MATH LOVE INSTITUTE

Madhya Pradesh Board of Secondary Education (MPBSE)

Class 8 Mathematics - Annual Examination 2025-26

Question Paper 2 with Complete Solutions

Based on Latest NCERT Syllabus & MP Board Pattern

Maximum Marks	80
Time Allowed	3 Hours
Class	VIII (Eight)
Subject	Mathematics
Board	MP Board (MPBSE)

📋 GENERAL INSTRUCTIONS:

1. This question paper contains **28 questions** divided into **Five Sections A, B, C, D and E**.
2. **Section A**: 10 Multiple Choice Questions of 1 mark each (10 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**.
8. Draw neat diagrams wherever required.
9. Use of calculators is **NOT** permitted.

SECTION A - MULTIPLE CHOICE QUESTIONS (1 × 10 = 10 Marks)

Q1. The additive inverse of (-7/9) is: **[1]**

(a) 7/9

(b) -7/9

(c) 9/7

(d) -9/7

Q2. The solution of the equation 5x - 8 = 12 is: **[1]**

(a) x = 2

(b) x = 3

(c) x = 4

(d) x = 5

Q3. Each exterior angle of a regular hexagon measures: **[1]**

(a) 45°

(b) 60°

(c) 90°

(d) 120°

Q4. The square root of 225 is: **[1]**

(a) 13

(b) 14

(c) 15

(d) 16

Q5. The cube of 4 is: **[1]**

(a) 12

(b) 16

(c) 64

(d) 256

Q6. If the cost price of an article is ₹800 and it is sold at a profit of 15%, the selling price is: **[1]**

(a) ₹900

(b) ₹920

(c) ₹950

(d) ₹880

Q7. The coefficient of x^2 in the expression $3x^2 + 5x - 7$ is: **[1]**

(a) 3

(b) 5

(c) -7

(d) 2

Q8. The lateral surface area of a cuboid with length 8 cm, breadth 5 cm and height 4 cm is: **[1]**

(a) 104 cm^2

(b) 160 cm^2

(c) 184 cm^2

(d) 200 cm^2

Q9. The value of $(-2)^4$ is: **[1]**

(a) -16

(b) 16

(c) -8

(d) 8

Q10. If a and b are in inverse proportion and a = 6 when b = 10, then when a = 15, b equals: **[1]**

(a) 2

(b) 3

(c) 4

(d) 5

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

Q11. Find the product: (3/7) × (-14/9) **[2]**

Q12. Solve: 3(x + 2) = 21 **[2]**

Q13. Find the value of: $\sqrt[3]{216}$ **[2]**

Q14. A shopkeeper bought a TV for ₹8,000 and sold it at a loss of 12%. Find the selling price. **[2]**

Q15. Factorise: $4x^2 - 16$ **[2]**

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

Q16. Show that the diagonals of a rectangle bisect each other. **[3]**

Q17. Solve the equation: (2x - 1)/3 + (x + 2)/2 = 5 **[3]**

Q18. The following data shows the marks obtained by 10 students: 35, 42, 28, 50, 45, 38, 40, 48, 33, 41. Find the median. **[3]**

Q19. A circular park has a radius of 21 m. Find its circumference and area. (Take π = 22/7) **[3]**

Q20. Use the identity $(a - b)^2 = a^2 - 2ab + b^2$ to find the value of $(98)^2$. **[3]**

Q21. Find the total surface area of a cube whose edge measures 6 cm. **[3]**

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

Q22. Verify the identity $(a - b)^2 = a^2 - 2ab + b^2$ by taking a = 5 and b = 3. Also find the value of $(997)^2$ using this identity. **[5]**

Q23. A sum of ₹15,000 is invested for 2 years at 12% per annum. Find: **[5]**
(i) Simple Interest
(ii) Compound Interest (compounded annually)
(iii) Difference between CI and SI

Q24. The parallel sides of a trapezium are 18 cm and 32 cm. If the distance between them is 15 cm, find the area of the trapezium. **[5]**
OR
A rhombus has diagonals of lengths 16 cm and 12 cm. Find its area and perimeter.

Q25. A cylindrical pillar has a diameter of 56 cm and height of 3.5 m. Find its curved surface area and volume. (Take π = 22/7) **[5]**

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

Q26. **[4]**

CASE STUDY 1: Swimming Pool Construction

A rectangular swimming pool is 40 m long and 20 m wide. The pool is surrounded by a pathway of uniform width 3 m on all sides.

Based on the above information, answer the following:

(i) Find the area of the swimming pool. **[1 mark]**

(ii) Find the total area including the pathway. **[2 marks]**

(iii) Find the area of the pathway only. **[1 mark]**

Q27. **[4]**

CASE STUDY 2: Investment and Interest

Priya invested ₹25,000 in a bank that offers 8% simple interest per annum. Her friend Neha invested the same amount at the same rate but with compound interest compounded annually.

Based on the above information, answer the following:

(i) Find Priya's simple interest after 3 years. **[1 mark]**

(ii) Find the amount Priya will receive after 3 years. **[1 mark]**

(iii) How much more interest will Neha earn compared to Priya in 3 years? **[2 marks]**

Q28. **[4]**

CASE STUDY 3: Monthly Expenses Data

The monthly expenses (in rupees) of 20 families in a locality are given below:
6500, 7200, 8000, 6800, 7500, 8200, 7000, 7800, 6900, 7400, 8100, 7300, 6700, 7600, 8300, 7100, 7700, 6600, 7900, 8500

Based on the above information, answer the following:

(i) Find the highest and lowest expenses. **[1 mark]**

(ii) Calculate the range of the data. **[1 mark]**

(iii) Find the mean monthly expense. **[2 marks]**

📚 END OF QUESTION PAPER 📚

Total Marks: 80

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

Section D: 20 marks | Section E: 12 marks

Time: 3 Hours

🎯 COMPLETE DETAILED SOLUTIONS WITH STEP-BY-STEP EXPLANATIONS

SECTION A - SOLUTIONS (1 × 10 = 10 Marks)

Q1. Answer: (a) 7/9

Solution:
Additive inverse of a number is the number which when added to it gives 0.
Additive inverse of (-7/9) = 7/9
Verification: (-7/9) + (7/9) = 0

Q2. Answer: (c) x = 4

Solution:
5x - 8 = 12
5x = 12 + 8
5x = 20
x = 20/5
x = 4

Q3. Answer: (b) 60°

Solution:
For a regular polygon with n sides:
Each exterior angle = 360°/n
For hexagon, n = 6
Each exterior angle = 360°/6 = 60°

Q4. Answer: (c) 15

Solution:
$\sqrt{225} = \sqrt{(15 \times 15)} = 15$

Q5. Answer: (c) 64

Solution:
$4^3 = 4 \times 4 \times 4 = 64$

Q6. Answer: (b) ₹920

Solution:
CP = ₹800

Profit = 15%
Profit amount = (15/100) × 800 = ₹120
SP = CP + Profit = 800 + 120 = ₹920

Q7. Answer: (a) 3

Solution:
In $3x^2 + 5x - 7$
Coefficient of x^2 is 3

Q8. Answer: (a) 104 cm²

Solution:
Lateral surface area of cuboid = 2h(l + b)
= 2 × 4 × (8 + 5)
= 8 × 13
= 104 cm²

Q9. Answer: (b) 16

Solution:
$(-2)^4 = (-2) \times (-2) \times (-2) \times (-2)$
= 4 × 4
= 16
(Even power makes it positive)

Q10. Answer: (c) 4

Solution:
In inverse proportion: $a_1 \times b_1 = a_2 \times b_2$
6 × 10 = 15 × b
60 = 15b
b = 60/15 = 4

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

Q11. Solution:

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

(3/7) × (-14/9)
= (3 × (-14))/(7 × 9)
= -42/63
= -2/3 (dividing by 21)

Answer: -2/3

Q12. Solution:

> **Marking Scheme:** 1 mark for steps + 1 mark for answer

$3(x + 2) = 21$
$x + 2 = 21/3$
$x + 2 = 7$
$x = 7 - 2$
$x = 5$

Q13. Solution:

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

$\sqrt[3]{216} = \sqrt[3]{(6 \times 6 \times 6)}$
$= 6$

Verification: $6^3 = 216$ ✓

Answer: 6

Q14. Solution:

> **Marking Scheme:** 1 mark for loss calculation + 1 mark for SP

CP = ₹8,000
Loss = 12%

Loss amount = (12/100) × 8000
= ₹960

SP = CP - Loss
= 8000 - 960
= ₹7,040

Answer: ₹7,040

Q15. Solution:

> **Marking Scheme:** 1 mark for common factor + 1 mark for factorization

$4x^2 - 16$
$= 4(x^2 - 4)$

= $4(x^2 - 2^2)$
Using $a^2 - b^2 = (a + b)(a - b)$:
= $4(x + 2)(x - 2)$

Answer: 4(x + 2)(x - 2)

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

Q16. Solution:

Marking Scheme: 1 mark given + 1 mark proof + 1 mark conclusion

Given: ABCD is a rectangle with diagonals AC and BD intersecting at O.
To Prove: O bisects both diagonals (AO = OC and BO = OD)

Proof:
In rectangle ABCD:
AB = DC (opposite sides)
AD = BC (opposite sides)
∠A = ∠B = ∠C = ∠D = 90°

In △ABC and △DCB:
AB = DC (opposite sides of rectangle)
BC = BC (common)
∠ABC = ∠DCB = 90°
∴ △ABC ≅ △DCB (SAS congruence)
∴ AC = BD (CPCT)

In △AOB and △COD:
AB = CD (opposite sides)
∠OAB = ∠OCD (alternate angles, AB || DC)
∠OBA = ∠ODC (alternate angles, AD || BC)
∴ △AOB ≅ △COD (ASA congruence)
∴ AO = OC and BO = OD (CPCT)

Hence, diagonals bisect each other. Proved.

Q17. Solution:

Marking Scheme: 1 mark LCM + 1 mark simplification + 1 mark answer

$(2x - 1)/3 + (x + 2)/2 = 5$

LCM of 3 and 2 = 6
Multiplying throughout by 6:
$2(2x - 1) + 3(x + 2) = 30$

4x - 2 + 3x + 6 = 30
7x + 4 = 30
7x = 26
x = 26/7

Answer: x = 26/7 or 3⅖

Q18. Solution:

> **Marking Scheme:** 1 mark arrangement + 1 mark finding median + 1 mark answer

Data: 35, 42, 28, 50, 45, 38, 40, 48, 33, 41

Arranging in ascending order:
28, 33, 35, 38, 40, 41, 42, 45, 48, 50

Number of terms (n) = 10 (even)
Median = Average of (n/2)th and (n/2 + 1)th terms
= Average of 5th and 6th terms
= (40 + 41)/2
= 81/2
= 40.5

Answer: Median = 40.5

Q19. Solution:

> **Marking Scheme:** 1.5 marks circumference + 1.5 marks area

Radius (r) = 21 m
π = 22/7

Circumference:
C = 2πr
= 2 × (22/7) × 21
= 2 × 22 × 3
= 132 m

Area:
A = πr²
= (22/7) × 21 × 21
= 22 × 3 × 21
= 1386 m²

Answer: Circumference = 132 m, Area = 1386 m²

Q20. Solution:

Marking Scheme: 1 mark identity + 1 mark substitution + 1 mark calculation

$(98)^2 = (100 - 2)^2$

Using $(a - b)^2 = a^2 - 2ab + b^2$
where $a = 100$, $b = 2$

$= (100)^2 - 2(100)(2) + (2)^2$
$= 10000 - 400 + 4$
$= 9604$

Answer: 9604

Q21. Solution:

Marking Scheme: 1 mark formula + 1 mark substitution + 1 mark answer

Edge of cube (a) = 6 cm

Total Surface Area of cube = $6a^2$
$= 6 \times (6)^2$
$= 6 \times 36$
$= 216$ cm²

Answer: 216 cm²

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

Q22. Solution:

Marking Scheme: 2 marks verification + 3 marks application

Verification with a = 5, b = 3:

LHS: $(a - b)^2 = (5 - 3)^2 = 2^2 = 4$

RHS: $a^2 - 2ab + b^2$
$= 5^2 - 2(5)(3) + 3^2$
$= 25 - 30 + 9$
$= 4$

LHS = RHS ✓
Identity verified

Finding $(997)^2$:
$(997)^2 = (1000 - 3)^2$

Using $(a - b)^2 = a^2 - 2ab + b^2$
where a = 1000, b = 3

$= (1000)^2 - 2(1000)(3) + (3)^2$
$= 1000000 - 6000 + 9$
$= 994009$

Answer: $(997)^2 = 994009$

Q23. Solution:

> **Marking Scheme:** 1.5 marks SI + 2.5 marks CI + 1 mark difference

Principal (P) = ₹15,000
Rate (R) = 12% per annum
Time (T) = 2 years

(i) Simple Interest:
$SI = (P \times R \times T)/100$
$= (15000 \times 12 \times 2)/100$
$= 360000/100$
= ₹3,600

(ii) Compound Interest:
$A = P(1 + R/100)^T$
$= 15000(1 + 12/100)^2$
$= 15000(1.12)^2$
$= 15000 \times 1.2544$
= ₹18,816

CI = A - P
= 18816 - 15000
= ₹3,816

(iii) Difference:
Difference = CI - SI
= 3816 - 3600
= ₹216

Answer: SI = ₹3,600, CI = ₹3,816, Difference = ₹216

Q24. Solution:

> **Marking Scheme:** 2 marks formula + 2 marks calculation + 1 mark answer

Trapezium:
Parallel sides: a = 18 cm, b = 32 cm

Height (h) = 15 cm

Area of trapezium = (1/2) × (sum of parallel sides) × height
= (1/2) × (18 + 32) × 15
= (1/2) × 50 × 15
= 375 cm²

Answer: 375 cm²

OR

Rhombus:
Diagonals: $d_1 = 16$ cm, $d_2 = 12$ cm

Area:
Area = (1/2) × d_1 × d_2
= (1/2) × 16 × 12
= 96 cm²

Perimeter:
Using Pythagoras theorem in half-rhombus:
Side² = $(d_1/2)^2 + (d_2/2)^2$
= $8^2 + 6^2$
= 64 + 36
= 100
Side = 10 cm

Perimeter = 4 × side = 4 × 10 = 40 cm

Answer: Area = 96 cm², Perimeter = 40 cm

Q25. Solution:

Marking Scheme: 2.5 marks CSA + 2.5 marks volume

Diameter = 56 cm, so radius (r) = 28 cm = 0.28 m
Height (h) = 3.5 m
π = 22/7

Curved Surface Area:
CSA = 2πrh
= 2 × (22/7) × 0.28 × 3.5
= 2 × (22/7) × (28/100) × 3.5
= 2 × 22 × 4 × 3.5/100
= 616/100
= 6.16 m²

Volume:
V = $\pi r^2 h$
= (22/7) × $(0.28)^2$ × 3.5

= (22/7) × 0.0784 × 3.5
= (22/7) × 0.2744
= 0.862 m³

Answer: CSA = 6.16 m², Volume = 0.862 m³

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

Q26. Solution: CASE STUDY 1 - Swimming Pool

Marking Scheme: 1 + 2 + 1 = 4 marks

(i) Area of swimming pool:
Length = 40 m, Width = 20 m
Area = 40 × 20 = 800 m²
Answer: 800 m²

(ii) Total area including pathway:
Pathway width = 3 m on all sides
New length = 40 + 3 + 3 = 46 m
New width = 20 + 3 + 3 = 26 m
Total area = 46 × 26 = 1196 m²
Answer: 1196 m²

(iii) Area of pathway only:
Area of pathway = Total area - Pool area
= 1196 - 800
= 396 m²
Answer: 396 m²

Q27. Solution: CASE STUDY 2 - Investment

Marking Scheme: 1 + 1 + 2 = 4 marks

P = ₹25,000, R = 8%, T = 3 years

(i) Priya's simple interest:
SI = (P × R × T)/100
= (25000 × 8 × 3)/100
= 600000/100
= ₹6,000
Answer: ₹6,000

(ii) Amount after 3 years (SI):
Amount = P + SI
= 25000 + 6000

= ₹31,000
Answer: ₹31,000

(iii) Neha's compound interest:
$A = P(1 + R/100)^3$
$= 25000(1.08)^3$
$= 25000 \times 1.259712$
= ₹31,492.80
CI = 31492.80 - 25000 = ₹6,492.80

Additional interest = CI - SI
= 6492.80 - 6000
= ₹492.80
Answer: ₹492.80 more

Q28. Solution: CASE STUDY 3 - Monthly Expenses

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

Data: 6500, 7200, 8000, 6800, 7500, 8200, 7000, 7800, 6900, 7400, 8100, 7300, 6700, 7600, 8300, 7100, 7700, 6600, 7900, 8500

(i) Highest and lowest:
Highest expense = ₹8,500
Lowest expense = ₹6,500
Answer: Highest = ₹8,500, Lowest = ₹6,500

(ii) Range:
Range = Highest - Lowest
= 8500 - 6500
= ₹2,000
Answer: ₹2,000

(iii) Mean monthly expense:
Sum = 6500+7200+8000+6800+7500+8200+7000+7800+6900+7400+8100+7300+6700+7600+8300+7100+7700+6600+7900+85
= 149,200
Number of families = 20
Mean = 149200/20 = 7460
Answer: ₹7,460

✅ END OF COMPLETE SOLUTIONS ✅

All 28 questions solved with detailed step-by-step explanations

MP Board Class 8 Maths - Paper 2 Topics Covered:

• Rational Numbers (Additive Inverse, Operations)

• Linear Equations in One Variable

• Understanding Quadrilaterals (Hexagon, Rectangle)

• Squares & Square Roots

• Cubes & Cube Roots

• Comparing Quantities (Profit/Loss, SI/CI)

• Algebraic Expressions & Identities

• Mensuration (Circle, Trapezium, Rhombus)

• Surface Areas & Volumes (Cube, Cuboid, Cylinder)

• Exponents & Powers

• Direct & Inverse Proportions

• Factorisation

• Data Handling (Mean, Median, Range)