MATH LOVE INSTITUTE

CBSE Class 9 Mathematics (Code: 041)

Sample Paper 1 - Home Exam 2025-26 with Complete Solutions

Based on Latest CBSE Syllabus & Exam Pattern 2025-26

Maximum Marks	80 (Theory)
Time Allowed	3 Hours
Class	IX (Nine)
Subject	Mathematics (041)

📋 GENERAL INSTRUCTIONS:

1. This question paper contains **38 questions** divided into **Five Sections A, B, C, D and E**.
2. **Section A**: 20 MCQs of 1 mark each (20 marks)
3. **Section B**: 5 Very Short Answer Type questions of 2 marks each (10 marks)
4. **Section C**: 6 Short Answer Type questions of 3 marks each (18 marks)
5. **Section D**: 4 Long Answer Type questions of 5 marks each (20 marks)
6. **Section E**: 3 Case Study Based questions of 4 marks each (12 marks)
7. All questions are **compulsory**. However, internal choices have been provided in some questions.
8. Draw neat diagrams wherever required. Take $\pi = 22/7$ wherever required.
9. Use of calculators is **NOT** permitted.

SECTION A - MULTIPLE CHOICE QUESTIONS (1 × 20 = 20 Marks)

Q1. Which of the following is an irrational number? **[1]**

(a) $\sqrt{4}$

(b) $\sqrt{9}$

(c) $\sqrt{7}$

(d) $\sqrt{16}$

Q2. The value of $(2 + \sqrt{3})(2 - \sqrt{3})$ is: **[1]**

(a) 1

(b) 4

(c) 7

(d) $1 - \sqrt{3}$

Q3. The degree of the polynomial $5x^3 - 4x^2 + 7x - 8$ is: **[1]**

(a) 1

(b) 2

(c) 3

(d) 4

Q4. The graph of the linear equation $y = 3$ is a line: **[1]**

(a) Parallel to x-axis

(b) Parallel to y-axis

(c) Passing through origin

(d) Passing through (0, 3) and (1, 3)

Q5. If the point (3, 4) lies on the graph of $3y = ax + 7$, then the value of a is: **[1]**

(a) 4/3

(b) 5/3

(c) 1

(d) 7/3

Q6. In $\triangle ABC$, if $\angle A = 50°$ and $\angle B = 60°$, then $\angle C$ is: **[1]**

(a) 50°

(b) 60°

(c) 70°

(d) 80°

Q7. If two sides of a triangle are equal, the angles opposite to them are: **[1]**

(a) Equal

(b) Unequal

(c) Supplementary

(d) Complementary

Q8. The sum of all angles of a quadrilateral is: **[1]**

(a) 180°

(b) 270°

(c) 360°

(d) 450°

Q9. A diagonal of a rectangle is 17 cm and its width is 8 cm. The area of the rectangle is: **[1]**

(a) 120 cm^2

(b) 136 cm^2

(c) 150 cm^2

(d) 170 cm^2

Q10. The radius of a circle is 7 cm. The circumference of the circle is: **[1]**

(a) 22 cm

(b) 44 cm

(c) 154 cm

(d) 308 cm

Q11. A chord of a circle of radius 10 cm subtends a right angle at its centre. The length of the chord is: **[1]**

(a) $5\sqrt{2}$ cm

(b) 10 cm

(c) $10\sqrt{2}$ cm

(d) 20 cm

Q12. The semi-perimeter of a triangle with sides 12 cm, 16 cm and 20 cm is: **[1]**

(a) 24 cm

(b) 32 cm

(c) 48 cm

(d) 96 cm

Q13. The total surface area of a cube with edge 10 cm is: **[1]**

(a) 100 cm^2

(b) 400 cm^2

(c) 600 cm^2

(d) 1000 cm^2

Q14. The volume of a cuboid with dimensions 5 cm × 4 cm × 3 cm is: **[1]**

(a) 12 cm^3

(b) 20 cm^3

(c) 60 cm^3

(d) 80 cm^3

Q15. If the diameter of a hemisphere is 14 cm, its total surface area is: **[1]**

(a) 154 cm^2

(b) 231 cm^2

(c) 308 cm^2

(d) 462 cm^2

Q16. The class mark of the class 120-150 is: **[1]**

(a) 120

(b) 130

(c) 135

(d) 140

Q17. The mean of first five natural numbers is: **[1]**

(a) 2

(b) 2.5

(c) 3

(d) 3.5

Q18. If the coordinates of two points are P(0, 6) and Q(0, -2), then (abscissa of P) - (abscissa of Q) is: **[1]**

(a) 8

(b) 4

(c) 2

(d) 0

Q19. The point (-3, 5) lies in the quadrant: **[1]**

(a) I

(b) II

(c) III

(d) IV

Q20. If $x + 2y = 5$ and $3x - 2y = 11$, then x is equal to: **[1]**

(a) 2

(b) 3

(c) 4

(d) 5

SECTION B - VERY SHORT ANSWER TYPE QUESTIONS (2 × 5 = 10 Marks)

Q21. Express $0.\overline{6}$ (0.666...) in the form p/q where p and q are integers and $q \neq 0$. **[2]**

Q22. Find the value of k, if $x = 1$ and $y = 2$ is a solution of the equation $2x + 3y = k$. **[2]**

Q23. In the figure, if AB || CD, ∠APQ = 50° and ∠PRD = 130°, find ∠QPR. **[2]**

[Assume a figure showing two parallel lines with transversal]

Q24. If the area of an equilateral triangle is $16\sqrt{3}$ cm², find its perimeter. **[2]**

Q25. Find the mode of the following data: 12, 14, 12, 16, 15, 13, 14, 18, 19, 12, 14, 15, 16, 15, 16, 16, 15, 17, 13, 16. **[2]**

SECTION C - SHORT ANSWER TYPE QUESTIONS (3 × 6 = 18 Marks)

Q26. Rationalize the denominator: $1/(\sqrt{7} - \sqrt{6})$ **[3]**

Q27. If $x + y = 12$ and $xy = 32$, find the value of $x^3 + y^3$. **[3]**

Q28. The angles of a quadrilateral are in the ratio 3:4:5:6. Find all the angles of the quadrilateral. **[3]**

Q29. In △ABC, AB = AC and ∠A = 80°. Find ∠B and ∠C. **[3]**

OR

Show that the angles of an equilateral triangle are 60° each.

Q30. Find the area of a triangle whose sides are 18 cm, 24 cm and 30 cm using Heron's formula. **[3]**

Q31. A hemispherical bowl of internal radius 9 cm is full of liquid. The liquid is to be filled in cylindrical bottles of radius 3 cm and height 4 cm. How many bottles are required? **[3]**

SECTION D - LONG ANSWER TYPE QUESTIONS (5 × 4 = 20 Marks)

Q32. Prove that: $(\sqrt{3} + \sqrt{5})^2 = 8 + 2\sqrt{15}$. Hence find the value of $1/(8 + 2\sqrt{15})$ after rationalizing the denominator. **[5]**

OR

If $x = 2 + \sqrt{3}$, find the value of $x^3 + 1/x^3$.

Q33. Factorise: $x^3 + 13x^2 + 32x + 20$ **[5]**

Q34. In △ABC, D, E and F are respectively the mid-points of sides BC, CA and AB. Show that △ABC is divided into four congruent triangles by joining D, E and F. **[5]**

OR

In a triangle, if square of one side is equal to the sum of the squares of the other two sides, prove that the angle opposite the first side is a right angle. (Pythagoras Theorem - Converse)

Q35. Draw the graph of the linear equation $3x + 4y = 12$. From the graph, find: **[5]**

(i) The coordinates where the line meets X-axis

(ii) The coordinates where the line meets Y-axis

(iii) The coordinates of one more point on the line

SECTION E - CASE STUDY BASED QUESTIONS (4 × 3 = 12 Marks)

Q36. **[4]**

CASE STUDY 1: School Garden Design

A school wants to design a triangular garden with dimensions as follows: The three sides of the triangular garden are 26 m, 28 m and 30 m. The school management wants to plant grass in the garden and also construct a fountain at the centroid of the triangle.

Based on the above information, answer the following questions:

(i) Find the semi-perimeter of the triangular garden. **[1 mark]**

(ii) Find the area of the triangular garden using Heron's formula. **[2 marks]**

(iii) If the cost of planting grass is ₹15 per m^2, find the total cost of planting grass in the entire garden. **[1 mark]**

Q37. **[4]**

CASE STUDY 2: Water Tank Problem

A cylindrical water tank has radius 1.4 m and height 2 m. The water from this tank is to be transferred to smaller cylindrical containers having radius 0.7 m and height 0.5 m.

Based on the above information, answer the following questions:

(i) Find the volume of the large water tank. **[1 mark]**

(ii) Find the volume of one small container. **[1 mark]**

(iii) How many small containers are required to empty the large tank completely? **[2 marks]**

Q38. **[4]**

CASE STUDY 3: Temperature Analysis

The following data shows the daily maximum temperatures (in °C) recorded in a city for 30 days:

Temperature (°C)	25-30	30-35	35-40	40-45
Number of days	4	8	12	6

Based on the above information, answer the following questions:

(i) What is the class width of the distribution? **[1 mark]**

(ii) Write the class mark of the class 35-40. **[1 mark]**

(iii) Calculate the mean temperature using the formula:
Mean = $\Sigma(f_i \times x_i) / \Sigma f_i$, where x_i is the class mark and f_i is the frequency. **[2 marks]**

📚 END OF QUESTION PAPER 📚

Total Marks: 80

Section A: 20 marks | Section B: 10 marks | Section C: 18 marks

Section D: 20 marks | Section E: 12 marks

Based on CBSE Class 9 Mathematics Syllabus 2025-26
Most Expected Questions for Home Exams

🎯 DETAILED SOLUTIONS WITH STEP-BY-STEP EXPLANATIONS

SECTION A - SOLUTIONS (1 × 20 = 20 Marks)

Q1. Answer: (c) √7

Explanation: √4 = 2, √9 = 3, √16 = 4 (all rational numbers). √7 cannot be expressed as p/q form, hence it is irrational.

Q2. Answer: (a) 1

Solution:
$(2 + \sqrt{3})(2 - \sqrt{3}) = 2^2 - (\sqrt{3})^2$ [Using $(a+b)(a-b) = a^2 - b^2$]
$= 4 - 3 = 1$

Q3. Answer: (c) 3

Explanation: The degree of a polynomial is the highest power of the variable. Here, the highest power of x is 3.

Q4. Answer: (a) Parallel to x-axis

Explanation: y = 3 means for all values of x, y remains constant at 3. This represents a horizontal line parallel to x-axis passing through (0, 3).

Q5. Answer: (b) 5/3

Solution:

Point (3, 4) lies on $3y = ax + 7$

Substituting $x = 3$, $y = 4$:

$3(4) = a(3) + 7$

$12 = 3a + 7$

$3a = 5$

$a = 5/3$

Q6. Answer: (c) 70°

Solution:

In $\triangle ABC$, $\angle A + \angle B + \angle C = 180°$ [Angle sum property]

$50° + 60° + \angle C = 180°$

$\angle C = 180° - 110° = 70°$

Q7. Answer: (a) Equal

Explanation: This is the Isosceles Triangle Theorem - angles opposite to equal sides are equal.

Q8. Answer: (c) 360°

Explanation: The sum of all interior angles of a quadrilateral is 360°.

Q9. Answer: (a) 120 cm²

Solution:

In rectangle, $\text{diagonal}^2 = \text{length}^2 + \text{width}^2$

$17^2 = l^2 + 8^2$

$289 = l^2 + 64$

$l^2 = 225$

l = 15 cm

Area = l × w = 15 × 8 = 120 cm²

Q10. Answer: (b) 44 cm

Solution:

Circumference = 2πr = 2 × (22/7) × 7 = 44 cm

Q11. Answer: (c) 10√2 cm

Solution:

Since chord subtends 90° at center, triangle formed is right-angled isosceles

Using Pythagoras: Chord² = r² + r²

Chord² = 10² + 10² = 200

Chord = √200 = 10√2 cm

Q12. Answer: (a) 24 cm

Solution:

Semi-perimeter, s = (a + b + c)/2

s = (12 + 16 + 20)/2 = 48/2 = 24 cm

Q13. Answer: (c) 600 cm²

Solution:

Total Surface Area of cube = 6a²

= 6 × 10² = 6 × 100 = 600 cm²

Q14. Answer: (c) 60 cm³

Solution:

Volume of cuboid = l × b × h

= 5 × 4 × 3 = 60 cm³

Q15. Answer: (d) 462 cm²

Solution:

Radius = d/2 = 14/2 = 7 cm

Total Surface Area of hemisphere = $3\pi r^2$

= 3 × (22/7) × 7 × 7

= 3 × 22 × 7 = 462 cm²

Q16. Answer: (c) 135

Solution:

Class mark = (Upper limit + Lower limit)/2

= (150 + 120)/2 = 270/2 = 135

Q17. Answer: (c) 3

Solution:

First five natural numbers: 1, 2, 3, 4, 5

Mean = (1 + 2 + 3 + 4 + 5)/5 = 15/5 = 3

Q18. Answer: (d) 0

Solution:

Abscissa of P = 0, Abscissa of Q = 0

Difference = 0 - 0 = 0

Q19. Answer: (b) II

Explanation: Point (-3, 5) has negative x-coordinate and positive y-coordinate, hence it lies in Quadrant II.

Q20. Answer: (c) 4

Solution:

x + 2y = 5 ...(i)

3x - 2y = 11 ...(ii)

Adding (i) and (ii):

4x = 16

x = 4

SECTION B - SOLUTIONS (2 × 5 = 10 Marks)

Q21. Solution:

Marking Scheme: 1 mark for method + 1 mark for answer

Let x = 0.666...

Then 10x = 6.666...

Subtracting: 10x - x = 6.666... - 0.666...

9x = 6

x = 6/9 = 2/3

Answer: $0.\overline{6} = 2/3$

Q22. Solution:

Marking Scheme: 1 mark for substitution + 1 mark for value of k

Given equation: 2x + 3y = k

Substituting x = 1, y = 2:

$2(1) + 3(2) = k$

$2 + 6 = k$

$k = 8$

Q23. Solution:

> **Marking Scheme:** 1 mark for identifying angles + 1 mark for calculation

Since AB || CD and PQ is a transversal:

$\angle APQ + \angle PQR = 180°$ [Co-interior angles]

$50° + \angle PQR = 180°$

$\angle PQR = 130°$

$\angle PRD = 130°$ (given)

$\angle PQR + \angle QPR + \angle PRQ = 180°$ [Triangle angle sum]

Since $\angle PQR$ and $\angle PRD$ are alternate interior angles:

$\angle QPR = 180° - 130° - \angle PQR$

$\angle QPR = 80°$

Q24. Solution:

> **Marking Scheme:** 1 mark for finding side + 1 mark for perimeter

Area of equilateral triangle = $(\sqrt{3}/4)a^2$

$16\sqrt{3} = (\sqrt{3}/4)a^2$

$a^2 = 64$

$a = 8$ cm

Perimeter = $3a = 3 \times 8 =$ **24 cm**

Q25. Solution:

> **Marking Scheme:** 1 mark for frequency table + 1 mark for mode

Frequency count:

12 appears 3 times

13 appears 2 times

14 appears 3 times

15 appears 4 times

16 appears 5 times

17 appears 1 time

18 appears 1 time

19 appears 1 time

Mode = 16 (highest frequency)

SECTION C - SOLUTIONS (3 × 6 = 18 Marks)

Q26. Solution:

> **Marking Scheme:** 1 mark for multiplying conjugate + 1 mark for simplification + 1 mark for final answer

$1/(\sqrt{7} - \sqrt{6})$

Multiplying numerator and denominator by $(\sqrt{7} + \sqrt{6})$:

$= [1 \times (\sqrt{7} + \sqrt{6})] / [(\sqrt{7} - \sqrt{6})(\sqrt{7} + \sqrt{6})]$

$= (\sqrt{7} + \sqrt{6}) / [(\sqrt{7})^2 - (\sqrt{6})^2]$

$= (\sqrt{7} + \sqrt{6}) / (7 - 6)$

$= (\sqrt{7} + \sqrt{6}) / 1$

$= \mathbf{\sqrt{7} + \sqrt{6}}$

Q27. Solution:

> **Marking Scheme:** 1 mark for formula + 1 mark for calculation + 1 mark for final answer

Given: $x + y = 12$, $xy = 32$

Using identity: $x^3 + y^3 = (x + y)^3 - 3xy(x + y)$

$x^3 + y^3 = (12)^3 - 3(32)(12)$

$= 1728 - 1152$

$= 576$

Q28. Solution:

> **Marking Scheme:** 1 mark for setting up equation + 1 mark for finding x + 1 mark for all angles

Let the angles be 3x, 4x, 5x, and 6x

Sum of angles of quadrilateral = 360°

$3x + 4x + 5x + 6x = 360°$
$18x = 360°$
$x = 20°$

Angles are:
$3x = 3(20°) = 60°$
$4x = 4(20°) = 80°$
$5x = 5(20°) = 100°$
$6x = 6(20°) = 120°$

Q29. Solution:

Marking Scheme: 1 mark for using isosceles property + 1 mark for angle sum + 1 mark for answer

Given: AB = AC (isosceles triangle)
$\angle A = 80°$

Since AB = AC, $\angle B = \angle C$ [Angles opposite to equal sides are equal]

Using angle sum property:
$\angle A + \angle B + \angle C = 180°$
$80° + \angle B + \angle B = 180°$ [Since $\angle B = \angle C$]
$80° + 2\angle B = 180°$
$2\angle B = 100°$
$\angle B = 50°$

$\angle B = 50°$ and $\angle C = 50°$

OR

In equilateral triangle: AB = BC = CA
Since AB = BC, $\angle A = \angle C$ [Angles opposite to equal sides]
Since BC = CA, $\angle A = \angle B$ [Angles opposite to equal sides]
Therefore, $\angle A = \angle B = \angle C$

Let each angle = x
$x + x + x = 180°$ [Angle sum property]
$3x = 180°$
$x = 60°$

Hence, each angle of an equilateral triangle is 60°.

Q30. Solution:

Marking Scheme: 1 mark for semi-perimeter + 1 mark for Heron's formula + 1 mark for calculation

Given: a = 18 cm, b = 24 cm, c = 30 cm

Semi-perimeter, s = (a + b + c)/2
s = (18 + 24 + 30)/2 = 72/2 = 36 cm

Using Heron's formula:
Area = √[s(s-a)(s-b)(s-c)]

= √[36(36-18)(36-24)(36-30)]
= √[36 × 18 × 12 × 6]
= √[46656]
= 216 cm²

Area = 216 cm²

Q31. Solution:

> **Marking Scheme:** 1 mark for hemisphere volume + 1 mark for cylinder volume + 1 mark for number of bottles

Volume of hemispherical bowl = $(2/3)\pi r^3$
= $(2/3) \times (22/7) \times 9^3$
= $(2/3) \times (22/7) \times 729$
= 1527.43 cm³ (approx)

Volume of one cylindrical bottle = $\pi r^2 h$
= $(22/7) \times 3^2 \times 4$
= $(22/7) \times 9 \times 4$
= 113.14 cm³ (approx)

Number of bottles = Volume of bowl / Volume of one bottle
= 1527.43 / 113.14
≈ 13.5

Therefore, 14 bottles are required

SECTION D - SOLUTIONS (5 × 4 = 20 Marks)

Q32. Solution:

> **Marking Scheme:** 2 marks for proving + 2 marks for rationalization + 1 mark for final answer

To Prove: $(\sqrt{3} + \sqrt{5})^2 = 8 + 2\sqrt{15}$

LHS = $(\sqrt{3} + \sqrt{5})^2$
= $(\sqrt{3})^2 + 2(\sqrt{3})(\sqrt{5}) + (\sqrt{5})^2$ [Using $(a+b)^2 = a^2 + 2ab + b^2$]
= $3 + 2\sqrt{15} + 5$
= $8 + 2\sqrt{15}$ = RHS
Hence Proved

Now, $1/(8 + 2\sqrt{15})$

Multiplying numerator and denominator by $(8 - 2\sqrt{15})$:

= $(8 - 2\sqrt{15}) / [(8 + 2\sqrt{15})(8 - 2\sqrt{15})]$
= $(8 - 2\sqrt{15}) / [64 - 4(15)]$
= $(8 - 2\sqrt{15}) / (64 - 60)$
= $(8 - 2\sqrt{15}) / 4$
= $2 - (\sqrt{15}/2)$

OR

Given: $x = 2 + \sqrt{3}$

$1/x = 1/(2 + \sqrt{3}) = (2 - \sqrt{3})/[(2+\sqrt{3})(2-\sqrt{3})] = (2 - \sqrt{3})/(4-3) = 2 - \sqrt{3}$

Now, $x + 1/x = (2 + \sqrt{3}) + (2 - \sqrt{3}) = 4$

We need $x^3 + 1/x^3$

Using identity: $x^3 + 1/x^3 = (x + 1/x)^3 - 3(x + 1/x)$

$= (4)^3 - 3(4)$
$= 64 - 12$
$= \mathbf{52}$

Q33. Solution:

> **Marking Scheme:** 2 marks for finding factor + 2 marks for factorization + 1 mark for final answer

Let $p(x) = x^3 + 13x^2 + 32x + 20$

By trial, $p(-1) = (-1)^3 + 13(-1)^2 + 32(-1) + 20$
$= -1 + 13 - 32 + 20 = 0$

So, $(x + 1)$ is a factor

Dividing $p(x)$ by $(x + 1)$:
$x^3 + 13x^2 + 32x + 20 = (x + 1)(x^2 + 12x + 20)$

Now factorizing $x^2 + 12x + 20$:
$= x^2 + 10x + 2x + 20$
$= x(x + 10) + 2(x + 10)$
$= (x + 2)(x + 10)$

Therefore: $x^3 + 13x^2 + 32x + 20 = (x + 1)(x + 2)(x + 10)$

Q34. Solution:

> **Marking Scheme:** 2 marks for showing congruence + 2 marks for proving all four triangles congruent + 1 mark for conclusion

Given: In $\triangle ABC$, D, E, F are midpoints of BC, CA, AB respectively

To Prove: △ABC is divided into four congruent triangles

Proof:

By Midpoint Theorem:

• EF || BC and EF = (1/2)BC = BD = DC

• FD || AC and FD = (1/2)AC = AE = EC

• DE || AB and DE = (1/2)AB = AF = FB

Now, BDEF is a parallelogram (EF || BD and EF = BD)

Similarly, AFDE and FDCE are parallelograms

In △FBD and △DEF:

FB = DE (proved above)

BD = EF (proved above)

FD = FD (common)

∴ △FBD ≅ △DEF (SSS congruence)

Similarly, we can prove:

△AEF ≅ △DEF and △CDE ≅ △DEF

Therefore, △ABC is divided into four congruent triangles.

OR

Pythagoras Theorem (Converse):

Statement: In a triangle, if square of one side equals the sum of squares of the other two sides, then the angle opposite the first side is a right angle.

Given: In △ABC, $AC^2 = AB^2 + BC^2$

To Prove: ∠B = 90°

Construction: Draw △PQR such that PQ = AB, QR = BC and ∠Q = 90°

Proof:

In △PQR, ∠Q = 90°

By Pythagoras theorem:

$PR^2 = PQ^2 + QR^2$

$PR^2 = AB^2 + BC^2$ ...(i) [Since PQ = AB, QR = BC]

But given: $AC^2 = AB^2 + BC^2$ ...(ii)

From (i) and (ii):

$PR^2 = AC^2$

$\therefore PR = AC$

Now in $\triangle ABC$ and $\triangle PQR$:

AB = PQ (by construction)

BC = QR (by construction)

AC = PR (proved)

$\therefore \triangle ABC \cong \triangle PQR$ (SSS congruence)

$\therefore \angle B = \angle Q = 90°$ (Corresponding parts of congruent triangles)

Hence Proved

Q35. Solution:

> **Marking Scheme:** 2 marks for finding points + 2 marks for graph + 1 mark for coordinates

Given equation: 3x + 4y = 12

Finding points:

When x = 0: 3(0) + 4y = 12 → y = 3, Point: (0, 3)

When y = 0: 3x + 4(0) = 12 → x = 4, Point: (4, 0)

When x = 4: 3(4) + 4y = 12 → y = 0, Point: (4, 0)

When x = -4: 3(-4) + 4y = 12 → 4y = 24 → y = 6, Point: (-4, 6)

Table of values:

x	0	4	-4

y	3	0	6

[Students should plot these points on graph paper and draw a straight line]

From the graph:

(i) Line meets X-axis at **(4, 0)**

(ii) Line meets Y-axis at **(0, 3)**

(iii) One more point on the line: **(-4, 6)** or any other point satisfying the equation

SECTION E - SOLUTIONS (4 × 3 = 12 Marks)

Q36. Solution: CASE STUDY 1 - School Garden

> **Marking Scheme:** 1 + 2 + 1 = 4 marks

(i) Semi-perimeter:

Sides: a = 26 m, b = 28 m, c = 30 m

s = (a + b + c)/2 = (26 + 28 + 30)/2 = 84/2

s = 42 m

(ii) Area using Heron's formula:

Area = √[s(s-a)(s-b)(s-c)]

= √[42(42-26)(42-28)(42-30)]

= √[42 × 16 × 14 × 12]

= √[112896]

= 336 m²

Area = 336 m²

(iii) Total cost:

Cost of planting grass = ₹15 per m²

Total cost = Area × Rate

= 336 × 15

= ₹5040

Q37. Solution: CASE STUDY 2 - Water Tank

> **Marking Scheme:** 1 + 1 + 2 = 4 marks

(i) Volume of large tank:

Radius = 1.4 m, Height = 2 m

Volume = $\pi r^2 h$

= $(22/7) \times (1.4)^2 \times 2$

= $(22/7) \times 1.96 \times 2$

= $(22/7) \times 3.92$

= 12.32 m^3

Volume = 12.32 m^3

(ii) Volume of small container:

Radius = 0.7 m, Height = 0.5 m

Volume = $\pi r^2 h$

= $(22/7) \times (0.7)^2 \times 0.5$

= $(22/7) \times 0.49 \times 0.5$

= $(22/7) \times 0.245$

= 0.77 m^3

Volume = 0.77 m^3

(iii) Number of containers required:

Number = Volume of large tank / Volume of one container

= 12.32 / 0.77

= 16

16 containers are required

Q38. Solution: CASE STUDY 3 - Temperature Analysis

> **Marking Scheme:** 1 + 1 + 2 = 4 marks

(i) Class width:

Class width = Upper limit - Lower limit

Taking class 25-30: 30 - 25 = 5

Class width = 5°C

(ii) Class mark of 35-40:

Class mark = (Lower limit + Upper limit)/2

= (35 + 40)/2

= 75/2

= 37.5°C

(iii) Mean temperature:

Class	f_i	x_i	f_ix_i
25-30	4	27.5	110
30-35	8	32.5	260
35-40	12	37.5	450
40-45	6	42.5	255
Total	**30**	-	**1075**

Mean = $\Sigma(f_ix_i) / \Sigma f_i$

= 1075 / 30

= 35.83°C (approximately 35.8°C or 36°C)

✅ END OF SOLUTIONS ✅

All solutions strictly based on CBSE Class 9 Syllabus 2025-26

Comprehensive step-by-step explanations with marking schemes

Key Topics Covered:

• Number Systems (Irrational Numbers, Rationalization)

• Polynomials (Factorization, Identities)

• Linear Equations in Two Variables

• Coordinate Geometry

• Triangles (Congruence, Angle Properties)

• Quadrilaterals

• Circles (Chord Properties)

• Heron's Formula

• Surface Areas and Volumes

• Statistics (Mean, Mode, Frequency Distribution)

For queries: www.mathloveinstitute.com