

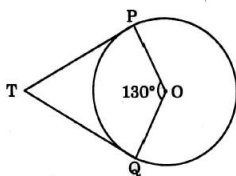
General Instructions:

1. All questions are compulsory.
2. The question paper consists of 31 questions divided into four sections – A, B, C and D. Section A comprises of 4 questions of 1 mark each, Section – B comprises of 6 questions of 2 marks each, Section – C comprises of 10 questions of 3 marks each and Section – D comprises of 11 questions of 4 marks each.
3. There is no overall choice.
4. Use of calculators is not permitted.
5. An additional 15 minutes is allowed to read the question paper.

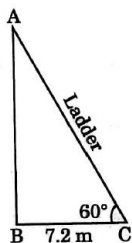
Section – A

Question numbers 1 to 4 carry 1 mark each.

1. If the angle between two radii of a circle is 130° , then find the angle between the tangents at the ends of the radii.



2. Find the length of a ladder which is at a distance of 7.2 m from a wall and makes an angle of elevation as 60° .

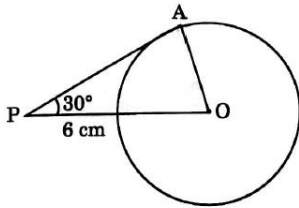


- A teacher has to reward a child by giving him a silver star. The teacher has equal silver, gold and bronze stars in a box. Find the probability that the teacher chooses the correct star when she is blind folded.
- Find the area of an isosceles triangle each of whose equal sides is 17 cm and whose base is 16 cm.

Section – B

Question numbers 5 to 10 carry 2 marks each.

- If (-3) is a root of the equation $x^2 + ax - 3 = 0$ and the equation $x^2 + ax + b = 0$ has equal roots, find the values of a and b .
- The first term and the last term of an AP are a and l respectively. Find the sum of the n^{th} term from the beginning and the n^{th} term from the end.
- In the figure, AP is a tangent to the circle with centre O, such that $OP = 6$ cm and $\angle OPA = 30^\circ$. Find AP and OA.

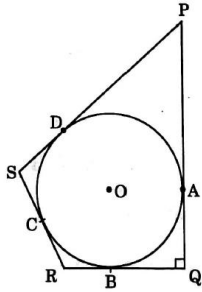


- If the point $P(x, y)$ is equidistant from the points $A(5, 1)$ and $B(-1, 5)$, prove that $3x = 2y$.
- Show that the points $P(x, y + z)$, $Q(y, z + x)$ and $R(z, x + y)$ are collinear.
- A racetrack is in the form of a ring whose inner and outer circumferences are 632 m and 720 m respectively. Find the width of the track.

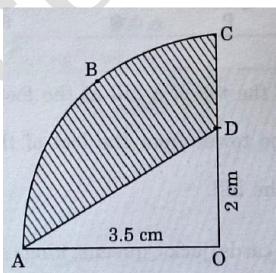
Section – C

Question numbers 11 to 20 carry 3 marks each.

- The sum of two numbers is 12 and the sum of their reciprocals is $\frac{3}{8}$. Find the numbers.
- In the figure, a circle with centre O is inscribed in a quadrilateral PQRS such that it touches the sides PQ, QR, RS and SP at points A, B, C and D respectively. If $PQ = 29$ cm, $PS = 23$ cm, $\angle Q = 90^\circ$ and $SC = 5$ cm, then find the radius of the circle.



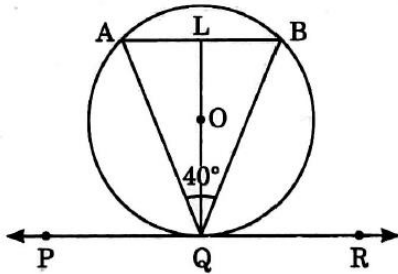
13. In a storm, a tree was broken by the wind. The top of the tree touched the ground at an angle of 30° , at a distance of 10 metres from the base. At what height from the base did the tree get broken? What was the height of the tree?
14. Draw a circle with centre O, radius 2 cm. From point P ($OP = 4.5$ cm), outside the circle, draw two tangents to the circle.
15. What is the probability of two friends, Naveen and Aman having (i) the same birthday? (ignore a leap year), (ii) different birthday?
16. A line intersects the x – axis at P and y – axis at Q. If R (2, 3) is the point which divides PQ in the ratio 2 : 1, find the coordinates of P and Q. Also find the distance PQ.
17. In a circle of radius 7 cm, an arc subtends an angle of 60° at the centre. Find (i) length of the arc (ii) area of the sector (iii) area of the minor segment.
18. From a cylinder of height 12 cm and radius 5 cm, a conical cavity of same height and same radius is hollowed out. Find the volume of the remaining solid.
19. A sponge contains water of about 60% of its volume. Find approximately, how much water will be found in 20 such sponges shaped like a cylinder with two hemispherical ends if complete lengths of each sponge is 5 cm and diameter is 2.8 cm?
20. In the figure, OABCD represents a quadrant of a circle of radius 3.5 cm with centre O. Find the area of the shaded region.



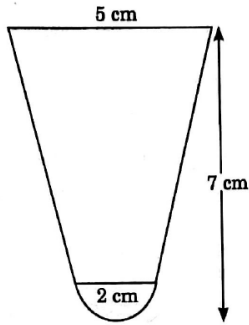
Section – D

Question numbers 21 to 31 carry 4 marks each.

21. Solve: $5^{x+1} + 5^{2-x} = 126$
22. The age of a man is twice the square of the age of his daughter. 8 years hence, age of the man will be 4 years more than 3 times the age of his daughter. Find their present ages.
23. The sum of first six terms of an A.P. is 42. The ratio of its 10th term to its 30th term is 1 : 3. Find the 12th term of the A.P.
24. A sum of Rs. 1000 is invested at 4% per annum at simple interest. Calculate the interest at the end of each year. Show that these interests form an A.P. Using this, find the interest at the end of 20 years.
25. Prove that the tangents drawn at the ends of a diameter of a circle are parallel.
26. In the figure, PQR is a tangent to the circle at Q, with centre O. AB is a chord parallel to PR such that $\angle AQB = 40^\circ$. Find $\angle BQR$.



27. The angle of elevation of the top of a hill at the foot of a tower is 60° and the angle of elevation of the top of the tower from the foot of the hill is 30° . If the tower is 70 m high, find the height of the hill.
28. From a pack of 52 playing cards, jacks, queens, kings and aces of black colour are removed. From the remaining, a card is drawn. Find the probability that the card drawn is (i) a red queen (ii) a black card (iii) a jack or a queen or a king.
29. If $A(-2, -1)$, $B(x, 0)$, $C(4, y)$ and $D(1, 2)$ are the vertices of a parallelogram, find the values of x and y .
30. A shuttlecock used for playing badminton has the shape of a frustum of a cone mounted on a hemisphere. The external diameters of the frustum are 5 cm and 2 cm and the height of the entire shuttlecock is 7 cm. Find the external surface area of the shuttlecock.



31. A colony park is to be developed. The neighbours plan the structure. The length of the park is 100 m and breadth is 70 m. They decide to plant trees on two smaller sides of width 2 m. On one side, they plan to have a semicircular shallow pond of radius 7 m, so that the birds could drink water. 5 m width of walking track is reserved on the longer sides of the park. The remaining park is reserved for children to play. Calculate the area for the children to play. Why did the neighbours plan to have trees and water pond?

