

SECTION - A

Question numbers 1 to 4 carry 1 mark each.

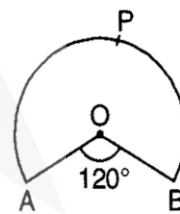
1. Find the missing terms, if following are in A.P. : 2, $\square$, 26, $\square$.
2. An observer 1.5 metres tall is 18.5 metres away from the tower. The angle of elevation of the top of the tower from his eye is 45° . What is the height of the tower ?
3. What is the probability that a non leap year has 53 Mondays ?
4. ABCD is a rectangle whose three vertices are A(0, 3), B(0, 0) and C(5, 0). Find the length of the diagonal BD.

SECTION - B

Question numbers 5 to 10 carry 2 marks each.

5. How many multiples of 4 lie between 10 and 260 ?
6. Find the nature of roots of the quadratic equation $2x^2 - 4x + 5 = 0$.
7. In two concentric circles, a chord of length 24 cm of larger circle becomes a tangent to the smaller circle whose radius is 5 cm. Find the radius of the larger circle.
8. Draw a line segment of length 5 cm, divide it in the ratio 3 : 7.
9. Draw a circle of radius 4 cm with centre O. Draw a diameter POQ. Through P construct a tangent to the circle.
10. In the given figure, OAPB is a sector of a circle of radius 3.5 cm with the centre at O. If $\angle AOB = 120^\circ$, then find the length of OAPBO.

[use $\pi = \frac{22}{7}$]

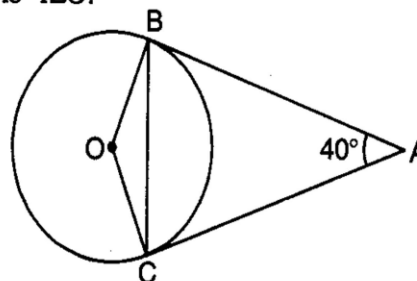


SECTION - C

Question numbers 11 to 20 carry 3 marks each.

11. The sum of 4th and 8th terms of an A.P. is 24 and the sum of the 6th and 10th terms is 34. Find the first term and the common difference of the A.P.
12. Divide 29 into such parts so that the sum of their squares is 425.

13. In the figure, AB and AC are tangents to a circle with centre O. If $\angle BAC = 40^\circ$, find $\angle BOC$ and $\angle ACB$.



14. A circus artist is climbing 40 m long rope, which is tightly stretched and tied from the top of a pole to a point on the ground. Find the height of the pole, if the angle made by the rope with the ground level is 30° .
15. A bag contains 1000 pens with different colours. 100 pens are taken out from the bag, out of which 20 were red, 35 were green, 15 were blue and remaining were black in colour. A pen is picked up from these 100 pens. What is the probability that the pen is :
(a) not red (b) green.



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16. If the point (x, y) is equidistant from the points $(a - b, a + b)$ and $(-a - b, a + b)$, prove that $x + b = 0$.
17. Show that the points $A(0, 1)$, $B(2, 3)$ and $C(3, 4)$ are collinear.
18. Find the volume of an oil container, which is in the shape of a cylinder with hemispherical ends. Total length of oil container is 23 m and radius is 3 m. [use $\pi = \frac{22}{7}$]
19. Area of a sector of a circle with angle 30° is 8 square units. Find the area of the circle. Also, find the radius of this circle.
20. The radius and height of a metallic cylinder are 4.2 cm and 5.6 cm respectively. It is melted and recast into a sphere. Find the radius of the sphere.

SECTION - D

Question numbers 21 to 31 carry 4 marks each.

21. Find the sum of all numbers between 250 and 1000 which are exactly divisible by 3.
22. Solve for x : $\frac{a}{ax-1} + \frac{b}{bx-1} = a+b, x \neq \frac{1}{a}, \frac{1}{b}$.
23. If the roots of the equation $(a-b)x^2 + (b-c)x + c-a = 0$ are equal, prove that $b+c=2a$.
24. The sides AB, BC and CA of triangle ABC touch a circle with centre O and radius r at P, Q and R respectively. Prove that :
$$\text{Area of } \triangle ABC = \frac{1}{2} (\text{perimeter of } \triangle ABC) \times (r)$$
25. Construct a pair of tangents PQ and PR to a circle of radius 4 cm from a point P outside the circle 8 cm away from the centre. Measure PQ and PR.
26. Two posts are k metres apart and the height of one is double that of the other. If from the mid-point of the line segment joining their feet, an observer finds the angles of elevation of their tops to be complementary, then find the height of the shorter post.
27. The blood group of 200 people are distributed as follows : 50 have type A blood, 65 have type B blood, 70 have type O blood and 15 have type AB blood. If a person from this group is selected at random, what is the probability that this person has :
(a) type O blood ? (b) type A blood ?
(c) type AB blood ? (d) type B or O blood ?
28. Find the point on the x-axis which is equidistant from the points $(2, -5)$ and $(-2, 9)$. Also, find the area of the isosceles triangle so formed.
29. If the radii of the circular ends of a frustum of height 6 cm are 15 cm and 7 cm respectively. Find the volume and the lateral surface area of the frustum. [Take $\pi = 3.14$]
30. On a square cardboard sheet of area 784 cm^2 , four congruent circular plates of maximum size are placed such that each circular plate touches the other two plates and each side of the square sheet is tangent to two circular plates. Find the area of the square sheet not covered by the circular plates.
31. In a school for blinds, children were taught to make candles. They were given a cuboidal piece of wax of dimensions $22 \text{ cm} \times 9 \text{ cm} \times 10 \text{ cm}$. From this wax piece, they made cylindrical candles of radius 3 cm and height 7 cm. Find how many candles will they make out of the given cuboidal piece, assuming wastage is negligible. What values can be concluded about these blind children who are learning to make candles ?