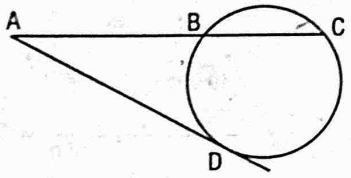
MORE QUESTIONS AND ANSWERS

1. In the figure AD is a tangent to the circle. If AB = 4 cm and BC = 5 cm, find the length of AD.



$AC = AB + BC = 4 + 5 = 9$

$AD^2 = AB \times AC = 4 \times 9 = 36$

$AD = \sqrt{36} = 6$ cm

2. Find the inradius of a triangle whose sides are 6 cm, 8 cm and 10 cm long.

Inradius, $r = \frac{A}{s}$

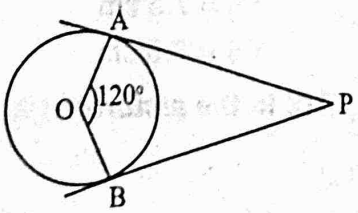
Since 6, 8, 10 is a Pythagorean triplet, this triangle is a right triangle.

Area of the triangle, $A = \frac{1}{2} \times 6 \times 8 = 24$ sq.cm.

$s = \frac{6+8+10}{2} = 12$ cm

Inradius $= \frac{A}{s} = \frac{24}{12} = 2$ cm

3. In the figure P is at a distance of 6 cm from the centre of the circle. PA and PB are tangents from the point P. Find the radius of the circle and length of tangents.



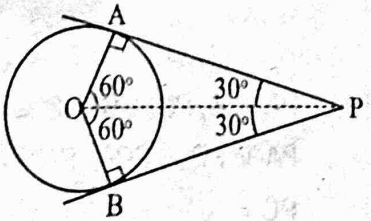
Draw OP.

In ΔOAP, ∠A = 90°,

Since ∠AOB = 120°,

∠AOP = 120 ÷ 2 = 60°

Then we can find that ∠APO = 30°.



Since the angles are 30°, 60° and 90°,

the sides are in the ratio $1 : \sqrt{3} : 2$

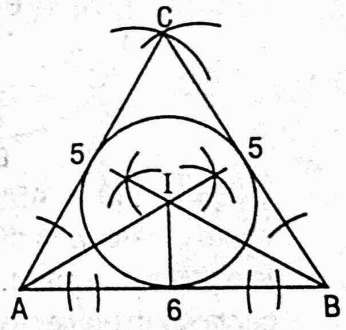
Since OP = 6, OA = 3 and $AP = 3\sqrt{3}$

Radius of the circle = 3 cm

Length of the tangent $= 3\sqrt{3}$ cm

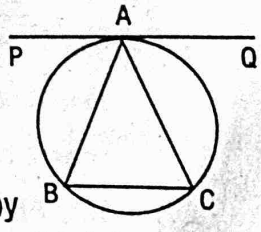
4. Draw a triangle of side 6 cm, 5 cm and 5 cm and construct its incircle. Write the radius of the incircle.

Draw ΔABC with AB = 6 cm, BC = 5 cm and AC = 5 cm. Draw the bisectors of ∠A and ∠B. These bisectors meet at I, the centre of the incircle. Draw a circle with I as centre and the perpendicular distance from I to AB as radius.



Radius of the incircle = 1.4 cm

5. In the figure lines PQ and BC are parallel. Prove that ΔABC is an isosceles triangle.



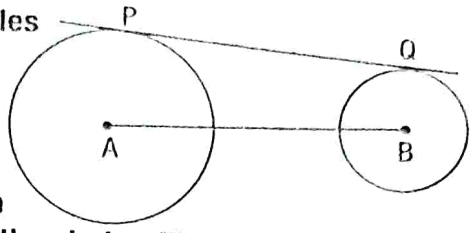
Since the alternate angles made by the parallel lines PQ and BC on the third line AC are equal, ∠QAC = ∠ACB ..... (1)

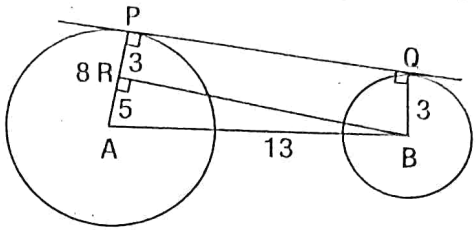
Since the angles which a chord makes with the tangent at its ends on any side are equal to the angle which it makes on the part of the circle on the other side, ∠QAC = ∠ABC .... (2)

From (1) and (2), ∠ACB = ∠ABC.

Since two angles of ΔABC are equal, sides opposite these angles are also equal. So ΔABC is isosceles.

6. **The radii of circles with centres A and B are 8 cm and 3 cm respectively. PQ is a common tangent to both the circles. The distance between A and B is 13 cm. Find the length of PQ.**





Draw BR through B and parallel to PQ. The quadrilateral PQBR thus got is a rectangle.

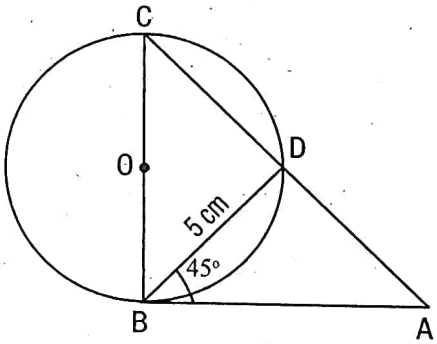
Since PA = 8 cm, PR = 3 cm, AR = 5 cm.

From right triangle ARB,

$RB = \sqrt{13^2 - 5^2} = \sqrt{169 - 25} = \sqrt{144} = 12$

Since PQ = RB, PQ = 12 cm.

7. **In the figure BC is the diameter of the circle and AB is a tangent. If BD = 5 cm and $\angle ABD = 45^\circ$ find $\angle C$, find the lengths of AB, BC and AC.**



$\angle C = \angle ABD = 45^\circ$. (In a circle, the angle which a chord makes with the tangent at one end on any side is equal to the angle which it makes on the part of the circle on the other side.)

BD = 5 cm, CD = 5 cm

$\therefore BC = \sqrt{5^2 + 5^2}$

$= \sqrt{50} = \sqrt{2 \times 25}$

$= 5\sqrt{2}$ cm

$\angle A = 45^\circ$; $AB = BC = 5\sqrt{2}$

$\therefore AC = \sqrt{\left(5\sqrt{2}\right)^2 + \left(5\sqrt{2}\right)^2}$

$= \sqrt{50 + 50}$

$= \sqrt{100} = 10$ cm

8. **Draw ΔABC in which two angles are 60° and 70° and the radius of the incircle is 3 cm.**

In ΔAIP, IP = inradius = 3 cm

$\angle P = 90^\circ, \angle A = 60 \div 2 = 30^\circ$

$\therefore \angle I = 60°$

Angles of ΔAIP are $30°$, $60°$ and $90°$.

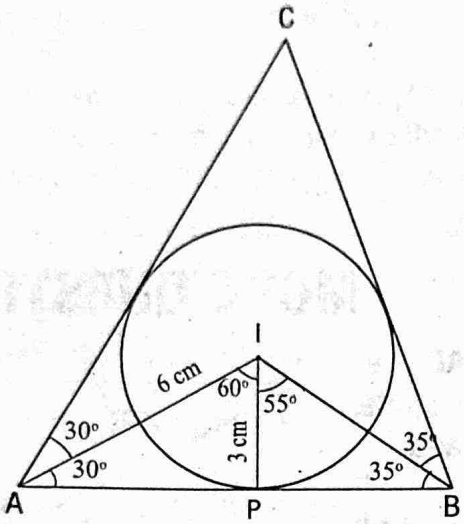
So its sides are in the ratio $1 : \sqrt{3} : 2$.

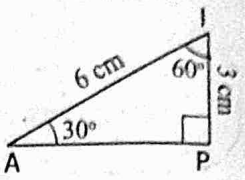
Since $IP = 3$ cm, $AI = 6$ cm

Draw a circle with centre I and radius 3 cm. Mark a point P on the circle. Draw a line through P perpendicular to IP. Measure and draw $\angle PIA = 60°$ to get the point A.

Measure and draw $\angle PIB = 55°$ to get B.

Draw $\angle IAC = 30°$ and $\angle IBC = 35°$ to get C.





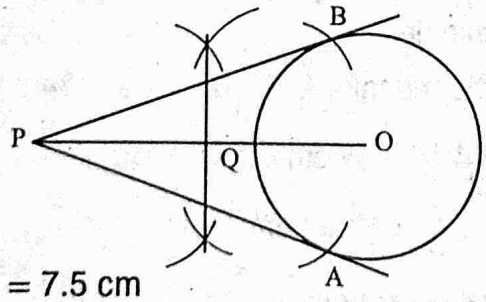
AB = 9.7 cm

AC = 11.5 cm

BC = 10.6 cm

9. Mark a point P, 8 cm away from the centre of a circle of radius 3 cm. Draw tangents to the circle from P. Measure and write their lengths.

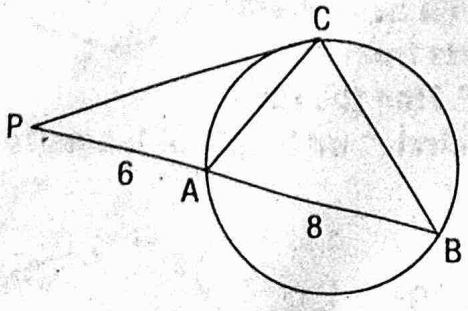
Draw a circle with centre O and radius 3 cm. Mark a point P, 8 cm away from O. Draw the line OP. Draw the perpendicular bisector of OP to find its midpoint Q. With Q as centre and PQ as radius, draw arcs to cut the circle at A and B. Draw the lines PA and PB.



PA = 7.5 cm

PB = 7.5 cm

10. In the picture if PA = 6 cm, AB = 8 cm, find PC.



PA = 6, PB = 6 + 8 = 14

$PA \times PB = PC^2$, $PC^2 = 6 \times 14 = 84$

$PC = \sqrt{84} = 9.2$ cm