



Delhi Public School, Howrah

Final Examination (2024 – 2025)

Class- IX

Care must be taken not to write anything on the question paper. All the questions must be attempted in the correct sequence.

Subject: - Mathematics (Code No - 041)

Time: 3 Hours

F.M. : 80

General Instructions:

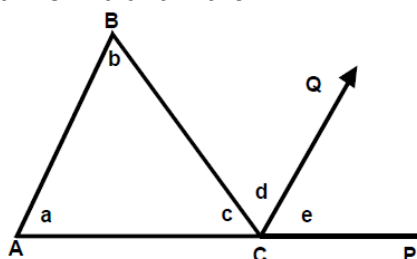
Read the following instructions carefully and follow them:

1. This question paper contains 38 questions.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Questions no. 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion- Reason based questions of 1 mark each.
4. In Section B, Questions no. 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Questions no. 36-38 are case study based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.
8. All Questions are compulsory. However, an internal choice in 2 Question of Section B, 2 Questions of Section C and 2 Questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required.
10. Take $\pi = 22/7$ wherever required if not stated.
11. Use of calculators is not allowed.

Section A

(Section A consists of 20 questions of 1 mark each.)

- 1) If $\left(\frac{3}{4}\right)^6 \times \left(\frac{16}{9}\right)^5 = \left(\frac{4}{3}\right)^{x+2}$, then the value of x is: [1]
(a) 2 (b) 4 (c) -2 (d) 6
- 2) On rationalizing the denominator of $\frac{7+\sqrt{14}}{\sqrt{5}+\sqrt{11}}$, we get [1]
(a) $\sqrt{7} - 2$ (b) $\frac{1}{6}(7 + \sqrt{14})(\sqrt{11} - \sqrt{5})$ (c) $\frac{\sqrt{11}+\sqrt{5}}{7+\sqrt{14}}$ (d) $\frac{1}{6}(7 + \sqrt{14})(\sqrt{11} + \sqrt{5})$
- 3) The value of $(2 - a)^3 + (2 - b)^3 + (2 - c)^3 - 3(2 - a)(2 - b)(2 - c)$, when $a + b + c = 6$ is [1]
(a) -3 (b) 3 (c) 0 (d) -1
- 4) If the coordinates of the two points are P(-5, 3) and Q(8, -9), then (abscissa of Q) - (abscissa of P) is [1]
(a) 4 (b) -12 (c) 13 (d) -13
- 5) The ordered pair (m, n) satisfies the equation $ax + by + c = 0$ if [1]
(a) $am + bn = 0$ (b) $c = 0$ (c) $am + bn + c = 0$ (d) $am + bn - c = 0$
- 6) The points (-5, 2) and (2, -5) lie in [1]
(a) Same Quadrant (b) Quadrant II and Quadrant III respectively
(c) Quadrant II and Quadrant IV respectively (d) Quadrant IV and Quadrant II respectively
- 7) In the given figure, if $AB \parallel CQ$, the sum of $\angle a$ and $\angle b$ is [1]



- (a) $\angle c + \angle d$ (b) $\angle d + \angle e$ (c) $\angle b + \angle c$ (d) $\angle a + \angle c$

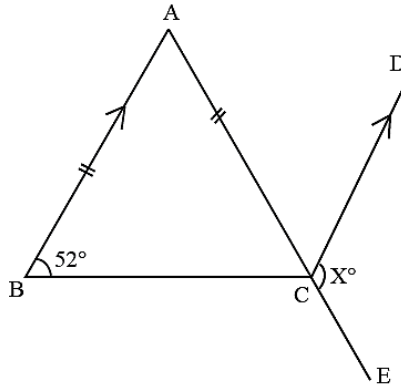
8) The angle which is five times its supplement is [1]

- (a) 150° (b) 180° (c) 90° (d) 360°

9) In $\triangle ABC$ and $\triangle DEF$, $AB = FD$ and $\angle A = \angle D$. The two triangles will be congruent by SAS axiom if [1]

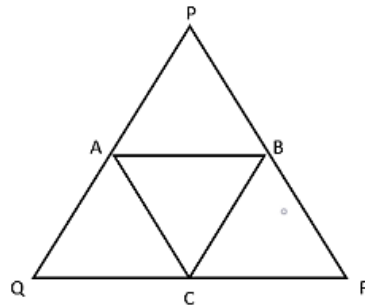
- (a) $BC = EF$ (b) $AC = DE$ (c) $AC = EF$ (d) $BC = DE$

10) In the following figure, ABC is an isosceles triangle with AB equal to AC . AC is produced to point E and CD is drawn parallel to BA . If $\angle CBA = 52^\circ$, the measurement of $\angle DCE$ is [1]



- (a) 76° (b) 128° (c) 104° (d) 100°

11) If perimeter of the equilateral triangle PQR is 36cm and A, B and C are midpoints, the perimeter of $\triangle ABC$ is [1]



- (a) 9 cm (b) 36 cm (c) 20 cm (d) 18 cm

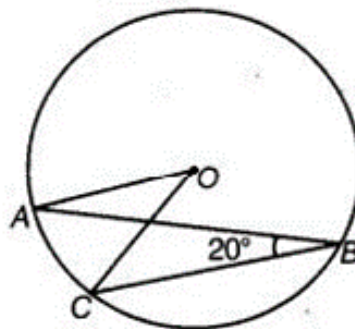
12) Diagonals of quadrilateral $ABCD$ bisect each other. If $\angle A = 45^\circ$, then the value of $\angle B$ is: [1]

- (a) 90° (b) 45° (c) 135° (d) 120°

13) The line joining the centre of a circle to the mid-point of a chord is always: [1]

- (a) Perpendicular to the chord (b) Parallel to the chord
(c) Equal to the chord (d) Equal to radius

14) In the given figure, if $\angle ABC = 20^\circ$, then $\angle AOC$ is equal to [1]



- (a) 20° (b) 40° (c) 60° (d) 10°

15) The area of an equilateral triangle is $16\sqrt{3} \text{ cm}^2$, then the perimeter of the triangle is [1]

- (a) 48 cm (b) 24 cm (c) 12 cm (d) 306 cm

16) The volume of two spheres are in the ratio of 64 : 27. The ratio of their surface area is: [1]

- (a) 4 : 3 (b) 3 : 4 (c) 16 : 9 (d) 5 : 9

- 17) The curved surface area and the slant height of a right circular cone are 99 cm^2 and 9 cm respectively. The diameter of the base of the cone is: [1]
 (a) 3.5 cm (b) 7 cm (c) 14 cm (d) 10.5 cm
- 18) To draw a histogram to represent the following frequency distribution, the adjusted frequency for the class interval 25 – 45 is: [1]

C. I.	5 – 10	10 – 15	15 – 25	25 – 45	45 – 75
f	6	12	10	8	15

[C.I. stands for Class Interval and f stands for frequency.]

- (a) 6 (b) 5 (c) 2 (d) 3

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):** If $p(x) = x^2 - 4x + 3$, then 3 and 1 are the zeroes of the polynomial $p(x)$. [1]

Reason (R): Number of zeroes of a polynomial cannot exceed its degree.

20) **Assertion (A):** The simplified form of $7^4 \times 7^5$ is 7^{20} . [1]

Reason (R): If $a > 0$ be a real number and p and q be rational numbers, then $a^p \times a^q = a^{p+q}$.

Section B

(Section B consists of 5 questions of 2 marks each.)

21) **(A)** If $p(x) = 2x^2 - 3x + 1$, then find the value of $\frac{p(1)-p(-1)}{2}$. [2]

OR

21) **(B)** If the remainder on dividing the polynomial $2x^4 - kx^2 + 5x - 3k + 3$ by $(x + 2)$ is 4, then find the value of k. [2]

22) If $x = 3m + 2$ and $y = 2m - 1$ is a solution of the equation $4x - 3y + 1 = 0$, find the value of m . [2]

23) **(A)** Write $\frac{7}{11}$ in decimal form (show the calculations) and mention the kind of decimal expansion it has. [2]

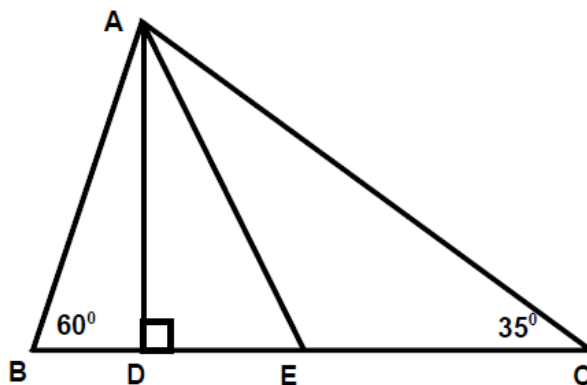
OR

23) **(B)** Represent $\sqrt{3}$ on the number line. [2]

24) Write the co-ordinates of the following points: [2]

- (i) Lying on both the axes.
- (ii) Lying on x-axis with x-coordinate 6.
- (iii) Lying in Quadrant III with x-coordinate is twice of y-coordinate.
- (iv) Lying on y-axis with y-coordinate -10 .

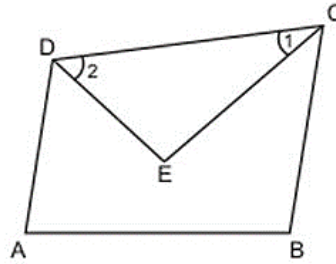
25) In the following figure, $AD \perp BC$ and AE is the angle bisector of $\angle BAC$. Find $\angle DAE$. [2]



Section C

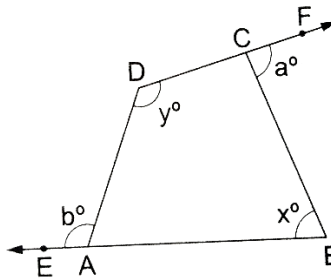
(Section C consists of 6 questions of 3 marks each.)

- 26) (A) In quadrilateral ABCD, the line segments bisecting $\angle C$ and $\angle D$ meet at E. Prove that $\angle A + \angle B = 2\angle CED$. [3]



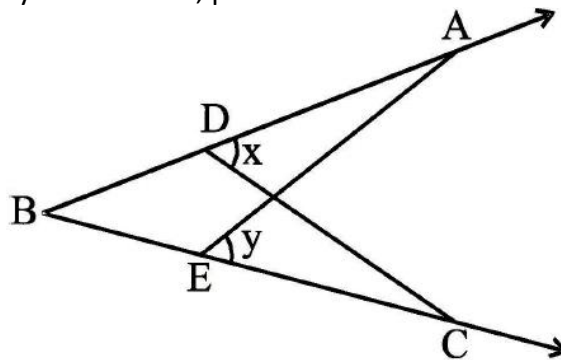
OR

- 26) (B) The sides BA and DC of a quadrilateral are produced as shown in the given figure. [3]



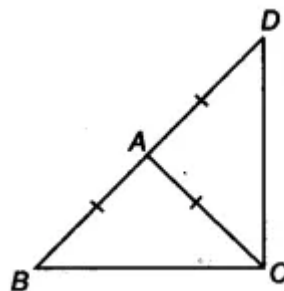
Prove that $x + y = a + b$

- 27) ABCD is a rectangle. X and Y are points on sides AD and BC respectively such that $AY = BX$. Prove that $BY = AX$ and $\angle BAY = \angle ABX$. [3]
- 28) Prove that the angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle. [3]
- 29) A triangular park in a city has lengths of sides as 100 m, 90 m and 110 m. A contract is given to a company for planting grass in the park at the rate of ₹ 4000 per square metre. Find the amount to be paid to the company. [$\sqrt{2} = 1.414$] [3]
- 30) (A) In the given figure, if $\angle x = \angle y$ and $AB = CB$, prove that $AE = CD$. [3]



OR

- 30) (B) $\triangle ABC$ is an isosceles triangle in which $AB = AC$. Side BA is produced to D such that $AD = AB$. Show that $\angle BCD$ is a right angle. [3]



- 31) What must be subtracted from $x^4 + 2x^3 - 2x^2 + 4x + 6$ so that the result is exactly divisible by $x^2 + 2x - 3$. [3]

Section D

(Section D consists of 4 questions of 5 marks each.)

- 32) If $(x - 3)$ and $(x - \frac{1}{3})$ are both factors of $ax^2 + 5x + b$, then show that $a = b$. [5]

- 33) (A) Find the values of a and b if $\frac{7+3\sqrt{5}}{3+\sqrt{5}} - \frac{7-3\sqrt{5}}{3-\sqrt{5}} = a + \sqrt{5}b$. [5]

OR

- 33) (B) If $x = \frac{5-\sqrt{21}}{2}$, prove that $(x^3 + \frac{1}{x^3}) - 5(x^2 + \frac{1}{x^2}) + (x + \frac{1}{x}) = 0$. [5]

- 34) (A) The internal and external diameters of a hollow hemispherical vessel are 24 cm and 25 cm respectively. If the cost of painting 1 cm² surface area is ₹ 1.5, find the total cost of painting the vessel all over. [5]

OR

- 34) (B) A cloth having an area of 165 m² is shaped into the form of a conical tent of radius 5 m.
 (i) How many students can sit in the tent if a student, on an average, occupies $\frac{5}{7}$ m² on the ground?
 (ii) Find the volume of the cone. [5]

- 35) The runs scored by two teams A and B on the first 60 balls in a cricket match are given below:

No. of Balls	1-6	7-12	13-18	19-24	25-30	31-36	37-42	43-48	49-54	55-60
Team A	5	6	8	9	12	15	14	2	18	11
Team B	2	8	12	19	12	10	16	8	10	3

Represent the data of both the teams on the same graph by frequency polygon. [5]

Section E

- 36) **Case Study-1:**

On the 15th birthday, Sumit's parent decided to invite all his friends and hired a magician for performing a magic show in the party. The magician was wearing a conical shape cap in which 30.8 sq.cm of cloth was used. Also, the circumference of the base of the cap was 17.6 cm.



Based on the above information, answer the following questions:

- a) Find the slant height of the cone. [1]
 b) How much cloth will be required for 15 caps (assuming that no cloth will be wasted)? [1]
 c) Find the height of the cone. [2]

OR

- d) What is the volume of the cone? [Find the answer in terms of π] [2]

- 37) **Case Study-2:**

Sanjay bought 5 notebooks and 2 pens for ₹ 120. He told to guess the cost of each notebook and pen to his friends, Mohan and Anil. Sanjay has given the clue that the cost of a notebook is greater than that of a pen.



Based on the above information, answer the following questions:

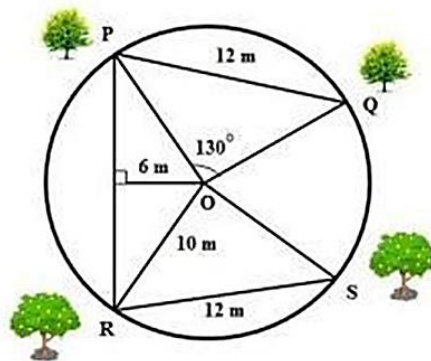
- Form linear equations in two variables based on the situation given above by taking cost of one notebook as ₹ x and cost of one pen as ₹ y . [1]
- If the cost of one notebook is ₹ 15 and cost of one pen is ₹ 10, then find the total amount for 9 pens and 2 notebooks. [1]
- Find the solution of the equation formed in (a) using Sanjay's clue. [2]

OR

- If the cost of one notebook is twice the cost of one pen, then find the cost of one pen from the equation obtained in (a). [2]

38) Case Study-3:

A farmer has a circular garden as shown in the picture. He has different types of trees, plants and flower plants in his garden. In the garden, there are two mango trees P and Q at a distance $PQ = 12$ m. Similarly, the garden has two Litchi trees at the same distance of 12 m as shown at R and S. PQ subtends $\angle POQ = 130^\circ$ at centre O. The perpendicular distance of PR from centre is 6 m and radius of garden is 10 m.



- What is the value of $\angle ROS$? [1]
- Find the value of $\angle ORS$. [1]
- Are the quadrilaterals QPTO and SRTO congruent with each other? Justify your answer. [2]

OR

- What is the distance between Mango tree P and Litchi tree R? [2]
