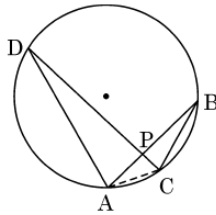


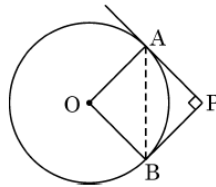
GRADE X
Question Bank (MATHEMATICS)
Chapter-10 CIRCLES

1 marks:

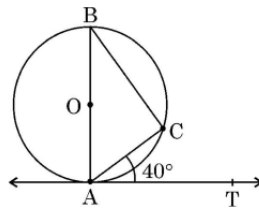
1. AB and CD are two chords of a circle intersecting at P. Choose the correct statement from the following: **[BOARD 2024]**



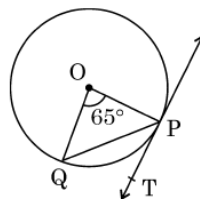
- a) $\Delta ADP \sim \Delta CBA$ b) $\Delta ADP \sim \Delta BPC$ c) $\Delta ADP \sim \Delta BCP$ d) $\Delta ADP \sim \Delta CBP$
2. In the given figure, tangents PA and PB to the circle centered at O, from point P are perpendicular to each other. If $PA = 5 \text{ cm}$ then length of AB is **[BOARD 2024]**



- a) 5 cm b) $5\sqrt{2} \text{ cm}$ c) $2\sqrt{5} \text{ cm}$ d) 10 cm
3. In the given figure, AT is tangent to a circle centered at O. If $\angle CAT = 40^\circ$ then $\angle CBA$ is equal to **[BOARD 2024]**



- a) 70° b) 50° c) 65° d) 40°
4. In the given figure, PT is tangent to a circle with centre O. Chord PQ subtends an angle of 65° at the centre. The measure of $\angle QPT$ is **[BOARD 2023 & BOARD 2024]**

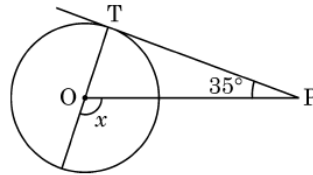


- a) 65° b) 57.5° c) 67.5° d) 32.5°

5. The maximum number of common tangents that can be drawn to two circles intersecting at two distinct points is **[BOARD 2024]**

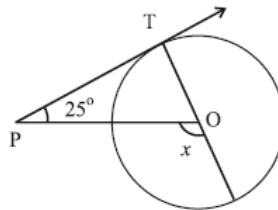
- a) 4 b) 3 c) 2 d) 1

6. In the given figure, if PT is a tangent to a circle with centre O and $\angle TPO = 35^\circ$ then the measure of $\angle x$ is **[BOARD 2024]**



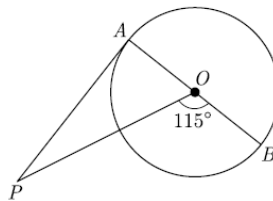
- a) 110° b) 115° c) 120° d) 125°

7. In the given figure, PT is a tangent at T to the circle with centre O . If $\angle TPO = 25^\circ$ then x is **[BOARD 2023]**

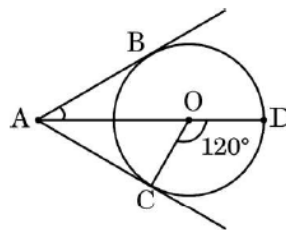


- a) 25° b) 65° c) 90° d) 115°

8. In the given figure, PA is a tangent from an external point P to a circle with centre O . If $\angle POB = 115^\circ$ then $\angle APO$ is

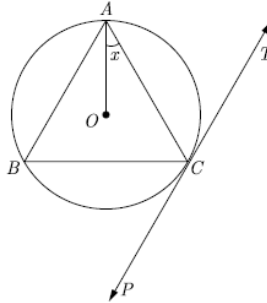


9. In the given figure, AC and AB are tangents to a circle centered at O . If $\angle COD = 120^\circ$ then $\angle BAO$ is **[BOARD 2023]**

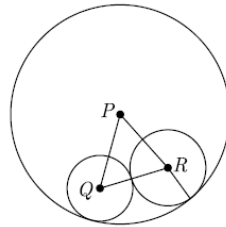


- a) 30° b) 60° c) 45° d) 90°

10. In the given figure, PT is a tangent at a point C to the circle with centre O . If $\angle ACP = 118^\circ$ then $\angle x$ is

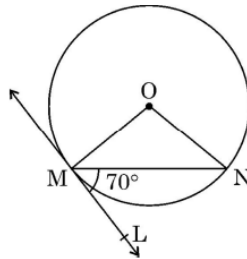


- a) 28° b) 32° c) 42° d) 38°
11. In the given figure, three circles with centres P , Q and R are drawn, such that the circles with centres Q and R touch each other externally and they touch the circle with centre P internally. If $PQ = 10\text{ cm}$, $PR = 8\text{ cm}$ and $QR = 12\text{ cm}$ then the diameter of the largest circle is



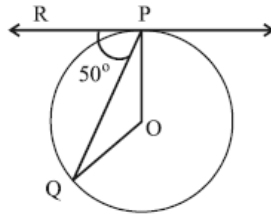
- a) 30 cm b) 20 cm c) 10 cm d) 40 cm
12. In the given figure, O is the centre of the circle. MN is the chord and the tangent ML at point M makes an angle of 70° with MN . The measure of $\angle MON$ is

[BOARD 2024]



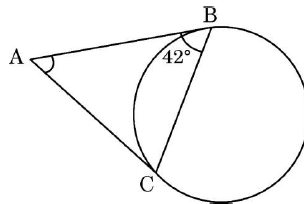
- a) 120° b) 140° c) 70° d) 90°
13. If an arc subtends an angle of 90° at the centre of a circle, then the ratio of its length to the circumference of the circle is
- [BOARD 2024]**
- a) 2:3 b) 1:4 c) 4:1 d) 1:3

14. In the given figure, O is the centre of the circle and PQ is the chord. If the tangent PR at P makes an angle of 50° with PQ, then the $\angle POQ$ is **[BOARD 2023]**



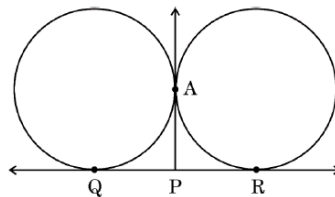
- a) 50° b) 40° c) 100° d) 130°

15. In the given figure, AB and AC are tangents to the circle. If $\angle ABC = 42^\circ$ then the measure of $\angle BAC$ is **[BOARD 2024]**



- a) 96° b) 42° c) 106° d) 86°

16. In the given figure, QR is the common tangent to the two given circles touching externally at A. The tangent at A meets QR at P. If $AP = 4.2 \text{ cm}$ then the length of QR is **[BOARD 2024]**

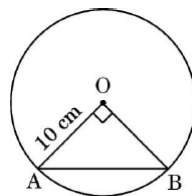


- a) 4.2 cm b) 2.1 cm c) 8.4 cm d) 6.3 cm

17. The area of the square inscribed in a circle of radius $5\sqrt{2} \text{ cm}$ is **[BOARD 2024]**

- a) 50 cm^2 b) 100 cm^2 c) 25 cm^2 d) 200 cm^2

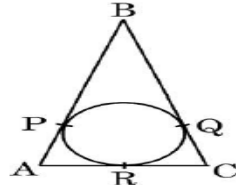
18. A chord of a circle of radius 10 cm subtends a right angle at its centre. The length of the chord (in cm) is **[BOARD 2024]**



- a) $5\sqrt{2}$ b) $10\sqrt{2}$ c) $\frac{5}{\sqrt{2}}$ d) 5

19. In the given figure, $AB = BC = 10 \text{ cm}$. If $AC = 7 \text{ cm}$, then the length of BP is

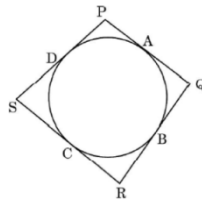
[BOARD 2023]



- a) 3.5 cm b) 7 cm c) 6.5 cm d) 5 cm

20. In the given figure, the quadrilateral PQRS circumscribes a circle. Here $PA + CS$ is equal to

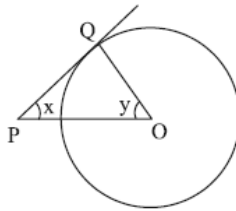
[BOARD 2023]



- a) QR b) PR c) PS d) PQ

21. In the given figure, PQ is a tangent to the circle with centre O. If $\angle OPQ = x$, $\angle POQ = y$ then $x + y$ is

[BOARD 2023]



- a) 45° b) 90° c) 60° d) 180°

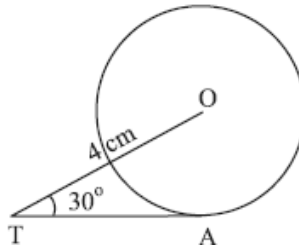
22. The length of tangent drawn to a circle of radius 9 cm from a point 41 cm from the centre is:

[BOARD 2023]

- a) 40 cm b) 9 cm c) 41 cm d) 50 cm

23. In the given figure, TA is a tangent to the circle with centre O such that $OT = 4 \text{ cm}$, $\angle OTA = 30^\circ$ then length of TA is

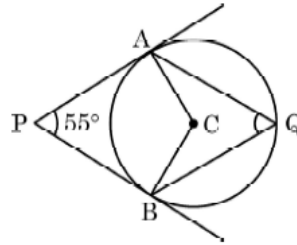
[BOARD 2023]



- a) $2\sqrt{3} \text{ cm}$ b) 2 cm c) $2\sqrt{2} \text{ cm}$ d) $\sqrt{3} \text{ cm}$

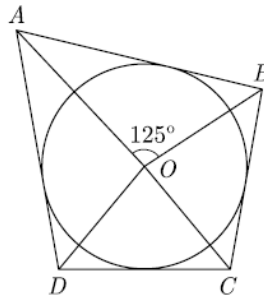
24. In the given figure, PA and PB are tangents from an external point P to circle with centre C and Q is any point on the circle. Then the measure of $\angle AQB$ is

[BOARD 2023]



- a) 62.5° b) 125° c) 55° d) 90°

25. In the given figure, if $\angle AOB = 125^\circ$ then $\angle COD$ is equal to



- a) 62.5° b) 45° c) 35° d) 55°

Options for Assertion and Reasoning Questions:

- a) Both assertion(A) and reason(R) are true and reason(R) is the correct explanation of assertion(A)
- b) Both assertion(A) and reason(R) are true but reason(R) is not the correct explanation of assertion(A)
- c) Assertion (A) is true but reason (R) is false
- d) Assertion (A) is false but reason (R) is true

26. **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.

[BOARD 2024]

27. **Assertion (A):** A tangent to a circle is perpendicular to the radius through the point of contact.

Reason (R): The length of the tangents drawn from an external point to a circle are equal.

[BOARD 2023]

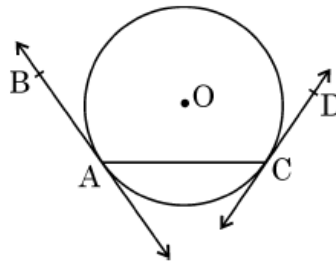
28. **Assertion (A):** If PA and PB are tangents drawn from an external point P to a circle with centre O, then the quadrilateral AOBP is cyclic.

Reason (R): The angle between 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. [BOARD 2023]

2 marks:

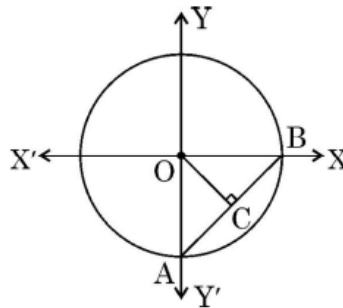
1. In the given figure, AB and CD are tangents to a circle centered at O.

Is $\angle BAC = \angle DCA$? Justify your answer. [BOARD 2024]



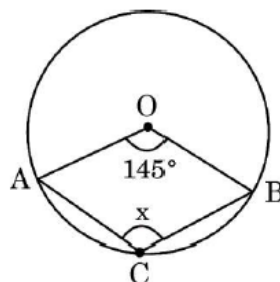
2. In the given figure, a circle centered at O has radius 7 cm, OC is median of $\triangle OAB$.

Find the length of median OC. [BOARD 2024]

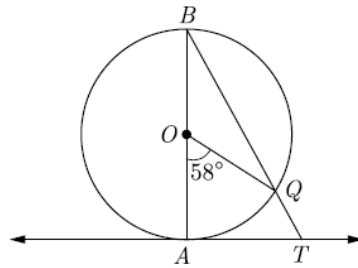


3. From an external point P, two tangents PA and PB are drawn to the circle with centre O. Prove that OP is the perpendicular bisector of chord AB. [BOARD 2024]

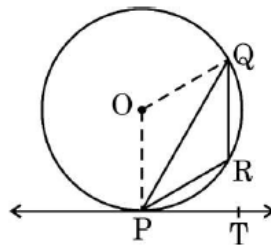
4. In the given figure, O is the centre of the circle. If $\angle AOB = 145^\circ$ then find the value of x. [BOARD 2024]



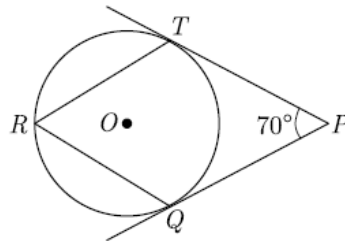
5. In the given figure, AB is the diameter of a circle with centre O and AT is a tangent. If $\angle AOQ = 58^\circ$ then find $\angle ATQ$.



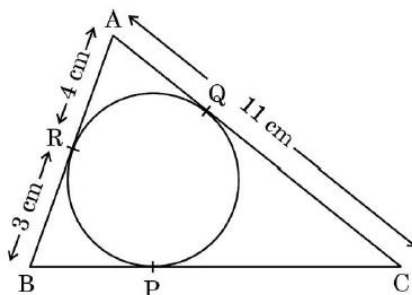
6. In the given figure, PQ is a chord of the circle centered at O . PT is a tangent to a circle at P . If $\angle QPT = 55^\circ$ then find $\angle PRQ$. **[BOARD 2023]**



7. In the given figure, O is the centre of the circle. PT and PQ are tangents to the circle from an external point P . If $\angle TPQ = 70^\circ$ find $\angle TRQ$.



8. In the given figure, $\triangle ABC$ is circumscribing a circle. Find the length of BC , if $AR = 4\text{ cm}$, $BR = 3\text{ cm}$ and $AC = 11\text{ cm}$. **[BOARD 2024]**



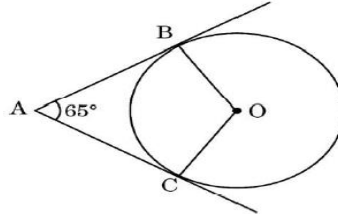
9. If two tangents inclined at an angle of 60° are drawn to a circle of radius 3 cm , then find the length of each tangent. **[BOARD 2024]**

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

[BOARD 2023 & BOARD 2024]

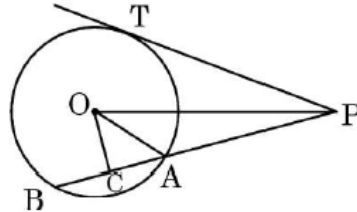
11. In the given figure, O is the centre of the circle. AB and AC are tangents drawn to the circle from point A. If $\angle BAC = 65^\circ$, then find the measure of $\angle BOC$.

[BOARD 2023]



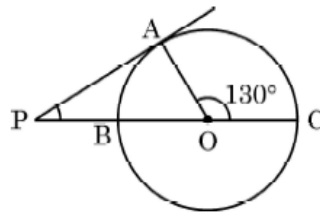
12. In the given figure, PT is a tangent to the circle centered at O. OC is the perpendicular to chord AB. Prove that $PA \cdot PB = PC^2 - AC^2$.

[BOARD 2023]

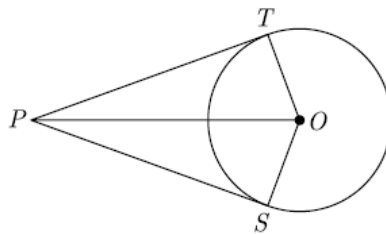


13. In the given figure, PA is a tangent to the circle drawn from the external point P and PBC is the secant to the circle with BC as diameter. If $\angle AOC = 130^\circ$ then find $\angle APB$.

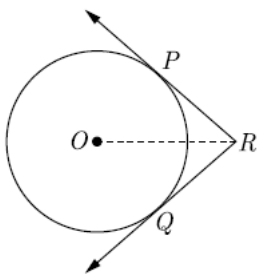
[BOARD 2023]



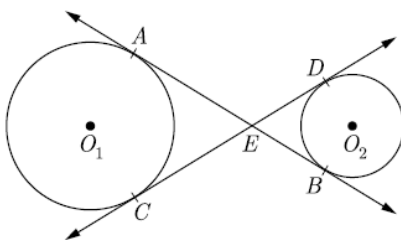
14. In the given figure, from a point P, two tangents PT and PS are drawn to a circle with centre O such that $\angle SPT = 120^\circ$, prove that $OP = 2 PS$.



15. In the given figure, two tangents RQ and RP are drawn from an external point R to the circle with centre O. If $\angle PRQ = 120^\circ$ then prove that $OR = PR + RQ$.

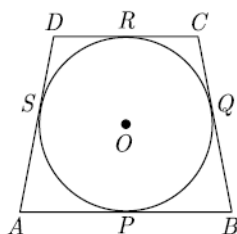


16. In the given figure, common tangents AB and CD to the two circles with centres O_1 and O_2 intersect at E. Prove that $AB = CD$.



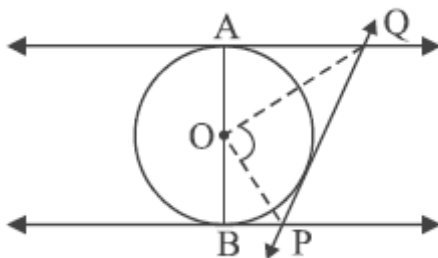
17. If a quadrilateral circumscribing a circle with centre O then prove that

$$AB + CD = BC + AD$$

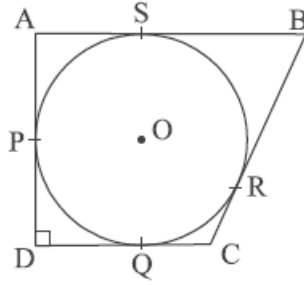


3 marks:

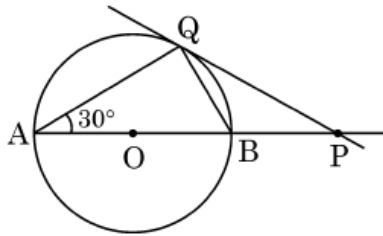
1. In the given figure, AB is a diameter of the circle with centre O. AQ, BP and PQ are tangents to the circle. Prove that $\angle POQ = 90^\circ$. **[BOARD 2024]**



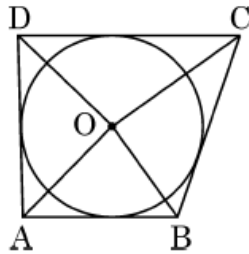
2. A circle with centre O and radius 8 cm is inscribed in a quadrilateral ABCD in which P, Q, R, S are the points of contact as shown. If AD is perpendicular to DC, $BC = 30 \text{ cm}$ and $BS = 24 \text{ cm}$ then find the length DC. **[BOARD 2024]**



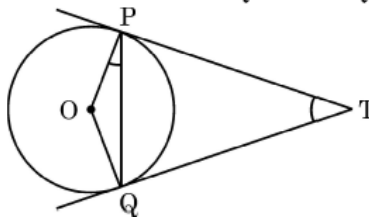
3. In the given figure, PQ is tangent to a circle centered at O and $\angle BAQ = 30^\circ$. Show that $BP = BQ$. **[BOARD 2024]**



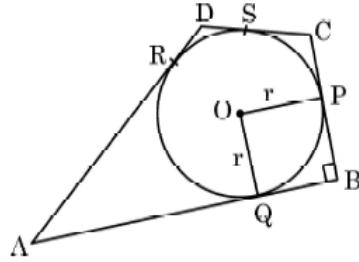
4. In the given figure, AB, BC, CD and DA are tangents to the circle with centre O forming a quadrilateral ABCD. Show that $\angle AOB + \angle COD = 180^\circ$. **[BOARD 2024]**



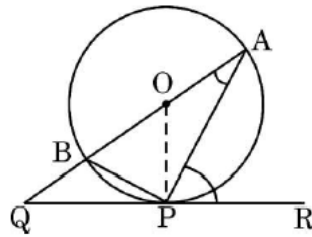
5. Prove that the tangents drawn at the end points of a chord of a circle makes equal angles with the chord. **[BOARD 2024]**
6. Prove that parallelogram circumscribing a circle is a rhombus. **[BOARD 2024]**
7. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2\angle OPQ$. **[BOARD 2023]**



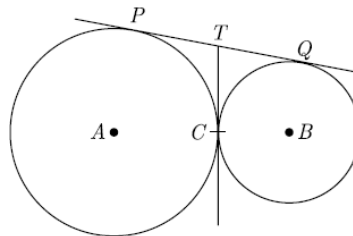
8. In the given figure, a circle is inscribed in a quadrilateral ABCD in which $\angle B = 90^\circ$. If $AD = 17\text{ cm}$, $AB = 20\text{ cm}$ and $DS = 3\text{ cm}$ then find the radius of the circle. **[BOARD 2023]**



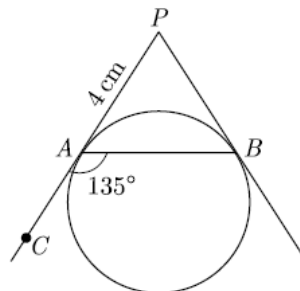
9. In the given figure, O is the centre of the circle and QPR is a tangent to it at P. Prove that $\angle QAP + \angle APR = 90^\circ$. **[BOARD 2023]**



10. 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. **[BOARD 2023]**
11. 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. **[BOARD 2023]**
12. In the given figure, two circles touch each other at the point C. Prove that the common tangent to the circles at C, bisects the common tangent at P and Q.

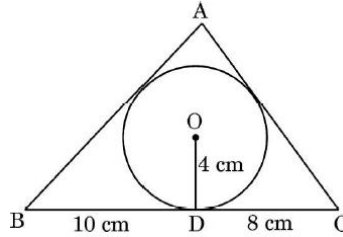


13. In the given figure, PA and PB are tangents to a circle from an external point P such that $PA = 4 \text{ cm}$ and $\angle BAC = 135^\circ$. Find the length of the chord AB.

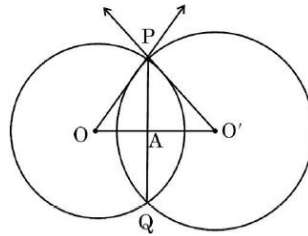


5 marks:

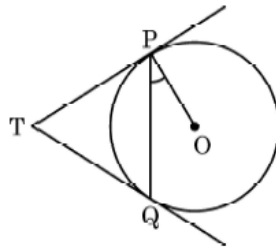
1. A triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC are of lengths 10 cm and 8 cm respectively. Find the lengths of the sides AB and AC, if it is given that area $\Delta ABC = 90 \text{ cm}^2$. **[BOARD 2023]**



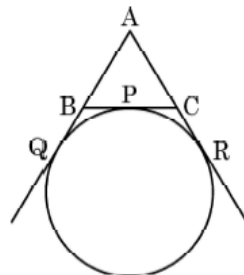
2. Two circles with centres O and O' of radii 6 cm and 8 cm respectively intersect at two points P and Q such that OP and O'P are tangents to the two circles. Find the length of the common chord PQ. **[BOARD 2023]**



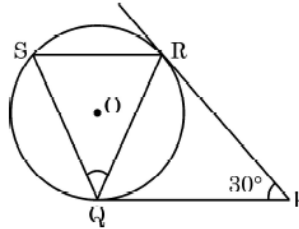
3. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2\angle OPQ$. **[BOARD 2023]**



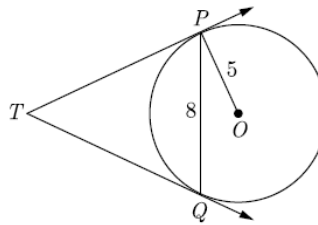
4. A circle touches the side BC of ΔABC at a point P and touches AB and AC when produced at Q and R respectively. Show that $AQ = \frac{1}{2}$ (Perimeter of ΔABC). **[BOARD 2023]**



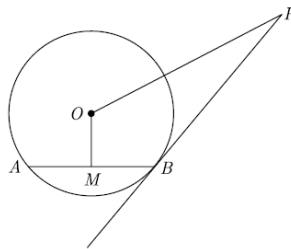
5. Prove that parallelogram circumscribing a circle is a rhombus. **[BOARD 2023]**
6. Prove that rectangle circumscribing a circle is a square.
7. In the given figure, tangents PQ and PR are drawn to a circle such that $\angle RPQ = 30^\circ$. A chord RS is drawn parallel to the tangent PQ. Find the $\angle RQS$. **[BOARD 2023]**



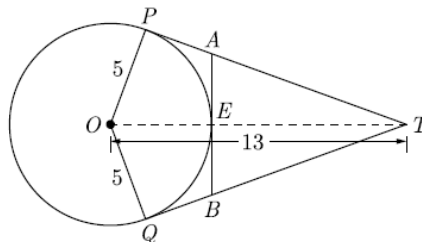
8. In the given figure, PQ is a chord of length 8 cm of circle of radius 5 cm with centre O. The tangents at P and Q intersect at a point T. Find the length of TP.



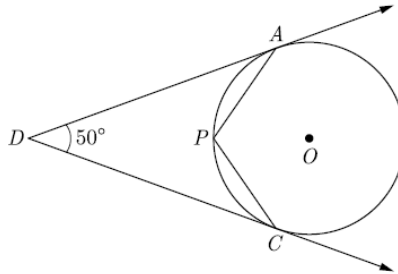
9. PB is a tangent to the circle with centre O to B. AB is a chord of length 24 cm at a distance of 5 cm from the centre. If the tangent is length 20 cm, then find the length of PO.



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



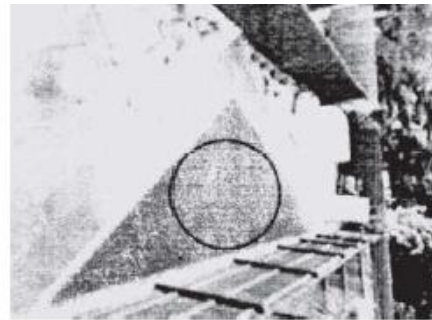
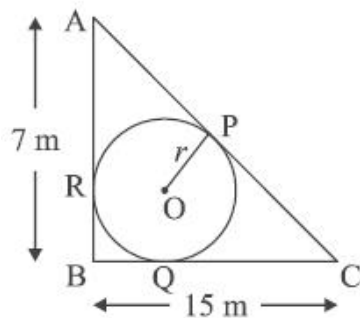
11. In the given figure, O is the centre of the circle. Determine $\angle APC$, if DA and DC are tangents and $\angle ADC = 50^\circ$.



Case Based Questions:

1. A backyard is in the shape of a triangle ABC with right angle at B . $AB = 7\text{ cm}$ and $BC = 15\text{ cm}$. 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 $AP = x\text{ m}$.

[BOARD 2024]



Based on the above information, answer the following questions:

- | | | |
|-----------|---|----------|
| (i) | Find the length of AR in terms of x . | 1 |
| (ii) | (a) Find the length PC in term of x and hence find the value of x . | 2 |
| OR | | |
| | (b) Find x and hence find the radius r of the circle. | 2 |
| (iii) | Write the type of quadrilateral $BQOR$. | 1 |