CBSE Board
Class X Mathematics
Sample Paper 10 (Standard)

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

General Instructions:

1. **All** questions are **compulsory**.
2. The question paper consists of **40** questions divided into **four sections** A, B, C, and D. **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 and **Section D** comprises of **6** questions of 4 marks each.
3. 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.
4. Use of calculator is **not** permitted.

Section A
(Questions 1 to 10 are multiple choice questions.
Select the most appropriate answer from the given options)

1. The HCF of two numbers is 27 and their LCM is 162. If one of the numbers is 54, what is the other number?
   A. 36
   B. 45
   C. 9
   D. 81

2. If the mean of a data is 27 and its median is 33. Then, the mode is
   A. 30
   B. 43
   C. 45
   D. 47

3. Which of the following is a pair of co-primes?
   A. $(14, 35)$
   B. $(18, 25)$
   C. $(31, 93)$
   D. $(32, 62)$

4. The pair of equations y = 0 and y = -5 has
   A. One solution
   B. Two solutions
   C. Infinitely many solutions
   D. No solution

5. $\sqrt{\dfrac{1+\sin A}{1-\sin A}} =$
   A. sec A + tan A
   B. sec A – tan A
   C. sec A tan A
   D. None of these

6. tan10°tan15°tan75°tan80° =
   A. $\dfrac{1}{16}$
   B. 0
   C. 1
   D. None of these

7. If tan θ = $\dfrac{a}{b}$ then $\dfrac{\cos\theta+\sin\theta}{\cos\theta-\sin\theta} =$
   A. $\dfrac{a+b}{a-b}$
   B. $\dfrac{a-b}{a+b}$
   C. $\dfrac{b+a}{b-a}$
   D. $\dfrac{b-a}{b+a}$

8. If the distance between the points A(4, p) and B(1, 0) is 5 then
   A. p = 4 only
   B. p = –4 only
   C. p = ± 4
   D. p = 0

9. A is a point on y-axis at a distance of 4 units from x-axis, lying below x-axis. The coordinates of A are
   A. (4, 0)
   B. (0, 4)
   C. (-4, 0)
   D. (0, -4)

10. A point P divides the join of A(5, -2) and B(9, 6) in the ratio 3:1. The coordinates of P are
   A. (4, 7)
   B. (8, 4)
   C. (12, 8)
   D. (2.5, 5)

(Q 11 – Q 15) Fill in the blanks

11. The shape of a glass is in the form of _____

12. Zeroes of p(x) = x² – 2x – 3 are ___

13. In ΔABC and ΔDEF, we have $\dfrac{AB}{DE} = \dfrac{BC}{EF} = \dfrac{AC}{DF} = \dfrac{5}{7}$ then ____

14. If a, a – 2, 3a are in A.P. then a = ____

OR

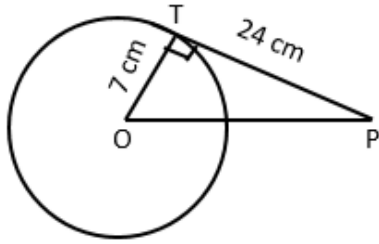   If a = 8, T_n = 62 and S_n = 210 then n = ____

15. For an event E, P(E) + P(not E) = ___

(Q 16 – Q 20) Answer the following

16. Express $0.\overline{8}$ as a fraction in simplest form.

17. If $\dfrac{AD}{DB} = \dfrac{4}{7}$ and AE = 6 cm where D and E are points on the sides AB and AC respectively of triangle ABC such that DE || BC. Find EC.

18. In a circle of radius 7 cm, tangent PT is drawn from a point P such that PT = 24 cm. If O is the centre of the circle, then length of OP = ?

19. Find the sum of first n even natural numbers.

OR

Write the next term of the AP $\sqrt{8}, \sqrt{18}, \sqrt{32}, ...$

20. Find the ratio of the sum and product of the roots of the equation $7x^2 - 12x + 18 = 0$

Section B

21. Without actually performing division, state whether the number $\dfrac{29}{343}$ will have a terminating decimal representation or not.

22. In two concentric circles, the radius of the inner circle is 5 cm. A chord of length 24 m of the outer circle becomes a tangent to the inner circle. Find the radius of the larger circle.

23. How many solid spheres of diameter 6 cm are required to be melted to form a solid metal cylinder of height 45 cm and diameter 4 cm?

OR

Three cubes whose edge measures 3 cm, 4 cm and 5 cm respectively to form a single cube. Find its edge.

24. A die is thrown at once. What is the probability of getting a prime number?

OR

A digit is chosen at random from the digits 1, 2, 3, 4, 5, 6, 7, 8, 9 then the probability that it is odd.

25. The sides of a certain triangle are 9 cm, 18 cm, and 16 cm. Determine whether these sides will form a right triangle or not?

26. Find the angular elevation of the sun when the shadow of a 10 m long pole is $10\sqrt{3}$ m.

Section C

27. If the co-ordinates of the mid-points of the sides of a triangle are (−1, −3), (2, 1) and (4, 5), find the co-ordinates of its vertices.

OR

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.

28. Find the sum: −5+ (−8) + (−11) +..............+ (−230)

29. Show that $6 + \sqrt{3}$ is irrational.

OR

Prove that $\sqrt{5}$ is an irrational number.

30. What is the probability that a number selected from the numbers 4, 5, ..., 25, is a prime number, when each of the given numbers is equally likely to be selected?

OR

The following table gives production yield per hectare of wheat of 100 farms of a village.

Production yield	50 - 55	55 - 60	60 - 65	65 - 70	70 - 75	75 - 80
Number of farms	2	8	12	24	38	16

Change the distribution to a 'more than' type distribution and draw ogive.

31. Prove that tan 1° tan 2° tan 3°.....tan 89° = 1

32. Solve the given equations for x and y by the method of cross-multiplication.
$7x - 2y = 3;\ 11x - \dfrac{3}{2}y = 8$

33. The cost of fencing a circular field at the rate of Rs. 24 per metre is Rs. 5280. The field is to be ploughed at the rate of Rs. 0.50 per m². Find the cost of ploughing the field. $\left(\text{Take } \pi = \dfrac{22}{7} \right)$

34. If the roots of the equation (a − b)x² + (b − c)x + (c − a) = 0 are equal then prove that 2a = b + c.

Section D

35. A motor boat, whose speed is 15km/hr in still water, goes 30 km downstream and comes back in a total time of 4hrs 30mins. Find the speed of the stream.

36. A straight highway leads to foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of $30°$, which is approaching the foot of the tower with a uniform speed. Six seconds later the angle of depression of the car is found to be $60°$. Find the time taken by the car to reach the foot of the tower from this point.

37. A sphere of diameter 6 cm is dropped into a cylindrical vessel partly filled with water. The radius of the vessel is 6 cm. If the sphere is completely submerged in water, find by how much the surface level of water will be raised.

OR

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.

38. Calculate the mode of the following frequency distribution table.

Marks	No. of Students
Above 25	52
Above 35	47
Above 45	37
Above 55	17
Above 65	8
Above 75	2
Above 85	0

OR

Find the mean of following distribution by the step deviation method.

Daily Expenditure:	100 - 150	150 - 200	200- 250	250 - 300	300- 350
No. of householders:	4	5	12	2	2

39. Construct a triangle, the lengths of whose sides are 5 cm, 6 cm and 7 cm. Now construct another triangle whose sides are $\dfrac{5}{7}$ times the corresponding sides of the first triangle.

40. If a line is drawn parallel to one side of a triangle to intersect the other two sides at distinct points, prove that the other two sides are divided in the same ratio.

OR

Prove that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.