

CAMBRIDGE SCHOOL SRINIVASPURI
HALF YEARLY EXAMINATION – 2025-26
MATHEMATICS
CLASS - X

TIME: 3 Hrs.

MM:

General Instructions:

1. This question paper contains 38 questions. All questions are compulsory.
2. This Question Paper is divided into five Sections - A, B, C, D and E.
3. In Section A, Question number 1 to 18 are multiple choice questions (MCQs) and question number 19 and 20 are Assertion- Reason based question of 1 mark each.
4. In Section B, Question Numbers 21 to 25 are very short answer (VSA) type carrying 2 marks each.
5. In Section C, Question numbers 26 to 31 are short answer (SA) type questions carrying 3 marks each.
6. In Section D, Question numbers 32 to 35 are long answer (LA) type questions carrying 5 marks each.
7. In Section E, Question numbers 36 to 38 are case- study based integrated questions carrying 4 marks each. Internal choice is provided in 2 marks question in each case study.
8. There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 2 questions in Section C, 2 questions in Section D and 3 questions of 2 marks in Section E.
9. Draw neat figures wherever required.

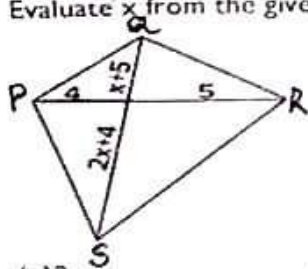
SECTION A

Section A consists of 20 questions of 1 mark each.

1x20

1. If the product of two coprime numbers is 217, then their L.C.M. is
 (a) 434 ☒ (b) 217 (c) 651 (d) Can't be determined
2. If α and β are the zeroes of the polynomial $f(x) = 4x^2 - 3x - 7$, then the value of $\frac{1}{\alpha} + \frac{1}{\beta}$ is:
 (a) $\frac{7}{3}$ (b) $\frac{3}{7}$ (c) $(-\frac{7}{3})$ ☒ (d) $(-\frac{3}{7})$
3. The roots of the equation $7x^2 + x - 1 = 0$ are:
☒ (a) real and distinct (b) real and equal (c) not real (d) none of these
4. The $(n - 1)^{th}$ term of an A.P. 7, 12, 17, 22... is given by
☒ (a) $5n + 2$ (b) $5n + 3$ (c) $5n - 5$ (d) $5n - 3$
5. The distance of the point P (-2, -3) from the origin is
 (a) 4 units (b) 9 units ☒ (c) $\sqrt{13}$ units (d) $\sqrt{15}$ units.
6. A quadratic polynomial, the sum of whose zeroes is (-5) and their product is 6, is
☒ (a) $x^2 + 5x + 6 = 0$ (b) $x^2 - 5x + 6 = 0$
 (c) $x^2 - 5x - 6 = 0$ (d) $-x^2 + 5x + 6 = 0$
7. If $\tan \alpha = \sqrt{3}$ and $\operatorname{cosec} \beta = 2$, then the value of $\alpha - \beta$ is
 (a) 45° ☒ (b) 30° (c) 90° (d) 60°
8. XY is drawn parallel to the base BC of a ΔABC cutting AB at X and AC at Y. If AB = 4cm, BX = YC = 2cm, then AY is
☒ (a) 2cm (b) 4cm (c) 6 cm (d) 8cm

9. The value of 'x' for which $(2x + 1)$, 10 and $(5x + 5)$ are three consecutive terms of an AP is
 (a) -1 (b) -2 (c) 1 ~~(d) 2~~
10. Three bells ring at intervals of 4, 7 and 14 minutes. All the three rang at 7 am. When will they ring together again?
 (a) 7:28 am (b) 7:54 am (c) 7:32 am (d) 7:40 am
11. If one zero of the polynomial $6x^2 + 37x - (k - 2)$ is reciprocal of the other, then, the value of k is:
 (a) 4 (b) -6 (c) 6 ~~(d) -4~~
12. If $x + 2$ is factor of $x^2 + ax + 2b$ and $a + b = 4$, then
 (a) $a = 1, b = 3$ ~~(b) $a = 3, b = 1$~~
 (c) $a = -1, b = 5$ (d) $a = 5, b = -1$
13. If $2x - 3y = 7$ and $(a + b)x - (a + b - 3)y = 4a + b$ has an infinite number of solutions, then.
 (a) $a = 5, b = 1$ (b) $a = -5, b = 1$
 (c) $a = 5, b = -1$ (d) $a = -5, b = -1$
14. For the given equation $kx^2 + 2x = c(2x^2 + b)$ to be quadratic, which of these cannot be the value of k?
 (a) c (b) 2c (c) 3c (d) $2c + 2b$
15. If $\sin A = \frac{1}{2}$, then the value of $\tan A$ is
 (a) 2 (b) $\sqrt{3}$ ~~(c) $\frac{1}{\sqrt{3}}$~~ (d) Not defined
16. If the points A (6, 1), B (8, 2), C (9, 4) and D (p, 3) are the vertices of a parallelogram, taken in order, then the value of p is
 (a) 4 (b) -6 (c) 7 (d) -2
17. The ratio in which the line segment joining the points P (-3, 10) and Q (6, -8) is divided by O (-1, 6) is:
 (a) 2:7 (b) 3:4 (c) 1:3 (d) 2:5
18. Evaluate x from the given trapezium PQRS such that $PQ \parallel SR$



- (a) 2 (b) 5 (c) 3 (d) 4

DIRECTIONS: In question numbers 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R) is given. 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 but 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):** The cosine of an angle is greater than the sine of the same angle for all angles less than 45°
Reason (R): For angles in a right triangle that are less than 45° , the adjacent (base) side is longer than the opposite (perpendicular) side.
20. **Assertion (A):** Common difference of an A.P in which $a_{21} - a_7 = 84$ is 14.
Reason (R): common difference of an A.P is the difference between the successive term and its preceding term.

SECTION B

Section B consists of 5 questions of 2 marks each.

5x2 =

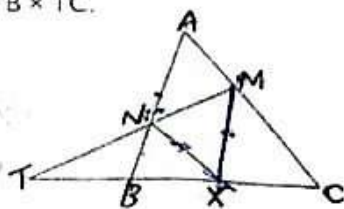
21. If $ax + by = a^2 - b^2$ and $bx + ay = 0$, find the value of $(x + y)$.
22. Find the middle term of A.P 6, 13, 20, ..., 230
23. Point A $(-1, y)$ and B $(5, 7)$ lie on a circle with centre $O(2, -3y)$. Find the values of y and hence find the radius of the circle
OR
 The midpoint of the line segment joining A $(2a, 4)$ and B $(-2, 3b)$ is $(1, 2a + 1)$. Find the value of a and b .
24. Given that $\sqrt{5}$ is irrational, prove that $3 + \frac{\sqrt{5}}{7}$ is irrational.
25. If $\tan A + \cot A = 2$, find the value of $\tan^{20} A + \cot^{20} A$.
OR
 Find the value of x such that $3 \tan^2 60^\circ - x \sin^2 45^\circ + \frac{3}{4} \sec^2 30^\circ = 2 \operatorname{cosec}^2 30^\circ$

SECTION C

6x3 = 18

Section C consists of 6 questions of 3 marks each.

26. Find HCF and LCM of 404 and 96 using prime factorization method and verify that $\text{HCF} \times \text{LCM} = \text{Product of two given number}$.
27. Find the zeroes of the polynomial $6x^2 + 5\sqrt{3}x - 3$ by factorisation method and verify the relation between the zeroes and the coefficients of the polynomial
OR
 If α and β are the zeroes of $x^2 - x - 2$, form a quadratic polynomial whose zeroes are $2\alpha + 1$ and $2\beta + 1$.
28. Solve for x : $\frac{1}{x-3} - \frac{1}{x+5} = \frac{1}{6}$, $x \neq 3$ and -5
OR
 Find the value of p for which the quadratic equation $(2p + 1)x^2 - (7p + 2)x + (7p - 3) = 0$ has equal roots.
29. Point P divides the line segment joining R $(-1, 3)$ and S $(9, 8)$ in the ratio $k:1$. If P lies on the line $x - y + 2 = 0$, find the value of k .
30. Any point X is taken on the side BC of a triangle ABC and XM, XN are drawn parallel to BA, CA meeting CA, BA at M and N respectively. MN meets BC produced in T. Prove that $TX^2 = TB \times TC$.



31. If $\sin(A+2B) = \frac{\sqrt{3}}{2}$, and $\cos(A+4B) = 0$, $A > B$ and $A+4B \leq 90^\circ$, then find the value of A and B.

SECTION -D

4)

Section D consists of 4 questions of 5 marks each.

32. Solve the pair of equations $x + 3y - 6 = 0$ and $2x - 3y - 12 = 0$ graphically and find the area of triangle formed between the lines and the y-axis.

OR

Solve for x and y:

$$27x + 31y = 85;$$

$$31x + 27y = 89$$

33. If the p^{th} term of an A.P. is $\frac{1}{q}$ and q^{th} term is $\frac{1}{p}$, prove that the sum of first pq terms of the A.P is $\left(\frac{pq+1}{2}\right)$

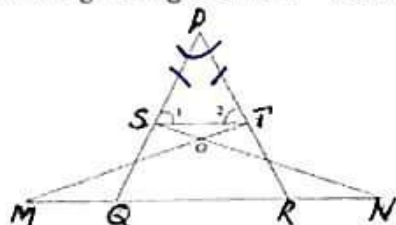
OR

- ✓ The first term of an A.P. is 5, the last term is 45 and sum of all the terms in the A.P is 400. Find the number of terms and the common difference.

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

3.

In the given figure, if $\angle 1 = \angle 2$ and $\triangle NSQ \cong \triangle MTR$, then prove that $\triangle PTS \sim \triangle PRQ$.



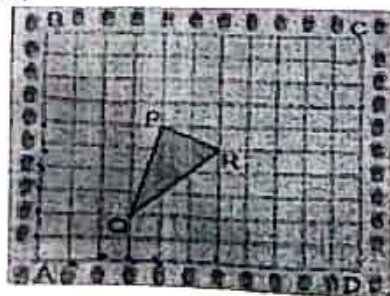
35. A motor boat whose speed is 18 km/hr in still water takes 1 hr more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream

SECTION E

4x3=

Case study-based questions

36. A garden is in the shape of a square. The gardener grew saplings of Ashoka tree on the boundary of the garden at the distance of 1 metre from each other. He wants to decorate the garden with rose plants. He chooses a triangular region inside the garden to grow.



In the above situation, the gardener took help from the students of class 10. They made a chart for it which looks like the given figure.

Based on the given information, answer the following questions.

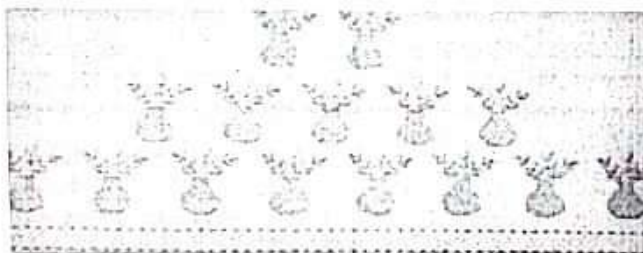
- (i) If A is taken as origin, what are the coordinates of the vertices of triangle PQR. ✓
- (ii) Find the distances PQ and QR.
- (iii) Is triangle PQR is isosceles. Justify your Answer. ✓

OR

Find the coordinate of the point which divides the line segment joining points P and R in the ratio 2:1.

37. Roshini, a plant lover, decided to start a nursery. She bought several plants with pots and arranged them in such a way that there are 2 pots in the first row, 5 in the second row, 8 in the third row, and so on.

Based on the above information and answer the following questions:



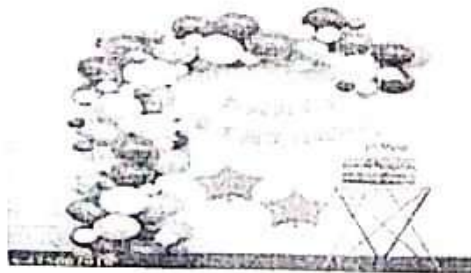
- (i) How many pots are placed in the 7th row? ✓
- (ii) Find the total number of pots in first five rows. ✓
- (iii) If she wants to place 100 pots in total, then find the total number of rows formed ✓ in the arrangement.

OR

How many pots are placed in ~~the last row~~ the (20)th row

38. Khushi wants to organize her birthday party. She is very health conscious; thus, she decided to serve only fruits at the party.

She has 36 apples and 60 bananas at home and decided to serve them. She does not want to discriminate among guests so she decided to distribute the fruits equally among all.



Based on the above information and answer the following questions.

- (i) How many Guests Khushi can invite at the most? ✓
- (ii) How many apples and bananas will each guest get?
- (iii) If she decided to add 42 mangoes, how many maximum guests can she invite?

OR

If she decided to add 3 more bananas and remove 6 apples, how many maximum guests can she invite?