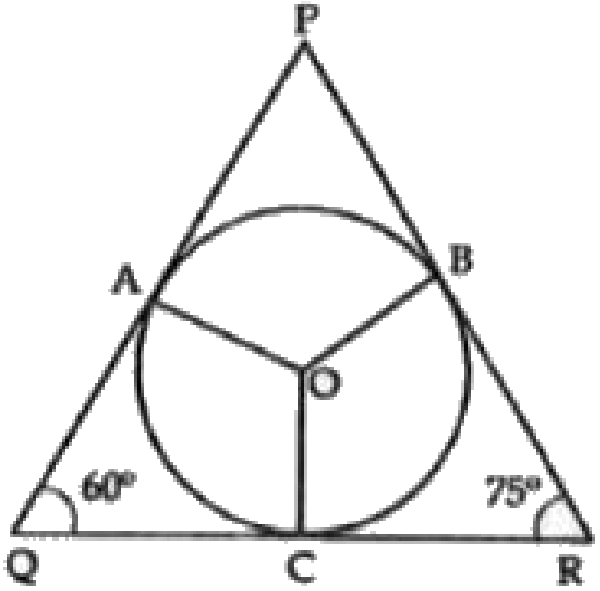
8. In a triangle PQR, O is the centre of the incircle, $\lfloor PQR = 60^\circ$, and $\lfloor PRQ = 75^\circ$.

Find $\lfloor AOB$



A. 75°

B. 45°

C. 135°

D. Can not be determined

Answer: C

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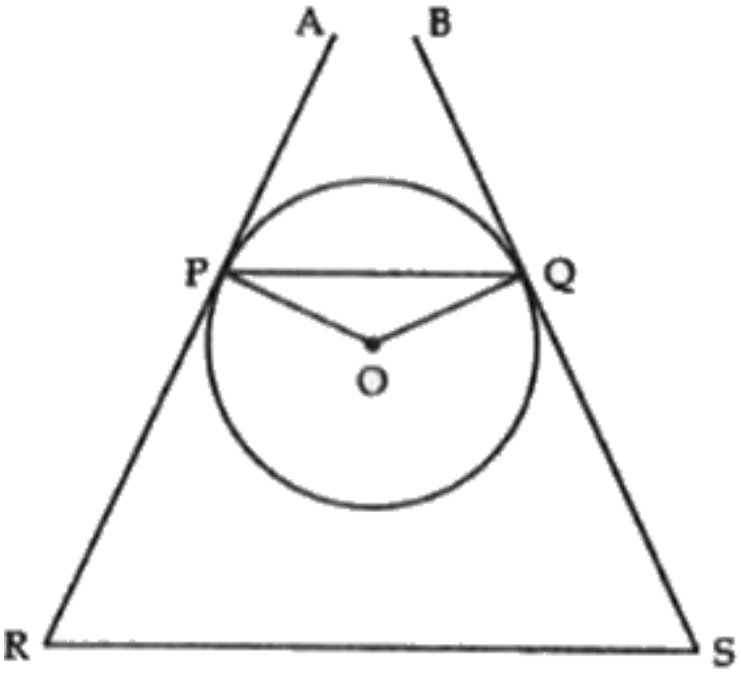
9. AR and BS are tangents to the circle, with centre O, touching at P and Q respectively, and PQ is the chord. If $\lfloor OQP = 25^\circ$, $\lfloor RPQ =$



A. 100

B. 115°

C. 150°

D. 90°

Answer: B

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