QUEST CLASSES

CBSE Board

Class X Mathematics

Sample Paper 1

Time: 3 hrs   Total Marks: 80

General Instructions:
1. **All** questions are **compulsory**.
2. The question paper consists of **30** questions divided into **four sections** A, B, C, and D. **Section A** comprises of **6** 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 **8** questions of 4 marks each.

Section A
(Questions 1 to 6 carry 1 mark each)

1. A letter is chosen at random from the word 'PROBABILITY'. What is the probability that the chosen letter is a vowel?

2. If the length of the shadow cast by a pole is $\sqrt{3}$ times the length of the pole, then find the angle of elevation of the Sun.

3. In ΔABC, ∠A = 80° and ∠B = 60°. If ΔABC ∼ ΔRQP, find the value of ∠P.

4. If $\dfrac{1}{2}$ is a root of the quadratic equation $x^2 + kx - \dfrac{5}{4} = 0$, find the value of k.

5. The decimal expansion of the rational number $\dfrac{2^3}{2^2.5}$ will terminate after how many decimal places?

6. In Fig., the sides AB, BC and CA of a triangle ABC, touch a circle at P, Q and R respectively. If AP = 4 cm, BP = 3 cm and AC = 11 cm, then find the length of BC (in cm).
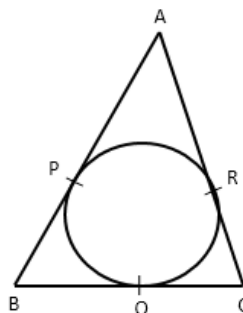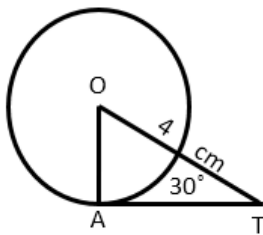
Section B
(Questions 7 to 12 carry 2 marks each)

7. α, β are the roots of the quadratic polynomial p(x) = x² − (k + 6)x + 2(2k − 1). Find the value of k, if $\alpha + \beta = \dfrac{1}{2}\alpha\beta$.

OR

If the product of the zero of the polynomial ax² − 6x − 6 is 4, find the value of a.

8. Use Euclid's division algorithm to find H.C.F. of 870 and 225.

9. In the given figure, AT is a tangent to the circle with centre O. Find the length of AT.

10. An umbrella has 10 ribs which are equally spaced. Assuming the umbrella to be a flat circle of radius 40 cm, find the area between two consecutive ribs of the umbrella.

11. The angle of depression of a car parked on the road from the top of a 150 m high tower is 30°. Find the distance of the car from the tower (in metres).

12. Find the value of $\dfrac{5\sin^2 30° + \cos^2 45° - 4\tan^2 30°}{2\sin 30° \cos 30° + \tan 45°}$.

OR

Express the trigonometric ratios sin 75° + cosec 75° of angles between 0° and 45°.

Section C
(Questions 13 to 22 carry 3 marks each)

13. Prove that: $\sqrt{\dfrac{\sec\theta - 1}{\sec\theta + 1}} + \sqrt{\dfrac{\sec\theta + 1}{\sec\theta - 1}} = 2\cos ec\theta$

OR

Without using trigonometric table, find the value of $\dfrac{\cos 70°}{\sin 20°} + \dfrac{\cos 59°}{\sin 31°} - 8\sin^2 30°$

14. A park with flower plants is to be developed within a quadrilateral with points A(0, −1), B(6, 7), C(−2, 3) and D(8, 3) as vertices and AB and CD as diagonals. Show that AB and CD bisect each other and AD² + DB² = AB². Find the area of the park. (All distances are in km)
As P.M. of your country, will you make a policy of creating green parks and gardens in every village and town of you country? Give reasons.

15. Check whether the equation 6x² − 7x + 2 = 0 has real roots, if yes, find them by completing the square method.

16. For what values of a and b does the following pairs of linear equations have an infinite number of solutions:
2x + 3y = 7; (a − b)x + (a + b)y = 3a + b − 2

17. In a seminar, the number of participants in Hindi, English and Mathematics are 60, 84 and 108 respectively. Find the minimum number of rooms required if in each room the same number of participants are to be seated and all of them being in the same subject.

18. A leading library has a fixed charge for the first three days and an additional charge for each day thereafter. Bhavya paid Rs. 27 for a book kept for seven days, while Vrinda paid Rs. 21 for a book kept for five days. Find the fixed charge and charge for each extra day.

19. Find the ratio in which the line segment joining the points A(3, −3) and B(−2, 7) is divided by x-axis. Also find the coordinates of the point of division.

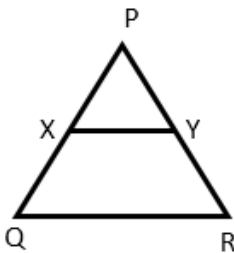**20.** If mean of the following data is 86, then what is the value of p?

Wages (in Rs.)	50-60	60-70	70-80	80-90	90-100	100-110
No. of workers	5	3	4	p	2	13

OR

A fair dice is rolled. Find the probability of getting
(i) 3 on the face of the dice.
(ii) an odd number on the face of the dice.
(iii) a number greater than 1 on the face of the dice.

21. In the figure, XY || QR, $\dfrac{PQ}{XQ} = \dfrac{7}{3}$ and PR = 6.3 cm. Find YR.

22. A card is drawn from a well shuffled deck of 52 cards. Find the probability of getting (i) a king of red colour (ii) a face card (iii) the queen of diamonds.

Section D
(Questions 23 to 30 carry 4 marks each)

23. Draw a triangle ABC with side BC = 6 cm, $\angle$C = 30° and $\angle$A = 105°. Then construct another triangle whose sides are $\dfrac{2}{3}$ times the corresponding sides of $\triangle$ ABC.

24. The interior angles of a polygon are in A.P. The smallest angle is 52° and the common difference is 8°. Find the number of sides of the polygon.

25. In triangle ABC, D is the mid-point of BC and AE ⊥ BC. If AC > AB, then show that:

$AB^2 = AD^2 - BC \times DE + \dfrac{BC^2}{4}$.

26. Solve the equations 2x − y + 6 = 0 and 4x + 5y − 16 = 0 graphically. Also determine the coordinate of the vertices of the triangle formed by these lines and the x-axis.

OR

Find the ratio in which the point P(− 1, a) divides the join of (− 5, 4) and B(3, − 2). Hence, find a.

27. The angle of elevation of a cloud from a point 60 metres above a lake is 30° and the angle of depression of the reflection of the cloud in the lake is 60°. Find the height of the cloud.

OR

The angle of elevation of a cloud from a point 'h' m above a lake is α and the angle of depression of its reflection in the lake is β. Prove that height of the cloud is

$\dfrac{h(\tan\beta + \tan\alpha)}{\tan\beta - \tan\alpha}$.

28. A lead pencil consists of a wood cylinder with a solid cylinder of graphite fitted into it. The diameter of the pencil is 7 mm. The diameter of the graphite is 1 mm and length of the pencil is 10 cm. Calculate the weight of whole pencil in grams if the density of the wood is 0.6 gm/ cm^3 and of graphite 2.3 gm/ cm^3.

29. The area enclosed by the circumferences of two concentric circles is 346.5 cm^2. If the circumference of the inner circle is 88 cm, calculate the radius of the outer circle.

30. For the data given below draw less than ogive curve.

Marks	0 - 10	10 - 20	20 – 30	30 - 40	40 - 50	50 – 60
Number of students	7	10	23	51	6	3

OR

Find the value of p, if the mean of the following distribution is 7.5   [4]

x	3	5	7	9	11	13
f	6	8	15	p	8	4