

PRERNA EDUCATION

CBSE SAMPLE PAPER – CLASS X
MATHEMATICS

Time: 3 hours

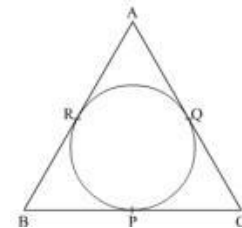
Max. Marks: 80

General Instructions :

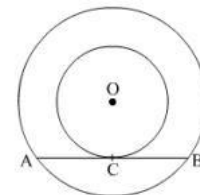
- (i) All questions are compulsory.
- (ii) This question paper consists of 30 questions divided into four Sections – A, B, C and D.
- (iii) Section A contains 6 questions of 1 mark each. Section B contains 6 questions of 2 marks each, Section C contains 10 questions of 3 marks each. Section D contains 8 questions of 4 marks each.
- (iv) There is no overall choice. However, an internal choice has been provided in four questions of 3 marks each and 3 questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
- (v) Use of calculators is not permitted.

SECTION A

1. A number is selected at random from first 50 natural numbers. Find the probability that it is a multiple of 3 and 4.
2. Solve for x : $3x^2 - 2\sqrt{6}x + 2 = 0$
3. The volume of a hemisphere is $2425 \frac{1}{2} \text{ cm}^3$. Find its curved surface area. [Use $\frac{22}{7}$]
4. Tangents PA and PB are drawn from an external point P to two concentric circles with centre O and radii 8 cm and 5 cm respectively, as shown in Fig.3. If AP = 15 cm, then find the length of BP.
5. In Fig.4, an isosceles triangle ABC, with AB = AC, circumscribes a circle. Prove that the point of contact P bisects the base BC.

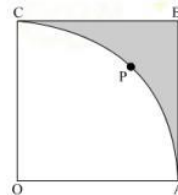


6. In Fig.5, the chord AB of the larger of the two concentric circles, with centre O, touches the smaller circle at C. Prove that AC = CB.



SECTION B

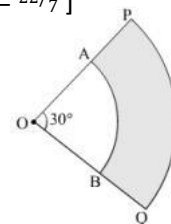
7. In Fig.6, OABC is a square of side 7 cm. IF OAPC is a quadrant of a circle with centre O, then find the area of the shaded regions. [Use = $\frac{22}{7}$]



8. Find the sum of all three digit natural numbers, which are multiples of 7.
9. Find the value(s) of k so that the quadratic equation $3x^2 - 2kx + 12 = 0$ has equal roots.
10. If the vertices of a triangle are (1,-3), (4, p) and (-9, 7) and its area is 15 sq.units, find the value(s) of p.
11. Prove that the parallelogram circumscribing a circle is a rhombus.
12. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

SECTION C

13. From a solid cylinder of height 7n cm and base diameter 12 cm, a conical cavity of same height and same base diameter is hollowed out. Find the total surface area of the remaining solid. [Use = $\frac{22}{7}$]
14. A cylindrical bucket, 32 cm high and with radius of base 18 cm, is filled with sand. This bucket is emptied on the ground and a conical heap of sand is formed. If the height of the conical heap is 24 cm, then find the radius and slant height of the heap.
15. In Fig. 7, PQ and AB are respectively the arcs of two concentric circles of radii 7 cm and 3.5 cm and centre O. If $\angle POQ = 30^\circ$, then find the area of the shaded region. [Use = $\frac{22}{7}$]



16. A kite is flying at a height of 45 m above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is 60° . Find the length of the string assuming that there is no slack in the string.

17. Draw a triangle ABC with side $BC = 6$ cm, $\angle C = 30^\circ$ and $\angle A = 105^\circ$. Then construct another triangle whose sides are $\frac{2}{3}$ times the corresponding side of ABC.
18. The 16th term of an AP is 1 more than twice its 8th term. If the 12th term of the AP is 47, then find its n^{th} term.
19. A card is drawn from a well shuffled deck of 52 cards. Find the probability of getting (i) a king of red color (ii) a face and (iii) the queen of diamonds.
20. A bucket is in the form of a frustum of a cone and it can hold 28.49 liters of water. If the radii of its circular ends are 28 cm and 21 cm, find the height of the bucket. [Use $\pi = \frac{22}{7}$]
21. The angle of elevation of the top of a hill at the foot of a tower is 60° and the angle of depression from the top of the tower to the foot of the hill is 30° . If the tower is 50 m high, find the height of the hill.
22. Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.

SECTION D

23. A quadrilateral ABCD is drawn to circumscribe a circle. Prove that $AB + CD = AD + BC$.
24. A shopkeeper buys some books for Rs. 80. If he had bought 4 more books for the same amount, each book would have cost Rs 1 less. Find the number of books he bought.
25. The sum of two numbers is 9 and the sum of their reciprocals is $\frac{1}{2}$. Find the numbers
26. Sum of first 20 terms of an AP is -240 , and its first term is 7. Find its 24th term.
27. A solid is in the shape of a cone standing on a hemisphere with both their radii being equal to 7 cm and the height of the cone is equal to its diameter. Find the volume of the solid. [Use $\pi = \frac{22}{7}$]
28. The sum of the first n terms of an AP whose first term is 8 and the common difference is 20 is equal to the sum of first $2n$ terms of another AP whose first term is -30 and the common difference is 8. Find n .
29. From a balloon vertically above a straight road, the angles of depression of two cars at an instant are found to be 45° and 60° . If the cars are 100 m apart, find the height of the balloon.
30. A window of a house is h metres above the ground. From the window, the angles of elevation and depression of the top and the bottom of another house situated on the opposite side of the lane are found to be α and β , respectively. Prove that the height of the other house is $h (1 + \tan \alpha \cot \beta)$ metres.
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