Goa Board
Class X Mathematics
Term II
Sample Paper - 6

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.

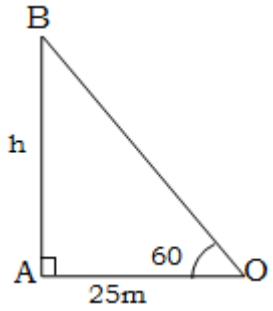
Section A
(Questions 1 to 8 carry 1 mark each)

1. The centroid of the triangle whose vertices are (3, −5), (−7, 4), and (10, −2) is

A. (2, 1)
B. (2, −1)
C. (3, 1)
D. (2, 3)

2. From the given figure, find h.

A. $25\sqrt{3}$ m
B. $2\sqrt{3}$ m
C. $50\sqrt{3}$ m
D. $\sqrt{3}$ m



3. Which of the following cannot be the probability of an event?

A. 0.3
B. −1.5
C. 0.5
D. 0.7

4. The radii of the ends of a frustum of a cone of height h cm are r_1 cm and r_2 cm. The volume in cm^3 of the frustum of the cone is:

A. $\frac{1}{3}\pi h\,[r_1^2 + r_2^2 + r_1r_2]$

B. $\frac{1}{3}\pi h[r_1^2 + r_2^2 - r_1r_2]$

C. $\frac{1}{3}\pi h[r_1^2 - r_2^2 + r_1r_2]$

D. $\frac{1}{3}\pi h[r_1^2 - r_2^2 - r_1r_2]$

5. The co-ordinates of a point A, where AB is diameter of a circle whose centre is $(2, -3)$ and B is $(1, 4)$, are:

A. $(3, 0)$

B. $(0, -10)$

C. $(3, 4)$

D. $(3, -10)$

6. The next term of the A.P. $\sqrt{7}, \sqrt{28}, \sqrt{63}, \ldots$ is

A. $\sqrt{112}$

B. $\sqrt{97}$

C. $\sqrt{84}$

D. $\sqrt{72}$

7. For what value(s) of k will the equation $kx^2 - 5x + k=0$ have a repeated root?

A. $\frac{1}{2}$

B. $\frac{-1}{2}$

C. $\frac{\pm 5}{2}$

D. $\frac{\pm 3}{2}$

8. The radii of two circles are 19 cm and 9 cm respectively. The radius of the circle which has its circumference equal to the sum of the circumferences of the two circles is:

A. 28 cm

B. 30 cm

C. 26 cm

D. 32 cm

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

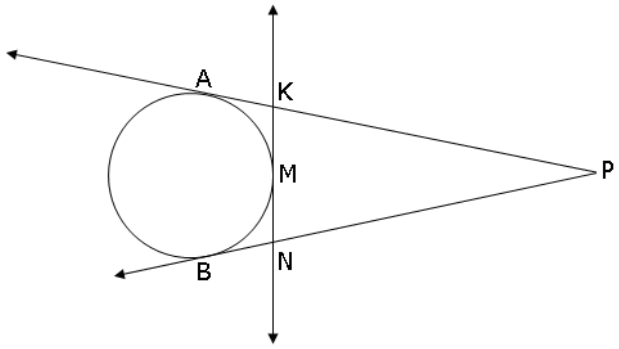
9. A car has two wipers which do not overlap. Each wiper has a blade of length 25 cm sweeping through an angle of 115°. Find the total area cleaned with each sweep of the blades.

10. For what value of n, the nth terms of the A.P.'s 63, 65, 67, ... and 3, 10, 17, ... are equal?

11. If the points A(−2, −1), B(a, 0), C(4, b) and D(1, 2) are the vertices of a parallelogram ABCD, find the values of a and b.

12. Find two consecutive positive integers, sum of whose squares is 25.

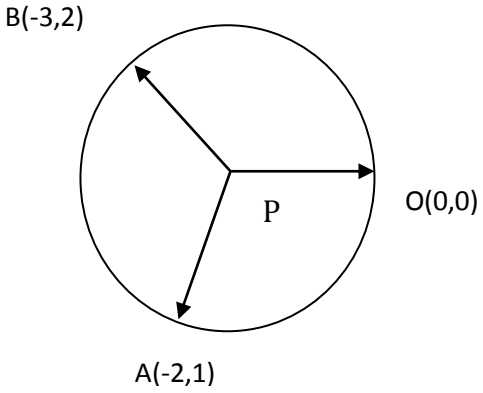
13. PA and PB are tangents from P to the circle. At point M, a tangent is drawn cutting PA at K and PB at N. Prove that KN = AK + BN.



14. Find the co-ordinates of the vertices B and C of $\triangle$ ABC, with A (1, −4) and the mid-point of sides through A being (2, −1) and (0, −1).

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

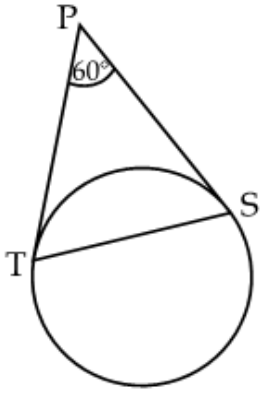
15. Find the co-ordinates of the centre of the circle passing through the points (0, 0), (−2, 1) and (−3, 2). Also, find its radius.



16. A well of diameter 2 m is dug 14 m deep. The earth taken out of it is spread evenly all around it to a width of 5 m to form an embankment. Find the height of the embankment.

17. Solve: $\frac{6}{y+1}+\frac{5}{2y+1}=3$

18. In the figure, PT and PS are tangents to a circle from a point P such that PT = 5 cm and m $\angle$ TPS = 60°. Find the length of chord TS.



19. Find the value of the middle term(s) of the arithmetic progression: −11, −7, −3, ... 49

20. Construct a tangent to a circle of radius 4 cm from a point on a concentric circle of radius 6 cm.

21. The angle of elevation of the top of a tower from two points distant 'a' and 'b' from the base and in the same straight line with it are complementary. Prove that the height of tower is $\sqrt{ab}$.

22. If D, E and F are the mid-points of sides BC, CA and AB respectively of a Δ ABC, whose vertices are A(−4, 1), B(6, 7) and C(2, -9), then prove that: ar (ΔDEF) = $\frac{1}{4}$ ar(ΔABC).

23. 17 cards numbered 1, 2, 3, 4, ……., 16, and 17, are put in a box and mixed thoroughly. A girl draws a card from the box. Find the probability that the number on the card is:

i. Prime
ii. Divisible by 3
iii. Divisible by both 2 and 3

24. The sum of the first six terms of an arithmetic progression is 42. The ratio of its 10^{th} term to its 30^{th} term is 1 : 3. Find the first and the thirteenth term of the A.P.

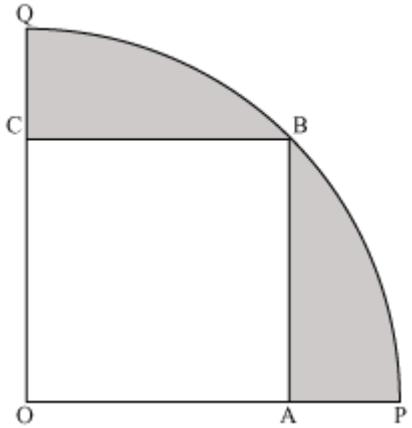
Section D
(Questions 25 to 34 carry 4 marks each)

25. Two circles touch externally. The sum of their areas is 130π sq. cm and the distance between their centres is 14 cm. Find the radii of the circles.

26. A solid toy is in the form of a hemisphere surmounted by a right circular cone. The height of the cone is 4 cm and the diameter of the base is 8 cm. Determine the volume of the toy. If a cube circumscribes the toy, then find the difference of the volumes of cube and the toy. Also, find the total surface area of the toy.

27. A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball is double of that of a red ball, determine the number of blue balls in the bag.

28. In the given figure, a square OABC is inscribed in a quadrant OPBQ. If OA = 20 cm, find the area of the shaded region. (Use $\pi = 3.14$)



29. If m times the m^{th} term of an A.P. is equal to n times its n^{th} term, show that the $(m + n)^{th}$ term of the A.P. is zero ($m \neq n$).

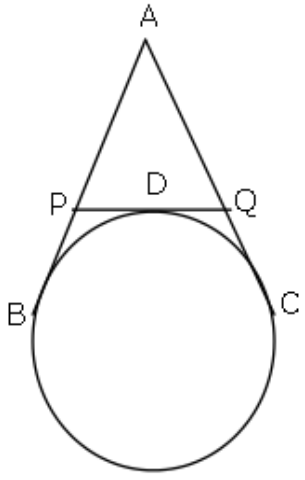
30. A hollow cone is cut by a plane parallel to the base and the upper portion is removed. If the curved surface of the remaining part is $\frac{8}{9}^{th}$ of the curved surface of the whole cone, find the ratio of the line segments into which the cone's altitude is divided by the plane.

31. Some students planned a picnic. The budget for food was Rs. 240. Since, four students of the group did not go the cost of food increased by Rs. 5 per student. How many students went for the picnic?

32. At the foot of a mountain the elevation of its summit is 45°. After ascending 1000 m towards the mountain, up a slope of 30° inclination, the elevation is found to be 60°. Find the height of the mountain.

33. PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q intersect at a point T. Find the length TP.

34. For a Science exhibition Samy presented a diagrammatic representation of 'Rain Water Harvesting' as his project. AB and AC are 5 m long pipes bringing water from the terrace of a building (as shown in the given figure). The triangular space is developed as a garden.



What is the perimeter of the triangular garden? What qualities do you think are encouraged by such exhibitions?