CBSE Board
Class X Mathematics
Sample Paper 8

Time: 3 hrs   **Total Marks: 80**

General Instructions:
1. **All** the questions are **compulsory**.
2. The question paper consists of **40** questions divided into **four sections** A, B, C, and D.
3. **Section A** comprises of **20** questions of 1 mark each. **Section B** comprises of **6** questions of 2 marks each. **Section C** comprises of **8** questions of 3 marks each. **Section D** comprises of **6** questions of 4 marks each.
4. There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, three questions of 3 marks each, and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
5. Use of calculator is **not** permitted.

Section A

Q 1 – Q 10 are multiple choice questions.
Select the most appropriate answer from the given options

1. The value of $(1 - \sin^2 x)\sec^2 x$ is
   A. 0
   B. −1
   C. 1
   D. 2

2. If $7\sin^2 \theta + 3\cos^2 \theta = 4$, then θ will be
   A. 30°
   B. 45°
   C. 60°
   D. 90°

3. If $\cos \theta = \dfrac{1}{\sqrt{3}}$, then the value of $\sin^2 \theta - \cos^2 \theta$ is

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

    B. $\dfrac{1}{3}$

    C. 0

    D. 1

4. Co-ordinates of the midpoint of a line joining the points A(3, 4) and B(7, 6) are

    A. (4, 5)

    B. (5, 4)

    C. (4, 4)

    D. (5, 5)

5. Decimal expansion of $\dfrac{17}{8}$ is

    A. Terminating and non-repeating

    B. Non-terminating and repeating

    C. Non-terminating and non-repeating

    D. Terminating and repeating

6. Product of two numbers is 18144 and their HCF is 6, then their LCM is

    A. 6

    B. 54

    C. 336

    D. 3024

7. Distance of a point (– 6, – 7) from y-axis is

    A. – 6

    B. 6

    C. – 7

    D. 7

8. X-coordinate of a point which divides the join of A(– 1, 7) and (4, – 3) in the ratio 2:3 is

    A. 2

    B. 1

    C. 0

    D. –1

9. If mean and mode of the data are 137.058 and 135.76 respectively, the median will be
   A. 409.876
   B. 204.938
   C. 136.625
   D. 75.123

10. The value(s) of k at which the lines represented by the pair of linear equations
    $9x + 3y + 12 = 0$ and $18x + 6y + k = 0$ are coincident is/are
    A. All values except at 24
    B. 6
    C. 12
    D. 24

(Q 11 – Q 15) Fill in the blanks

11. The probability of occurrence of an event A is denoted by P(A). Then, the range of P(A) will be _____.

12. If $(x - m)$ is a factor of the polynomial $x^3 - (m^2 - 1)x + 2$, then value of m is _____.

    OR

    If $x = 1$ is a zero of the polynomial $x^2 + kx + 3 = 0$, then k will be _____.

13. The common difference of an A.P. $7 + 10\frac{1}{2} + 14 + \text{............} + 84$ is _____.

14. Sides of two similar triangles are in the ratio 4 : 9. Areas of these triangles are in the ratio _____.

15. A bucket is in the form of a frustum of a cone of slant height 31.62 cm with radii of its lower and upper ends as 10 cm and 20 cm respectively. The surface area of the bucket will be _____.

(Q 16 – Q 20) Answer the following

16. Find the sum of the series 2, 7, 12, ..., up to 10 terms.

17. Find the distance between two parallel tangents of a circle of radius 5 cm.

    OR

   If the perimeter and area of a circle are numerically equal, then find the radius of the circle.

18. Given that HCF (306, 657) = 9, find LCM (306, 657).

19. Determine nature of the roots of the quadratic equation $4x^2 - 20x + 25 = 0$.

20. ABC is an isosceles triangle right angled at C. Prove that $AB^2 = 2\ AC^2$.

Section B

21. In the given figure, PQL and PRM are tangents to the circle with centre O at the points Q and R respectively. S is a point on the circle such that $m\angle SQL = 50°$ and $\angle SRM = 60°$. Find the value of $\angle QSR$.
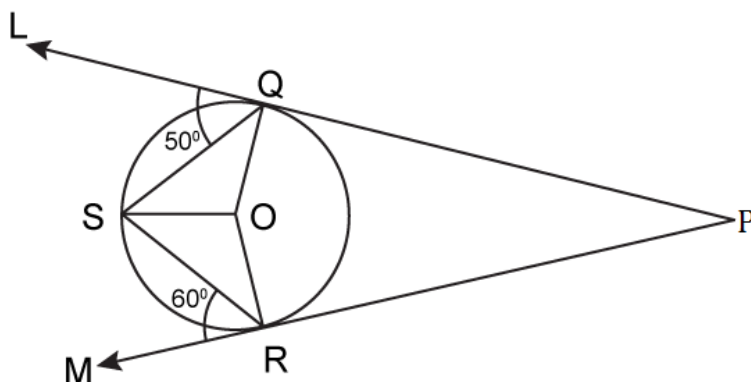
OR

In a circle of radius 10 cm, an arc subtends an angle of $90°$ at the centre. Find the area of the major sector.

22. Metallic spheres of radii 3 cm, 4 cm, and 5 cm respectively, are melted to form a single solid sphere. Find the radius of the resulting sphere.

23. A tree is broken by the wind. The top struck the ground at an angle of $30°$ and at a distance of 30 metres from the foot of the tree. Find the height of the tree in metres.

24. In the given figure, ABC is a triangle, DE || BC and $\dfrac{AD}{BD} = \dfrac{3}{2}$

   i. Find out $\dfrac{AD}{AB}$.

   ii. Prove that the $\triangle ADE$ is similar to $\triangle ABC$ and write down the ratio $\dfrac{DE}{BC}$.
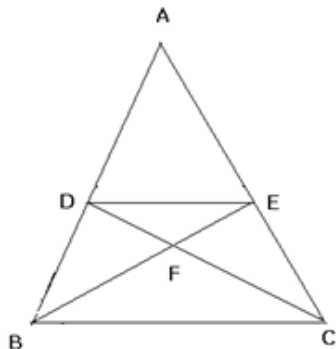
25. Check whether 6^n can end with the digit 0 for any natural number n.

26. What is the probability of having 53 Thursdays in a non-leap year?

<div align="center">**OR**</div>

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

<div align="center">**Section C**</div>

27. If the points A(7, −2), B(5, 1) and C(3, k) are collinear, then find the value of k.

<div align="center">**OR**</div>

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

28. Prove that: $\dfrac{\sec A + \tan A}{\sec A - \tan A} = \left(\dfrac{1 + \sin A}{\cos A}\right)^2$

<div align="center">**OR**</div>

Prove that $\tan 1° \tan 2° \tan 3° \ldots \tan 89° = 1$

29. Solve for x and y:

$\dfrac{x}{a} + \dfrac{y}{b} = 2; \quad ax - by = a^2 - b^2$

30. Prove that $\dfrac{3}{2\sqrt{5}}$ is an irrational number.

**31.** Find the median for the following frequency distribution:

Class Interval	10 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79
Frequency	2	4	8	9	4	2	1

32. Find three terms of an A.P. whose sum is 3 and product is −8.

OR

Which term of the series 3, 8, 13, 18, …. is 498?

33. In the given figure, ABCD is a square of side 14 cm. With centres A, B, C and D, four circles are drawn such that each circle touches externally two of the remaining three circles. Find the area of the shaded region.
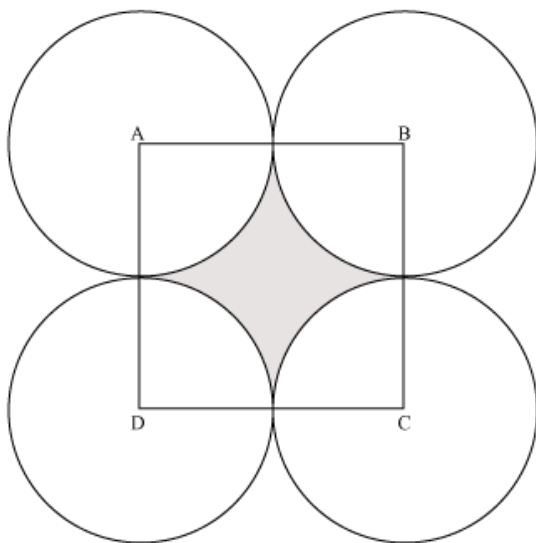
34. Find all zeroes of polynomial $4x^4 - 20x^3 + 23x^2 + 5x - 6$ if two of its zeroes are 2 and 3.

Section D

35. Construct an isosceles triangle whose base is 8 cm and altitude 4 cm and then another triangle whose sides are $1\frac{1}{2}$ times the corresponding sides of the isosceles triangle.

OR

Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60°.

36. In the given figure, ΔPQR is right-angled triangle right-angled at Q. DE ⊥ PR. Prove ΔPQR ~ ΔPED and find the lengths of PE and DE if PD = 3 cm, QD = 2 cm and QR = 12 cm.
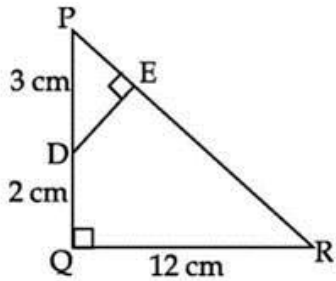
37. A two digit number is such that the product of its digits is 18. When 63 is subtracted from the number, the digits interchange their places. Find the number.

38. A 1.5 m tall boy is standing at some distance from a 30 m tall building. The angle of elevation from his eyes to the top of the building increases from 30° to 60° as he walks towards the building. Find the distance he walked towards the building.

OR

A statue, 1.6 m tall, stands on a top of pedestal, from a point on the ground, the angle of elevation of the top of statue is 60° and from the same point the angle of elevation of the top of the pedestal is 45°. Find the height of the pedestal.

39. A copper wire of 4 mm diameter is evenly wound around a cylinder whose length is 24 cm and diameter 20 cm so as to cover whole surface. Find the length and weight of the wire assuming the density to be 8.68 gm/cm³.

OR

In the diagram given below if AF = 21 cm, CE = 30 cm and FB = 7 cm. Find the volume of the figure.   [3]
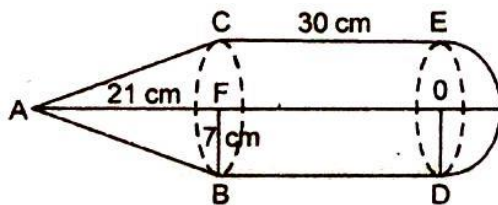
40. The following data gives the information on the observed lifetimes (in hours) of 225 electrical components:

Lifetimes (in hours)	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100	100 – 120
Frequency	10	35	52	61	38	29

Determine the modal lifetimes of the components.