

## 10<sup>th</sup> Geometry[17 marks] Topic: Circle Topic: Construction



Tangents to a circle motivated by chords drawn from points coming closer and closer to the point.



(Prove) The tangent at any point of a circle is perpendicular to the radius through the point of contact.



(Prove) The lengths of tangents drawn from an external point to circle are equal.

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1. (Prove) The tangent at any point of a circle is perpendicular to the radius through the point of contact.
2. (Prove) The lengths of tangents drawn from an external point to circle are equal.

Practice paper based on CBSE Question Paper SA-II -2011- 2012 For Exam 2013-14

1 mark Questions

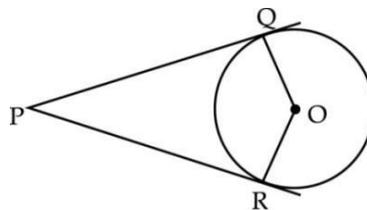
Q. If two tangents inclined at an angle  $60^\circ$  are drawn to a circle of radius 5 cm, then length of each tangent (in cm) is equal to : (A)  $5\sqrt{3}/2$  (B) 10 (C) 3 (D)  $5\sqrt{32}$

Q. The distance between two parallel tangents in a circle of radius 3.5 cm is :

(A) 7 cm (B) 14 cm (C) 3.5 cm (D) 1.75 cm

Q. AT is a tangent to a circle at A with centre O from an external point T, such that  $OT = 8$  cm and  $\angle OTA = 30^\circ$ . The length of AT (in cm) is : (A)  $\sqrt{2}$  (B)  $3\sqrt{2}$  (C)  $4\sqrt{3}$  (D) 4

Q. In given figure, O is the centre of a circle of radius 6 cm. At a distance of 10 cm from O, a point P is taken. Two tangents PQ and PR are drawn to the circle from this point. Then area of quadrilateral PQOR is :

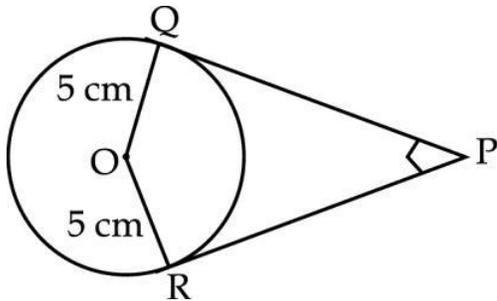


Q. The length of the tangent drawn from a point 8 cm away from the centre of a circle of radius 6 cm is: (A)  $\sqrt{7}$  cm (B)  $2\sqrt{7}$  cm (C) 10 cm (D) 5 cm

Q. In the given figure, the pair of tangents PQ and PR drawn from an external point P to a circle with

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centre O are inclined to each other at  $90^\circ$ . If length of each tangents is 5 cm, then the radius (in cm) of the circle is :



(A) 10 (B) 7.5 (C) 5 (D) 2.5

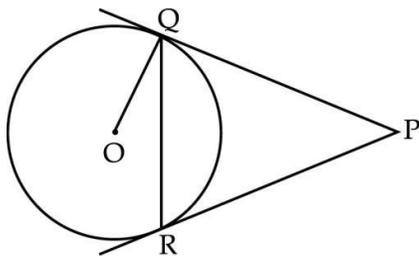
Q. From a point P, which is at a distance of 13 cm from the centre O of a circle of radius 5 cm, the pair of tangents PQ and PR are drawn to the circle. Then the area of the quadrilateral PQOR (in  $\text{cm}^2$ ) is :

(A) 60 (B) 65 (C) 30 (D) 32.5

Q. If angle between two radii of a circle is  $130^\circ$ , the angle between the tangents at the ends of the radii is :

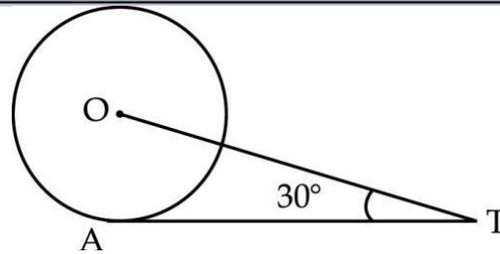
(A)  $90^\circ$  (B)  $50^\circ$  (C)  $70^\circ$  (D)  $40^\circ$

Q. In the given figure, PQ and PR are tangents to the circle with centre O such that  $\angle QPR = 50^\circ$ , then  $\angle OQR$  is equal to :



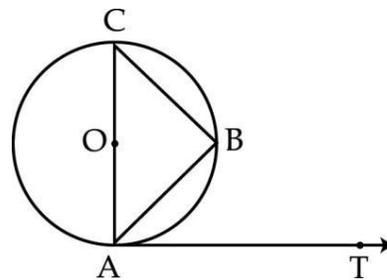
(A)  $25^\circ$  (B)  $30^\circ$  (C)  $40^\circ$  (D)  $50^\circ$

Q. In the given figure, AT is a tangent to the circle with centre O such that OT is 4 cm and  $\angle OTA = 30^\circ$ , then AT is equal to (in cm)



(A) 4 (B) 2 (C)  $2\sqrt{3}$  (D)  $4\sqrt{3}$

Q In the given figure, AB is a chord of the circle and AOC is its diameter such that  $\angle ACB = 50^\circ$ . If AT is the tangent to the circle at the point A, then  $\angle BAT$  is equal to

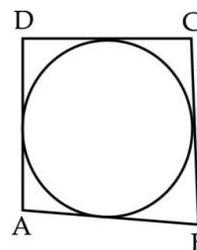


(A)  $65^\circ$  (B)  $60^\circ$  (C)  $50^\circ$  (D)  $40^\circ$

Q. If radii of two concentric circles are 4cm and 5cm, then the length of each chord of one circle which is tangent to the other (in cm) is (A) 3 (B) 6 (C) 9 (D) 1

Q. If the angle between two radii of a circle is  $130^\circ$ , then the angle between the tangents at the end points of radii at their point of intersection is : (A)  $90^\circ$  (B)  $50^\circ$  (C)  $70^\circ$  (D)  $40^\circ$

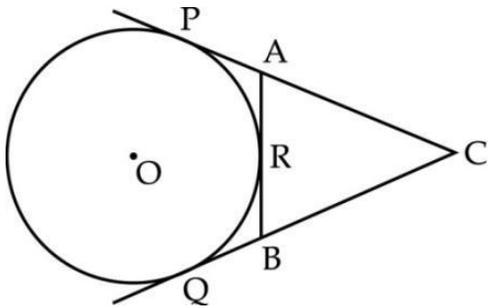
Q. If four sides of a quadrilateral ABCD are tangential to the circle as shown in the fig, then :  
 (A)  $AC + AD = BD + CD$  (B)  $AB + CD = BC + AD$   
 (C)  $AC + AD = BC + BD$  (D)  $AB + CD = AC + BC$



Q. If PA and PB are two tangents from a point P to a circle with centre O and are inclined to each other at an angle of  $80^\circ$ , then  $\angle POA$  is equal to : (A)  $50^\circ$  (B)  $60^\circ$  (C)  $70^\circ$  (D)  $80^\circ$

Q. In the given fig., CP and CQ are tangents to a circle with centre O and line segment AB touches the circle at R with CP = 11 cm, AR = 3 cm, BC = 7 cm, then BR is equal to :

(A) 4 cm (B) 3 cm (C) 5 cm (D) 10 cm



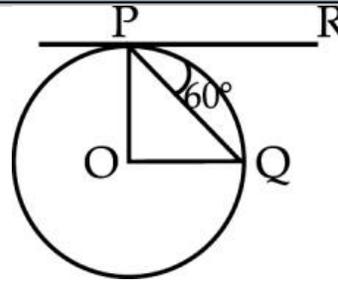
Q. Two tangents QA and QB are drawn to the circle with centre O such that  $\angle AQB = 60^\circ$  with AQ = 3 cm, then OQ is equal to : (A)  $\sqrt{3}$  (B)  $\sqrt{3}/2$  (C) 6 cm (D)  $2\sqrt{3}$  cm

Q. To draw two tangents to a circle, which are inclined at an angle of  $60^\circ$ , the perpendiculars are to be drawn at the ends of two radii which are at an angle of : (A)  $60^\circ$  (B)  $120^\circ$  (C)  $90^\circ$  (D)  $75^\circ$

Q. If tangents PA and PB from a point P to a circle with centre O, are inclined to each other at an angle of  $80^\circ$ , then  $\angle POA$  is equal to (A)  $50^\circ$  (B)  $60^\circ$  (C)  $70^\circ$  (D)  $80^\circ$

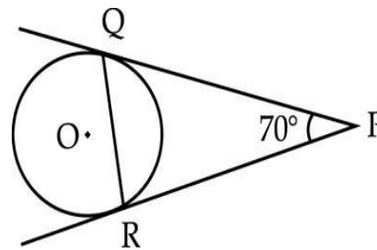
Q. PA is a tangent to a circle from a point A with center O. Find the radius OA if PA = 4 cm and OP = 5 cm. (A) 2 cm (B) 3 cm (C) 1.5 cm (D) none

Q. If O is the centre of a circle, PQ is a chord and the tangent PR at P make an angle of  $60^\circ$  with PQ, then  $\angle POQ$  is equal to :



(A)  $30^\circ$  (B)  $120^\circ$  (C)  $100^\circ$  (D)  $110^\circ$

Q. In the given figure, PQ and PR are tangents to the circle with centre O such that  $\angle QPR = 70^\circ$ , then  $\angle OQR$  is equal to



(A)  $25^\circ$  (B)  $35^\circ$  (C)  $40^\circ$  (D)  $20^\circ$

## 2 marks Questions

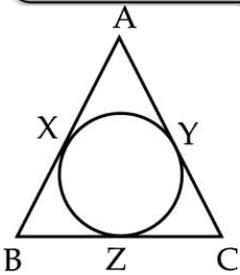
Q. Prove that the line segment joining the points of contact of two parallel tangents to a circle is a diameter of the circle.

Q. A circle touches all the four sides of a quadrilateral ABCD whose sides AB, BC and CD have length (in cm) 6, 7 and 4 respectively, find the length of AD.

Q. Find the area of a right angled triangle, if the radius of its circumcircle is 3 cm and altitude drawn to the hypotenuse is 2 cm.

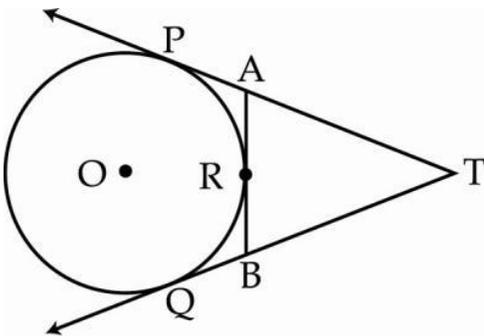
Q. ABC is an isosceles triangle in which AB = AC which is circumscribed about a circle as shown in the figure. Show that BC is bisected at the point of contact.

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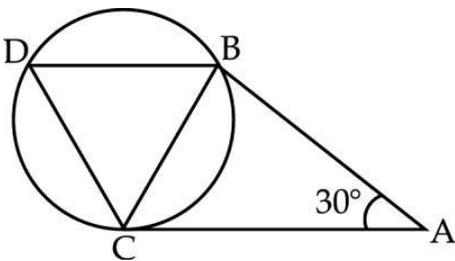
Q. If PA and PB are two tangents drawn from a point P to a circle with centre O touching it at A and B, prove that OP is the perpendicular bisector of AB.

Q. In the given figure, TP and TQ are tangents from T to the circle with centre O and R is any point on the circle. If AB is a tangent to the circle at R, prove that:  $TA + AR = TB + BR$

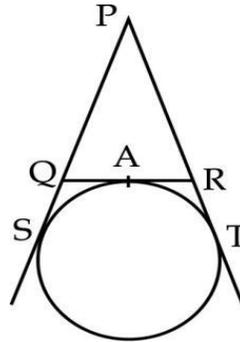


Q. Two tangents PA and PB are drawn from an external point P to a circle with centre O. Prove that AOBP is a cyclic quadrilateral

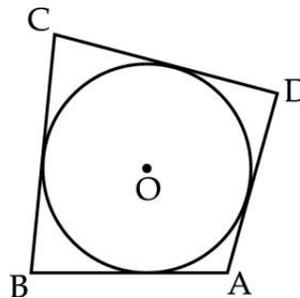
Q. In the given figure, tangents AC and AB are drawn to a circle from a point A such that  $\angle BAC = 30^\circ$ . A chord BD is drawn parallel to the tangent AC. Find  $\angle DBC$ .



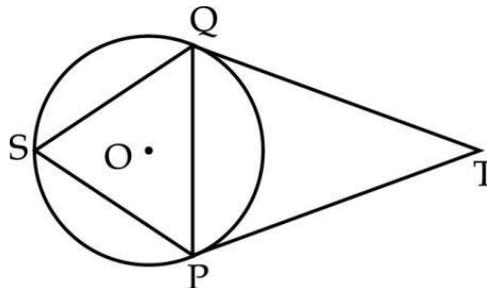
Q. In given figure, a circle touches the side QR of  $\triangle PQR$  at A and sides PQ and PR on producing at S and T respectively. If  $PS = 8$  cm, find the perimeter of  $\triangle PQR$ .



Q. A circle touches all the four sides of the quadrilateral ABCD, as shown in the figure. If  $AB = 6$  cm,  $BC = 7$  cm,  $CD = 4$  cm, find the length of AD.



Q. PT and QT are two tangents to the circle. If  $\angle PTQ = 50^\circ$ , find  $\angle PSQ$  and  $\angle OPQ$



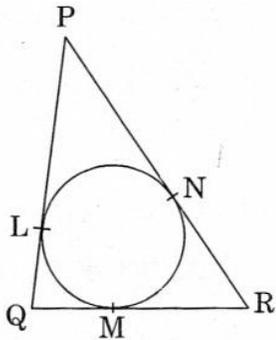
Q. Prove that the tangents drawn at the end points of a diameter of a circle are parallel

Q. Prove that in two concentric circle , the chord of the larger circle, which touches the smaller circle, is bisected at the point of contact.

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## 3 marks Questions

Q. In fig. A circle is inscribed in a triangle PQR with PQ = 10cm , QR=8 cm and PR = 12 cm .Find the lengths of QM,RN and PL

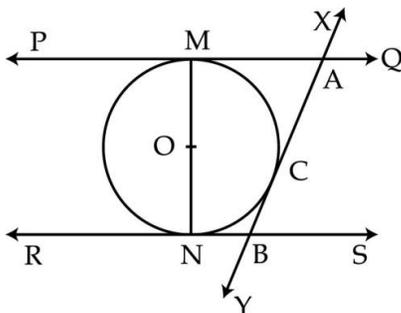


Q. ABC is a right – angled triangle, right angled at B and with BC = 6 cm and AB = 8 cm. A circle with centre O and radius x has been inscribed in  $\Delta ABC$ . Find the value of x.

Q. Prove that the intercept of a tangent between a pair of parallel tangents to a circle subtend a right angle at the centre of the circle.

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

Q. In the fig., PQ and RS are two parallel tangents to a circle with centre O and another tangent XY, with point of contact C intersects PQ at A and RS at B. Prove that  $\angle AOB = 90^\circ$ .

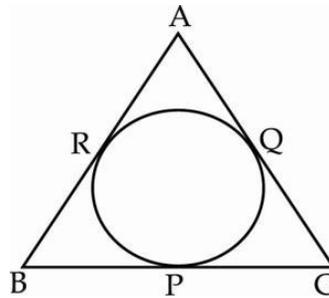


Q. If all the sides of a parallelogram touch a circle then prove that the parallelogram is a rhombus. or,

Prove that the parallelogram circumscribing a circle is a rhombus.

Q. PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q intersect at a point T. Find the length TP.

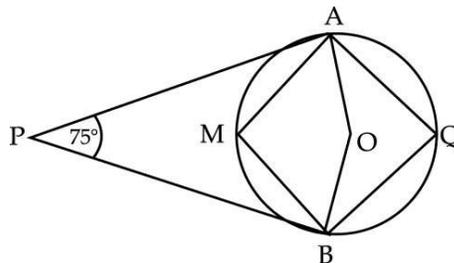
Q. ABC is an isosceles triangle in which  $AB = AC$ , circumscribed about a circle, as shown in the figure. Prove that the base is bisected by the point of contact.



Q. AB is a diameter and AC is a chord of a circle such that  $\angle BAC = 30^\circ$ . If the tangent at C intersects AB produced at D, prove that  $BC = BD$ .

Q. A circle touches the side BC of a  $\Delta ABC$  at point P and touches AB and AC when produced at Q and R respectively. Show that  $AQ = \frac{1}{2}$  (perimeter of  $\Delta ABC$ )

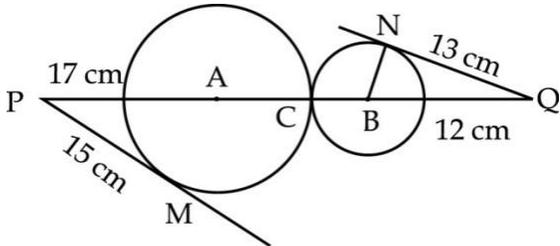
Q. In the given figure 'O' is the centre of the circle. Determine  $\angle AQB$  and  $\angle AMB$ , if PA and PB are tangents and,  $\angle APB = 75^\circ$



Q. In fig. Two circles with centre A and B touch each other externally. PM = 15 cm is tangent to circle with centre A and QN = 13 cm is tangent to circle with

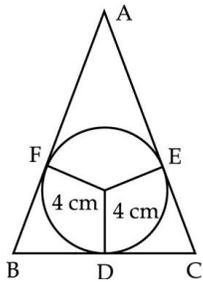
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centre B from external points P & Q. If PA = 17 cm and BQ = 12 cm. Find the distance between the centres A and B of circles.



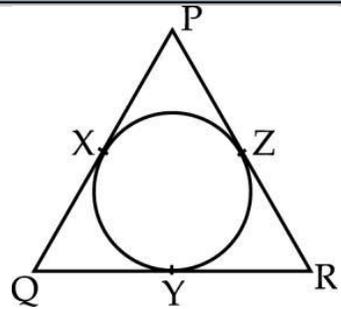
Q. ABCD is a quadrilateral such that  $\angle D = 90^\circ$ . A circle with centre O and radius  $r$  touches the sides AB, BC, CD, and DA at P, Q, R and S respectively. If BC = 38 cm, CD = 25 cm and BP = 27 cm find  $r$ .

Q. In the figure, the radius of in circle of  $\triangle ABC$  is 4 cm and segments into which one side BC is divided by the point of contact D are 6 cm and 8 cm. Find AB and AC.

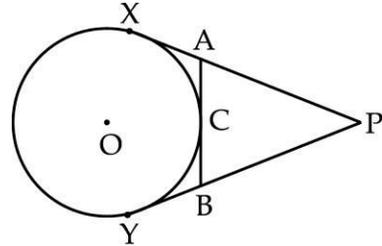


Q. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre.

Q. In the given figure a circle touches the sides PQ, QR and PR of  $\triangle PQR$  at the points X, Y and Z respectively. Show that  $PX + QY + RZ = XQ + YR + ZP = \frac{1}{2}$  (Perimeter of  $\triangle PQR$ )



Q. In the given figure, from an external point P, tangents PX and PY are drawn to a circle with centre O. If AB is another tangent to the circle at C and PX = 14 cm, find the perimeter of  $\triangle PAB$ .

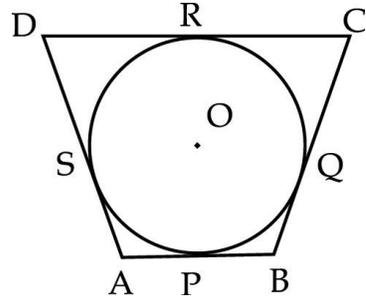


Q. Prove that the line segment joining the points of contact of two parallel tangents passes through the centre.

Q. Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.

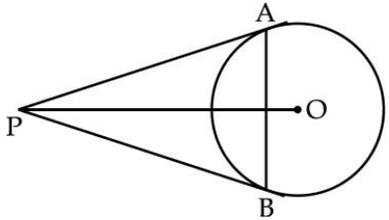
Q. Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

Q. In the given figure, all the sides of a quadrilateral ABCD touch a circle with centre O. Prove that  $\angle AOB + \angle COD = 180^\circ$  and  $\angle BOC + \angle AOD = 180^\circ$

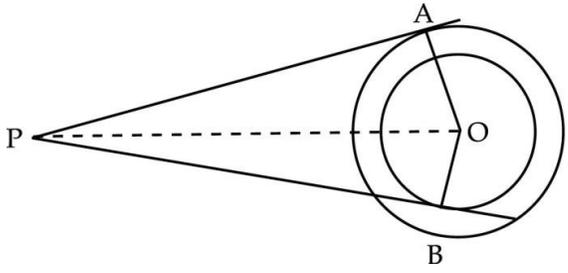


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Q. In the given figure, PA and PB are two tangents drawn to a circle with centre O and radius  $r$ . If  $OP = 2r$ , show that  $\triangle APB$  is equilateral.



Q. Two concentric circles are of radii 5 cm and 3 cm and centre at O. Two tangents PA and PB are drawn to two circles from an external point P such that  $AP = 12$  cm (see figure). Find length of BP.



**4 marks Questions**

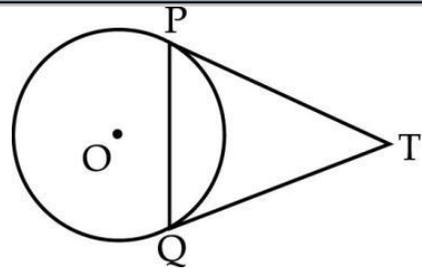
Q. Prove that the tangent to a circle is perpendicular to the radius through the point of contact.

Q. Prove that the lengths of tangents drawn from an external point to a circle are equal.

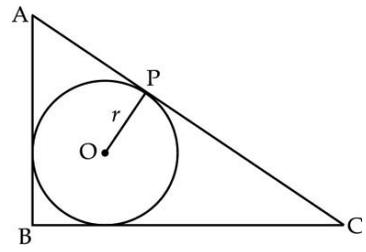
Q. The radius of the in-circle of a triangle is 4 cm and the segments into which one side is divided by the point of contact are 6 cm and 8 cm. Determine the other two sides of the triangle.

Q. Two circles with centers O and O' of radii 3cm and 4cm respectively intersect at two points P and Q such that OP and O'P are tangents to the two circles. Find the length of the common chord PQ.

Q. In given figure, PQ is a chord of length 8 cm in a circle of radius 5 cm. The tangents at P and Q intersect at a point T. Find the length of TP.



Q. In given figure,  $\triangle ABC$  is right angled at B.  $AB = 6$  cm,  $BC = 8$  cm. Find the radius ' $r$ ' of the circle inscribed.



Q. A circle with centre O touches the sides of a Quadrilateral ABCD at P, Q, R and S respectively. Prove that the angles, subtended at the centre by a pair of opposite sides of ABCD are supplementary.

Q. 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 of length 8 cm and 6 cm respectively. (see figure). Find the sides AB and AC.

