

Lord, Help me be honest, calm and upright so that I write this exam with you by my side.

MID TERM EXAMINATION (2024-25)

CLASS IX

SUBJECT: MATHEMATICS

M.M.: 80

Time: 3 hrs

General Instructions:

1. The question paper consists of five sections A , B , C , D , E
2. Section A consists of 20 multiple choice questions of 1 mark each .
3. Section B consists of 5 questions of 2 marks each .
4. Section C consists of 6 questions of 3 marks each .
5. Section D consists of 4 questions of 5 marks each .
6. Section E consists of 3 case based questions of 4 marks each .
7. All questions are compulsory , however internal choice is provided in 2 questions of Section B , 2 questions of Section C , 2 questions of D and also in subparts carrying 2 marks of Section E

1. Which of the following is irrational? 1

- (A) $\sqrt{\frac{4}{9}}$ (B) $\frac{\sqrt{12}}{\sqrt{3}}$ (C) $\sqrt{7}$ (D) $\sqrt{81}$

2. Degree of the zero polynomial is 1

- (A) 0 (B) 1 (C) Any natural number (D) Not defined

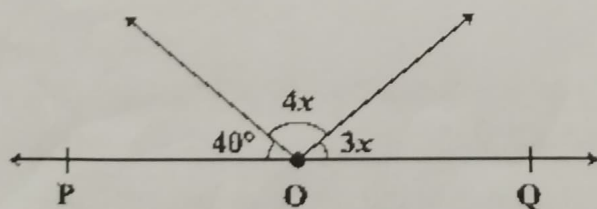
3. The value of $0.12\bar{3}$ in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$ is 1

- (A) $\frac{37}{100}$ (B) $\frac{37}{300}$ (C) $\frac{37}{900}$ (D) $\frac{37}{70}$

4. If the point $(3, 4)$ is a solution of equation $3y = ax + 7$, then the value of a is 1

- (A) $\frac{3}{5}$ (B) $\frac{5}{3}$ (C) 5 (D) $\frac{5}{2}$

5. POQ is a line. The value of x is 1

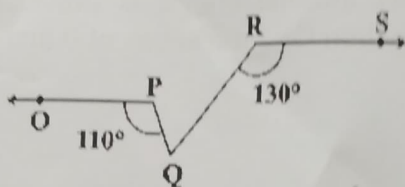


- (A) 20° (B) 25° (C) 30° (D) 35°

6. The length of each side of an equilateral triangle having an area of $9\sqrt{3}$ cm² is 1

- (A) 8 cm (B) 36 cm (C) 4 cm (D) 6 cm

7. If $p(x) = x + 3$, then $p(x) + p(-x)$ is equal to
 (A) 3 (B) $2x$ (C) 0 (D) 6
8. If each side of an equilateral triangle is doubled, then ~~find~~ the ratio of area of the triangle thus formed and the given triangle is
 (A) 2:1 (B) 4:1 (C) 1:4 (D) 1:2
9. If two interior angles on the same side of a transversal intersecting two parallel lines are in the ratio 2 : 3, then the greater of the two angles is
 (A) 54° (B) 108° (C) 120° (D) 136°
10. If $x + 1$ is a factor of the polynomial $2x^2 + kx$, then the value of k is
 (A) -3 (B) 4 (C) 2 (D) -2
11. If $OP \parallel RS$, $\angle OPQ = 110^\circ$ and $\angle QRS = 130^\circ$, then $\angle PQR$ is equal to



- (A) 40° (B) 50° (C) 60° (D) 70°
12. The points (other than origin) for which abscissa is equal to the ordinate will lie in
 (A) I quadrant only (B) I and II quadrants
 (C) I and III quadrants (D) II and IV quadrants
13. Which of the following is not a criterion for congruence of triangles?
 (A) SAS (B) ASA (C) SSA (D) SSS
14. If the coordinates of the two points are $P(-2, 3)$ and $Q(-3, 5)$, then (abscissa of P) - (abscissa of Q) is
 (A) -5 (B) 1 (C) -1 (D) -2
15. The point of the form $(0, a)$ always lies on :
 (A) x-axis (B) y-axis
 (C) On the line $y = x$ (D) On the line $x + y = 0$
16. The point which lies on y-axis at a distance of 5 units in the negative direction of y-axis is
 (A) $(0, 5)$ (B) $(5, 0)$ (C) $(0, -5)$ (D) $(-5, 0)$
17. In triangles ABC and DEF , $AB = FD$ and $\angle A = \angle D$. The two triangles will be congruent by SAS axiom if
 (A) $BC = EF$ (B) $AC = DE$ (C) $AC = EF$ (D) $BC = DE$

18. The linear equation $3x - y = x - 1$ has : 1
- (A) A unique solution (B) Two solutions
 (C) Infinitely many solutions (D) No solution

19. **ASSERTION** : If a, b, c are the lengths of three sides of a triangle, then area of a triangle = $s(s-a)(s-b)(s-c)$, where s = perimeter of triangle. 1

REASON : In Herons Formula semi perimeter $s = \frac{1}{2}(a + b + c)$, $s = \frac{1}{2}$ (perimeter of triangle).

- (a) Both assertion and reason are true and reason is the correct explanation of assertion.
 (b) Both assertion and reason are true but reason is not the correct explanation of assertion.
 (c) Assertion is true but reason is false.
 (d) Assertion is false but reason is true.
20. **Assertion** : In ΔABC , $\angle C = \angle A$, $BC = 4$ cm and $AC = 5$ cm. Then, $AB = 4$ cm 1

Reason: In a triangle, angles opposite to two equal sides are equal.

- (a) Both assertion (A) and reason (R) are correct and reason (R) is the correct explanation of assertion (A).
 (b) Both assertion (A) and reason (R) are correct 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
21. Simplify: $[5(8^{1/3} + 27^{1/3})^3]^{1/4}$ 5 2

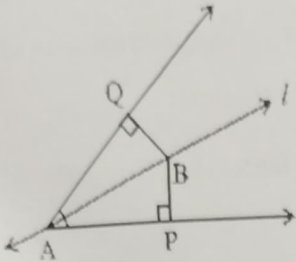
OR

Simplify $\sqrt{45} - 3\sqrt{20} + 4\sqrt{5}$

22. Find the value of a , if $x - a$ is a factor of $x^3 - ax^2 + 2x + a - 1$. $\frac{1}{3}$ 2
23. The Autorikshaw fare in a city is charged Rs 10 for the first kilometer and @ Rs 4 per kilometer for subsequent distance covered. Write the linear equation to express the above statement. (Take the total distance covered be x km and the fare charged Rs y .) 2

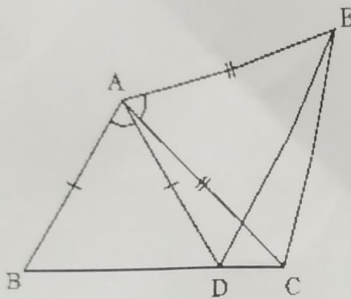
$10 + 4x = y$

24. In the given figure, Line l is the bisector of $\angle A$ and B is any point on l . BP and BQ are perpendiculars from B to the arms of $\angle A$. Show that B is equidistant from the arms of $\angle A$.



OR

In the given figure, $AC = AE$, $AB = AD$ and $\angle BAD = \angle EAC$. Show that $BC = DE$.



25. If a transversal intersects two lines such that the bisectors of a pair of corresponding angles are parallel, then prove that the two lines are parallel.
26. Represent $\sqrt{10}$ on the number line.

OR

Represent $\sqrt{8.5}$ on the number line

27. Without finding the cubes, factorise $(x - y)^3 + (y - z)^3 + (z - x)^3$

OR

If both $(x - 2)$ and $(x - \frac{1}{2})$ are factors of $px^2 + 5x + r$, show that $p = r$.

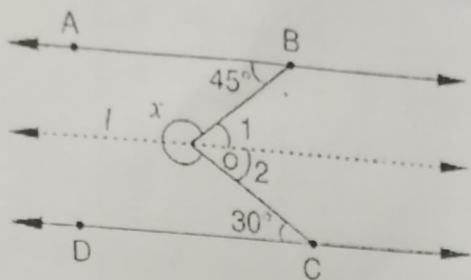
28. Find the coordinates of the point

- which lies on the x -axis at a distance of 7 units to the left from the y -axis.
- which lies on x and y axes both. $(0, 0)$ $(-6, 0)$
- whose abscissa is the smallest prime number and which lies on x -axis. $(2, 0)$

29. Write the equation $\frac{x}{2} + \frac{3y}{5} = 1$ in standard form and also find its 2 solutions $(2, 0)$ $(0, \frac{5}{3})$

30. The perimeter of a triangle is 50 cm. One side of a triangle is 4 cm longer than the smaller side and the third side is 6 cm less than twice the smaller side. Find the area of the triangle using Herons formula. $20\sqrt{30}$

31. In the given figure, $AB \parallel CD$ and $l \parallel AB$. Determine $\angle 1$, $\angle 2$ and x . Give reasons for your answer



32. a) Find the values of a and b if

$$\frac{5 + 2\sqrt{3}}{7 + 4\sqrt{3}} - \frac{5 - 2\sqrt{3}}{7 - 4\sqrt{3}} = a + b\sqrt{3}$$

OR

Simplify: $\frac{3\sqrt{2}}{\sqrt{6}-\sqrt{3}} - \frac{4\sqrt{3}}{\sqrt{6}-\sqrt{2}} + \frac{2\sqrt{3}}{\sqrt{6}+2}$

33. Factorize the polynomial using Factor Theorem $p(x) = 2x^3 - 3x^2 - 17x + 30$

OR

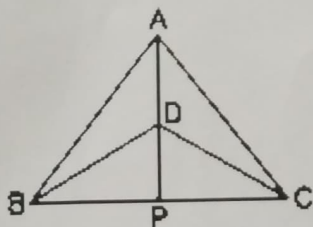
$(x+3)(2x-5)(x-2)$

Verify that $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$ and hence factorise $729y^3 + 125z^3$

34. $\triangle ABC$ and $\triangle DBC$ are two isosceles triangles on the same base BC and vertices A and D are on the same side of BC . If AD is extended

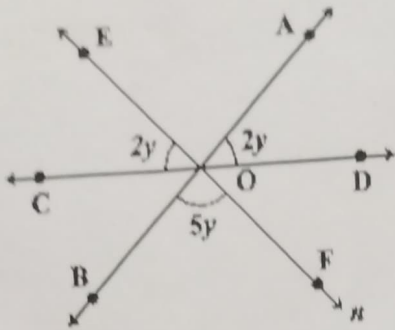
to intersect BC at P , show that

- (i) $\triangle ABD \cong \triangle ACD$
- (ii) $\triangle ABP \cong \triangle ACP$
- (iii) AP bisects $\angle A$ as well as $\angle D$.
- (iv) AP is the perpendicular bisector of BC .



35. (a) Prove that if two lines intersect, then the vertically opposite angles so formed are equal.

(b) In the given Figure, AB , CD and EF are three lines concurrent at O . Find the value of y .



36. Fruits are an excellent source of essential vitamins and minerals, and they are high in fiber. Fruits also provide a wide range of health-boosting antioxidants, including flavonoids. Eating a diet high in fruits and vegetables can reduce a person's risk of developing heart disease, cancer, inflammation, and diabetes.

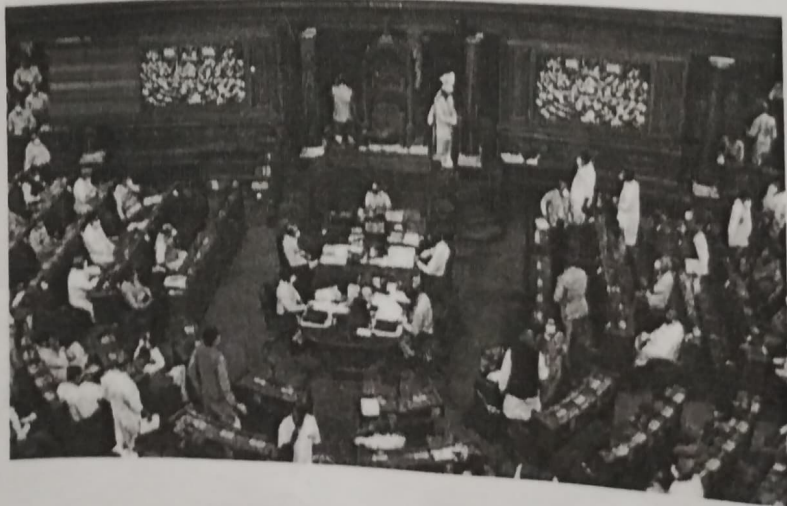
Ashima went to the fruit market to buy some fruits. She bought some mangoes and melons. Assuming the cost of one mango as Rs x and the cost one melon as Rs y . Answer the following questions

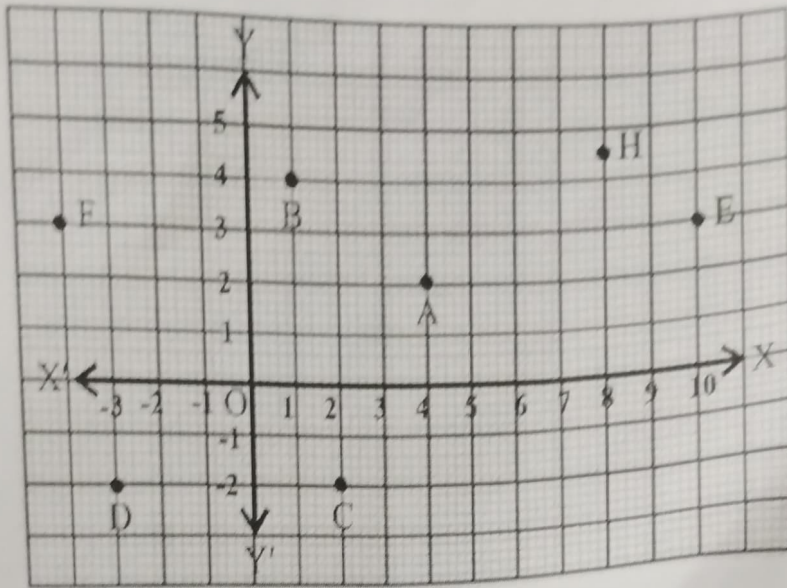
- (i) If 3 mangoes and 2 melons together cost Rs 9, write a linear equations for this information. $3x + 2y = 9$
- (ii) Also the price of a mango is 1 more than the cost of 2 melons. write a linear equations for this information, $x = 1 + 2y$
- (iii) find two different solutions of equation formed in (i) $(1, 3), (2, 1)$

OR

find two different solutions of equation formed in (ii)

37. Students of class IX visited Sansad Bhawan. Teacher assigned them the activity to observe and take some pictures to analyse the seating arrangement of various MP's and speaker based on coordinate geometry. The staff tour guide explained various facts related to Maths of Sansad Bhawan to the students, students applied coordinate geometry on the seating arrangement of MP's and speaker.





Refer to the above image and graph to answer the following

- (i) What are the coordinates of position 'F'? $(-3, 3)$
- (ii) What is the abscissa of position 'D' and coordinates of mirror image of point D along x axis? -3

OR

In which quadrant, the point 'C' lie and also find coordinates of mirror image of point C along y axis?

- (iii) Find the perpendicular distance of the point E from the y-axis
38. Rohan is renovating his house. A floral design on the floor is made up of 16 tiles which are triangular, the sides of the triangle being 9 cm, 28 cm and 35 cm. 2+1
+ 1
- (i) Find the area of above mentioned 1 tile using Herons Formula
- OR
- Find the area of another tile in the shape of an equilateral triangle of side 'a' using Herons Formula. 8
- (ii) Calculate the area of 16 tiles of dimensions 9 cm, 28 cm and 35 cm. 57656
- (iii) Find the cost of polishing these tiles at the rate of 50p per cm^2 .
- (Use $\sqrt{6} = 2.44$)

