SATLUJ PUBLIC SCHOOL

PRE-BOARD 1 (DECEMBER 2022)

Set-A

STANDARD MATHEMATICS (X)

Time: 3 Hours

MM: 80

General Instructions:

(i) This Question Paper has 5 Sections A-E. Section A has 20 MCQs carrying 1 mark each. Section B has 5 questions carrying 02 marks each. Section C has 6 questions carrying 03 marks each. Section D has 4 questions carrying 05 marks each. Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.

(ii) All Questions are compulsory. However, internal choices have been provided.

(iii) Draw neat figures wherever required. Take π =22/7 wherever required if not stated.

SECTION -A

1. The number $3^{13} - 3^{10}$ is divisible by:
(a) 3, 13, 5 (b) 3, 10 (c) 2, 3, 13 (d) 2, 3 10

2. Graphically, the pair of equations given by:
$2x - y - 1 = 0$ and $2x + 3y - 12 = 0$,Represents 2 lines which are:
(a) Parallel (b) intersecting at exactly one point
(c) Coincident (d) Intersecting at exactly two point

3. The centroid of triangle whose vertices are (3, -7), (-8, 6) and (5, 10) is:
(a) 16/3, 23/3 (b) 0, 3 (c) 1/3, 11/3 (d) 2, 1

4. If sin A + cosec A = 2, then $\sin^2 A + \text{cosec}^2 A$=
(a) 4 (b) 2 (c) 0 (d) 1

5. A card is selected at random from a well shuffled deck of playing cards. The probability of its being a red face card, is:
(a) 3/26 (b) 3/13 (c) 1/13 (d) 2/13

6. For the following distribution:

Classes	0-5	5-10	10-15	15-20	20-25
Frequencies	10	15	12	20	9

The sum of the upper limits of the modal and median classes is:
(a) 35 (b) 15 (c) 30 (d) 45

7. The circumference of a circle is 44 cm, then the area of the circle is:
(a) 276 cm^2 (b) 44 cm^2 (c) 176 cm^2 (d) 154 cm^2

8. The number of revolutions made by a circular wheel of radius 0.25 m in rolling a distance of 11 km is:
(a) 2800 (b) 4000 (c) 5500 (d) 7000

9. Two dice are rolled simultaneously. What is the probability that 5 will come up atleast once?
(a) 1/6 (b) 7/36 (c) 11/36 (d) 13/36

10. If the mode of a data is 53 and mean is 33, then its median is:
(a) 36.97 (b) 38 (c) 40 (d) 39.67

11. $\Delta ABC \sim \Delta PQR$, perimeter of ΔABC= 32 cm, perimeter of ΔPQR=48cm and PR=6cm, then the length of AC is equal to:
(a) 9 cm (b) 4 cm (c) 8 cm (d) 18 cm

12. If a and b are zeros of $2-3x-x^2$ then product of zeroes i.e. ab is:
(a) -3 (b) 1 (c) -2 (d) 3

13. If C (-2, 1) is the mid-point of the line segment joining A (-6, p) and B (2, p + 6), then the value of p is:
(a) 2 (b) -2 (c) 0 (d) 4

14. If $\sin\theta + \cos\theta = \sqrt{2}$, then $\tan\theta + \cot\theta$ =
(a) 1 (b) 2 (c) 3 (d) 4

15. If the perimeter of a circle is equal to that of a square, then ratio of their areas is:
(a) 22/7 (b) 7/12 (c) 14/11 (d) 11/14

16. The area of the circle that can be inscribed in a square of 8cm is:
(a) 36π cm^2 (b) 16π cm^2 (c) 12π cm^2 (d) 9π cm^2

17. Length of the diagonal of a cuboid of dimensions 6 cm x 3 cm x 2 cm is:
(a) 11cm (b) $\sqrt{11}$ cm (c) 49 cm (d) 7 cm

18. If 7 times the 7^{th} term of an A.P. is equal to 11 times its 11^{th} term then its 18^{th} term will be:
(a) 7 (b) 11 (c) 18 (d) 0

19. Statement A (assertion): If product of two numbers is 5780 and their HCF is 17, then their LCM is 340.
Statement R (Reason): HCF is always a factor of LCM.
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

20. Statement A (assertion): Point P(-4, 2) lies on the line segment joining the points A (-4, 6) and B(-4, -6)
Statement R (Reason): Mid-point of the line segment joining A (x_1, y_1) and B (x_2, y_2) is $(x_1 + x_2)/2 , (y_1 + y_2)/2$,
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

SECTION B

21. Find the nature of the roots of the quadratic equations $2x^2 - 4\sqrt{3}x + 4 = 0$.

22. How many three-digit numbers are divisible by 7?

OR

Which term of the AP: 7, 13 19.....is 205?

23. Find the point on the y-axis which is equidistant from (6, 5) and (-4, 3).

OR

Find the coordinates of the point which divides the join of (4, -3) and (8, 5) in the ratio 3:1.

24. If $\sin (A - B) = 1/2$ and $\cos (A + B) = ½$, $0^o < A + B \leq 90^o$, $A > B$, Find A & B.

25. Two straight paths are represented by the equations $x - 3y = 2$ and $-2x + 6y = 5$. Check whether the paths cross each other or not.

SECTION C

26. The angle of elevation of a cloud from a point 100m above a lake is 30^o and the angle of depression of its reflection in the lake is 60^o, find the height of the cloud from the surface of lake.

27. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2\ \angle OPQ$.

OR

Prove that the lengths of tangents drawn from an external point to a circle are equal.

28. In a circle of radius 14 cm, an arc subtends an angle of 60^o 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.

29. Solve for x and y:
$ax + by = c$
$bx + ay = 1 + c$

30. If $\tan A = n \tan B$ and $\sin A = m \sin B$, prove that $\cos^2 A = (m^2 - 1)/(n^2 - 1)$.

31. Find the zeroes of the following quadratic polynomials and verify the relationship between the zeros and the coefficients.
$5x^2 - 2\sqrt{5}x - 3$

SECTION D

32. Prove that $\sqrt{3}$ is irrational and show that $\sqrt{3} + \frac{1}{\sqrt{3}}$ is irrelational.

33. Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.

OR

Sides AB and BC and median AD of a triangle ABC are respectively proportional to sides PQ and QR and median PM of Δ PQR. Show that $\Delta ABC \sim \Delta PQR$.

34. If the median of the distribution given below is 206, find the value of x and y.

Class Interval	170-180	180-190	190-200	200-210	210-220	220-230	230-240	240-250	Total
Frequency	4	x	12	15	13	y	14	6	80

OR

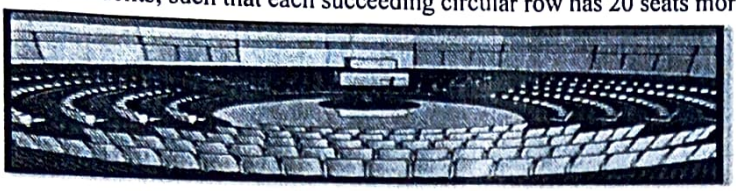
Class Interval	65-85	85-105	105-125	125-145	145-165	165-185	185-205
Frequency	4	5	13	20	14	8	4

Find the mode and the mean of the data given above.

35. One Card is drawn from a well shuffled deck of 52 cards. Find the probability of getting:
(I) a king of black colour (II) a face card (III) either a king or a queen
(IV) neither a jack nor a king (V) the jack of hearts

SECTION E

36. An open air theatre was to be constructed in school in the shape of concentric circular arrangement to accommodate at least 3400 students, such that each succeeding circular row has 20 seats more than the previous one.



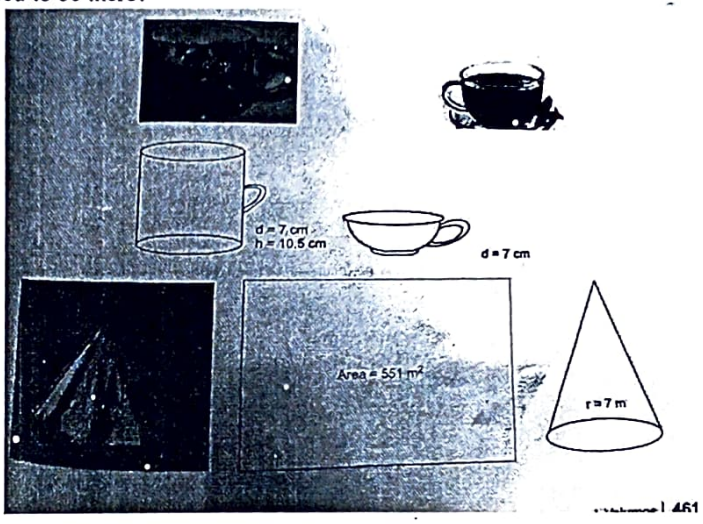
Read this information carefully answer the following questions.

i) If the first circular row had 40 seats, how many seats will be there in the 12^{th} row?

ii) If there were 19 rows in the theatre, how many seats will be there in the middle row?

iii) For 3400 seats in the theatre, how many rows need to be there?

37. Adventure camps are the perfect place for the children to practice decision-making for themselves without parents and teachers guiding their every move. Some students of a school reached for adventure at Sakleshpur. At the camp, the waiters served some students with a welcome drink in a cylindrical glass and some students in a hemispherical cup whose dimensions are given below. After that they went for a jungle trek. The jungle trek was enjoyable but tiring. As dusk fell, it was time to take shelter. Each group of four students was given a canvas of area $551m^2$. Each group had to make a conical tent to accommodate all the four students. Assuming that all the stitching and wasting incurred while cutting, would amount to $1m^2$, the students put the tents. The radius of the tent is 7m.



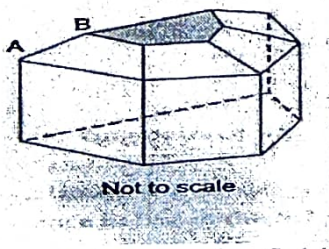
(i) Find the volume of cylindrical cup.

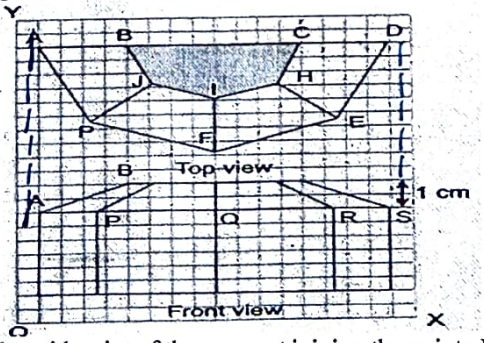
(ii) Find the volume of hemispherical cup.

(iii) Find the height of the conical tent prepared to accommodate four students.

38. The diagram show the plans for a sunroom. It will be built onto the wall of a house. The four walls of the sunroom are square clear glass panels. The roof is made using

* Four clear glass panels, trapezium in shape, all the same size.
* One tinted glass panel, half a regular octagon in shape.





(i) Refer to Top View, find the mid-point of the segment joining the points J(6,17) and I(9,16).

(ii) Refer to Front View, find x, if the point (x,y) is equidistant from Q(9,8) and S(17,8).

(iii) Refer to Front View, find the distance between the points A and S.