MATH LOVE INSTITUTE

CBSE Class 8 Mathematics

Home Exam 2025-26 - Sample Paper Set 5

Strictly Based on Latest NCERT Syllabus - Class 8 Level Only

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

📋 GENERAL INSTRUCTIONS:

1. This question paper contains **38 questions** divided into **Five Sections A, B, C, D and E**.
2. **Section A** comprises of 20 MCQs of 1 mark each.
3. **Section B** comprises of 6 questions of 2 marks each.
4. **Section C** comprises of 6 questions of 3 marks each.
5. **Section D** comprises of 3 questions of 5 marks each.
6. **Section E** comprises of 3 case study based questions of 4 marks each (with sub-parts).
7. All questions are **compulsory**. However, internal choices have been provided in some questions.
8. Use of calculator is **NOT** permitted.
9. Draw neat and clean diagrams wherever required.
10. Write all working and steps clearly for better understanding and full marks.

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

Q1. Using the identity $(a + b)(a - b) = a^2 - b^2$, the value of 63×57 is: **[1]**

(a) 3,591

(b) 3,491

(c) 3,691

(d) 3,391

Q2. The factorization of $x^2 - 11x + 30$ is: **[1]**

(a) $(x - 5)(x - 6)$

(b) $(x - 10)(x - 3)$

(c) $(x + 5)(x + 6)$

(d) $(x - 15)(x - 2)$

Q3. The solution of $2x + 7 = 23$ is: **[1]**

(a) $x = 6$

(b) $x = 7$

(c) $x = 8$

(d) $x = 9$

Q4. A shopkeeper bought a TV for ₹10,000 and sold it for ₹12,000. The profit percent is: **[1]**

(a) 15%

(b) 18%

(c) 20%

(d) 25%

Q5. The compound interest on ₹4,000 at 10% per annum for 2 years (compounded annually) is: **[1]**

(a) ₹800

(b) ₹820

(c) ₹840

(d) ₹860

Q6. The area of a trapezium with parallel sides 24 cm and 16 cm and height 10 cm is: **[1]**

(a) 180 cm^2

(b) 200 cm^2

(c) 220 cm^2

(d) 240 cm^2

Q7. The total surface area of a cube with side 5 cm is: **[1]**

(a) 100 cm^2

(b) 125 cm^2

(c) 150 cm^2

(d) 175 cm^2

Q8. In a pie chart, if a sector represents 20% of the total, its central angle is: **[1]**

(a) 36°

(b) 60°

(c) 72°

(d) 90°

Q9. The opposite angles of a parallelogram are: **[1]**

(a) Equal

(b) Supplementary

(c) Complementary

(d) Right angles

Q10. A quadrilateral with exactly one pair of parallel sides is called: **[1]**

(a) Parallelogram

(b) Rhombus

(c) Trapezium

(d) Rectangle

Q11. The common factor in $8a^2b + 12ab^2$ is: **[1]**

(a) 2ab

(b) 4ab

(c) 8ab

(d) ab^2

Q12. If $5x - 2 = 3x + 8$, then x equals: **[1]**

(a) 3

(b) 4

(c) 5

(d) 6

Q13. An article marked at ₹500 is sold for ₹400. The discount percent is: **[1]**

(a) 10%

(b) 15%

(c) 20%

(d) 25%

Q14. The volume of a cube with edge 7 cm is: **[1]**

(a) 243 cm^3

(b) 294 cm^3

(c) 343 cm^3

(d) 392 cm^3

Q15. The curved surface area of a cylinder with radius 14 cm and height 5 cm is (use π = 22/7): **[1]**

(a) 220 cm^2

(b) 330 cm^2

(c) 440 cm^2

(d) 550 cm^2

Q16. Two coins are tossed together. The probability of getting at least one head is: **[1]**

(a) 1/4

(b) 1/2

(c) 3/4

(d) 1

Q17. If three angles of a quadrilateral are 60°, 90°, and 110°, the fourth angle is: **[1]**

(a) 80°

(b) 90°

(c) 100°

(d) 110°

Q18. The expansion of $(a + b)^2$ is: **[1]**

(a) $a^2 + b^2$

(b) $a^2 + 2ab + b^2$

(c) $a^2 - 2ab + b^2$

(d) $a^2 + ab + b^2$

Q19. If cost price is ₹800 and loss is 10%, the selling price is: **[1]**

(a) ₹700

(b) ₹720

(c) ₹750

(d) ₹780

Q20. Using the identity $(x + a)(x + b) = x^2 + (a + b)x + ab$, find the product of $(x - 3)(x - 4)$: **[1]**

(a) $x^2 - 7x + 12$

(b) $x^2 + 7x + 12$

(c) $x^2 - 12x + 7$

(d) $x^2 + 12x - 7$

SECTION B - SHORT ANSWER QUESTIONS I (2 × 6 = 12 Marks)

Q21. Factorize using regrouping: $2xy + 3x + 2y + 3$ **[2]**

Q22. Solve: $7x - 2(x + 4) = 11$ **[2]**

Q23. Find the compound interest on ₹6,000 at 10% per annum for 2 years compounded annually. **[2]**

Q24. Find the area of a rhombus whose diagonals are 24 cm and 18 cm. **[2]**

Q25. Two adjacent angles of a parallelogram are in the ratio 5:4. Find both angles. **[2]**

Q26. A die is thrown once. Find the probability of getting: **[2]**

(i) a prime number

(ii) a number less than 5

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

Q27. Using the identity $(a - b)^2 = a^2 - 2ab + b^2$, find the value of $(997)^2$ **[3]**

Q28. The ages of Hari and Harry are in the ratio 5:7. Four years later, their ages will be in the ratio 3:4. Find their present ages. **[3]**

Q29. By selling an article for ₹1,920, a man gains 20%. At what price should he sell it to gain 30%? **[3]**

OR

A trader marks his goods at 40% above cost price and allows a discount of 25%. Find his profit or loss percent.

Q30. Find the capacity of a cylindrical tank with diameter 1.4 m and height 2 m in litres. (Use $\pi = 22/7$, 1 m^3 = 1000 litres) **[3]**

Q31. The marks obtained by 40 students in a test are given below. Draw a histogram: **[3]**

Marks	0-20	20-40	40-60	60-80
Frequency	5	10	18	7

Q32. The diagonals of a rhombus are perpendicular to each other. If one diagonal is 16 cm and the side of rhombus is 10 cm, find the length of the other diagonal. **[3]**

SECTION D - LONG ANSWER QUESTIONS (5 × 3 = 15 Marks)

Q33. (a) Factorize using identities: $49x^2 + 84xy + 36y^2$ **[5]**

(b) If $x + 1/x = 5$, find the value of $x^2 + 1/x^2$

OR

Expand using identity: $(5a - 3b)^2$

Q34. A number consists of two digits whose sum is 9. If 27 is subtracted from the number, the digits interchange their places. Find the number. **[5]**

Q35. Calculate the amount and compound interest on ₹12,000 at 10% per annum for 2½ years, compounded half-yearly. **[5]**

OR

The population of a city was 20,000 in the year 2020. It increases at the rate of 5% per annum. Find the population at the end of the year 2022.

SECTION E - CASE STUDY BASED QUESTIONS (4 × 3 = 12 Marks + 3 Internal Choice = 15 Marks)

Q36. **[4]**

CASE STUDY 1: Cylindrical Storage Tank

A factory needs to construct a cylindrical water storage tank with a radius of 3.5 m and height of 6 m. The tank needs to be painted on the outside (curved surface and top). The bottom will be on the ground and does not need painting. Cost of painting is ₹25 per square meter. (Use $\pi = 22/7$)

Based on the above information, answer the following questions:

(i) Find the curved surface area of the tank. **[1 mark]**

(ii) Find the total area to be painted (curved surface + top). **[1 mark]**

OR

Find the capacity of the tank in litres. (1 m^3 = 1000 litres)

(iii) What is the total cost of painting the tank? **[2 marks]**

Q37. **[4]**

CASE STUDY 2: Business Profit Analysis

A shopkeeper purchased 200 notebooks at ₹15 each. He sold:

- 100 notebooks at a profit of 20%
- 60 notebooks at a profit of 15%
- Remaining notebooks at cost price

Based on the above information, answer the following questions:

(i) What is the selling price of one notebook sold at 20% profit? **[1 mark]**

(ii) What is the total selling price of all 200 notebooks? **[1 mark]**

OR

What is the total cost price of all notebooks?

(iii) What is the overall profit percent for the shopkeeper? **[2 marks]**

Q38. **[4]**

CASE STUDY 3: School Election Results

In a school election for head boy, 600 students voted. The votes received by different candidates are:

Candidate	Amit	Raj	Sunil	Vijay
Votes	240	180	120	60

Based on the above information, answer the following questions:

(i) Who won the election and by what percentage of total votes? **[1 mark]**

(ii) What is the central angle for Raj in a pie chart representation? **[1 mark]**
OR
How many more votes did Amit get than Sunil?

(iii) If a voter is selected at random, what is the probability that they voted for either Amit or Raj? **[2 marks]**

📚 END OF QUESTION PAPER 📚

Total Marks: 80

Section A: 20 marks | Section B: 12 marks | Section C: 18 marks

Section D: 15 marks | Section E: 12 marks | Internal Choice: 3 marks

All questions strictly based on NCERT Class 8 syllabus.
Verified against official NCERT curriculum guidelines 2025-26.

🎯 DETAILED ANSWER KEY WITH SOLUTIONS

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

Q1. Answer: (a) 3,591

Solution:

$63 \times 57 = (60 + 3)(60 - 3)$

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

$= 60^2 - 3^2$

$= 3600 - 9$

$= 3,591$

Q2. Answer: (a) (x - 5)(x - 6)

Solution:

$x^2 - 11x + 30$

We need two numbers that multiply to 30 and add to -11

Those numbers are -5 and -6

$= (x - 5)(x - 6)$

Q3. Answer: (c) x = 8

Solution:

$2x + 7 = 23$

$2x = 16$

$x = 8$

Q4. Answer: (c) 20%

Solution:

C.P. = ₹10,000

S.P. = ₹12,000

Profit = 12,000 - 10,000 = ₹2,000

Profit% = (2000/10000) × 100 = 20%

Q5. Answer: (c) ₹840

Solution:

P = ₹4,000, R = 10%, T = 2 years

$A = P(1 + R/100)^2$

$= 4000(1.1)^2$

$= 4000 \times 1.21$

= ₹4,840

C.I. = 4840 - 4000 = ₹840

Q6. Answer: (b) 200 cm²

Solution:

Area of trapezium = $\frac{1}{2}(a + b)h$

$= \frac{1}{2}(24 + 16) \times 10$

$= \frac{1}{2} \times 40 \times 10$

$= 200\ cm^2$

Q7. Answer: (c) 150 cm²

Solution:

T.S.A. of cube = $6a^2$

$= 6 \times 5^2$

$= 6 \times 25$

$= 150\ cm^2$

Q8. Answer: (c) 72°

Solution:

Central angle = Percentage × 360°

= 20% × 360°

= (20/100) × 360°

= 72°

Q9. Answer: (a) Equal

Explanation: In a parallelogram, opposite angles are equal.

Q10. Answer: (c) Trapezium

Explanation: A trapezium has exactly one pair of parallel sides.

Q11. Answer: (b) 4ab

Solution:

$8a^2b = 2 \times 2 \times 2 \times a \times a \times b$

$12ab^2 = 2 \times 2 \times 3 \times a \times b \times b$

Common factors: 2, 2, a, b

H.C.F. = 4ab

Q12. Answer: (c) 5

Solution:

5x - 2 = 3x + 8

5x - 3x = 8 + 2

$2x = 10$

$x = 5$

Q13. Answer: (c) 20%

Solution:

M.P. = ₹500

S.P. = ₹400

Discount = 500 - 400 = ₹100

Discount% = (100/500) × 100 = 20%

Q14. Answer: (c) 343 cm³

Solution:

Volume of cube = a^3

$= 7^3$

$= 343\ cm^3$

Q15. Answer: (c) 440 cm²

Solution:

C.S.A. = $2\pi rh$

$= 2 \times (22/7) \times 14 \times 5$

$= 2 \times 22 \times 2 \times 5$

$= 440\ cm^2$

Q16. Answer: (c) 3/4

Solution:

Possible outcomes: HH, HT, TH, TT = 4

At least one head: HH, HT, TH = 3

P(at least one head) = 3/4

Q17. Answer: (c) 100°

Solution:

Sum of angles = 360°

60° + 90° + 110° + Fourth angle = 360°

260° + Fourth angle = 360°

Fourth angle = 100°

Q18. Answer: (b) $a^2 + 2ab + b^2$

Explanation: Standard identity: $(a + b)^2 = a^2 + 2ab + b^2$

Q19. Answer: (b) ₹720

Solution:

C.P. = ₹800

Loss = 10% of 800 = ₹80

S.P. = C.P. - Loss

= 800 - 80

= ₹720

Q20. Answer: (a) $x^2 - 7x + 12$

Solution:

(x - 3)(x - 4)

Using identity: $(x + a)(x + b) = x^2 + (a + b)x + ab$

Here a = -3, b = -4

$= x^2 + (-3 - 4)x + (-3)(-4)$

$= x^2 - 7x + 12$

SECTION B - ANSWERS (2 × 6 = 12 Marks)

Q21. Solution:

> **Marking Scheme:** 1 mark for grouping + 1 mark for final factorization

$2xy + 3x + 2y + 3$

$= x(2y + 3) + 1(2y + 3)$

$= (2y + 3)(x + 1)$

Answer: (2y + 3)(x + 1)

Q22. Solution:

> **Marking Scheme:** 1 mark for simplification + 1 mark for solving

$7x - 2(x + 4) = 11$

$7x - 2x - 8 = 11$

$5x - 8 = 11$

$5x = 19$

x = 19/5 or 3.8

Q23. Solution:

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

P = ₹6,000, R = 10%, T = 2 years

$A = P(1 + R/100)^2$

$= 6000(1.1)^2$

$= 6000 \times 1.21$

= ₹7,260

C.I. = A - P = 7260 - 6000

C.I. = ₹1,260

Q24. Solution:

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

Area of rhombus = ½ × d_1 × d_2

= ½ × 24 × 18

= 12 × 18

Area = 216 cm²

Q25. Solution:

> **Marking Scheme:** 1 mark for finding angles + 1 mark for both angles

Let the angles be 5x and 4x

Adjacent angles in parallelogram are supplementary:

5x + 4x = 180°

9x = 180°

x = 20°

First angle = 5 × 20 = 100°

Second angle = 4 × 20 = 80°

Angles: 100° and 80°

(Opposite angles are also 100° and 80°)

Q26. Solution:

> **Marking Scheme:** 1 mark for each part

Total outcomes on a die = 6

(i) P(prime number):

Prime numbers: 2, 3, 5 = 3 outcomes

P = 3/6 = 1/2

(ii) P(number less than 5):

Numbers less than 5: 1, 2, 3, 4 = 4 outcomes

P = 4/6 = 2/3

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

Q27. Solution:

> **Marking Scheme:** 1 mark for identifying identity + 2 marks for calculation

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

Using identity: $(a - b)^2 = a^2 - 2ab + b^2$

Here a = 1000, b = 3

$= 1000^2 - 2(1000)(3) + 3^2$

= 1,000,000 - 6,000 + 9

= 994,009

Q28. Solution:

> **Marking Scheme:** 1 mark for equation + 1 mark for solving + 1 mark for both ages

Let Hari's present age = 5x

Let Harry's present age = 7x

After 4 years:

Hari's age = 5x + 4

Harry's age = 7x + 4

According to question:

(5x + 4)/(7x + 4) = 3/4

4(5x + 4) = 3(7x + 4)

$20x + 16 = 21x + 12$

$16 - 12 = 21x - 20x$

$x = 4$

Hari's present age = $5 \times 4 = 20$ years

Harry's present age = $7 \times 4 = 28$ years

Hari: 20 years, Harry: 28 years

Q29. Solution:

> **Marking Scheme:** 1 mark for C.P. + 1 mark for S.P. + 1 mark for final answer

S.P. = ₹1,920, Gain = 20%

S.P. = C.P. + 20% of C.P.

$1920 = C.P. \times 1.2$

C.P. = 1920/1.2 = ₹1,600

For 30% gain:

S.P. = C.P. + 30% of C.P.

$= 1600 \times 1.3$

S.P. = ₹2,080

OR

Let C.P. = 100

M.P. = 140 (40% above C.P.)

Discount = 25% of 140 = 35

S.P. = 140 - 35 = 105

Profit = 105 - 100 = 5

Profit% = 5%

Profit = 5%

Q30. Solution:

> **Marking Scheme:** 1 mark for volume + 1 mark for conversion + 1 mark for final answer

Diameter = 1.4 m, so radius = 0.7 m

Height = 2 m

Volume = $\pi r^2 h$

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

$= (22/7) \times (7/10) \times (7/10) \times 2$

$= 22 \times 0.1 \times 0.1 \times 2$

$= 3.08\ m^3$

Capacity in litres = 3.08×1000

= 3,080 litres

Q31. Solution:

> **Marking Scheme:** 1 mark for axes + 1 mark for drawing bars + 1 mark for labeling

Histogram:

Draw a histogram with:

• X-axis: Marks (class intervals: 0-20, 20-40, 40-60, 60-80)

• Y-axis: Frequency (Number of students)

• Bars with heights: 5, 10, 18, 7 respectively

• No gaps between consecutive bars

• Proper labeling of axes and title

[Student should draw the actual histogram on graph paper]

Q32. Solution:

> **Marking Scheme:** 1.5 marks for finding other diagonal + 1.5 marks for calculation

In a rhombus, diagonals are perpendicular bisectors

One diagonal = 16 cm

Side = 10 cm

Diagonals bisect each other at 90°

Half of first diagonal = 16/2 = 8 cm

Let half of second diagonal = x cm

Using Pythagoras theorem in right triangle:

$(\text{Side})^2 = (\text{Half diagonal}_1)^2 + (\text{Half diagonal}_2)^2$

$10^2 = 8^2 + x^2$

$100 = 64 + x^2$

$x^2 = 36$

$x = 6$ cm

Second diagonal $= 2x = 2 \times 6$

Other diagonal = 12 cm

SECTION D - ANSWERS (5 × 3 = 15 Marks)

Q33. Solution:

Marking Scheme: 2.5 marks for each part

(a) Factorize: $49x^2 + 84xy + 36y^2$

$= (7x)^2 + 2(7x)(6y) + (6y)^2$

Using identity: $a^2 + 2ab + b^2 = (a + b)^2$

$= (7x + 6y)^2$

Answer: $(7x + 6y)^2$

(b) Given: $x + 1/x = 5$

Squaring both sides:

$(x + 1/x)^2 = 25$

$x^2 + 2(x)(1/x) + 1/x^2 = 25$

$x^2 + 2 + 1/x^2 = 25$

$x^2 + 1/x^2 = 23$

Answer: 23

OR

$(5a - 3b)^2$

Using identity: $(a - b)^2 = a^2 - 2ab + b^2$

$= (5a)^2 - 2(5a)(3b) + (3b)^2$

$= 25a^2 - 30ab + 9b^2$

Answer: $25a^2 - 30ab + 9b^2$

Q34. Solution:

> **Marking Scheme:** 2 marks for equations + 2 marks for solving + 1 mark for number

Let the tens digit = x

Let the units digit = y

Original number = 10x + y

First condition:

x + y = 9 ... (1)

Second condition:

When 27 is subtracted, digits interchange:

(10x + y) - 27 = 10y + x

10x + y - 27 = 10y + x

9x - 9y = 27

x - y = 3 ... (2)

Adding equations (1) and (2):

2x = 12

x = 6

From (1): y = 9 - 6 = 3

Original number = 10(6) + 3

Number = 63

Q35. Solution:

> **Marking Scheme:** 2 marks for amount + 2 marks for C.I. + 1 mark for final answer

P = ₹12,000, R = 10% p.a. = 5% half-yearly

Time = 2½ years = 5 half-years

$A = P(1 + R/100)^n$

$= 12000(1 + 5/100)^5$

$= 12000(1.05)^5$

$= 12000 \times 1.2762815625$

= ₹15,315.38

C.I. = A - P

= 15315.38 - 12000

Amount = ₹15,315.38

C.I. = ₹3,315.38

OR

Population in 2020 = 20,000

Rate = 5% per annum

Time = 2 years (2020 to 2022)

Population in 2022 = $P(1 + R/100)^T$

$= 20000(1 + 5/100)^2$

$= 20000(1.05)^2$

$= 20000 \times 1.1025$

= 22,050

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

Q36. Solution: CASE STUDY 1 - Cylindrical Storage Tank

Marking Scheme: 1 + 1 + 2 = 4 marks

(i) C.S.A. = $2\pi rh$

$= 2 \times (22/7) \times 3.5 \times 6$

$= 2 \times 22 \times 0.5 \times 6$

= 132 m²

C.S.A. = 132 m²

(ii) Area of top = πr^2

= (22/7) × 3.5 × 3.5

= 22 × 0.5 × 3.5

= 38.5 m²

Total area = C.S.A. + Top

= 132 + 38.5

= 170.5 m²

OR

Volume = $\pi r^2 h$

= (22/7) × 3.5 × 3.5 × 6

= 22 × 0.5 × 3.5 × 6

= 231 m³

= 231 × 1000 litres

= 2,31,000 litres

(iii) Total cost = Area × Rate

= 170.5 × 25

= ₹4,262.50

Q37. Solution: CASE STUDY 2 - Business Profit Analysis

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

(i) C.P. of one notebook = ₹15

Profit = 20%

S.P. = C.P. + 20% of C.P.

= 15 + (20/100) × 15

= 15 + 3

S.P. = ₹18

(ii) 100 notebooks at ₹18 = ₹1,800

60 notebooks at 15% profit = 60 × 15 × 1.15 = ₹1,035

Remaining 40 notebooks at C.P. = 40 × 15 = ₹600

Total S.P. = 1800 + 1035 + 600

= ₹3,435

OR

Total C.P. = 200 × 15

= ₹3,000

(iii) Total C.P. = ₹3,000

Total S.P. = ₹3,435

Profit = 3435 - 3000 = ₹435

Profit% = (435/3000) × 100

= 14.5%

Q38. Solution: CASE STUDY 3 - School Election Results

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

(i) Total votes = 600

Amit: 240, Raj: 180, Sunil: 120, Vijay: 60

Amit won with 240 votes

Percentage = (240/600) × 100

Amit won with 40% of total votes

(ii) Central angle for Raj:

Raj's votes = 180

Central angle = (180/600) × 360°

= (3/10) × 360°

= 108°

OR

Amit - Sunil = 240 - 120

= 120 more votes

(iii) P(Amit or Raj):

Amit + Raj votes = 240 + 180 = 420

Total votes = 600

P = 420/600

= 7/10

= 0.7 or 70%

✅ END OF ANSWER KEY ✅

All solutions strictly follow Class 8 NCERT syllabus

Complete step-by-step solutions with marking schemes