EXERCISE #1

Q.1 In the given figure, PA and PB are the tangent segments to a circle with centre O. Show that the points A, O, B and P are concyclic.



Q.2 From an external point P, tangents PA and PB are drawn to a circle with centre O. If CD is the tangent to the circle at a point E and PA = 14cm, find the perimeter of Δ PCD.



Q.3 A circle is inscribed in a $\triangle ABC$ having AB = 10 cm, BC = 12 cm and CA = 8 cm and touching these sides at D, E, F respectively, as shown in the figure. Find AD, BE and CF.



Q.4 In the given figure, ABCD is a quadrilateral in which $\angle D = 90^{\circ}$. A circle C(O, r) touches the sides AB, BC, CD and DA at P, Q, R, S respectively. If BC = 38 cm, CD = 25 cm and BP = 27 cm, find the value of r.



- Q.5 A point P is 7 cm from the centre of circle whose diameter is 8cm. How many tangents can be drawn to the circle ?
- Q.6 Find the distance between two parallel tangents to a circle whose radius is 4.5 cm.
- **Q.7** A square circumscribe a circle of radius 5 cm. Find the length of a diagonal of the square.
- **Q.8** In the adjoining figure, PA and PB are tangents from P to a circle with centre C. If $\angle APB = 50^\circ$, find $\angle ACB$.



Q.9 In the adjoining figure PQ and PR are tangents from P to a circle with centre O. If $\angle POR = 55^{\circ}$, find $\angle QPR$



Q.10 In the adjoining figure PA and PB are tangents from Q to a circle with centre C. If $\angle APB = 80^{\circ}$, find $\angle ACP$.



Q.11 In the adjoining figure PA and PB are tangents from P to a circle with centre C. If

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the radius of the circle is 4 cm and PA \perp PB, then find the length of each tangent



- Q.12 Find the length of tangent drawn to a circle with radius 7 cm from a point 25 cm away from the centre of the circle.
- Q.13 A point P is 26 cm away from the centre of a circle and the length of the tangent drawn from P to the circle is 24 cm. Find the radius of the circle.
- Q.14 Two tangent segments BC and BD are drawn to a circle with centre O such that $\angle CBD = 120^{\circ}$. Prove that OB = 2BC.



Q.15 In the given figure, O is the centre of two concentric circles of radii 4 cm and 6 cm respectively. PA and PB are tangents to the outer and inner circle respectively. If PA = 10 cm, find the length of PB up to one place of decimal.



- Q.16 (a) In the figure (i) given below, triangle ABC is circumscribed, find x.
 - (b) In the figure (ii) given below, quadrilateral ABCD is circumscribed, find x.

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- Q.17 (a) In the figure (i) given below, quadrilateral ABCD is circumscribed; find the perimeter of quadrilateral ABCD.
 - (b) In the figure (ii) given below. quadrilateral ABCD is circumscribed and $AD\perp DC$, find x if radius of incircle is 10 cm.



- Q.18 (a) In the figure (i) given below, from an external point P, tangents PA and PB are drawn to a circle. CE is a tangent to the circle at D. If AP = 15 cm, find the perimeter of the triangle PEC.
 - (b) In the figure (ii) given below, the incircle of $\triangle ABC$ touches the sides BC, CA and AB at points P, Q and R respectively. If AB = AC, prove that BP = PC.



Q.19 In the figure given below, ABC is a right angled triangle at A with sides AB = 5 cm and BC = 13 cm. A circle with centre O has

been inscribed in the triangle ABC. Calculate the radius of the incircle.



Q.20 In the given figure, a circle touches all the four sides of a quadrilateral ABCD whose three sides are AB = 6 cm, BC = 7 cm and CD = 4cm. Find AD.



Q.21 In the given figure, PA and PB are tangents such that PA = 9 cm and $\angle APB = 60^{\circ}$. Find the length of chord AB.



Q.22 From a point P, two tangents PA and PB are drawn to a circle C (O, r). If OP = 2r, show that $\triangle APB$ is equilateral.



Q.23 Prove that the opposite sides of a quadrilateral circumscribing a circle subtends supplementary angles at the centre of the circle.

- Q.24 (a) In the figure (i) given below, PA and PB are tangents drawn from an external point P to a circle with centre O. Prove that $\angle APB = 2 \angle OAB.$
 - (b) In the figure (ii) given below, PQ is a chord of length 8 cm of a circle with centre O. The tangents at P and Q intersect at T. If the radius of the circle is 5 cm, find the length PT.



Q.25 In the adjoining figure, ABC is a right angled triangle with AB = 6 cm and AC = 8 cm. A circle with centre O has been inscribed inside the triangle. Calculate the value of r, the radius of the inscribed circle.



Q.26 In the adjoining figure two circles touch each other externally at C. Prove that the common tangent at C bisects the other two common tangents.



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Answer Key

| 2. 28 cm | 3. $AD = 3cm$, H | BE = 7 cm, CH | F = 5 cm | 4. $r = 14 \text{ cm}$ | 5. two | 6. 9 cm |
|---------------------------|--------------------------|--------------------------------|----------------|-------------------------------|-----------------------|------------------|
| 7. $10\sqrt{2}$ cm | 8 . 130° | 9. 70° | 10. 50° | 11. 4 cm | 12. 24 cm | 13. 10 cm |
| 15. 10.9 cm | 16. (a) 14 cm ; (| (b) 9 cm | 17. (a) 36 cm | m; (b) 21 cm | 18. (a) 30 cm; | 19. 2 cm |
| 20. 3 cm | 21. 9 cm | 24. (b) $6\frac{2}{3}c$ | m | 25. 2 cm | | |

EXERCISE # 2

- Q.1 If the length of a chord of a circle is 16 cm and is at a distance of 15 cm from the centre of the circle, then find the radius of the circle (in cm).
- Q.2 The radius of a circle is 6 cm. Then find the perpendicular distance from the centre of the circle to the chord which is 8 cm in length.
- Q.3 An equilateral triangle ABC is inscribed in a circle with centre O. Then find ∠BOC.



Q.4 In the adjoining figure, O is the centre of the circle. If $\angle OBC = 25^{\circ}$, then find $\angle BAC$.



Q.5 In fig. O is the centre of the circle. If $\angle BAC = 52^{\circ}$, then find $\angle OCD$.



- Q.6 In a circle with centre O, AB and CD are two diameters perpendicular to each other. Then find the length of chord AC.
- Q.7 In a circle with centre O, the unequal chords AB and CD intersect each other at P. Then find, Δ APC and Δ DPB.

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Q.8 In the given figure, AB and CD are two common tangents to the two touching circles. If DC = 4 cm, then find AB.
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Q.9 CD is a direct common tangent to two circles intersecting each other at A and B. Then find \angle CAD + \angle CBD.



Q.10 In the adjoining figure, PQ is the tangent at K. If LN is a diameter and \angle KLN = 30°, then find \angle PKL.



Q.11 In the adjoining figure, POQ is the diameter of the circle. R and S are any two points on the circle. Then find relation between $\angle PRQ$ and $\angle PSQ$.



- **Q.12** Two equal circles of radius r intersect such that each passes through the centre of the other. Then find the length of common chord.
- Q.13 If four sides of a quadrilateral ABCD are tangential to a circle, then find relation between AB, BC, CD, AD, BD.

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Q.14 In the adjoining figure, A, B, C are three points on a circle with centre O. If $\angle AOB = 90^{\circ}$ and $\angle BOC = 120^{\circ}$, then find $\angle ABC$.



Q.15 AB is a diameter and AC is a chord of a circle such that \angle BAC = 30°. The tangent at C intersects AB produced in D. Then find relation between BC & BD.



- Q.16 Find the length of the tangent drawn from a point 8 cm away from the centre of a circle of radius 6 cm.
- Q.17 Two circles of radii 20 cm and 37 cm intersect in A and B. If O and O' are their centres and AB = 24 cm, then find distance OO'.
- Q.18 If two diameters of a circle intersect each other at right angles, then find the type of quadrilateral formed by joining their end points.
- Q.19 If ABC is an arc of a circle and \angle ABC = 135°, then find the ratio of arc PQR to the circumference.
- **Q.20** If one angle of a cyclic trapezium is triple the other, then find the greater one measures.
- Q.21 Find the angle in a major segment of a circle.

Q.22 O is the centre of a circle. If tangent PQ = 12 cm and BQ = 8 cm, then find chord AB.



- Q.23 AB and CD are two parallel chords of a circle with centre O such that AB = 6 cm and CD = 12 cm. The chords are on the same side of the centre and the distance between them is 3 cm. Then find the radius of the circle.
- Q.24 In a circle of radius 17 cm, two parallel chords are drawn on opposite side of a diameter. The distance between the chords is 23 cm. if the length of one chord is 16 cm. Then find the length of the other.
- Q.25 In the adjoining figure, $\angle ADC = 140^{\circ}$ and AOB is the diameter of the circle. Then find $\angle BAC$.



- Q.26 If two circle are such that the centre of one lies on the circumference of the other, then find the ratio of the common chord of the two circles to the radius of any one of the circles.
- Q.27 If tangents QR, RP, PQ are drawn respectively at A, B, C to a circle circumscribing an acute angled \triangle ABC so as to form another \triangle PQR, then find \angle RPQ.

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- **Q.28** Two circles touch externally. The sum of their areas is 130π sq cm and the distance between their centres is 14 cm. Find the radius of the smaller circle.
- **Q.29** Two circles touch internally. The sum of their areas is, 116π sq. cm and the distance between their centres is 6 cm. Find the radius of the larger circle.
- Q.30 Two circles touch each other internally. Their radii are 2 cm and 3 cm. Find the biggest chord of the outer circle which is outside the inner circle, is of length.

| 1. 17 | 2. $2\sqrt{5}$ cm | 3. 120° | 4. 65° | 5. 52° | 6. $\frac{1}{\sqrt{2}}$ AB |
|------------------------|---------------------------|---------------------------|------------------|---------------------------|----------------------------|
| 7. Similar | 8. 8 cm | 9. 180° | 10. 60° | 11. ∠ PRQ = | ∠ PSQ |
| 12. $r\sqrt{3}$ | 13. $AB + CD = B$ | BC + AD | 14. 75° | 15. BC = BD | |
| 16. 10 cm | 17. 51 cm | 18. square | 19. 3 : 8 | 20. 135° | 21. Less than 90° |
| 22. 10 cm | 23. $3\sqrt{5}$ cm | 24. 30 cm | 25. 50° | 26. $\sqrt{3}$: 1 | 27. 180° – 2 ∠ BAC |
| 28. 3 cm | 29. 10 cm | 30. $4\sqrt{2}$ cm | | | |

Answer Key

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