

CBSE Board
Class X Mathematics
Sample Paper 7 (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.
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Section A

(Q 1- Q 10 are multiple choice questions.

Select the most appropriate answer from the given options.)

1. $5.\overline{69}$ is
 - A. an integer
 - B. a rational number
 - C. a natural number
 - D. an irrational number
2. If the mean of the following data is 20.6, then the value of p is

x_i	10	5	p	25	35
f_i	3	5	25	7	5

- A. 5
 - B. 10
 - C. 15
 - D. 25
3. If $HCF(26, 169) = 13$, then $LCM(26, 169) = ?$
 - A. 26
 - B. 52
 - C. 338
 - D. 13

4. Which of the following method is used to solve a pair of linear equations in two variables algebraically?
- A. Substitution method
 - B. Elimination method
 - C. Cross – multiplication method
 - D. All of these
5. The value of $\frac{\tan 55^\circ}{\cot 35^\circ} + \cot 1^\circ \cot 2^\circ \dots \cot 90^\circ$ is
- A. 0
 - B. 1
 - C. 2
 - D. -2
6. $(1 - \cos^2 A) \operatorname{cosec}^2 A = ?$
- A. 0
 - B. 1
 - C. 2
 - D. 3
7. $\cos(\alpha + \beta) = 0$, then $\sin(\alpha - \beta)$ can be reduced to
- A. $\sin \alpha$
 - B. $\sin 2\alpha$
 - C. $\cos \beta$
 - D. $\cos 2\beta$
8. The mid-point of the line segment joining P(-2,8) and Q(-6,-4) is
- A. (-4, 2)
 - B. (4, 2)
 - C. (4, -2)
 - D. (-4, -2)
9. The value of x, for which the points (x,-1), (2,1) and (4,5) lie on a line is
- A. 0
 - B. 1
 - C. 2
 - D. 3
10. The ordinate of a point is twice its abscissa. If its distance from the point (4,3) is $\sqrt{10}$, then the coordinates of the point are
- A. (1, 2) or (3, 5)
 - B. (1, 2) or (3, 6)
 - C. (2, 1) or (6, 3)
 - D. (2, 1) or (3, 6)

(Q 11- Q 15) Fill in the blanks

11. If the length, breadth and height of a cuboid are equal, then it is called a ____.

OR

The radii of two cylinders are in the ratio 2:3. If their heights are in the ratio 3:5, then the ratio of their curved surface areas is ____.

12. If $x - 2$ is a factor of the polynomial $x^3 - 6x^2 + ax - 8$, then the value of a is equal to ____.

13. If $\triangle ABC$ and $\triangle DEF$ are similar such that $6AB = 4DE$ and $BC = 12$ cm, then $EF =$ ____.

14. $\frac{\square}{\square}$ is the next term of the AP $4, \frac{9}{2}, 5, \frac{11}{2}, 6, \dots$.

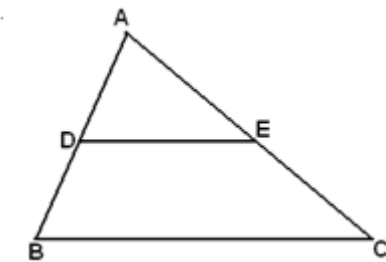
15. The probability of getting a non-face card from a deck of cards is $\frac{\square}{\square}$.

(Q 16- Q 20) Answer the following

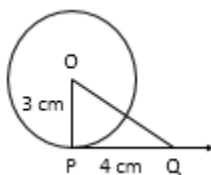
16. A number divided by 143 leaves 31 as remainder. What will be the remainder when the same number is divided by 13?

17. In $\triangle ABC$, D and E are points on the sides AB and AC respectively such that

$DE \parallel BC$. If $\frac{AD}{DB} = \frac{2}{3}$ and $EC = 4$ cm, then find AE .



18. Find OQ from the following figure:



19. In the AP $3, 6, 9, \dots, 60$, if the common difference is 3 and the last term is 60, then which of the following is the 12th term from the end of the AP?

20. Show that the equation $(x^2 + 1)^2 - x^2 = 0$ has no real roots.

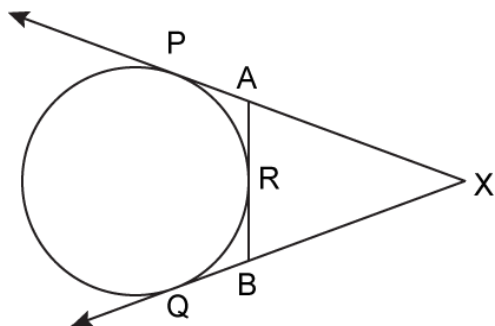
OR

Is -1 the root of quadratic equation $3x^2 + 2x - 1 = 0$?

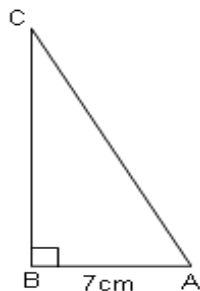
Section B

(Questions 21 to 26 carry 2 marks each)

21. Use Euclid's division algorithm to find H.C.F. of 870 and 225.
22. In the given figure, XP and XQ are tangents from X to the circle. R is a point on the circle. Prove that $XA + AR = XB + BR$.



23. Find the area of an isosceles triangle, each of whose equal side is 13 cm and whose base is 24 cm.
24. In $\triangle ABC$, $m\angle B = 90^\circ$, $AB = 7$ cm and $AC - BC = 1$ cm. Determine the values of $\sin C$ and $\cos C$.



25. A card is drawn at random from a well-shuffled deck of playing cards. Find the probability of drawing
- (i) a face card
 - (ii) a card which is neither a king nor a red card.

OR

What is the probability of getting the same number on both dice in the experiment of throwing two dice?

26. The radii of the two circular ends of the bucket are 15 cm and 10 cm. The height of the bucket is 8 cm then what is the capacity of the bucket?

OR

A frustum of a right circular cone has a diameter of base 10 cm, top 8 cm and height 4 cm then what is the area of the whole surface?

Section C

(Questions 27 to 34 carry 3 marks each)

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

OR

Prove that a positive integer n is prime, if no prime p less than or equal to \sqrt{n} divides n .

28. Find the sum of all 15 terms of an AP whose middle-most term is 56.

29. For what values of a and b does the following pair of linear equations have an infinite number of solutions:

$$2x + 3y = 7; (a - b)x + (a + b)y = 3a + b - 2$$

OR

Solve the given equations for x and y by the method of cross-multiplication.

$$7x - 2y = 3; 11x - \frac{3}{2}y = 8$$

30. On dividing $x^4 - 4x^3 + x - 1$ by $x + 5$, we get the remainder as:

31. The line segment joining the points $A(2, 1)$ and $B(5, -8)$ is trisected at the points P and Q where P is nearer to A . If point P lies on the line $2x - y + k = 0$, find the value of k .

32. If θ and ϕ are acute angles of a right triangle, and if $\frac{\sin^2 \theta}{\cos^4 \phi} + \frac{\sin^4 \phi}{\cos^2 \theta} = 1$, then prove that

$$\frac{\cos^4 \theta}{\sin^2 \phi} + \frac{\cos^2 \phi}{\sin^4 \theta} = 1$$

33. If a square is inscribed in a circle, find the area of the remaining region inside the circle given the circumference of circle = 14π and the perimeter of a square = 24. Find the ratio of the area of the circle to the area of the square.

34. Find the modal age of 100 residents of a colony from the following data:

Age in yrs. (more than or equal to)	0	10	20	30	40	50	60	70
No. of Persons	10	90	75	50	28	15	5	0

OR

The following distribution gives the daily income of 50 workers of a factory:

Daily Income (In Rs.)	100-120	120-140	140-160	160-180	180-200
Number of workers	12	14	8	6	10

Convert the distribution above to a less than type of cumulative frequency distribution and draw its ogive.

Section D

(Questions 35 to 40 carry 4 marks each)

35. Draw a circle of radius 4.2 cm. Draw a pair of tangents to this circle inclined to each other at an angle of 45° .

OR

Construct a $\triangle ABC$ in which $BC = 6.5$ cm, $AB = 4.5$ cm and $\angle ABC = 60^\circ$. Construct a triangle similar to this triangle whose sides are $\frac{3}{4}$ of the corresponding sides of $\triangle ABC$.

36. In a right-angled triangle, the square of the hypotenuse is equal to the sum of squares of the other two sides.
37. A sailor can row a boat 8 km downstream and return to the start point in 1 hour 40 minutes. If the speed of the stream is 2 kmph, then find the speed of the boat in still water.

OR

In a class test, the sum of Kamal's marks in Mathematics and English is 40. If he had got 3 marks more in Mathematics and 4 marks less in English, the product of the marks would have been 360. Find his marks in two subjects separately.

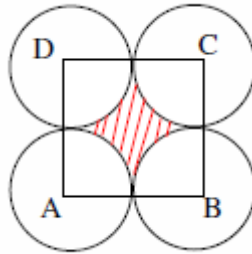
38. A solid toy is in the form of a hemisphere surmounted by a right circular cone. The height of the cone is 4 cm and the diameter of its base is 8 cm. Determine the volume of the toy. If a cube circumscribes the toy, then find the difference of the volumes of cube and the toy. Also, find the total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

OR

A vessel is in the form of an inverted cone. Its height is 8 cm and the radius of its top is 5 cm. It is filled with water up to the rim. When lead shots, each of which is a sphere of radius 0.5 cm are dropped into the vessel, $\frac{1}{4}$ of the water flows out. Find the number of lead shots dropped into the vessel.

39. Two poles of equal heights are standing opposite to each other on either side of the road, which is 80 m wide. From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30° , respectively. Find the height of each pole and the distances of the point from the poles. [Take $\sqrt{3} = 1.732$]

40. In the given figure, points A, B, C and D are the centres of four circles, each having a radius of 1 unit. If a point is chosen at random from the interior of square ABCD, what is the probability that the point will be chosen from the shaded region?



OR

Tickets numbered 2, 3, 4, 5, ..., 100, 101 are placed in a box and mixed thoroughly. One ticket is drawn at random from the box. Find the probability that the number on the ticket is

- (i) An even number
- (ii) A number less than 16
- (iii) A number which is a perfect square
- (iv) A prime number less than 40