

Time: 2 Hour

Total Marks: 60

Class : X
Subject : Mathematics

MCQ SINGLE CORRECT

1. If ___ and 1 are the sum and product of roots of a quadratic equation respectively, then the equation is _____

(a) $x^2 - x + 1 = 0$

(b) $x^2 + x + 1 = 0$

(c) $x^2 + 5x + 1 = 0$

(d) $x^2 - x + 5 = 0$

2. The tops of two poles of height 25 m and 15 m are connected by a wire. If the wire makes an angle of 30° with the horizontal, then find the length of wire.

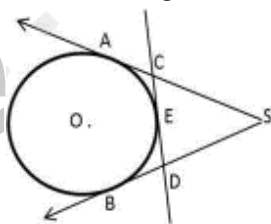
(a) 30 m

(b) 20 m

(c) 5 m

(d) 10 m

3. As shown in the given image, from an external point S, tangent SA and SB are drawn to circle O. CD is tangent to the circle at E. If AS = 12 cm, find the perimeter of $\triangle SCD$.



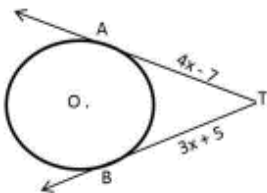
(a) 20 cm

(b) 24 cm

(c) 25 cm

(d) 12 cm

4. TA and TB are tangents to circle O from point T. $TA = 4x - 7$ and $TB = 3x + 5$, find TA.



(a) 12 cm

(b) 24 cm

(c) 41 cm

(d) 36 cm

5. Which constant must be added or subtracted to solve the equation $5x^2 - \sqrt{2}x + 3 = 0$ by the method of completing the square?

(a) $\frac{1}{50}$

(b) $\frac{1}{10}$

(c) $\sqrt{2}$

(d) 1

TRUE/FALSE

6. $\cot A$ is the product of \cot and A .

(a) True

(b) False

7. The value of $\tan A$ is always less than 1

(a) True

(b) False

8. State whether true or false :

The value of $\sin \theta$ increases as θ increases.

(a) True

(b) False

9. State whether true or false :

$\sin \theta = \cos \theta$ for all values of θ .

(a) True

(b) False

10. State whether the following are true or false. Justify your answer.

$\cos A$ is the abbreviation used for the cosecant of angle A .

(a) True

(b) False

VERY SHORT DESC

11. The radii of two right circular cylinders are in the ratio 2 : 3 and their heights are in the ratio 5 : 4. Calculate the ratio of their curved surface areas and also the ratio of their volumes.

12. The radius and height of a right circular cone are in the ratio of 3 : 4. If its volume is 301.44 cm^3 , find its radius and the slant height.

13. A small pack of cards consists of the Ace, King, Queen, Jack and ten of all four suits. Find the probability of selecting from this pack

i) an Ace

ii) the Queen of spades

iii) a red card

iv) any King or Queen

14. Find the ratio in which the point $(-3, p)$ divides the line segment joining the points $(-5, -4)$ and $(-2, 3)$. Hence, find the value of p .

15. If $A(4, -8)$, $B(-9, 7)$ and $C(18, 13)$ are the vertices of a triangle ABC , find the length of the median through A and coordinates of centroid of the triangle.

SHORT DESC - 25 WORDS

16. Two cones have their heights in the ratio 1 : 3 and the radii of their bases in the ratio 3 : 1. Find the ratio of their volumes.
17. From a well shuffled pack of 52 cards, two black kings and two black jacks are removed. From the remaining cards, a card is drawn at random. Find the probability that the drawn card is neither an ace nor a king.
18. The circumference of the base of a 12 m high solid cone is 22 m. Find the volume of the cone.
19. A circle touches all the four sides of a quadrilateral ABCD. Prove that $AB + CD = BC + DA$.
20. Draw tangents from an external point P to a circle of radius 4 cm without using the centre.

MED DESC - 50 WORDS

21. The annual profits earned by 30 shops of a shopping complex in a locality give rise to the following distribution:

Profit (in lakhs in Rs.)	Number of shops (frequency)
More than or equal to 5	30
More than or equal to 10	28
More than or equal to 15	16
More than or equal to 20	14
More than or equal to 25	10
More than or equal to 30	7
More than or equal to 35	3

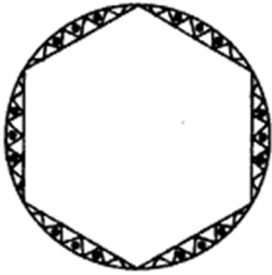
Draw both ogives for the data above. Hence, obtain the median profit.

22. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre.
Find:
 - i) The length of the arc
 - ii) Area of the sector formed by the arc
 - iii) Area of the segment formed by the corresponding chord
23. A box contains 5 red marbles, 8 white marble and 4 green marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be
(i) red ? (ii) white ? (iii) not green ?
24. The following table gives production yield per hectare of wheat of 100 farms of a village.

Production yield (in kg/ha)	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 its ogive.

25. A round table cover has six equal designs as shown in figure. If the radius of the cover is 28 cm. Find the cost of making the designs at the rate of Rs. 0.35 per cm^2 .
 ($\sqrt{3} = 1.7$)



LONG DESC - 100 WORDS

26. If the median of the following frequency distribution is 32.5. Find the values of f_1 and f_2

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70	Total
Frequency	f_1	5	9	12	f_2	3	2	40

OR

The marks obtained by 100 students of a class in an examination are given below.

Marks	No. of Students
0-5	2
5-10	5
10-15	6
15-20	8
20-25	10
25-30	25
30-35	20
35-40	18
40-45	4
45-50	2

Draw 'a less than' type cumulative frequency curves (ogive). Hence find median.

27. A bucket open at the top is in the form of a frustum of a cone with a capacity of 12308.8 cm^3 . The radii of the top and bottom of circular ends of the bucket are 20 cm and 12 cm respectively. Find the height of the bucket and also the area of the metal sheet used in making it. (Use $\pi = 3.14$)
28. If the sum of first four terms of an AP is 40 and that of first 14 terms is 280. Find the sum of its first n terms.
29. Prove that $\frac{\sin A - \cos A + 1}{\sin A + \cos A - 1} = \frac{1}{\sec A - \tan A}$

30. Two water taps together can fill a tank in $1\frac{7}{8}$ hours. The tap with longer diameter takes 2 hours less than the tap with smaller one to fill the tank separately. Find the time in which each tap can fill the tank separately.

OR

A boat goes 30 km upstream and 44 km downstream in 10 hours. In 13 hours, it can go 40 km upstream and 55 km downstream. Determine the speed of the stream and that of the boat in still water.

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