

CLASS IX MATHEMATICS | NUMBER SYSTEMS

CHAPTER ASSESSMENT | CBSE/NCERT-ALIGNED | 2026-27

Time: 1 hour 30 minutes

Questions: 25

Maximum Marks: 50

Name: _____ Roll No.: _____ Date: _____

Instructions: All questions are compulsory; attempt either alternative in Q24. Write answers on a separate answer sheet. Show all steps. Use exact values unless asked otherwise. Calculators are not allowed. Marks are shown in brackets.

SECTION A | OBJECTIVE QUESTIONS

12 × 1 = 12 marks

- Which of the following is a rational number? [1]
(A) $\sqrt{2}$ (B) $\sqrt{3}$ (C) $\sqrt{16}$ (D) $\sqrt{5}$
- Which is the smallest of these number sets that contains -9 ? [1]
(A) Natural numbers (B) Whole numbers (C) Integers (D) Irrational numbers
- The decimal form of $13/40$ is: [1]
(A) 0.0325 (B) 0.325 (C) 0.35 (D) 3.25
- How many rational numbers lie strictly between $5/8$ and $3/4$? [1]
(A) None (B) One (C) Two (D) Infinitely many
- Fill in the blank:** In p/q , where p and q are integers, q must not equal _____. [1]
- Fill in the blank:** An irrational decimal is non-terminating and _____. [1]
- True or False:** Every integer is a rational number. [1]
- True or False:** The product of two irrational numbers is always irrational. [1]
- Match the columns.** Write the two correct pairs. ($1/2$ mark each) [1]

Column A	Column B
(i) 0.125	(a) Non-terminating repeating decimal
(ii) 0.121212... (12 repeats)	(b) Terminating decimal
- Very short answer:** Write one irrational number strictly between 2 and 3. [1]

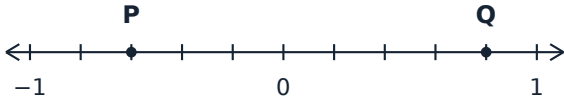
For Q11-12, choose the correct assertion-reason option:

- (A) Both A and R are true; R correctly explains A. (B) Both are true; R does not explain A.
(C) A is true, but R is false. (D) A is false, but R is true.

- Assertion (A):** $0.454545...$ (45 repeats) is a rational number. [1]
Reason (R): Every non-terminating decimal is irrational.
- Assertion (A):** There is no smallest positive rational number. [1]
Reason (R): If r is a positive rational number, $r/2$ is a smaller positive rational number.

SECTION B | SHORT ANSWERS

5 × 2 = 10 marks

- Write the values of P and Q on the number line. [2]
Each unit interval is divided into five equal parts. (1 + 1)

- (a) Write -0.625 as p/q in lowest terms. (1) [2]
(b) Between which two consecutive integers does it lie? (1)
- Use long division to find the decimal form of $7/12$. State its decimal type. (1 + 1) [2]
- Find three distinct rational numbers strictly between $2/5$ and $1/2$. Show your method. [2]
- Express $0.363636...$ (36 repeats) as p/q in lowest terms. Show the algebraic steps. [2]

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Continue answering on your answer sheet. Give reasons wherever asked.

Q18-25 | 28 marks

SECTION C | APPLICATION QUESTIONS

4 × 3 = 12 marks

- 18.** Find one rational and one irrational number strictly between 1.4 and 1.5. Justify both choices, using squares to check the irrational number. **(1 + 2)** **[3]**
- 19.** Express 1.27777... (only 7 repeats) as a fraction in lowest terms. Show all algebraic steps. **[3]**
- 20.** On a number line, A represents $-\frac{7}{6}$ and B represents $\frac{5}{4}$. Find the distance AB and the rational number at the midpoint of AB. Show your working. **(2 + 1)** **[3]**
- 21.** Give an example showing that the sum of two irrational numbers can be rational. Then explain why $5 + \sqrt{2}$ is irrational, given that $\sqrt{2}$ is irrational. **(1 + 2)** **[3]**

SECTION D | CASE-BASED QUESTIONS

2 × 4 = 8 marks

22. Number cards at a maths exhibition **[4]**

On card C, successive 1s are separated by 1, 2, 3, ... zeros; this pattern continues forever.

Card A	Card B	Card C
0.375	0.484848... (48 repeats)	0.101001000100001...

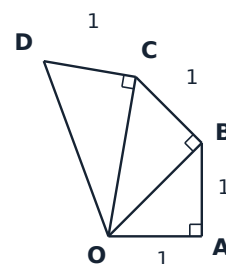
- (a) Which two cards show rational numbers? **(1)**
- (b) Express the number on card B as $\frac{p}{q}$ in lowest terms. Show your working. **(2)**
- (c) Is the number on card C rational or irrational? Explain using its decimal expansion. **(1)**

23. A square-root spiral **[4]**

A student builds the first three right triangles of a square-root spiral.

$OA = AB = BC = CD = 1$ unit. Each new outer segment is perpendicular to the preceding radius, as marked.

- (a) Find OB and OC using Pythagoras' theorem. **(1 + 1)**
- (b) Find OD. Is its length rational or irrational? Justify your answer. **(2)**



SECTION E | LONG ANSWERS AND PROOFS

2 × 4 = 8 marks

- 24.** Prove that $\sqrt{3}$ is irrational. Assume $\sqrt{3} = \frac{p}{q}$ in lowest terms, where p and q are integers and $q \neq 0$. Explain the contradiction reached. **[4]**
OR
Prove that $\sqrt{2}$ is irrational by assuming $\sqrt{2} = \frac{p}{q}$ in lowest terms and deriving a contradiction.
- 25.** Let a and b be rational numbers with $a < b$. **[4]**
(a) Prove that $m = \frac{(a + b)}{2}$ is rational and that $a < m < b$. **(3)**
(b) Explain how repeating the midpoint process shows that infinitely many rational numbers lie between a and b. **(1)**