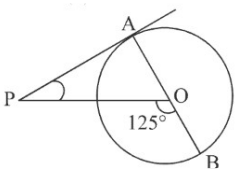
10. Circles - Board Exam Questions

The detailed solution for all the questions can be found at
pschool.in/math/ncert/g10/chap-10

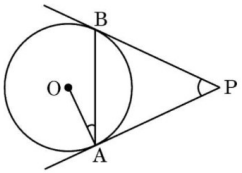
1 Mark Questions (MCQ)

1) If TP and TQ are two tangents to a circle with centre O from an external point T so that ∠POQ = 120°, then ∠PTQ is equal to:

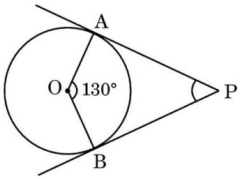
2) In the given figure, PA is a tangent from an external point P to a circle with centre O. If ∠POB = 125°, then ∠APO is equal to:



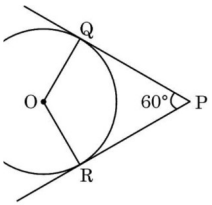
3) In the given figure, PA and PB are tangents to a circle centred at O. If ∠OAB = 15°, then ∠APB equals:



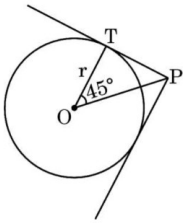
4) In the given figure, PA and PB are tangents to a circle centred at O. If ∠AOB = 130°, then ∠APB is equal to:



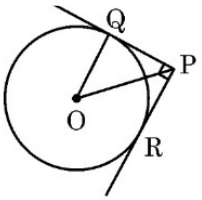
5) In the given figure, PQ and PR are tangents to a circle with centre O and radius 3 cm. If ∠QPR = 60°, then the length of each tangent is:



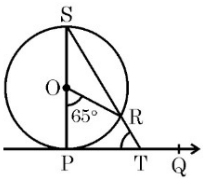
6) In the given figure, PT is a tangent to the circle with centre O and radius r. If ∠POT = 45°, then the length of OP is:



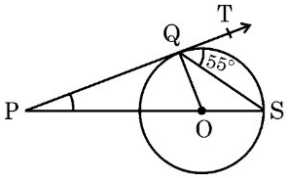
7) If PQ and PR are tangents to the circle with centre O and radius 4 cm such that ∠QPR = 90°, then the length OP is



8) PQ is tangent to a circle with centre O. If ∠POR = 65°, then m∠PTR is

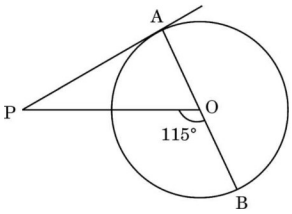


9) In the given figure, PQ is tangent to the circle with centre O. S is a point on the circle such that ∠SQT = 55°. The m∠QPS is

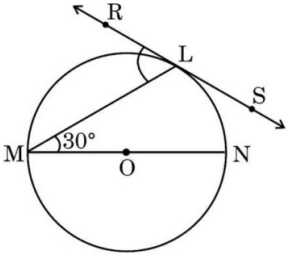


10) The tangents drawn at the extremities of the diameter of a circle are always:
(a) parallel (b) perpendicular
(c) equal (d) intersecting

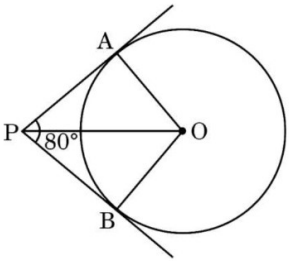
11) In the given figure, PA is a tangent from an external point P to a circle with centre O. If ∠POB = 115°, then ∠APO is equal to:



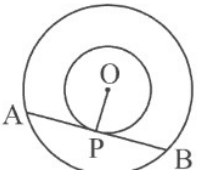
12) In the given figure, RS is the tangent to the circle at the point L and MN is the diameter. If ∠NML = 30°, then ∠RLM is:



13) If tangents PA and PB drawn from an external point P to the circle with centre O are inclined to each other at an angle of 80° as shown in the given figure, then the measure of ∠POA is:



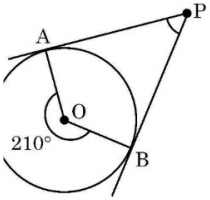
14) In the adjoining figure, AB is the chord of the larger circle touching the smaller circle. The centre of both the circles is O. If AB = 2r and OP = r, then the radius of larger circle is:



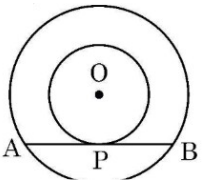
15) A parallelogram having one of its sides 5 cm circumscribes a circle. The perimeter of parallelogram is:

16) Which of the following statements is false?
(a) Infinite number of tangents can be drawn to a circle (b) Infinite number of tangents can be drawn to a circle from a point outside the circle
(c) Infinite number of secants can be drawn to a circle from a point outside the circle (d) Angle between tangent and diameter at point of contact is 90°

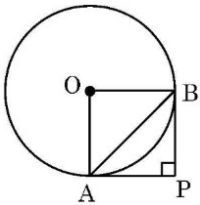
17) In the adjoining figure, PA and PB are tangents to a circle with centre O. The measure of angle APB is



18) In the adjoining figure, the sum of radii of two concentric circles is 16 cm. The length of chord AB which touches the inner circle at P is 16 cm. The difference of the radii of the given circles is

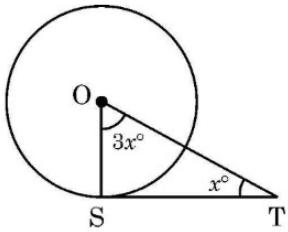


19) In the adjoining figure, PA and PB are tangents to a circle with centre O such that $\angle P = 90°$. If AB = $3\sqrt{2}$ cm, then the diameter of the circle is



20) For a circle with centre O and radius 5 cm, which of the following statements is true?
P: Distance between every pair of parallel tangents is 5 cm.
Q: Distance between every pair of parallel tangents is 10 cm.
R: Distance between every pair of parallel tangents must be between 5 cm and 10 cm.
S: There does not exist a point outside the circle from where length of tangent is 5 cm.
(a) P (b) Q
(c) R (d) S

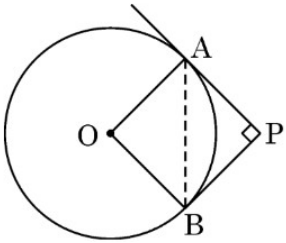
21) In the adjoining figure, TS is a tangent to a circle with centre O. The value of 2x° is



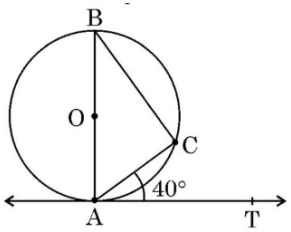
22) A quadrilateral ABCD is drawn to circumscribe a circle. If BC = 7 cm, CD = 4 cm and AD = 3 cm, then the length of AB is

23) The length of a tangent drawn to a circle of radius 9 cm from a point at a distance of 41 cm from the centre of the circle is

24) In the given figure, tangents PA and PB to the circle centred at O, from point P are perpendicular to each other. If PA = 5 cm, then length of AB is equal to

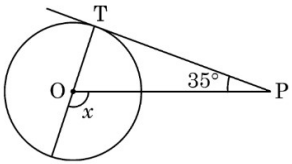


25) In the given figure, AT is tangent to a circle centred at O. If ∠CAT = 40°, then ∠CBA is equal to

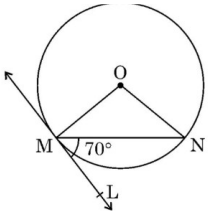


26) Maximum number of common tangents that can be drawn to two circles intersecting at two distinct points is:

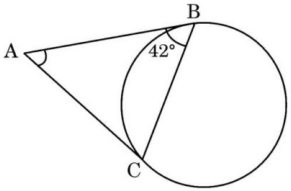
27) In the given figure, if PT is a tangent to a circle with centre O and ∠TPO = 35°, then the measure of ∠x is:



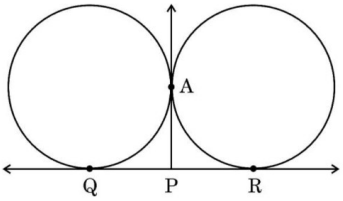
28) In the given figure, O is the centre of the circle. MN is the chord and the tangent ML at point M makes an angle of 70° with MN. The measure of ∠MON is:



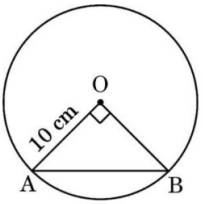
29) In the given figure, AB and AC are tangents to the circle. If ∠ABC = 42°, then the measure of ∠BAC is:



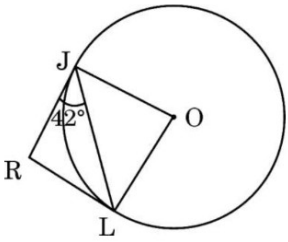
30) In the given figure, QR is a common tangent to the two given circles touching externally at A. The tangent at A meets QR at P. If AP = 4.2 cm, then the length of QR is:



31) A chord of a circle of radius 10 cm subtends a right angle at its centre. The length of the chord (in cm) is:

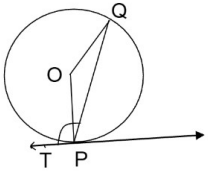


32) In the given figure, RJ and RL are two tangents to the circle. If ∠RJL = 42°, then the measure of ∠JOL is:

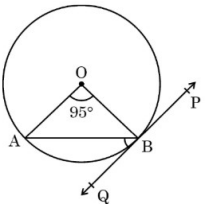


33) Which of the following statements is NOT true?
(a) A number of secants can be drawn at any point on the circle (b) Only one tangent can be drawn at any point on a circle
(c) A chord is a line segment joining two points on the circle (d) From a point inside a circle only two tangents can be drawn

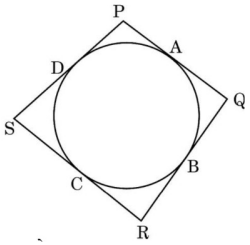
34) In the given figure, a tangent has been drawn at a point P on the circle centred at O. If ∠TPQ = 110° then ∠POQ is equal to



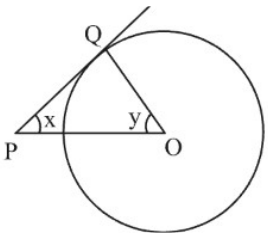
35) In the given figure, PQ is tangent to the circle centred at O. If ∠AOB = 95°, then the measure of ∠ABQ will be



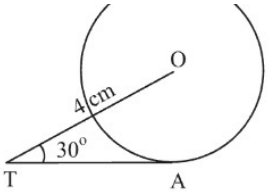
36) In the given figure, the quadrilateral PQRS circumscribes a circle. Here PA + CS is equal to:



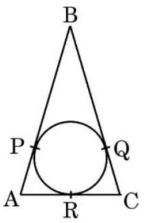
37) In the given figure, PQ is a tangent to the circle with centre O. If ∠OPQ = x, ∠POQ = y, then x + y is:



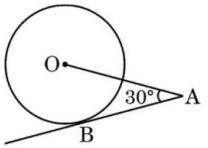
38) In the given figure, TA is a tangent to the circle with centre O such that OT = 4 cm, ∠OTA = 30°, then length of TA is:



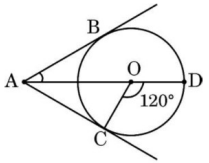
39) In the given figure, AB = BC = 10 cm. If AC = 7 cm, then the length of BP is:



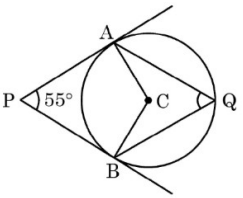
40) In the given figure, AB is a tangent to the circle centered at O. If OA = 6 cm and ∠OAB = 30°, then the radius of the circle is:



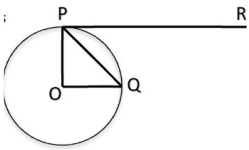
41) In the given figure, AC and AB are tangents to a circle centered at O. If ∠COD = 120°, then ∠BAO is equal to:



42) In the given figure, PA and PB are tangents from external point P to a circle with centre C and Q is any point on the circle. Then the measure of ∠AQB is



43) If O is centre of a circle and chord PQ makes an angle 50° with the tangent PR at the point of contact P, then the angle subtended by the chord at the centre is



44) A quadrilateral PQRS is drawn to circumscribe a circle. If PQ = 12 cm, QR = 15 cm and RS = 14 cm, then find the length of SP is

45) If two tangents inclined at an angle of 60° are drawn to a circle of radius 3 cm, then the length of each tangent is equal to

Assertion and Reason

1) ASSERTION (A): Radius is the smallest distance of a tangent from the centre of the circle.
REASON (R): Radius is perpendicular to the tangent.

2) ASSERTION (A): If two tangents are drawn to a circle from an external point, then they subtend equal angles at the centre of the circle.
REASON (R): A parallelogram circumscribing a circle is a rhombus.

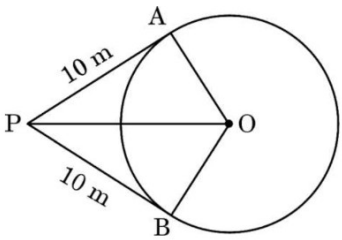
3) ASSERTION (A): Tangents drawn at the end points of a diameter of a circle are always parallel to each other.
REASON (R): The lengths of tangents drawn to a circle from a point outside the circle are always equal.

4) ASSERTION (A): The tangents drawn at the end points of a diameter of a circle, are parallel.
REASON (R): Diameter of a circle is the longest chord.

5) ASSERTION (A): A tangent to a circle is perpendicular to the radius through the point of contact.
REASON (R): The lengths of tangents drawn from an external point to a circle are equal.

2 Mark Questions

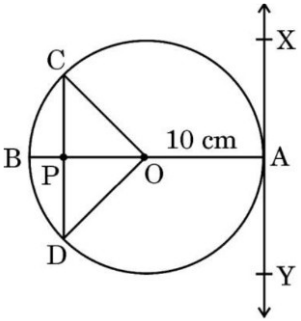
1) A person is standing at P outside a circular ground at a distance of 26 m from the centre of the ground. He found that his distances from the points A and B on the ground are 10 m (PA and PB are tangents to the circle). Find the radius of the circular ground.



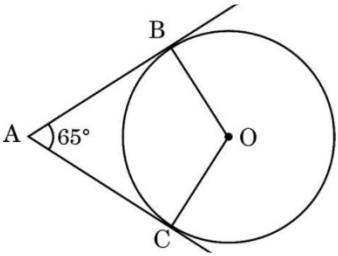
2) If two tangents inclined at an angle of 60° are drawn to a circle of radius 3 cm, then find the length of each tangent.

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

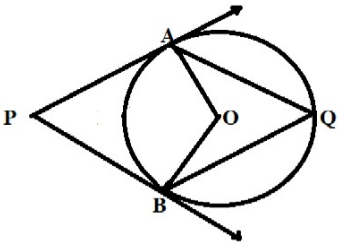
4) At point A on the diameter AB of a circle of radius 10 cm, tangent XAY is drawn to the circle. Find the length of the chord CD parallel to XY at a distance of 16 cm from A.



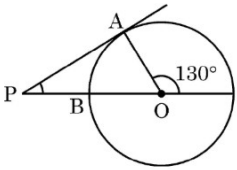
5) In the given figure, O is the centre of the circle. AB and AC are tangents drawn to the circle from point A. If $\angle BAC = 65^\circ$, then find the measure of ∠BOC.



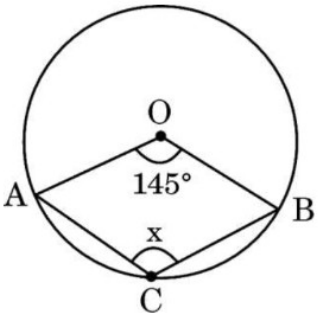
6) In the given figure, O is the centre of circle. Find ∠AQB, given that PA and PB are tangents to the circle and $\angle APB = 75^\circ$.



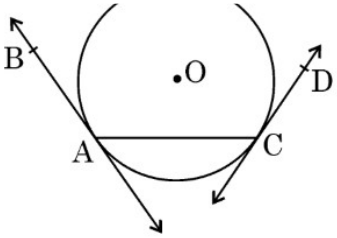
7) In the given figure, PA is a tangent to the circle drawn from the external point P and PBC is the secant to the circle with BC as diameter. If $\angle AOC = 130^\circ$, then find the measure of ∠APB, where O is the centre of the circle.



8) In the given figure, O is the centre of the circle. If $\angle AOB = 145^\circ$, then find the value of x.

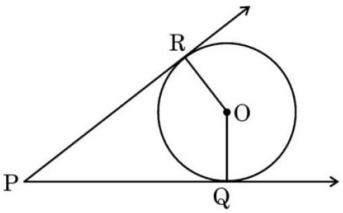


9) In the given figure, AB and CD are tangents to a circle centred at O. Is $\angle BAC = \angle DCA$? Justify your answer.

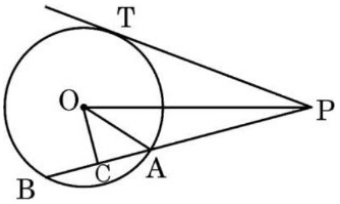


10) Prove that the tangents drawn at the ends of a diameter of a circle are parallel.

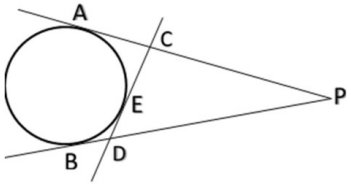
11) In the given figure, O is the centre of the circle. PQ and PR are tangents. Show that the quadrilateral PQOR is cyclic.



12) In the given figure, PT is a tangent to the circle centered at O. OC is perpendicular to chord AB. Prove that PA . $PB = PC^2 - AC^2$.



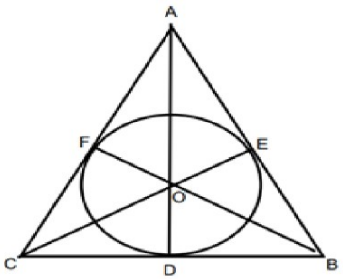
13) From an external point P, two tangents, PA and PB are drawn to a circle with centre O. At a point E on the circle, a tangent is drawn to intersect PA and PB at C and D,



respectively. If $PA = 10$ cm, find the perimeter of △PCD.

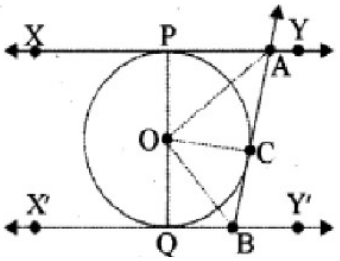
14) A circle is inscribed in a right-angled triangle ABC, right angled at B. If $BC = 7$ cm and $AB = 24$ cm, find the radius of the circle.

15) A △ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC are of lengths 10 cm and 8 cm respectively. Find the lengths of the sides AB and AC, if it is given that $\text{ar}(\triangle ABC) = 90 \text{ cm}^2$.

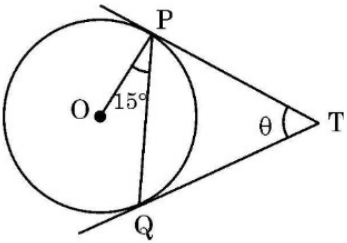


3 Mark Questions

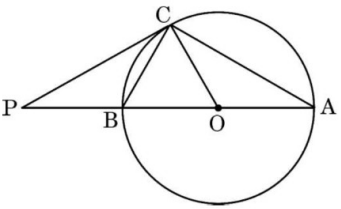
1) Prove that the lengths of tangents drawn from an external point to a circle are equal.
2) Prove that the parallelogram circumscribing a circle is a rhombus.
3) Prove that the angle between the two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line-segment joining the points of contact at the centre.
4) Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.
5) Prove that the tangents drawn at the end points of a chord of a circle makes equal angles with the chord.
6) Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2\angle OPQ$.
7) In the adjoining figure, XY and X'Y' are parallel tangents to a circle with centre O. Another tangent AB touches the circle at C intersecting XY at A and X'Y' at B. Prove that AB subtends right angle at the centre of the circle; or $\angle AOB = 90^\circ$.



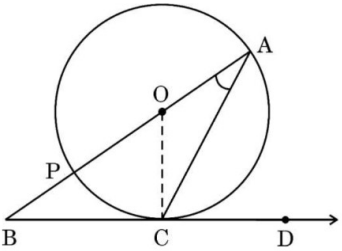
8) In the adjoining figure, TP and TQ are tangents drawn to a circle with centre O. If $\angle OPQ = 15^\circ$ and $\angle PTQ = \theta$, then find the value of sin 2θ.



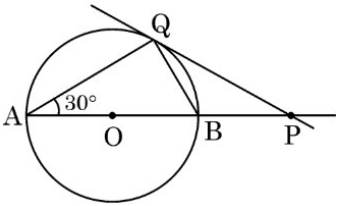
9) In the given figure, PC is a tangent to the circle at C. AOB is the diameter which when extended meets the tangent at P. Find ∠CBA and ∠BCO, if $\angle PCA = 110^\circ$.



10) In the given figure, O is the centre of the circle and BCD is tangent to it at C. Prove that $\angle BAC + \angle ACD = 90^\circ$.

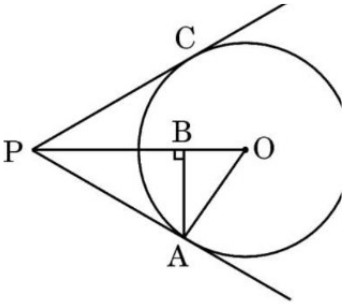


11) In the given figure, PQ is tangent to a circle centred at O and $\angle BAQ = 30^\circ$; show that $BP = BQ$.

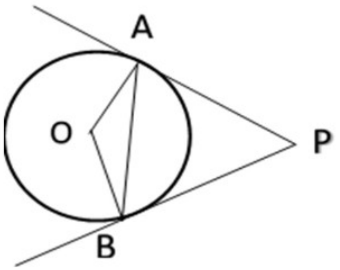


12) Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

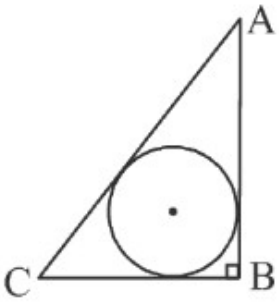
13) In the given figure, PA is the tangent to the circle with centre O such that $OA = 10$ cm, $AB = 8$ cm and $AB \perp OP$. Find the length of PB.



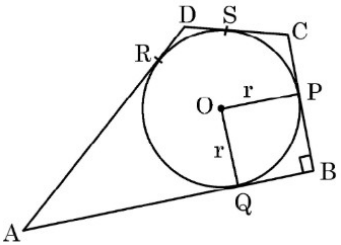
14) PA and PB are tangents drawn to a circle of centre O from an external point P. Chord AB makes an angle of 30° with the radius at the point of contact. If length of the chord is 6 cm, find the length of the tangent PA and the length of the radius OA.



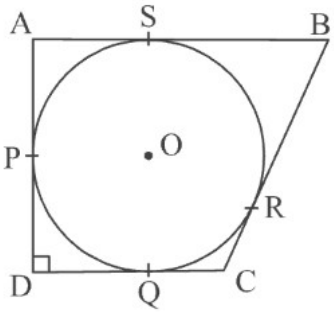
15) In the given figure, $\triangle ABC$ is a right triangle in which $\angle B = 90^\circ$, $AB = 4$ cm and $BC = 3$ cm. Find the radius of the circle inscribed in the triangle ABC.



16) In the given figure, a circle is inscribed in a quadrilateral ABCD in which $\angle B = 90^\circ$. If $AD = 17$ cm, $AB = 20$ cm and $DS = 3$ cm, then find the radius of the circle.



17) A circle with centre O and radius 8 cm is inscribed in a quadrilateral ABCD in which P, Q, R, S are the points of contact as shown. If AD is perpendicular to DC, $BC = 30$ cm and $BS = 24$ cm, then find the length DC.



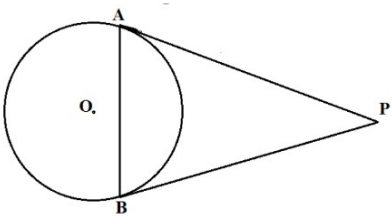
18) Rectangle ABCD circumscribes the circle of radius 10 cm. Prove that ABCD is a square. Hence, find the perimeter of ABCD.

19) In the given figure, if a circle touches the side QR of $\triangle PQR$ at S and extended sides PQ and PR at M and N respectively, then prove that: $PM = \frac{1}{2}(PQ + QR + PR)$



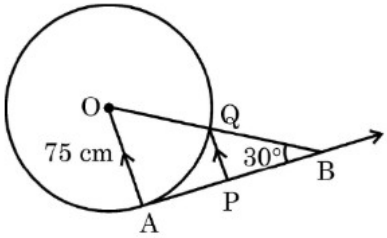
4 Mark Questions

1) In a technology park in Hyderabad, a company installed a circular meditation garden for its employees as shown in the figure.
Arjun, a designer, stood at a point P outside the garden and drew



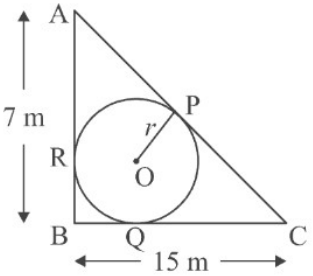
two tangents PA and PB to the circular boundary. The radius of the garden is 9 m, and the distance of point P from the centre O is 18 m. For preparing safety guidelines, Arjun needed the lengths of the tangents. During a demonstration to interns, he asked them to compute the angle formed between the two tangents using the properties of circle.
(i) What is the measure of $\angle$OAP? (1)
(ii) Calculate the length of the tangent PA. (1)
(iii) Calculate the measure of $\angle$AOB. (2)
OR In the above design, if PA and PB were inclined at 60°, then what would be their length?

2) The discus throw is an event in which an athlete attempts to throw a discus. The athlete spins anti-clockwise around one and a half times through a circle, then releases the throw. When released, the discus travels along



tangent to the circular spin orbit. In the given figure, AB is one such tangent to a circle of radius 75 cm. Point O is centre of the circle and $\angle ABO = 30^\circ$. PQ is parallel to OA.
(a) Find the length of AB. (1)
(b) Find the length of OB. (1)
(c) Find the length of AP. (2)
OR Find the length of PQ.

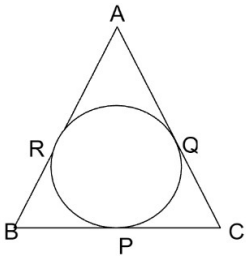
3) A backyard is in the shape of a triangle ABC with right angle at B. $AB = 7$ m and $BC = 15$ m. A circular pit was dug inside it such that it touches the walls AC, BC and AB at P, Q and R respectively such that $AP = x$ m.
(i) Find the length of AR in terms of x. (1)
(ii) Write the type of quadrilateral



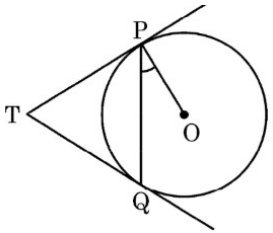
BQOR. (1)
(iii) (a) Find the length PC in terms of x and hence find the value of x. (2)
OR (b) Find x and hence find the radius r of circle.

5 Mark Questions

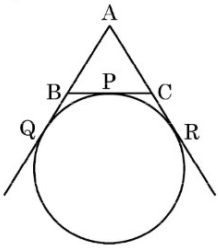
1) Prove that the lengths of tangents drawn from an external point to a circle are equal.
Using above result, find the length BC of △ABC. Given that, a circle is inscribed in △ABC touching the sides AB, BC and CA at R, P and Q respectively and $AB = 10$ cm, $AQ = 7$ cm, $CQ = 5$ cm.



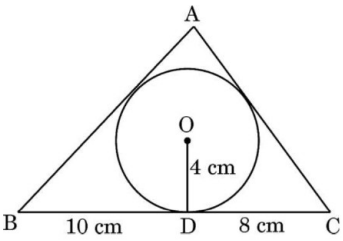
2) Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2\angle OPQ$.



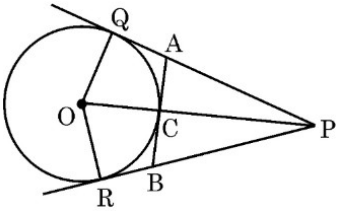
3) A circle touches the side BC of a △ABC at a point P and touches AB and AC when produced at Q and R respectively. Show that $AQ = \frac{1}{2}(\text{Perimeter of } \triangle ABC)$.



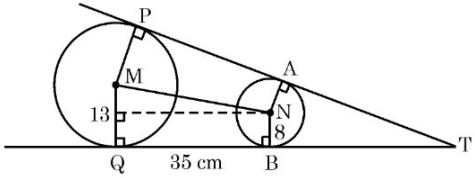
4) A triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC are of lengths 10 cm and 8 cm respectively. Find the lengths of the sides AB and AC, if it is given that area $\triangle ABC = 90$ cm^2.



5) PQ and PR are two tangents to a circle with centre O and radius 5 cm. AB is another tangent to the circle at C which lies on OP. If $OP = 13$ cm, then find the length AB and PA.



6) In the given figure, TP and TQ are tangents to a circle with centre M, touching another circle with centre N at A and B respectively. It is



given that $MQ = 13$ cm, $NB = 8$ cm, $BQ = 35$ cm and $TP = 80$ cm.
(i) Name the quadrilateral MQBN. (1)
(ii) Is MN parallel to PA? Justify your answer. (1)
(iii) Find length TB. (1)
(iv) Find length MN. (2)

7) Two circles with centres O and O′ of radii 6 cm and 8 cm, 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.

