Subject: Mathematics **Max. Marks: 80**

Class: X **Duration: 3 Hours**

I. Four alternatives are given for each of the following questions. Choose the correct alternative and write the complete answer along with its letter of alphabet in your answer booklet.

8 x 1 = 8

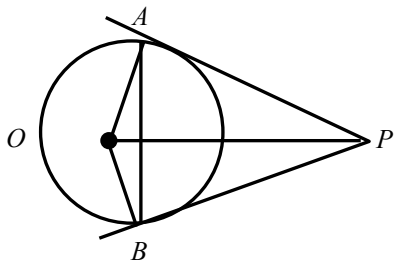
1. If the n^{th} term of an AP $a_n = 18 - 3n$, then its 7^{th} term is

   (a) 11 (b) +3 (c) -3 (d) 0

2. The solutions for the equations $x + y = 10$ and $x - y = 2$ are

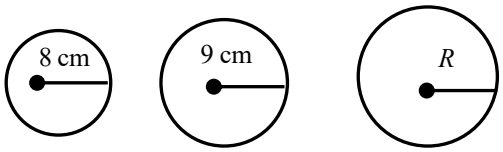
   (a) $x = 7, y = 3$ (b) $x = 4, y = 6$ (c) $x = 8, y = 2$ (d) $x = 6, y = 4$

3. In the fig. $\angle AOP = 50°$ then $\angle OAB$ is equal to



   (a) 50° (b) 40° (c) 90° (d) 80°

4. If the radii of given two circles are 8 cm and 9 cm and sum of the circumference of first two circles is equal to the third circle, then radius third circle is equal to



   (a) 17 cm (b) 1 cm (c) 17cm^2 (d) 72cm

5. The quadratic equation in the following is

   (a) $x(x+3) = (x+5)^2$ (b) $x^2 - 5x + 4$

   (c) $2x^2 - 5x + 2 = x(x+2)$ (d) $2x^3 + 7x + 1 = 0$

6. If $\theta = 30°$, then the value of $\cos 2\theta$ is

   (a) $\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}$ (c) $\frac{1}{\sqrt{2}}$ (d) 1

7. If $P(E)=\frac{11}{15}$ then $P(\overline{E})$ is

(a) $\frac{15}{11}$ (b) $\frac{4}{11}$ (c) $\frac{4}{15}$ (d) $\frac{15}{4}$

8. The distance from origin to $P(6,8)$ is

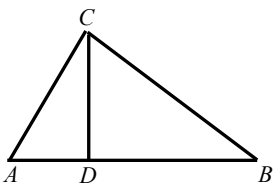
(a) 8 units (b) 10 units (c) 6 units (d) 14 units

II. Answer the following questions in one word or sentence each: 8 x 1 = 8

9. Write the condition for a pair of lines to be parallel.
10. $\Delta ABC \sim \Delta DEF$, if area of $\Delta ABC = 64\,\text{cm}^2$ and area of $\Delta DEF = 121\text{cm}^2$. If $EF = 15.4\,\text{cm}$. Find BC.
11. State basic proportionality theorem.
12. Form a quadratic polynomial whose sum and product of zeroes are respectively 5 and 6.
13. Area of the base of cone $300\,\text{cm}^2$ and its height 10cm, find its volume?
14. Write the empirical relationship between the three measures of central tendency.
15. Express trigonometric ratio $\sin A$, in terms of $\cot A$.
16. Write the formula used to fine the surface area of given solid using normal notations.

III. Answer the following questions: 8 x 2 = 16

17. If five times the fifth term of an AP is equal to eight times its eighth term. Show its thirteenth term is zero.
18. Solve: $10x+3y=35$ and $6x-5y=11$.
19. Find, for what value of 'k' the equation $kx^2+6x+1=0$ has equal roots.
20. Solve using quadratic formula: $2x^2+x-4=0$.
21. Draw a circle of radius 4cm and construct a pair of tangents such that the angle between them is $80°$.
22. Prove that $5+\sqrt{3}$ is an irrational number.
23. In the given figure, if $\angle ACB = \angle CDA$, AC=8cm, and AD=4cm, then find the length of AB.



24. The minute hand of a clock is 10cm long. Find the area of the face of the clock described by the minute hand between 9am 9.35am.

IV. Answer the following questions: **9 x 3 = 27**

25. Prove that: $\frac{\sin\theta-\cos\theta}{\sin\theta+\cos\theta}+\frac{\sin\theta+\cos\theta}{\sin\theta-\cos\theta}=\frac{2}{2\sin^2\theta-1}$

    OR

    Prove that: $\frac{1+\cos\theta}{1-\cos\theta}=\left(\text{cosec}\,\theta+\cot\theta\right)^2$

26. The angle of elevation of the top of a building from feet of tower is $30°$. The angle of elevation of the top of the tower from the foot of building is $60°$. If the tower is 60m, find the height of building.

27. Find the median for the following:

C-I	0-10	10-20	20-30	30-40	40-50	50-60
f	5	8	20	15	7	5

    OR

    Calculate mode for the following:

C-I	10-25	25-40	40-55	55-70	70-85
f	2	3	7	6	6

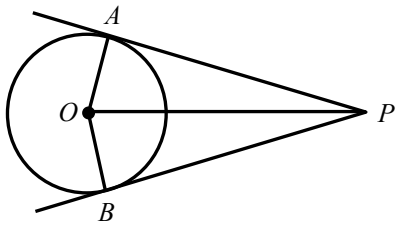
28. Draw less than type ogive for the following:

C-I	0-20	20-40	40-60	60-80	80-100
f	12	14	8	6	10

29. Draw a triangle ABC with side BC=6cm, AB=5cm and $\angle ABC=60°$. Then construct a triangle whose sides are $\frac{5}{3}$ of the corresponding sides of ΔABC.

30. Name the type of triangle found if any, by the following points $A(-5,6)$, $B(-4,-2)$ and $C(7,5)$ given reasons for your answer.

31. Question:



    From the figure how are PA and PB related in terms of their lengths, state the theorem related to this and prove logically.

32. Speed of boat in still water is 35 km/h. It goes 30km upstream and returns back at the same point in 4 hours 30 minutes. Find the speed of the stream.

33. Two coins are tossed simultaneously. What is the probability of getting (i) At least one head (ii) At most one tall (iii) A head and at tail?

V. Answer the following questions: 4 x 4 = 16

34. Solve graphically: $2x + y - 3;\ x - 2y = 4$.

35. In an AP of 50 terms, the sum of first 10 terms is 210 and the sum of its last 15 terms is 2565. Find the AP.

36. Prove that "the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides".

37. (a) Find the quotient and the reminder when $p(x) = 3x^3 + x^2 + 2x + 5$ is divided by $g(x) = x^2 + 2x + 1$.

    (b) If the point $p(6,2)$ divides the line segment joining $A(6,5)$ and $B(4,y)$ in the ratio 3:1. Find the value of y.

VI. Answer the following questions: 1 x 5 = 5

38. (a) A medicine capsule is in the shaper of a cylinder with hemispheres stuck to each its ends. The length of the entire capsule is 14mm and diameter of the capsule is 5mm. Find its surface area.

    (b) A drinking glass is in the shape of a frustum of a cone of height 14cm. The diameters of its two circular ends are 4cm and 2cm. Find the capacity of the glass.