

**Goa Board
Class X Mathematics
Term II
Sample Paper - 9**

Time: 3 hrs

Total Marks: 90

General Instructions:

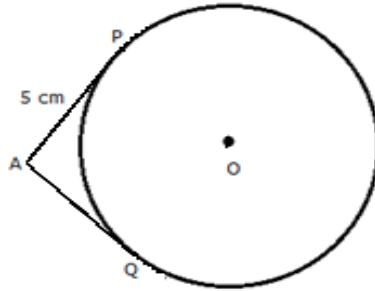
1. All questions are **compulsory**.
 2. The question paper consists of **34** questions divided into **four sections** A, B, C, and D. **Section A** comprises of **8** questions of 1 mark each, **Section B** comprises of **6** questions of 2 marks each, **Section C** comprises of **10** questions of 3 marks each and **Section D** comprises of **10** questions of 4 marks each.
 3. Question numbers **1 to 8** in **Section A** are multiple choice questions where you are to select **one** correct option out of the given four.
 4. Use of calculator is **not** permitted.
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**Section A
(Questions 1 to 8 carry 1 mark each)**

1. If the area of a rectangle is 24 m^2 and its perimeter is 20 m, the equation to find its length and breadth would be:
 - A. $x^2 - 10x + 24 = 0$
 - B. $x^2 + 12x + 24 = 0$
 - C. $x^2 - 10x - 24 = 0$
 - D. $x^2 + 10x + 28 = 0$
2. The co-ordinates of the point which divide the line segment joining P (-2, 2) and Q (2, 8) into two equal parts are:
 - A. (2, 5)
 - B. (5, 0)
 - C. (0, 5)
 - D. (2, 3)
3. If the sum of n terms of an A.P. is $3n^2 + 5n$ then which of its terms is 164?
 - A. 26th
 - B. 27th
 - C. 28th
 - D. 29th

4. In the figure, the pair of tangents AP and AQ drawn from an external point A to a circle with centre O are perpendicular to each other and length of each tangent is 5 cm. The radius of the circle is:

- A. 10 cm
- B. 7.5 cm
- C. 5 cm
- D. 2.5 cm



5. A vertical tower is 20 m high. A man at some distance from the tower knows that the cosine of the angle of the elevation of the top of tower is 0.5. He is standing from the foot of the tower at a distance of:

- A. $20\sqrt{3}$ m
- B. $30\sqrt{3}$ m
- C. $\frac{20}{\sqrt{3}}$ m
- D. $\frac{10}{\sqrt{3}}$ m

6. If the probability of winning a game is 0.3, then the probability of losing it is:

- A. 0.5
- B. 0.2
- C. 0.7
- D. 0.3

7. If the diameter of a semicircular protractor is 14 cm, then its perimeter is:

- A. 30 cm
- B. 36 cm
- C. 40 cm
- D. 44 cm

8. A spherical shell of lead, whose external diameter is 18 cm, is melted and recast into a right circular cylinder, whose height is 8 cm and diameter 12 cm. The internal diameter of the shell is:

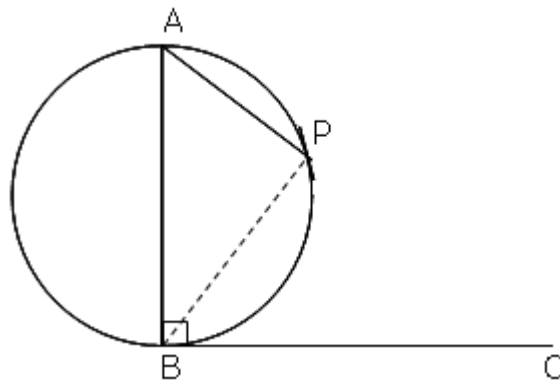
- A. $6\sqrt{19}$ cm
- B. $6(19)^{\frac{1}{3}}$ cm
- C. 619 cm
- D. $6(19)^{\frac{1}{4}}$ cm

Section B
(Questions 9 to 14 carry 2 marks each)

9. A car travels a distance of 0.99 km in which each wheel makes 450 complete revolutions. Find the radius of its wheels.

10. If the points $(a, 0)$, $(0, b)$ and $(1, 1)$ are collinear, then prove that $\frac{1}{a} + \frac{1}{b} = 1$.

11. AB is a diameter of a circle. BC is the tangent to the circle at B as shown in the given figure. Show that $\angle PBC = \angle BAP$.



12. Which term of the A.P.: 5, 15, 25, will be 130 more than the 31st term?

13. The points $A(4, -1)$, $B(6, 0)$, $C(7, 2)$ and $D(5, 1)$ are the vertices of a rhombus. Is ABCD also a square?

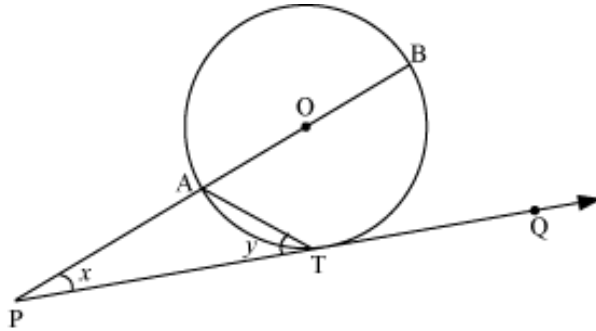
14. Find the roots of the quadratic equation $x^2 + 2\sqrt{2}x - 6 = 0$ by the factorisation of the corresponding quadratic polynomial.

Section C
(Questions 15 to 24 carry 3 marks each)

15. The horizontal distance between two towers is 140 m. The angle of elevation of the top of the first tower when seen from top of the second tower is 30° . If the height of the second tower is 60 m, find the height of the first tower.

16. A well of diameter 3 m is dug 14 m deep. The earth taken out of it has been spread evenly all around it to a width of 4 m to form an embankment. Find the height of the embankment.

17. In the given figure, the diameter AB of the circle with centre O is extended to a point P and PQ is a tangent to the circle at the point T. If $\angle BPT = x$ and $\angle ATP = y$, then prove that $x + 2y = 90^\circ$.



18. Find the area of the rhombus ABCD whose vertices are $A(3, 0)$, $B(4, 5)$, $C(-1, 4)$ and $D(-2, -1)$.

19. If the sum of first m terms of an A.P. is n and the sum of first n terms is m , then show that the sum of its first $(m + n)$ terms is $-(m + n)$.

20. Construct a triangle similar to ΔABC in which $AB = 6$ cm, $BC = 5$ cm and $m\angle B = 60^\circ$, with its sides equal to $\frac{7}{5}$ of the corresponding sides of ΔABC .

21. An integer is chosen at random from 1 to 200. What is the probability that the integer chosen is divisible by 6 or 8?

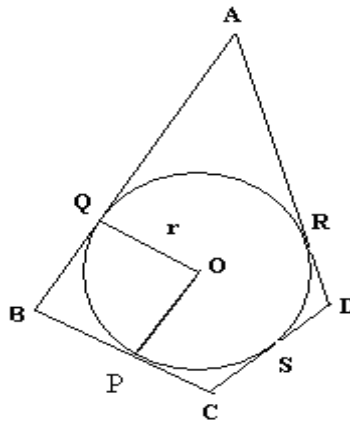
22. Solve: $\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}$, where $x \neq -4, 7$

23. In a school, students thought of planting trees around the school to reduce air pollution. It was decided that the number of trees which each section of each class would plant will be the same as the class in which they are studying, e.g., a section of class-I will plant 1 tree, a section of class II will plant 2 trees and so on till class XII. There are three sections of each class. How many trees will be planted by the students? What value can you infer from the planting of trees by the students?
24. If $a \neq b \neq c$, prove that the points (a, a^2) , (b, b^2) and (c, c^2) can never be collinear.

Section D

(Questions 25 to 34 carry 4 marks each)

25. A man on a cliff observes a boat at an angle of depression of 30° which is approaching the shore to a point immediately beneath the observer with uniform speed. Six minutes later, the angle of depression of the boat is found to be 60° . Find the time taken by the boat to reach the shore.
26. A circle is inscribed in a quadrilateral ABCD in which $m\angle B = 90^\circ$. If $AD = 23$ cm, $AB = 29$ cm and $DS = 5$ cm. Find the radius of the circle.



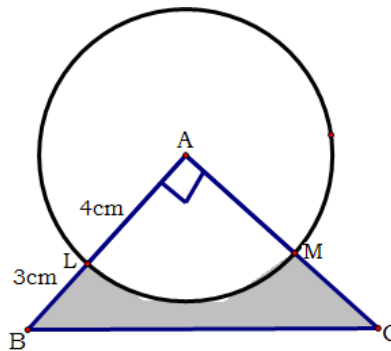
27. The radii of the circular ends of a solid frustum of a cone are 33 cm and 27 cm, and its slant height is 10 cm. Find its capacity and total surface area. Take $\pi = \frac{22}{7}$.
28. The diagonal of a rectangular field is 60 metres more than the shorter side. If the longer side is 30 metres more than the shorter side, find the length of the sides of the field.
29. Prove that the lengths of tangents drawn from an external point to a circle are equal.

30. From a pack of 52 playing cards, Jacks, Queens, Kings and Aces of red colour are removed. From the remaining cards, a card is drawn at random. Find the probability that the card drawn is

- i. A black Queen
- ii. A red card
- iii. A black Jack
- iv. A picture card (Jacks, Queens and Kings are picture cards)

31. A solid toy is in the form of a cylinder with hemispherical ends. If the entire length of the solid is 108 cm and the diameter of the hemispherical ends is 36 cm. Find the cost of polishing the surface of the solid at the rate of 7 paise per sq. cm. (Use $\pi = 22/7$)

32. A momento is made as shown in the figure. Its base is to be silver plated from the front at the rate of Rs. 20 per cm^2 . Sides of both the triangles are equal. What is the total cost of silver plating?



33. The gate receipts at the show of a film amounted to Rs. 6500 on the first night and showed a drop of Rs. 110 every succeeding night. If the operational expenses of the show are Rs. 1000 a day, then find the night on which the show ceases to be profitable.

34. With the vertices A, B and C of a ΔABC as centres, arcs are drawn with radii 5 cm each as shown in the figure. If $AB = 14$ cm, $BC = 48$ cm and $CA = 50$ cm, then find the area of the shaded region (Use $\pi = 3.14$).

