DELHI PUBLIC SCHOOL SUSHANT LOK-GURUGRAM	PRE-BOARD -1 Subject: Maths Standard Marks: 80 Class: X	Time: 3 Hrs. Session: 2024-25 Date: / /2024
STUDENT'S NAME_____ SECTION____ ROLL NO. ____		INVIGILATOR'S SIGNATURE:

General Instructions:

- *This Question paper contains - five sections A, B, C, D and E.*
- ***Section A** has 18 **MCQ's** and 02 **Assertion-Reason** based questions of 1 mark each.*
- ***Section B** has 5 **Very Short Answer (VSA)**-type questions of 2 marks each.*
- ***Section C** has 6 **Short Answer (SA)**-type questions of 3 marks each.*
- ***Section D** has 4 **Long Answer (LA)**-type questions of 5 marks each.*
- ***Section E** has 3 **case based integrated units of** assessment (04 marks each) with subparts of the values of 1, 1 and 2 marks each respectively.*
- *All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.*
- *Draw neat figures wherever required.*
- *Use of the Calculator is not permitted.*

SECTION-A

(20x1=20)

1. The value of c for which the equation $ax^2 + bx + c = 0$ has equal roots is:

(A) $\frac{b^2}{4a}$ (B) $\frac{b^2}{4a}$

(C) $\frac{a^2}{b}$ (D) $\frac{a^2}{4b}$

$0 = b^2 - 4ac$

$b^2 = 4ac$

$\frac{b^2}{4a} = c$

2. The system $kx - y = 2$ and $6x - 2y = 3$ has a unique solution only when:

(A) $k \neq 3$ (B) $k \neq 0$

(C) $k = 3$ (D) $k \neq -3$

$\frac{k}{6} \neq \frac{1}{2}$

$\frac{k}{6} \neq \frac{1}{2}$

$\frac{k}{6} \neq \frac{1}{2}$

$2k \neq 6$

$k \neq 3$

3. The distance between $(\tan\alpha, 0)$ and $(0, 1)$ is:

(A) $\sec^2\alpha$ (B) $\cot^2\alpha$

(C) $\sec\alpha$ (D) $\cot\alpha$

4. Find the 7th term from the end of the AP -11, -8, -5,.....,49.

(A) 5 (B) 20

(C) 26 (D) 31

5. $x = a$ and $x = b$ graphically represent two lines

(A) intersecting at (a,b) (B) perpendicular to y axis

(C) parallel to x axis (D) parallel to y axis

18. The minute hand of a clock is 84cm long. The distance covered by the tip of minute hand from 10:10 am to 10:25 am is

(A) 44 cm (B) 88 cm

(C) 132 cm (D) 176 cm

ASSERTION -REASON BASED QUESTIONS

In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

(A) Both A and R are true and R is the correct explanation of A.

(B) Both A and R are true but R is not the correct explanation of A.

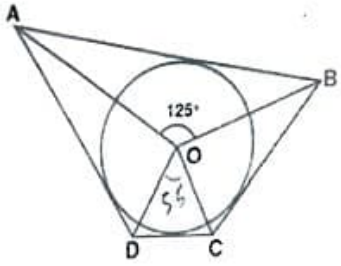
(C) A is true but R is false.

(D) A is false but R is true.

19. **Assertion (A) :** If $a = 2^3 \times 3$, $b = 2 \times 3 \times 5$, $c = 3^n \times 5$ and $LCM\ (a, b, c) = 2^3 \times 3^2 \times 5$, then $n = 2$

Reason (R): product of the numbers = Product of their HCF and their LCM

20. **Assertion** (A): Quadrilateral ABCD circumscribes a circle, $\angle AOB = 125°$ and $\angle COD = 55°$



125
55
180

Reason (R): The opposite sides of a quadrilateral that circumscribes a circle, subtend a pair of supplementary angles at the centre of the circle.

SECTION-B

(5X2=10)

21. The line segment joining the points A (4, -5) and B(4, 5) is divided by the point P such that AP : AB = 2:5. Find the coordinates of P.

22. Prove that $\sqrt{3}$ is not a rational number.

23. In what ratio does the point $\left(\frac{1}{2}, 6\right)$ divide the line segment joining the points $(3, 5)$ and $(-7, 9)$?

24. If $\sin\theta + \cos\theta = l$ and $\sec\theta + \text{cosec}\,\theta = m$, then prove that $m(l^2 - 1) = 2l$.

25. Two tangent segments AB and AC are drawn to a circle through a point A such that $\angle BAC = 120°$ Prove that $OA = 2AB$, given O to be the centre of the circle.

11. The radius of a solid wooden sphere is **r** cm. It is divided into two equal parts. The total surface area of two parts is:

(A) $6\pi r^2$ (B) $4\pi r^2$

(C) $3\pi r^2$ (D) $8\pi r^2$

12. The volume of a right circular cone whose area of the base is 156 cm^2 and the vertical height is 8cm is:

(A) 2496 cm^3 (B) 1248 cm^3

(C) 416 cm^3 (D) 1664 cm^3

13. The radii of three circles are 5cm, 6 cm and 8cm respectively. The radius of the circle having circumference equal to the sum of the circumferences of three circles.

(A) 11cm (B) 18cm

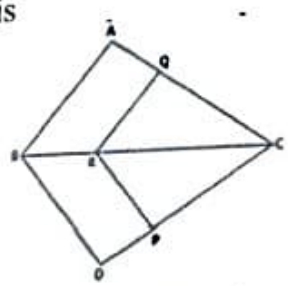
(C) 14cm (D) 19cm

14. The median of a data exceeds the mean by 2. By how much does the mode exceed its mean ?

(A) 3 (B) 6

(C) 9 (D) 12

15. In the given figure, QR ∥ AB, RP ∥ BD, CQ = x + 2, QA = x, CP = 5x + 4, PD = 3x. Then the value of x is



(A) 1 (B) 6

(C) 3 (D) 9

16. If the point (x, 4) lies on a circle whose centre is at the origin and radius is 5cm then the value of x is

(A) ±4 (B) ±3

(C) 4 (D) 3

17. Consider the following frequency distribution of the heights of 60 students:

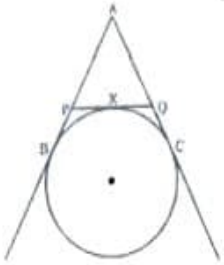
Wt. in Kg	50 – 55	55 – 60	60 – 65	65 – 70	70 – 75	75 – 80
No. of students	15	13	10	8	9	5

The sum of the lower limit of the modal class and upper limit of the median class is

(A) 110 (B) 115

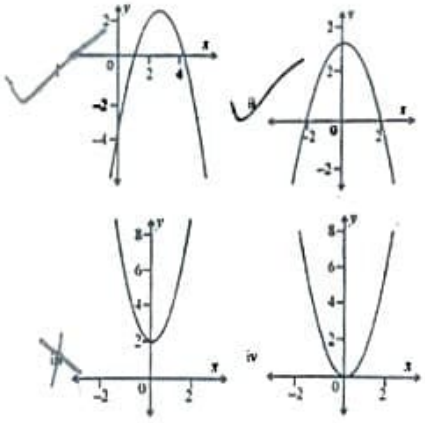
(C) 120 (D) 130

6. In the adjoining figure, AB and AC are tangents to the circle. If the length of AB is 12 cm, find the perimeter of ΔAPQ



(A) 16 cm
(B) 18 cm
(C) 24 cm
(D) 30 cm

7. Aman factorized a quadratic polynomial and found its zeros to be real. Which of the following could represent the graph of that polynomial?



(A) Only (iii)
(B) Only (i) and (ii)
(C) Only (iii) and (iv)
(D) Only (i), (ii) and (iv)

8. Given that $\sin\alpha = \frac{\sqrt{3}}{2}$ and $\tan\beta = \frac{1}{\sqrt{3}}$ then the value of $\cos(\alpha - \beta)$:

(A) $\frac{\sqrt{3}}{2}$
(B) $\frac{1}{2}$
(C) 0
(D) $\frac{1}{\sqrt{2}}$

9. Quadrilateral ABCD is circumscribed about a circle. The sides AB, CD and AD are of lengths 5.4 cm, 6.9 cm and 4.7 cm respectively Then length of BC is

(A) 6.2 cm
(B) 3.2 cm
(C) 7.6 cm
(D) 4.8 cm

10. If $3x = \text{cosec}\,\theta$ and $\frac{3}{x} = \cot\theta$, find the value of $3(x^2 - \frac{1}{x^2})$

(A) 1
(B) 3
(C) $\frac{1}{3}$
(D) $-\frac{1}{3}$

34. (a) A and B are two points 150 km apart on a highway. Two cars start from A and B at the same time. If they move in the same direction, they meet in 15 hours. But if they move in opposite directions, they meet in one hour. Find their speeds.

(b) If -5 is a root of the quadratic equation $2x^2 + px - 15 = 0$ and the equation $p(x^2 + x) + k = 0$ has equal roots, find the values of p and k.

35. The mean of the following data is 78, find the values of x and y

Class interval	50-60	60-70	70-80	80-90	90-100	Total
Frequency	8	6	12	x	y	50

OR

The heights (in cm) of 50 girls are recorded in the following table.

Height in cm)	120-130	130-140	140-150	150-160	160-170
No of girls	2	8	12	20	8

Calculate the median and modal height. Hence, using them find the mean height.

(3×4=12)

SECTION-E

36. An auditorium has 20 seats in the first row, 24 seats in the second and 28 seats in the third row and so on.

(A) How many seats are there in the 16^{th} row?

(B) In the last row of the auditorium there are 116 seats. How many rows are there in the auditorium?

(C) What is the total number of seats in the auditorium?

OR

If they are planning to have a total of 2340 seats in the auditorium. How many rows would they have?

SECTION-C

(6×3=18)

26. A garden has 48 guava trees, 60 pineapple trees and 96 mango trees. These have to be arranged in rows such that such each row has the same number of trees and all are of same type. Find the minimum number of such rows that can be formed.

27. If α and β are zeroes of the quadratic polynomial $x^2 - 6x + a$; find the value of 'a' if $3\alpha + 2\beta = 20$.

28. If $\sec\theta = x + \frac{1}{4x}$ then prove that $\sec\theta + \tan\theta = 2x$ or $\frac{1}{2x}$.

29. Three consecutive natural numbers are such that the square of the middle number exceeds the difference of the squares of the other two by 60. Find the numbers.

OR

Find the value of k for which the roots of the quadratic equation $(k-4)x^2 + 2(k-4)x + 2 = 0$ **are real and equal.**

30. If AD and PM are medians of ΔABC and ΔPQR respectively where $\Delta ABC \sim \Delta PQR$. Prove that $\frac{AB}{PQ} = \frac{AD}{PM}$

31. A chord of a circle of radius 12 cm subtends an angle of 120° at the centre. Find the area of the minor segment of the circle. (Use $\pi = 3.14$ and $\sqrt{3} = 1.73$)

OR

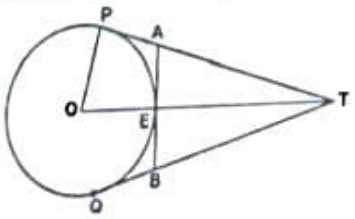
The perimeter of a sector of a circle of radius 5.6 cm is 27.2 cm. Find the area of the sector.

SECTION-D

(4×5=20)

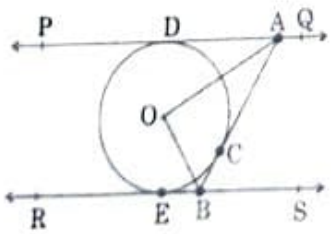
32. The angle of elevation of an aeroplane from a point on the ground is 45°, after flying for 15 seconds the angle of elevation changes to 30°. If the plane is flying at a height of 2500m, find the speed of the plane. (Given $\sqrt{3} = 1.732$)

33. In the adjoining figure 'O' is the centre of a circle of radius 5cm. T is a point such that OT=13 cm and OT intersects circle at E. If AB is a tangent to the circle at E. Find the length of AB, where TP and TQ are two tangents to the circle.



OR

PQ and RS are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersects PQ at A and RS at B. Prove that $\angle AOB = 90°$



37. A carpenter is making decorative pieces from wood. He has two cubes of side 7 cm each. He decides to scoop out the largest hemisphere from one of the ends of one of the cubes and attach it at the top of the other one.

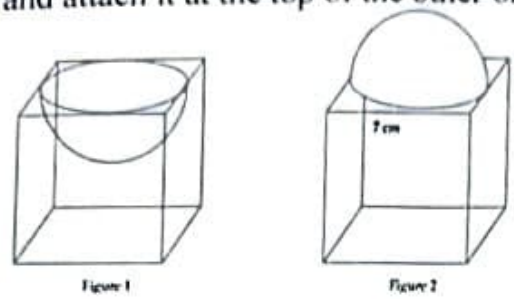


Figure 1 Figure 2

Based on the above information, answer the following questions:

(A) What is the depth of the hemisphere removed from the first cube?

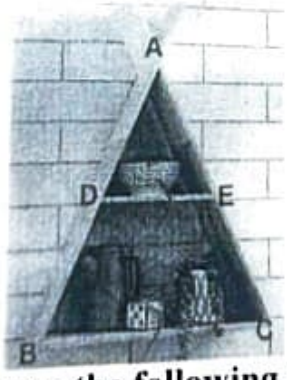
(B) What part (value) of the surface area of the cube (in sq. cm) is lost because of removing the hemisphere? (Refer figure 1)

(C) What is the total surface area of the toy (Refer figure 1)?

OR

What is the difference in the volumes of the decorative cubes in figure 2 and figure 1?

38. While browsing through the catalogue of wooden shelves, Kartik came across this beautiful triangular shaped shelf. In the shelf, DE is parallel to the base BC could be used for displaying small plants and showpieces.



Based on the above information, answer the following questions:

(A) Find the relation between the sides AD, DB, AE and EC. Also, mention the theorem used.

(B) Find the length of AD given AE = 1.8 cm, BD = 7.2 cm and CE = 5.4 cm.

(C) Find the perimeter of triangle ABC if the perimeter of triangle ADE is 7.4cm

OR

Find the value of x, if AD = $(x + 3)$ cm, BD = $(3x + 19)$ cm, AE = x cm and EC = $(3x + 4)$ cm.