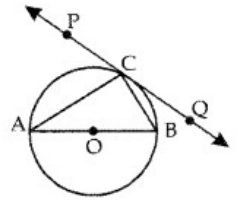


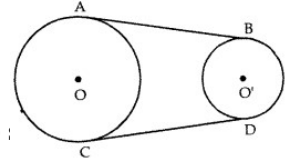
- 1) From an external point P, tangents PA and PB are drawn to a circle with centre O. If $\angle PAB = 50^\circ$, then find $\angle AOB$.



- 2) In figure, PQ is a tangent at a point C to a circle with centre O. If AB is a diameter and $\angle CAB = 30^\circ$, find $\angle PCA$.

- 3) Two tangents are drawn to a circle from an external point P, touching the circle at the points A and B and a third tangent intersects segment PA in C and segment PB in D and touches the circle at Q. If $PA = 20$ units, then find the perimeter of $\triangle PCD$.

- 4) In the figure, AB and CD are common tangents to two circles of unequal radii. Prove that $AB = CD$.



- 5) ABC is a right triangle, right angled at B. A circle is inscribed in it. The lengths of the two sides forming the right angle are 6 cm and 8 cm. Find the radius of the incircle.

- 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) A circle touches the side BC of a $\triangle ABC$ at P, and touches AB and AC produced at Q and R respectively as shown in fig. Show that $AQ = \frac{1}{2}(\text{Perimeter of } \triangle ABC)$.

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

- 9) In the figure, tangents PQ and PR are drawn from an external point P to a circle with centre O, such that $\angle RPQ = 30^\circ$. A chord RS is drawn parallel to the tangent P. Find $\angle RQS$.

- 10) In the figure, l and m are two parallel tangents to a circle with centre O, touching the circle at A and B respectively. Another tangent at C intersects the line l at D and m at E. Prove that $\angle DOE = 90^\circ$.

- 11) The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 10 minutes.

- 12) In figure, are shown two arcs PAQ and PBQ. Arc PAQ is a part of circle with centre O and radius OP while arc PBQ is a semicircle drawn on PQ as diameter with centre M. If $OP = PQ = 10$ cm, show that area of shaded region is $25(\sqrt{3} - \pi/6)\text{cm}^2$

- 13) An elastic belt is placed around the rim of a pulley of radius 5 cm. From one point C on the belt, the elastic belt is pulled directly away from the centre O of the pulley until it is at P, 10 cm from the point O. Find the length of the belt that is still in contact with the pulley. Also find the shaded area, (use $\pi = 3.14$ and $\sqrt{3} = 1.73$)

- 14) In figure, ABDC is a quadrant of a circle of radius 28 cm and a semicircle BEC is drawn with BC as diameter. Find the area of the shaded region.

- 15) In given figure, ABC is a triangle right-angled at B, with $AB = 14$ cm and $BC = 24$ cm. With the vertices A, B and C as centers, arcs are drawn each of radius 7 cm. Find the area of the shaded region.

- 16) Find the area of the shaded region in figure, where a circular arc of radius 7 cm has been drawn with vertex O of an equilateral triangle OAB of side 12 cm, as centre.

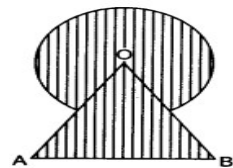
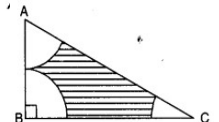
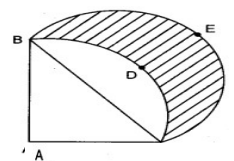
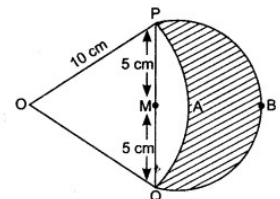
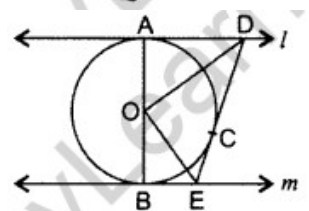
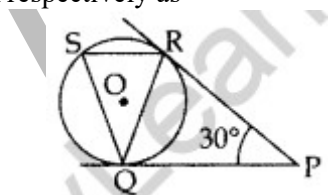
- 17) Find the length of the longest rod that can be kept in a room of dimensions $12\text{ cm} \times 9\text{ cm} \times 8\text{ cm}$.

- 18) The decorative block shown in fig. is made of two solids-a cube and a hemisphere. The base of the block is a cube with edge 5 cm and the hemisphere fixed on the-top has a diameter of 4.2 cm. Find the total surface area of the block.

- 19) A hemispherical tank full of water is emptied by a pipe at the rate of $25/7$ litres per second. How much time will it take to empty the tank if the diameter of base of tank is 3 meter?

- 20) How many coins 1.75 cm in diameter and of thickness 2 mm must be melted to form a cuboid of dimensions $11\text{ cm} \times 10\text{ cm} \times 7\text{ cm}$?

- 21) A copper rod of diameter 1 cm and length 8 cm is drawn in to a wire of length 18 m of uniform thickness. Find the thickness of wire.



- 22) In a hospital used water is collected in a cylindrical tank of diameter 2 m and height 5 m. After recycling, this water is used to irrigate a park of hospital whose length is 25 m and breadth is 20 m. If tank is filled completely then what will be the height of standing water used for irrigating the park. Write your views on recycling of water.
- 23) A conical vessel of radius 6 cm and height 8 cm is completely filled with water. A sphere is lowered into the water and its size is such that when it touches the sides it is just immersed as shown in figure. What fraction of water flows out?
- 24) A well, whose diameter is 7cm, has been dug 22.5m deep and the earth dugout is used to form an embankment around it. If the height of the embankment is 1.5m, find the width of the embankment.
- 25) An agriculture field is in the form of a rectangle of length 20m and width 14m. A 10m deep well of diameter 7m is dug in a corner of the field and the earth taken out of the well is spread evenly over the remaining part of the field. Find the rise in the level.
- 26) Water is flowing at the rate of 3km/hr through a circular pipe of 20cm internal into a circular cistern of diameter 10m and depth 2m. In how much time will cistern will be filled?
- 27) If $7 \sin^2 \theta + 3 \cos^2 \theta = 4$, then find the value of $\tan \theta$.
- 28) If $\sin \theta + \cos \theta = \sqrt{2}$, then evaluate $\tan \theta + \cot \theta$
- 29) $\sin A(1 + \tan A) + \cos A(1 + \cot A) = \sec A + \operatorname{cosec} A$
- 30) If $\cos^2 \theta - \sin^2 \theta = \tan^2 \theta$, prove that
 $\cos \theta = 1/2\sqrt{\cos \theta}$
- 31) If C and Z are acute angles and that $\cos C = \cos Z$ prove that $\angle C = \angle Z$
- 32) If $\sec A = x + 1/4x$, prove that $\sec A + \tan A = 2x$ or $1/2x$
- 33) If $\operatorname{cosec} A + \cot A = m$, show that $m^2 - 1/m^2 + 1 = \cos A$.
- 34) If $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$, show that $\cos \theta - \sin \theta = \sqrt{2} \sin \theta$.
- 35) A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability of getting neither a red card nor a queen.
- 36) Cards marked with number 3, 4, 5, ..., 50 are placed in a box and mixed thoroughly. A card is drawn at random from the box. Find the probability that the selected card bears a perfect square number.
- 37) Three distinct coins are tossed together. Find the probability of getting (2015 D)
 (i) at least 2 heads
 (ii) at most 2 heads.
- 38) The probability of selecting a red ball at random from a jar that contains only red, blue and orange balls is $1/4$. The probability of selecting a blue ball at random from the same jar is $1/3$. If the jar contains 10 orange balls, find the total number of balls in the jar.
- 39) All red face cards are removed from a pack of playing cards. The remaining cards were well shuffled and then a card is drawn at random from them. Find the probability that the drawn card is
 (i) a red card
 (ii) a face card
 (iii) a card of clubs.
- 40) Two different dice are thrown together. Find the probability of:
 (i) getting a number greater than 3 on each die
 (ii) getting a total of 6 or 7 of the numbers on two dice
- 41) Find the probability that a leap year selected at random, will contain 53 Mondays.
- 42) A number x is selected at random from the numbers 1, 2, 3 and 4. Another number y is selected at random from the numbers 1, 4, 9 and 16. Find the probability that product of x and y is less than 16.
- 43) A card is drawn at random from a well shuffled deck of playing cards. Find the probability that the card drawn is
 (i) a card of spade or an ace. (ii) a black king. (iii) neither a jack nor a king.
 (iv) either a king or a queen.

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