

PRACTICE PAPER 09 (2026-27)
CHAPTER 03 THE WORLD OF NUMBERS

SUBJECT: MATHEMATICS

CLASS : IX

MAX. MARKS : 40

DURATION : 1½ hrs

General Instructions:

- (i). All questions are compulsory.
- (ii). This question paper contains 20 questions divided into five Sections A, B, C, D and E.
- (iii). **Section A** comprises of 10 MCQs of 1 mark each. **Section B** comprises of 4 questions of 2 marks each. **Section C** comprises of 3 questions of 3 marks each. **Section D** comprises of 1 question of 5 marks each and **Section E** comprises of 2 Case Study Based Questions of 4 marks each.
- (iv). There is no overall choice.
- (v). Use of Calculators is not permitted

SECTION – A

Questions 1 to 10 carry 1 mark each.

1. Which of the following fractions has a terminating decimal expansion?
(a) $\frac{41}{180}$ (b) $\frac{23}{375}$ (c) $\frac{17}{128}$ (d) $\frac{29}{154}$
2. Which of the following numbers is irrational?
(a) 0.272727... (b) $\frac{17}{9}$ (c) $\sqrt{245}$ (d) 4.625
3. The rational number exactly midway between $\frac{1}{5}$ and $\frac{4}{5}$ is
(a) $\frac{1}{2}$ (b) $\frac{3}{5}$ (c) $\frac{2}{5}$ (d) $\frac{2}{3}$
4. The decimal expansion of $\frac{19}{8000}$ terminates after
(a) 3 decimal places (b) 4 decimal places (c) 5 decimal places (d) 6 decimal places
5. The value of 0.181818... is
(a) $\frac{1}{11}$ (b) $\frac{2}{11}$ (c) $\frac{3}{11}$ (d) $\frac{4}{11}$
6. Which pair contains only irrational numbers?
(a) $\sqrt{7}, \sqrt{13}$ (b) $\sqrt{4}, \sqrt{11}$ (c) $\sqrt{9}, \sqrt{17}$ (d) $\sqrt{25}, \sqrt{8}$
7. The number of rational numbers between $\frac{1}{3}$ and $\frac{2}{3}$ is
(a) one (b) finite (c) two (d) infinite
8. Which of the following is rational?
(a) $\sqrt{588}$ (b) $\sqrt{675}$ (c) $\sqrt{484}$ (d) $\sqrt{507}$

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

- (a) Both A and R are true and R is the correct explanation of A.
- (b) Both A and R are true but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true.

9. **Assertion (A):** Every rational number can be represented on the number line.
Reason (R): Every rational number corresponds to a unique point on the number line.
10. **Assertion (A):** $\sqrt{529}$ is rational.
Reason (R): 529 is a perfect square.

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. Riya bought a Mathematics notebook for ₹18 $\frac{3}{4}$, a geometry box for ₹26 $\frac{1}{2}$ and a packet of colour pencils for ₹14 $\frac{3}{4}$. How much money did she spend altogether?
12. Find four rational numbers between $\frac{4}{5}$ and $\frac{17}{20}$.
13. Find: (i) $\frac{6}{25} \div \frac{3}{10}$ (ii) $\frac{-9}{44} \div \frac{3}{11}$
14. Express $0.\overline{23}$ in the form of p/q where $q \neq 0$

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. Simplify: $\left(\frac{-5}{9} \times \frac{72}{-125}\right) - \left(\frac{11}{17} \times \frac{34}{55}\right) + \left(\frac{28}{-13} \times \frac{-52}{21}\right)$
16. Prove that $\sqrt{3}$ is an irrational number.
17. $\frac{5}{8}$ of total number of teachers come by bus, while $\frac{1}{8}$ of teachers come by two wheeler. All the other teachers walk to school of which $\frac{1}{4}$ walk on their own. If 78 teachers come to school walking on their own, how many teachers taught in that school.

OR

Verify the property $x \times (y + z) = x \times y + x \times z$ of rational numbers by taking

$$x = \frac{-2}{3}, y = \frac{-4}{6}, z = \frac{-7}{9}.$$

SECTION – D

Questions 18 carry 5 marks each.

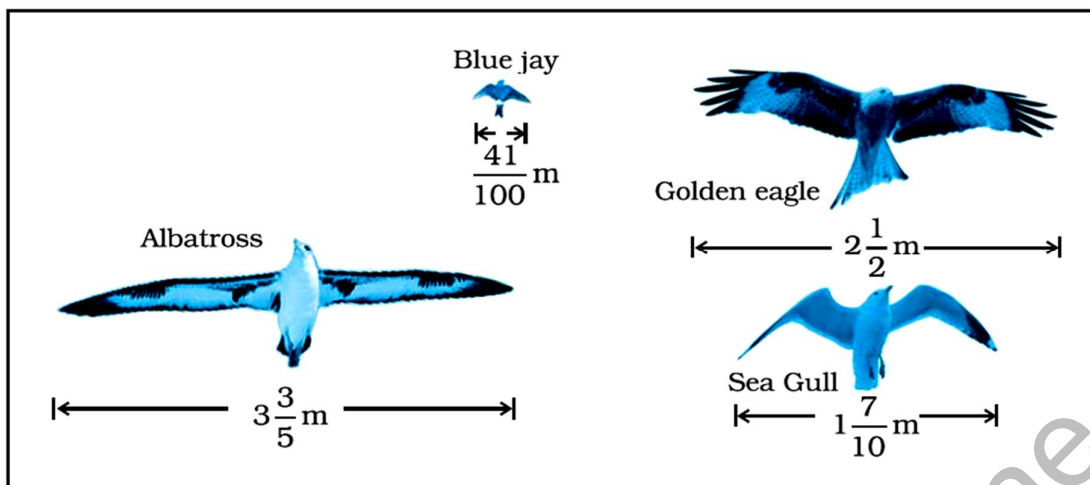
18. Represent $\sqrt{2}$, $\sqrt{3}$ and $\sqrt{5}$ on the same number line

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. Case Study-1:

The diagram shows the wingspans of different species of birds. Use the diagram to answer the question given below:



- (a) How much longer is the wingspan of an Albatross than the wingspan of a Sea gull? (2)
 (b) How much longer is the wingspan of a Golden eagle than the wingspan of a Blue jay? (2)

20. Case Study-2: Investigating Decimal Expansions Through Digital Learning

During a digital mathematics workshop, students used educational software to explore decimal expansions of rational numbers. The software generated different fractions and asked students to predict whether the decimal expansion would terminate or recur. Students first reduced fractions to their lowest forms and then examined the prime factors of the denominators. They observed that denominators containing only factors 2 and 5 always produced terminating decimals. Whenever other prime factors appeared, the decimal expansions became non-terminating recurring. By experimenting with many examples, students developed a deeper understanding of the connection between prime factorisation and decimal representation of rational numbers.



- (a) Determine whether $\frac{21}{125}$ has a terminating decimal expansion. (1)
 (b) Determine whether $\frac{13}{84}$ has a terminating decimal expansion. (1)
 (c) Determine whether $\frac{17}{500}$ has a terminating decimal expansion. (1)
 (d) Determine whether $\frac{19}{198}$ has a terminating decimal expansion. (1)

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(ANSWERS)

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SECTION – A

Questions 1 to 10 carry 1 mark each.

1. Which of the following fractions has a terminating decimal expansion?

(a) $\frac{41}{180}$ (b) $\frac{23}{375}$ (c) $\frac{17}{128}$ (d) $\frac{29}{154}$

Ans: (c) $\frac{17}{128}$

$128 = 2^7$

Since the denominator contains only the prime factor 2, the decimal expansion terminates.

2. Which of the following numbers is irrational?

(a) 0.272727... (b) $\frac{17}{9}$ (c) $\sqrt{245}$ (d) 4.625

Ans: (c) $\sqrt{245}$

$\sqrt{245} = 7\sqrt{5}$

which is irrational.

3. The rational number exactly midway between $\frac{1}{5}$ and $\frac{4}{5}$ is

(a) $\frac{1}{2}$ (b) $\frac{3}{5}$ (c) $\frac{2}{5}$ (d) $\frac{2}{3}$

Ans: (a) $\frac{1}{2}$

$\frac{\frac{1}{5} + \frac{4}{5}}{2} = \frac{1}{2}$

4. The decimal expansion of $\frac{19}{8000}$ terminates after

(a) 3 decimal places (b) 4 decimal places (c) 5 decimal places (d) 6 decimal places

Ans: (d) 6 decimal places

$8000 = 2^6 \times 5^3$

$\frac{19}{8000} = 0.002375$

There are 6 decimal places.

5. The value of 0.181818... is

(a) $\frac{1}{11}$ (b) $\frac{2}{11}$ (c) $\frac{3}{11}$ (d) $\frac{4}{11}$

Ans: (b) $\frac{2}{11}$

$$\frac{2}{11} = 0.181818\dots$$

6. Which pair contains only irrational numbers?

(a) $\sqrt{7}, \sqrt{13}$ (b) $\sqrt{4}, \sqrt{11}$ (c) $\sqrt{9}, \sqrt{17}$ (d) $\sqrt{25}, \sqrt{8}$

Ans: (a) $\sqrt{7}, \sqrt{13}$

Both $\sqrt{7}$ and $\sqrt{13}$ are irrational.

7. The number of rational numbers between $\frac{1}{3}$ and $\frac{2}{3}$ is

(a) one (b) finite (c) two (d) infinite

Ans: (d) infinite

8. Which of the following is rational?

(a) $\sqrt{588}$ (b) $\sqrt{675}$ (c) $\sqrt{484}$ (d) $\sqrt{507}$

Ans: (c) $\sqrt{484}$

$\sqrt{484} = 22$

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

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9. **Assertion (A):** Every rational number can be represented on the number line.

Reason (R): Every rational number corresponds to a unique point on the number line.

Ans: (a) Both A and R are true and R is the correct explanation.

10. **Assertion (A):** $\sqrt{529}$ is rational.

Reason (R): 529 is a perfect square.

Ans: (a) Both A and R are true and R is the correct explanation.

$\sqrt{529} = 23$

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. Riya bought a Mathematics notebook for ₹ $18\frac{3}{4}$, a geometry box for ₹ $26\frac{1}{2}$ and a packet of colour pencils for ₹ $14\frac{3}{4}$. How much money did she spend altogether?

Ans: Cost of a Mathematics notebook = ₹ $18\frac{3}{4} = ₹\frac{75}{4}$

Cost of a geometry box = ₹ $26\frac{1}{2} = ₹\frac{53}{2}$

Cost of a packet of colour pencils = ₹ $14\frac{3}{4} = ₹\frac{59}{4}$

Therefore, Total amount spent = $\frac{75}{4} + \frac{53}{2} + \frac{59}{4} = \frac{75+106+59}{4} = \frac{240}{4} = ₹60$

12. Find four rational numbers between $\frac{4}{5}$ and $\frac{17}{20}$.

Ans: $\frac{4}{5} = \frac{160}{200}$ and $\frac{17}{20} = \frac{170}{200}$

Required rational numbers are $\frac{161}{200}, \frac{162}{200}, \frac{163}{200}, \frac{164}{200}$

13. Find: (i) $\frac{6}{25} \div \frac{3}{10}$ (ii) $\frac{-9}{44} \div \frac{3}{11}$

Ans:

$$(i) \frac{6}{25} \div \frac{3}{10} = \frac{6}{25} \times \frac{10}{3} = \frac{\cancel{2}^1 \times \cancel{10}^2}{5 \times \cancel{25}_1} = \frac{2 \times 2}{5 \times 1} = \frac{4}{5}$$

$$(ii) \frac{-9}{44} \div \frac{3}{11} = \frac{-9}{44} \times \frac{11}{3} = \frac{\cancel{3}^{-1} \times \cancel{11}^1}{4 \times \cancel{44}_1} = \frac{-3 \times 1}{4 \times 1} = \frac{-3}{4}$$

14. Express $0.\overline{23}$ in the form of p/q where q $\neq$ 0

Ans: Let $x = 0.23$

$$x = 0.232323 \dots \dots \dots (1)$$

We have two repeating digits after decimal point, so we multiply both sides of (1) by 100.

$$100x = 23.2323 \dots \dots \dots (2)$$

Subtracting (1) from (2), we get

$$100x - x = (23.2323\dots) - (0.2323\dots)$$

$$\Rightarrow 99x = 23$$

$$\Rightarrow x = 23/99$$

$$\Rightarrow 0.\overline{23} = 23/99$$

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. Simplify: $\left(\frac{-5}{9} \times \frac{72}{-125}\right) - \left(\frac{11}{17} \times \frac{34}{55}\right) + \left(\frac{28}{-13} \times \frac{-52}{21}\right)$

Ans:

$$\begin{aligned} & \left(\frac{-5}{9} \times \frac{72}{-125}\right) - \left(\frac{11}{17} \times \frac{34}{55}\right) + \left(\frac{28}{-13} \times \frac{-52}{21}\right) \\ &= \frac{\cancel{5}^1 \times \cancel{72}^8}{\cancel{9}_1 \times \cancel{125}_{25}} - \frac{\cancel{11}^1 \times \cancel{34}^2}{\cancel{17}_1 \times \cancel{55}_5} + \frac{\cancel{28}^4 \times \cancel{52}^4}{\cancel{13}_1 \times \cancel{21}_3} \\ &= \frac{1 \times 8}{1 \times 25} - \frac{1 \times 2}{1 \times 5} + \frac{4 \times 4}{1 \times 3} = \frac{8}{25} - \frac{2}{5} + \frac{16}{3} \\ &= \frac{8 \times 3 - 2 \times 15 + 16 \times 25}{75} = \frac{24 - 30 + 400}{75} = \frac{424 - 30}{75} = \frac{394}{75} \end{aligned}$$

16. Prove that $\sqrt{3}$ is an irrational number.

Ans: Let $\sqrt{3}$ is a rational number then we have $\sqrt{3} = \frac{p}{q}$, where p and q are co-primes.

$$\Rightarrow p = \sqrt{3} q$$

Squaring both sides, we get $p^2 = 3q^2$

$\Rightarrow p^2$ is divisible by 3 $\Rightarrow p$ is also divisible by 3

So, assume $p = 3m$ where m is any integer.

Squaring both sides, we get $p^2 = 9m^2$

But $p^2 = 3q^2$

$$\text{Therefore, } 3q^2 = 9m^2 \Rightarrow q^2 = 3m^2$$

$\Rightarrow q^2$ is divisible by 3 $\Rightarrow q$ is also divisible by 3

From above we conclude that p and q have one common factor i.e. 3 which contradicts that p and q are co-primes.

Therefore, our assumption is wrong.

Hence, $\sqrt{3}$ is an irrational number.

17. $\frac{5}{8}$ of total number of teachers come by bus, while $\frac{1}{8}$ of teachers come by two wheeler. All the other teachers walk to school of which $\frac{1}{4}$ walk on their own. If 78 teachers come to school walking on their own, how many teachers taught in that school.

Ans: Let the number of teachers be = x

$$\text{Number of teachers come by bus} = \frac{5x}{8}$$

$$\text{Number of teachers come by car} = \frac{x}{8}$$

$$\text{Number of teachers walk to school} = x - \left(\frac{5x}{8} + \frac{x}{8} \right) = x - \frac{6x}{8} = \frac{8x - 6x}{8} = \frac{2x}{8} = \frac{x}{4}$$

$$\text{Number of teachers walk to school on their own} = \frac{1}{4} \times \frac{x}{4} = 78$$

$$\Rightarrow \frac{x}{16} = 78 \Rightarrow x = 1248$$

Hence 1248 teachers taught in the school.

OR

Verify the property $x \times (y + z) = x \times y + x \times z$ of rational numbers by taking

$$x = \frac{-2}{3}, y = \frac{-4}{6}, z = \frac{-7}{9}.$$

$$\text{Ans: Given that } x = \frac{-2}{3}, y = \frac{-4}{6}, z = \frac{-7}{9}$$

$$\begin{aligned} x \times (y + z) &= \frac{-2}{3} \times \left[\left(\frac{-4}{6} \right) + \left(\frac{-7}{9} \right) \right] = \frac{-2}{3} \times \left(\frac{-12 - 14}{18} \right) \\ &= \frac{-2}{3} \times \left(\frac{-26}{18} \right) = \frac{26}{27} \end{aligned}$$

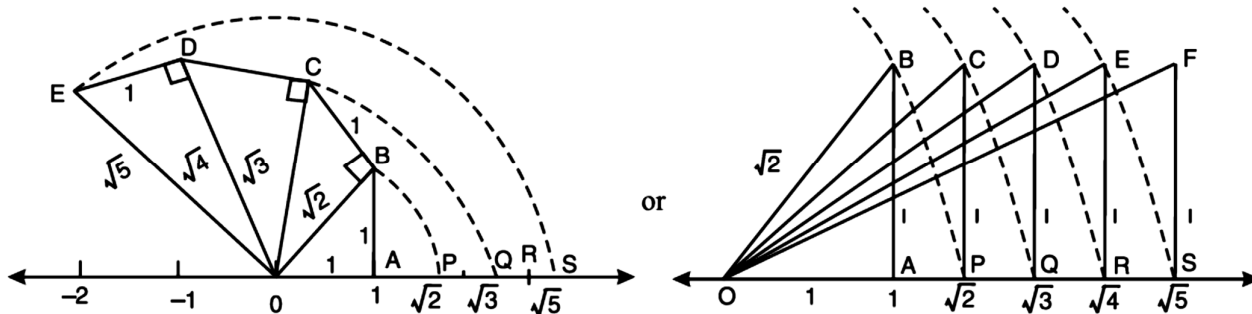
$$\begin{aligned} (x \times y) + (x \times z) &= \left(\frac{-2}{3} \times \frac{-4}{6} \right) + \left(\frac{-2}{3} \times \frac{-7}{9} \right) = \frac{8}{18} + \frac{14}{27} \\ &= \frac{24 + 28}{54} = \frac{52}{54} = \frac{26}{27} \end{aligned}$$

SECTION – D

Questions 18 carry 5 marks each.

18. Represent $\sqrt{2}$, $\sqrt{3}$ and $\sqrt{5}$ on the same number line

Ans:

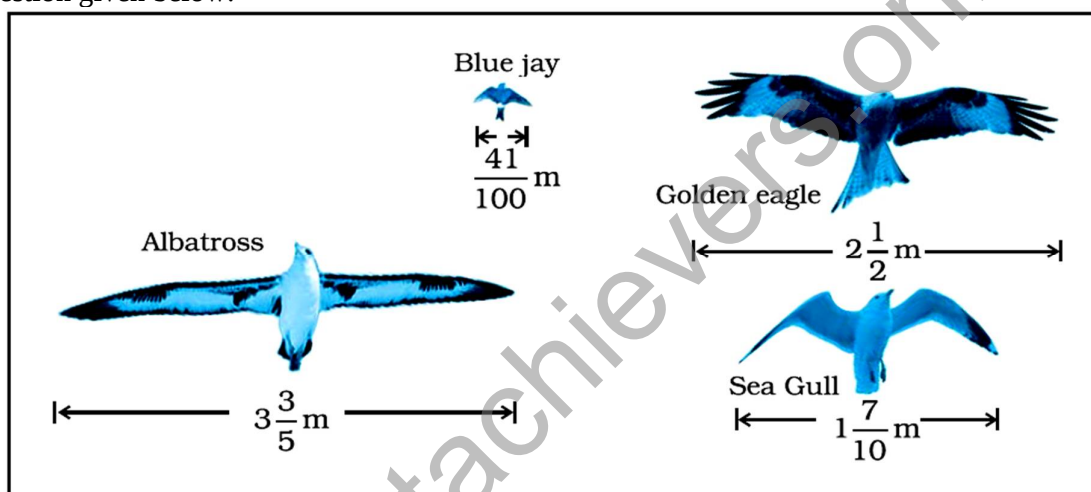


SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. Case Study-1:

The diagram shows the wingspans of different species of birds. Use the diagram to answer the question given below:



- (a) How much longer is the wingspan of an Albatross than the wingspan of a Sea gull?
 (b) How much longer is the wingspan of a Golden eagle than the wingspan of a Blue jay?

Ans: (a) Length of wingspan of Albatross = $3\frac{3}{5}m = \frac{18}{5}m$

Length of wingspan of sea gull = $1\frac{7}{10}m = \frac{17}{10}m$

Difference = $\frac{18}{5} - \frac{17}{10} = \frac{36-17}{10} = \frac{19}{10}m$

(b) Length of wingspan of Golden eagle = $2\frac{1}{2}m = \frac{5}{2}m$

Length of wingspan of olfactory = $\frac{41}{100}m$

Difference = $\frac{5}{2} - \frac{41}{100} = \frac{250-41}{100} = \frac{209}{100}m$

20. Case Study-2: Investigating Decimal Expansions Through Digital Learning

During a digital mathematics workshop, students used educational software to explore decimal expansions of rational numbers. The software generated different fractions and asked students to predict whether the decimal expansion would terminate or recur. Students first reduced fractions to their lowest forms and then examined the prime factors of the denominators. They observed that denominators containing only factors 2 and 5 always produced terminating decimals. Whenever

other prime factors appeared, the decimal expansions became non-terminating recurring. By experimenting with many examples, students developed a deeper understanding of the connection between prime factorisation and decimal representation of rational numbers.



- (a) Determine whether $\frac{21}{125}$ has a terminating decimal expansion.
- (b) Determine whether $\frac{13}{84}$ has a terminating decimal expansion.
- (c) Determine whether $\frac{17}{500}$ has a terminating decimal expansion.
- (d) Determine whether $\frac{19}{198}$ has a terminating decimal expansion.

Ans: (a) $125 = 5^3$

Terminating.

(b) $84 = 2^2 \times 3 \times 7$

Non-Terminating and Recurring.

(c) $500 = 2^2 \times 5^3$

Terminating.

(d) $198 = 2 \times 3^2 \times 11$

Non-Terminating and Recurring.