No. of Printed Pages : 11 **Set-B** *Roll No. .....*

PRE BOARD-I, 2024-25 **MG-140+80=220**

MATHEMATICS

Time : 3 hrs.] **Class X** **[M.M. : 80**

General Instructions—

(i) This question paper contains - five sections A, B, C, D and E.

(ii) Section A has 18 MCQs and 02 Assertion-Reason based questions of 1 mark each.

(iii) Section B has 5 Very Short Answer (VSA) type questions of 2 marks each.

(iv) Section C has 6 Short Answer (SA) type questions of 3 marks each.

(v) Section D has 4 Long Answer (LA) type questions of 5 marks each.

(vi) Section E has 3 case based integrated units of Assessment (4 marks each) with sub parts of the values of 1, 1 and 2 marks each respectively.

(vii) All questions are compulsory. However, an internal choice in 2 questions 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.

SECTION-A

Section A consists of 20 questions of 1 mark each—

1. Zeroes of quadratic polynomial $2x^2-3x-9$ are :

(A) Both positive (B) Both negative

(C) One positive and one negative (D) None

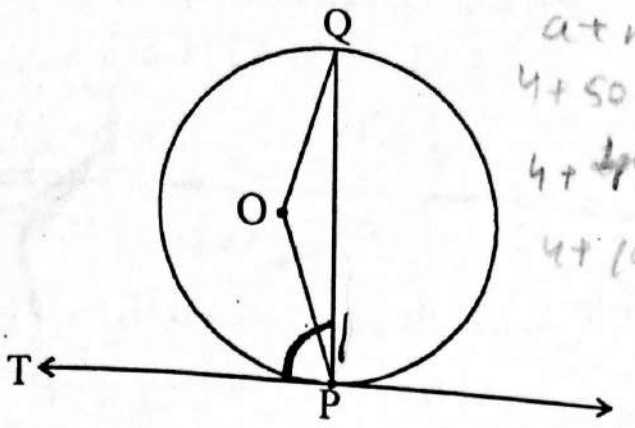
2. If system of equations $4x-5y=6$ and $-12x+ay=b$ is inconsistent which of the following can't be the value of b :

(A) –16 (B) –18

(C) –20 (D) –22

3. Tangent has been drawn at point P on circle centred at O. If $\angle TPQ = 110°$, find $\angle POQ$.

P. T. O.

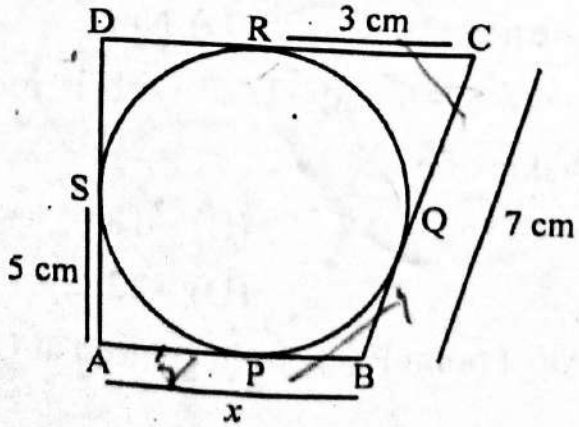


(A) 110°
(B) 70°
(C) 140°
(D) None

4. Middle term of sequence 4, 8, 12 ..... 100 is :
(A) 46
(B) 47
(C) 48
(D) None

5. The radius of the base of a right circular cone and radius of sphere are each 5 cm in length. If volume of cone is equal to volume of sphere then the height of cone is :
(A) 5 cm
(B) 20 cm
(C) 10 cm
(D) 4 cm

6. ABCD is a quadrilateral circumscribing a circle such that sides of quadrilateral touch circle at P, Q, R and S. Here AB = x, BC = 7 cm, CR = 3 cm and AS = 5 cm. Find x.



(A) 5 cm
(B) 8 cm
(C) 2 cm
(D) 9 cm

7. Find the expression : $1+\frac{\cot^2\alpha}{1+\operatorname{cosec}\alpha}$

(A) $\sin\alpha$ (B) $\sec\alpha$

(C) $\operatorname{cosec}\alpha$ (D) $\tan\alpha$

8. Frame quadratic polynomial whose zeroes are $7+2\sqrt{5},\ 7-2\sqrt{5}$:

(A) $x^2+14x+29$ (B) x^2+14

(C) $x^2-14x+29$ (D) None

9. The following distribution shows the marks distribution of 80 students

Marks	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60
No. of students	2	12	28	56	76	80

The median class is :

(A) 20 - 30 (B) 40 - 50

(C) 30 - 40 (D) 10 - 20

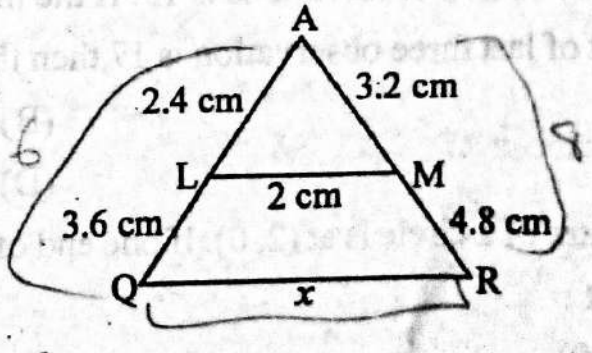
10. In ΔPQR, $LM \parallel QR$, if $PL = 2.4$ cm, $LQ = 3.6$ cm, $PM = 3.2$ cm, $MR = 4.8$ cm, $LM = 2$ cm. Find x .

(A) 4 cm

(B) 5 cm

(C) 6 cm

(D) 8 cm



11. If $2, \frac{1}{2}$ are zeroes of px^2+5x+r then :

(A) $p = r = 2$ (B) $p = r = -2$

(C) $p = 2, r = -2$ (D) None

12. Given $2\sin^2\alpha - \cos^2\alpha = 2$, find α :

(A) 0° (B) 90°

(C) 45° (D) 30°

13. The volume of a solid hemisphere is $\frac{396}{7}$ cm^3. The total surface area of solid hemisphere (in sq. cm.) is :

(A) $\frac{396}{7}$ (B) $\frac{594}{7}$

(C) $\frac{549}{7}$ (D) $\frac{604}{7}$

14. A card is drawn at random from a pack of 52 cards. Find the probability that the drawn card is not a face card.

(A) $\frac{1}{2}$ (B) $\frac{3}{13}$

(C) $\frac{10}{13}$ (D) $\frac{3}{52}$

15. The perimeter of triangle with vertices (0, 12), (0, 0) and (5, 0) is :

(A) 50 cm (B) 28 cm

(C) 26 cm (D) 30 cm

16. The mean of five observations is 15. If the mean of first three observation is 14 and that of last three observation is 17 then the third observation is :

(A) 18 (B) 20

(C) 19 (D) 17

17. The centre of a circle is at (2, 0). If one end of diameter is at (6, 0) then the other end is at :

(A) (0, 0) (B) (-6, 0)

(C) (4, 0) (D) (–2, 0)

18. Two dice are rolled together. The probability of getting sum of numbers on two dice as 2, 3 or 5 is :

(A) $\frac{7}{36}$ (B) $\frac{4}{9}$ (C) $\frac{5}{36}$ (D) $\frac{11}{36}$

DIRECTION : In the question number 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R).

Choose the correct option :

(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.

19. **Assertion (A) :** $\left(2+\sqrt{3}\right)\sqrt{3}$ is an irrational number.

Reason (R) : Product of two irrational number is always irrational.

20. **Assertion (A) :** If radius of sector of a circle is reduced to its half and angle is doubled then the perimeter of sector remains same.

Reason (R) : The length of an arc subtending angle θ at the centre of a circle of radius $r = \frac{\pi r\theta}{180^\circ}$

SECTION-B

Section B consists of 5 questions of 2 marks each.

21. Sum of LCM and HCF of 2 numbers is 1260. If LCM is 900 more than HCF. Find product of 2 numbers.

OR

Find HCF and LCM of :

$p(x) = (x^2-3x+2)$ and $q(x) = (x^2-4)$

22. Two dice are rolled together bearing numbers 4, 6, 7, 9, 11, 12. Find the probability that the product of numbers obtained is perfectly square.

OR

How many positive three digit integers have hundredths digit 8 and unit's digit 5. Find the probability of selecting one such numbers out of all three digit numbers.

23. If $\cot(A+B)=\frac{1}{\sqrt{3}}$ and $\cot(A-B)=\sqrt{3}$, $0<A+B\leq 90°, A>B$. Find A and B.

Also find cosec (3B+A).

24. If A(–2, 1), B (x, 0), C (4, y) and D (1, 2) are vertices of parallelogram ABCD. Find the values of x and y. Also find length of AB.

25. Line $4x+y=4$ divides the line segment joining the points (–2, –1) and (3, 5) in a certain ratio. Find the ratio.

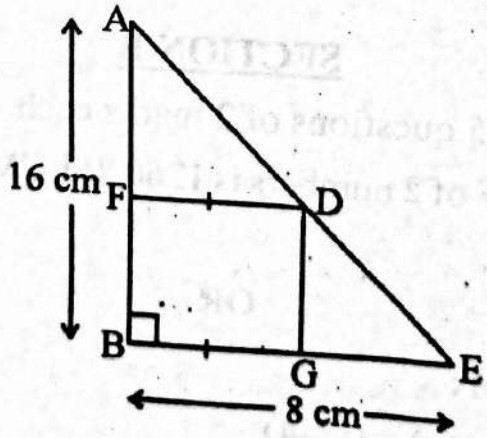
SECTION-C

Section C consists of 6 questions of 3 marks each.

26. Show ΔABC where A(–2, 0), B (0, 2) and C (2, 0) and ΔPQR where P(–4, 0), Q(4, 0) and R(0, 4) are similar triangles. Write symbolic form of triangles and applicable similarity criteria.

OR

Sides AB and BE of a right triangle, right angled at B are of lengths 16 cm and 8 cm respectively. Find the length of side of largest square FDGB that can be inscribed in triangle ABE.



27. Find the value of p for which the quadratic equation $p(x-4)(x-2)+(x+1)^2=0$ has real and equal roots.

28. If α and β are zeroes of quadratic polynomial x^2-6x+y. Find y if $3+2\beta=20$

29. Prove that—

$$\frac{\tan\theta}{1-\cot\theta}+\frac{\cot\theta}{1-\tan\theta}=1+\tan\theta+\cot\theta$$

30. The minute hand of a wall clock is 18 cm long. Find area of the face of the clock described by minute hand in 20 minutes.

OR

Find the area of minor segment and length of an arc of a circle whose radius is 21 cm and subtending an angle of 60° at the centre.

31. Prove that $\sqrt{11}$ is an irrational number.

SECTION-D

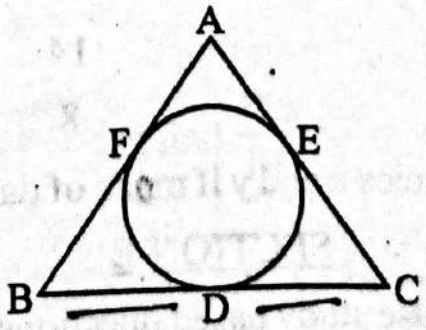
Section D consists of 4 questions of 5 marks each.

32. When 6 boys were admitted and 6 girls left percentage of boys increases from 60% to 75%. Find original number of boys and girls.

OR

The sum of a two digit number and the number obtained by reversing the order of its digits is 99. If ten's digit is 3 more than the unit's digit then find the number verify your answer.

33. Prove that length of tangents drawn from an external point are equal. Using above result prove BD = CD. Given that the incircle of ΔABC touches sides BC, CA and AB at D, E and F respectively and AB = AC.



34. From the top of a 9m high building the angle of elevation of the top of a cable tower is 60° and angle of depression of its foot is 45°. Find the height of a tower and distance between building and tower. (Use $\sqrt{3}$ = 1.732)

35. Find the median for the following data—

Marks	No. of students
Less than 10	0
Less than 30	10
Less than 50	25
Less than 70	43
Less than 90	65
Less than 110	87
Less than 130	96
Less than 150	100

OR

A student noted the number of cars passing through a spot on a road for 1(periods each of 2 minutes and compiled data in the following table—

Number of cars	Numbers of periods
0-10	7
10-20	x
20-30	13
30-40	15
40-50	y
50-60	10
60-70	14
70-80	8

Find the missing frequencies x and y if mode of data us given to be 44.

SECTION-E

Section E consists of 3 case study based questions of 4 marks each.

36. A farmer has triangular piece of land. He grows plants in 9 rows in AP form such that 20 plants in 1st row, 19 plants in next row, 18 plants in row next to it and so on.

Row 3 → 🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼

Row 2 → 🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼

Row 1 → 🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼🌼

(i) How many plants does the farmer grow in 6th row ? 1

(ii) How many plants does he grow in all ? 2

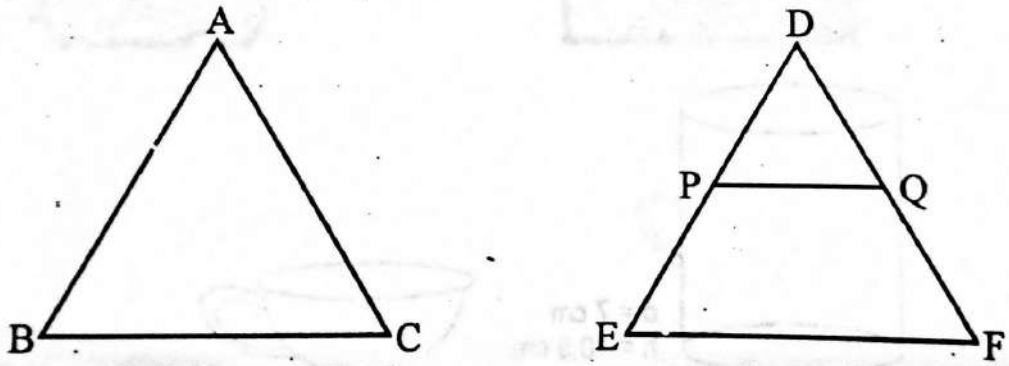
OR

If there are 9 rows of plants, how many plants are there in the middle row?

(iii) If the farmer changes the arrangement of plants and grow 20 plants in first row, 18 plants in next row, 16 plants in the row next to it and so on. How many plants are still left to be grown after 9th row? 1

37. Triangle is a very popular shape used in interior designing. The picture given above shows a cabinet designed by a famous interior designer.

Here the largest triangle is represented by ΔABC and smallest one with shelf is represented by ΔDEF. PQ is parallel to EF. 1



(i) Show that $\Delta DPQ \sim \Delta DEF$. 1

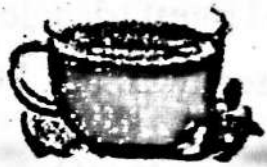
(ii) If DP = 50 cm, PE = 70 cm find $\frac{PQ}{EF}$ 1

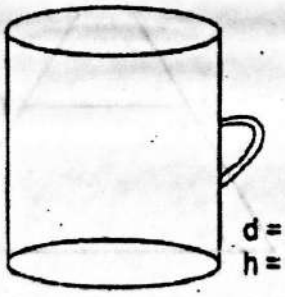
(iii) If 2 AB = 5 DE and $\Delta ABC \sim \Delta DEF$. Show $\frac{\text{Perimeter } \Delta ABC}{\text{Perimeter } \Delta DEF}$ is constant. 2

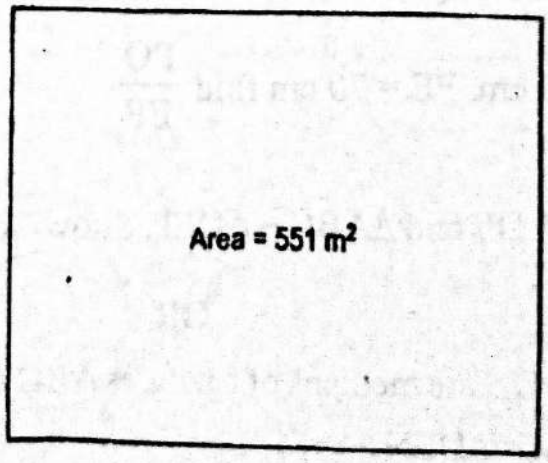
OR

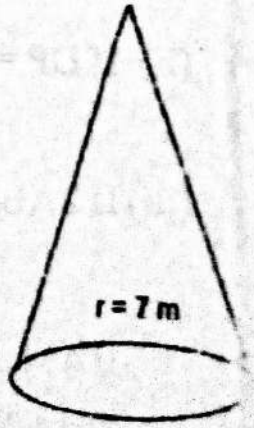
If AM and DN are medians of triangles ABC and DEF respectively then prove that $\Delta ABM \sim \Delta DEN$.

38. 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 shown 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 551 m^2. Each group had to make a conical tent to accommodate all the four students. Assuming that all the stitching and was ting incurred while cutting, would amount to 1 m^2, the students put the tents. The radius of the tent is 7 m.









Based on the above information, answer the following questions:

(i) What is the height of the conical tent prepared to accommodate four students? 2

(ii) What is the volume of cylindrical cup? 1

OR

Find the volume of hemispherical cup.

(iii) How much space on the ground is occupied by each student in the conical tent? 1