

SAMPLE QUESTION PAPER

Class 9 – Mathematics

SA-I Examination • 2026-27

Time Allowed: 3 hours

Maximum Marks: 90

General Instructions:

1. All questions are compulsory.
2. This question paper consists of 4 sections.
3. Section A contains MCQs of 1 mark each. Section B contains 2-mark questions. Section C contains 3-mark questions. Section D contains 4-mark questions.
4. There is no overall choice. However, internal choices are provided in some questions.
5. Use of calculator is not permitted.

SECTION A

Question numbers 1 to 8 carry 1 mark each. Choose the correct option.

- Q1.** Which of the following is an irrational number? **[1 Mark]**
(A) $\sqrt{16}$ (B) $\sqrt{9/4}$ (C) $\sqrt{7}$ (D) 0.25
- Q2.** If $x = 2 + \sqrt{3}$, then the value of $x + 1/x$ is: **[1 Mark]**
(A) 4 (B) $2\sqrt{3}$ (C) $4 + 2\sqrt{3}$ (D) $4 - 2\sqrt{3}$
- Q3.** The value of $(64)^{-1/3} \times (64)^{1/3} + (64)^{2/3}$ is: **[1 Mark]**
(A) 17 (B) 1 (C) 16 (D) 15
- Q4.** If $p(x) = x^3 - 4x^2 + x + 6$, then $p(3)$ equals: **[1 Mark]**
(A) 6 (B) 0 (C) -6 (D) 3
- Q5.** Which of the following is a factor of $x^3 + 3x^2 - x - 3$? **[1 Mark]**
(A) $x - 3$ (B) $x + 2$ (C) $x - 1$ (D) $x + 3$
- Q6.** The degree of the polynomial $5x^4 - 3x^2 + 7x - 2$ is: **[1 Mark]**
(A) 2 (B) 1 (C) 4 (D) 3
- Q7.** In triangle ABC, if $\angle A = 55^\circ$ and $\angle B = 65^\circ$, then the exterior angle at C equals: **[1 Mark]**
(A) 60° (B) 120° (C) 115° (D) 130°
- Q8.** Which of the following pairs of angles can be the base angles of an isosceles triangle? **[1 Mark]**
(A) $60^\circ, 80^\circ$ (B) $90^\circ, 90^\circ$ (C) $50^\circ, 50^\circ$ (D) $70^\circ, 50^\circ$
- Q9.** The point $(-3, 5)$ lies in which quadrant of the Cartesian plane? **[1 Mark]**
(A) Quadrant I (B) Quadrant II (C) Quadrant III (D) Quadrant IV
- Q10.** The perpendicular distance of the point $P(4, -7)$ from the x-axis is: **[1 Mark]**
(A) 4 units (B) 7 units (C) 11 units (D) 3 units
- Q11.** The lateral surface area of a cube of side 5 cm is: **[1 Mark]**
(A) 25 cm^2 (B) 100 cm^2 (C) 150 cm^2 (D) 75 cm^2

- Q12.** If the radius of a sphere is doubled, by what factor does the surface area change? **[1 Mark]**
(A) 2 (B) 4 (C) 8 (D) 16

SECTION B

Question numbers 13 to 19 carry 2 marks each. Write neat and concise solutions.

- Q13.** Simplify: $(\sqrt{5} + \sqrt{3})(\sqrt{5} - \sqrt{3}) + (2 + \sqrt{3})^2$ **[2 Marks]**
- Q14.** Rationalise the denominator of $3/(4 + \sqrt{7})$ and express in the form $a + b\sqrt{7}$. **[2 Marks]**
- Q15.** If the polynomial $p(y) = y^3 - 5y^2 + ky + 6$ has $(y - 2)$ as a factor, find the value of k . **[2 Marks]**
- Q16.** Expand using a suitable identity: $(3x - 2y)^2$ **[2 Marks]**
- Q17.** In the figure, two straight lines PQ and RS intersect at point O. If $\angle POR = 5x$ and $\angle ROQ = 3x + 20^\circ$, find the value of x and the measure of each angle formed at O. **[2 Marks]**
- Q18.** In triangle PQR, the bisectors of $\angle Q$ and $\angle R$ meet at point I. If $\angle P = 70^\circ$, find $\angle QIR$. **[2 Marks]**
- Q19.** The point A(3, k) and B(-1, 2) are such that the segment AB is parallel to the x-axis. Find the value of k and the length of AB. **[2 Marks]**

SECTION C

Question numbers 20 to 29 carry 3 marks each. Show all steps clearly.

- Q20.** Express 0.32 (i.e., 0.323232...) as a fraction in its simplest form. Hence verify that it is a rational number. **[3 Marks]**
- Q21.** If $a = 5 - 2\sqrt{6}$, find the value of $\sqrt{a} + 1/\sqrt{a}$. **[3 Marks]**
- Q22.** Factorise completely: $2x^3 + x^2 - 13x + 6$ **[3 Marks]**
- Q23.** Using a suitable algebraic identity, evaluate 98^3 without direct multiplication. (Hint: write $98 = 100 - 2$) **[3 Marks]**
- Q24.** In triangle ABC, D is the midpoint of BC. Prove that $AB + AC > 2AD$. (Use the property that the sum of any two sides of a triangle is greater than the third side.) **[3 Marks]**
- Q25.** In a quadrilateral ABCD, $\angle A = 80^\circ$, $\angle B = (2x + 10)^\circ$, $\angle C = (3x - 5)^\circ$, and $\angle D = 65^\circ$. Find the values of $\angle B$ and $\angle C$. Also verify that ABCD is a valid quadrilateral. **[3 Marks]**
- Q26.** ABC is an isosceles triangle with $AB = AC$. D is a point on BC such that $AD \perp BC$. Prove that $\angle ABD = \angle ACD$. **[3 Marks]**
- Q27.** In the given figure, lines l and m are parallel and t is a transversal. If $\angle 1 = (4x + 15)^\circ$ and $\angle 2 = (5x - 10)^\circ$ are co-interior (same-side interior) angles, find x and both angles. Also state which property is used. **[3 Marks]**

- Q28.** Prove that the angles opposite to equal sides of a triangle are equal (i.e., the base angles of an isosceles triangle are equal). Use this result to find $\angle B$ and $\angle C$ in triangle ABC where $AB = AC$ and $\angle A = 50^\circ$. **[3 Marks]**
- Q29.** The total surface area of a closed cylinder is 1540 cm^2 . If the height of the cylinder is 10 cm , find its radius and volume. (Use $\pi = 22/7$) **[3 Marks]**

SECTION D

Question numbers 30 to 39 carry 4 marks each. Questions marked with () have an OR part. Write detailed step-by-step solutions.*

- Q30.** Represent $\sqrt{9.3}$ on the number line using geometric construction. Describe each step clearly. **[4 Marks]**
- Q31.** (*) If $x = (\sqrt{3} + 1)/(\sqrt{3} - 1)$ and $y = (\sqrt{3} - 1)/(\sqrt{3} + 1)$, find the value of $x^2 + y^2 + xy$. Show all rationalization steps. **[4 Marks]**

O R

- Q31(OR).** Prove that $(a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$. Using this identity, find the value of $a^2 + b^2 + c^2$ if $a + b + c = 10$ and $ab + bc + ca = 27$. **[undefined Mark]**
- Q32.** (*) Factorise: $8x^3 - y^3 - 6x^2y + 3xy^2 + 27 - 18y^2 + 27y - y^3$. Wait – factorise $27x^3 + 8y^3 + z^3 - 18xyz$. Verify your factorisation by substituting $x = 1, y = 1, z = -3$. **[4 Marks]**

O R

- Q32(OR).** Factorise: $x^4 + x^2 + 1$. Hence factorise $x^4 + x^2 + 1$ completely into irreducible quadratic factors and verify by expanding the result. **[undefined Mark]**
- Q33.** (*) Using the Factor Theorem, show that $(2x + 1)$ is a factor of $2x^3 + 7x^2 + 2x - 3$. Hence, fully factorise the polynomial $2x^3 + 7x^2 + 2x - 3$. **[4 Marks]**

O R

- Q33(OR).** If $x + y + z = 6$ and $xy + yz + zx = 11$, find the value of $x^3 + y^3 + z^3 - 3xyz$. Also find $x^2 + y^2 + z^2$ using the given information. **[undefined Mark]**
- Q34.** Prove that if two lines intersect, then the vertically opposite angles are equal. Using this theorem, find all four angles at the point of intersection if one of the angles is $(3y - 15)^\circ$. **[4 Marks]**
- Q35.** (*) In triangle ABC, the bisectors of $\angle B$ and $\angle C$ meet at O. Prove that $\angle BOC = 90^\circ + (1/2)\angle A$. **[4 Marks]**

O R

- Q35(OR).** In triangle ABC, if D is a point on BC such that $\angle ABD = \angle ACD$, prove that ABDC is an isosceles arrangement i.e., $AB = AC$. (Prove the converse: if base angles are equal, then triangle is isosceles.) **[undefined Mark]**
- Q36.** In triangle ABC and triangle DEF, $AB = DF, AC = DE,$ and $BC = EF$. Prove that triangle ABC \cong triangle DFE using an appropriate **[4 Marks]**

congruence criterion. Also state clearly all corresponding parts that are equal.

- Q37. (*)** In a parallelogram ABCD, E is the midpoint of AB and F is the midpoint of CD. Prove that the line segments AF and CE bisect the diagonal BD. **[4 Marks]**

O R

- Q37(OR).** In the figure, ABCD is a quadrilateral in which AB = AD and CB = CD. Show that (i) AC bisects $\angle A$ and $\angle C$, and (ii) $AC \perp BD$. **[undefined Mark]**

- Q38. (*)** Plot the points A(1, 3), B(-2, -1), and C(4, -1) on the Cartesian plane. Find the lengths of all three sides of triangle ABC using the distance formula. Hence determine whether triangle ABC is scalene, isosceles, or equilateral. **[4 Marks]**

O R

- Q38(OR).** The vertices of a rectangle PQRS are P(1, 2), Q(5, 2), and R(5, 6). Find the coordinates of S. Also find the lengths of the diagonals PR and QS using the distance formula and verify that the diagonals of a rectangle are equal. **[undefined Mark]**

- Q39. (*)** A cuboid-shaped water tank has length 4 m, breadth 3 m, and height 2.5 m. It is to be painted on all outer surfaces including the base. Find the total area to be painted. If the painting cost is ₹25 per square metre, what is the total cost? Also find the volume of water the tank can hold. **[4 Marks]**

O R

- Q39(OR).** The diameter of a hemispherical bowl is 14 cm. Find (i) its curved surface area, (ii) its total surface area, and (iii) the volume of liquid it can hold. (Use $\pi = \frac{22}{7}$) **[undefined Mark]**