VIKRAMADITYA ACADEMY

Sainik School • Military School • RIMC Coaching | Day Boarding & Boarding

ENTRANCE EXAM 2027

CLASS **9th**

SAINIK SCHOOL

ALL INDIA SAINIK SCHOOLS ENTRANCE EXAM (AISSEE)

Admission to Class IX • Conducted by NTA

COMPLETE GUIDE

ALL SUBJECTS • ONE BOOK • STRICTLY AS PER OFFICIAL SYLLABUS

Mathematics | **Intelligence** | **English** | **General Science** | **Social Science**

5	PYQs	MCQs	5 Sets
Sections in One Book	Chapter-wise with Answers	Practice with Answer Keys	Practice Papers + Key & Hints

- ✔ Strictly as per AISSEE Class IX official syllabus (Appendix III)
- ✔ PYQs first in every chapter, then practice MCQs
- ✔ Short description, tricks & key points for each chapter
- ✔ Answer keys, explanations & solutions included
- ✔ Maths (200 marks) given the largest share of the book
- ✔ 5 full-length practice sets with answer key & hints

Published by: Vikramaditya Academy | Director: Naresh Sharma
Plot No. 11, Wazirpur Road, Palwali, Sector-88, Greater Faridabad • Branch: JCB Sr. Sec. School, Agra Chowk, Palwal
99919 18624 • 85271 10778 • 97176 15334 • 93501 72741 | www.vikramadityacademy.com

AISSEE (Class IX) — Scheme of Examination

Section	Subject	Questions	Marks each	Total Marks
A	Mathematics	50	4	200
B	Intelligence	25	2	50
C	English	25	2	50
D	General Science	25	2	50
E	Social Science	25	2	50
Total		**150**		**400**

Important points (AISSEE Information Bulletin):

- Duration **180 minutes** (02:00 pm to 05:00 pm). Paper-pencil exam on **OMR** sheet; all questions are **Multiple Choice Questions**.
- **No negative marking** for a wrong response. Medium of the question paper for Class IX is **English only**.
- Questions are based on the topics listed in Appendix 'III' of the Information Bulletin (Class VIII level).
- Age for Class IX: between 13 and 15 years as on 31 March of the admission year (as per bulletin dates). Boys and girls are eligible.

Where to Score — Marks Weightage

Section	Share of total marks	Strategy
Mathematics	200 / 400 = 50%	Master tricks & formulas, solve all PYQs and every practice MCQ; speed matters most here.
Intelligence	50 / 400 = 12.5%	Learn the rule for each question type (analogy, series, coding, figures) and practise daily.
English	50 / 400 = 12.5%	Grammar rules + vocabulary lists; read the explanations of PYQs.
General Science / Social Science	50 + 50 / 400 = 25%	Revise chapter description and one-liners; repeat the PYQs — facts are often repeated.

How to Use this Guide

Part of each chapter	What it gives you
Chapter Description & Key Points	A short description of the chapter with short tricks, formulas, key facts and one-liners for quick revision.
Previous Year Questions (PYQs)	All previous-year questions of that chapter (Sainik School / RMS CET), given **first**, followed by their answers and explanations / solutions.
Solved Examples (Maths)	Exam-pattern examples with complete step-by-step solutions.
Practice MCQs	Selected option-type questions on the exam pattern, followed by the answer key (with hints / solutions where available).
5 Practice Sets	Full-length AISSEE practice papers at the end of the book, each with answer key and one-line solutions.

Study tip: Read the chapter description first, attempt all PYQs without looking at the answers, check with the key, then solve the practice MCQs in a fixed time. Attempt the five practice sets in exam conditions (3 hours).

Contents

Official Syllabus & Exam Scheme (NTA Bulletin) 4

Mathematics 7

1. Number System 7
2. Playing with Numbers 14
3. Rational Numbers 20
4. Exponents & Powers 25
5. Squares & Square Roots 31
6. Cubes & Cube Roots 37
7. Algebraic Expressions & Identities 43
8. Factorisation & Division of Algebraic Expressions 50
9. Linear Equations in One Variable 57
10. Ratio, Proportion & Unitary Method 63
11. Percentage 70
12. Profit, Loss & Discount 76
13. Simple & Compound Interest 83
14. Time & Work 90
15. Pipes & Cisterns 97
18. Lines, Angles & Parallel Lines 105
19. Triangles & Their Properties (Pythagoras) 111
20. Understanding Quadrilaterals & Polygons 117
21. Circle: Circumference & Area 124
22. Perimeter, Area & Conversion of Units 131
23. Surface Area & Volume (Cube, Cuboid, Cylinder) 137
24. Symmetry, Practical Geometry & Visualising Solid Shapes 144
25. Data Handling, Graphs & Coordinates 150
26. Average, Mean, Median & Mode 158
27. Probability 163

Intelligence 169

1. Analogy 169
2. Classification (Odd One Out) 176
3. Series and Sequences 180
4. Coding – Decoding 184
5. Blood Relation 189
6. Direction Sense 195
7. Ranking and Order 199
8. Sitting Arrangement 203
9. Arrange the Words 208
10. Alpha-Numeric Series & Conditional Numbers 214
11. Clock and Calendar 218
12. Mathematical Operations 223
13. Syllogism and Statement – Conclusion 226
14. Puzzles, Decision Making and Critical Thinking 231
15. Venn Diagram 235
16. Pattern and Missing Numbers 243
17. Figure Series and Odd Figure 251
18. Mirror and Water Images 259
19. Counting of Figures 267
20. Cube and Dice 276

English 284

1. The Sentence & Kinds of Sentences 284
2. Noun and its Kinds 288
3. Gender — Change of Gender 291
4. Number — Change of Number 293
5. Pronoun and its Kinds 296
6. Adjectives & Comparison of Adjectives 298
7. Articles & Determiners 301
8. Verbs and Types of Verbs 305
9. Tenses (Tense Forms) 307
10. Modals 311
11. Subject–Verb Agreement 314
12. Adverbs 317
13. Prepositions 320
14. Conjunctions 323
15. Interjections 327
16. Phrases and Clauses 329
17. Conditional Sentences (Conditions) 332
18. Active and Passive Voice 335
19. Direct and Indirect Speech (Narration) 343
20. Question Tags 351
21. Transformation of Sentences (Change as Directed) 353
22. Spotting Errors / Error Correction 357
23. Sentence Improvement 360
24. Order of Words, Sentence Rearrangement & Para Jumbles 364
26. Synonyms 369
27. Antonyms 375
29. Idioms, Phrases & Phrasal Verbs 381
30. Confusing Words & Word Formation 386
31. Spelling Check & Correct Spellings 389
32. Reading Comprehension (Prose & Poem) 393

General Science 411

1. Force and Pressure 411
2. Friction 417
4. Sound 422
5. Light 427
7. Electric Current and its Effects 434
8. Chemical Effects of Electric Current 438
9. Some Natural Phenomena 444
10. Stars and the Solar System 448
13. Metals and Non-Metals 453
14. Fossil Fuel (Coal & Petroleum) 460
15. Combustion and Flame 466
16. Synthetic Fibres and Plastics 472
17. Pollution of Air and Water & Global Warming 478
18. Cell – Structure and Function 483
19. Micro-organisms: Friend and Foe 489
22. Reproduction in Plants 496
23. Reproduction in Animals 500
24. Reaching the Age of Adolescence 505
25. Crop Production and Management 511
26. Conservation of Plants & Animals 516

Social Science 522

1. Geographical Diversity of India 522
2. Resources and Their Conservation 526
3. Weather and Climate 534
4. Landforms and Life 538
5. Locating Places on the Earth 542
6. Oceans and Continents 545
7. From the Rulers to the Ruled: Types of Government 548
8. The Constitution of India 553
9. Universal Franchise and India's Electoral System 560
10. The Parliamentary System: Legislature and Executive 564
11. Grassroots Democracy: Local Self-Government 569
12. From Barter to Money 573
13. Understanding Markets 577
14. Economic Activities Around Us 580
15. The Beginnings of Indian Civilisation 586
16. India's Cultural Roots 589
17. New Beginnings: Cities and States 592
18. The Rise of Empires: The Mauryas 596
19. The Age of Reorganisation (c. 200 BCE – 300 CE) 600
20. The Gupta Era: An Age of Tireless Creativity 603
21. Reshaping India's Political Map (c. 800 – 1700 CE) 606
22. The Rise of the Marathas 610
23. The Colonial Era in India 614

Previous Year Papers — Solved 624

Sainik School AISSEE 2026 (with solutions) 624
Sainik School AISSEE 2024 (with solutions) 636

Practice Sets (with Answer Key & Hints) 649

AISSEE Practice Set – 02 649
AISSEE Practice Set – 11 658
AISSEE Practice Set – 23 668
AISSEE Practice Set – 37 677
AISSEE Practice Set – 48 686

Official Syllabus & Exam Scheme — NTA Information Bulletin (1/3)

ALL INDIA SAINIK SCHOOLS ENTRANCE EXAMINATION - 2027

4.4.3.2 For IX Std (Based on topics listed in Appendix 'III')

Section	Topic	No. of Questions	Marks for each Correct answer	Total marks
A	Mathematics	50	4	200
B	Intelligence	25	2	50
C	English	25	2	50
D	General Science	25	2	50
E	Social Science	25	2	50
	Total	**150**		**400**

4.4.4 There is no negative marking for a wrong response.

4.5 **MEDIUM OF EXAMINATION**.

4.5.1 For admission to Class IX: English only

4.5.2 For admission to Class VI:

- English
- Marathi
- Odia
- Bengali
- Hindi
- Assamese
- Punjabi
- Tamil
- Gujarati
- Telugu
- Kannada
- Urdu
- Malayalam

4.5.3 A candidate can choose any of the above languages irrespective of school applied for.

4.5.4 Option of medium of Question Paper should be carefully chosen while filling in the Application Form. The option once exercised cannot be changed.

4.5.5 Candidates opting for English or Hindi would be provided bilingual Exam Booklet (i.e., in English and Hindi).

4.5.6 Candidates opting for regional languages would be provided Exam Booklet in the language opted by the candidate in their application form and English.

4.5.7 In case of any ambiguity in translation/construction of a question in the exam, its English version (except for the Language section questions) shall be treated as final and the decision of NTA shall be final in this regard.

4.5.8 Candidates passing in AISSEE-2027 would be eligible for admission, irrespective of the medium of the examination, subject to meeting other eligibility criteria.

Official Syllabus & Exam Scheme — NTA Information Bulletin (2/3)

ALL INDIA SAINIK SCHOOLS ENTRANCE EXAMINATION - 2027

APPENDIX- III
(Refers to Para 4.6 of Information Bulletin 2027)

TOPICS COVERED IN CLASS IX: MATHEMATICS

Total Question – 50 **Max Marks– 200**

Sl.	Topics	Sl.No.	Topics	Sl.	Topics
1.	Rational Numbers	13.	Simple Interest	25.	Data handling
2.	Linear Equations in One Variable	14.	Compound Interest	26.	Bar graph
3.	Understanding Quadrilaterals	15.	Discount	27.	Line graph
4.	Triangles & its Properties	16.	Visualizing solid shape	28.	Playing with numbers
5.	Angles sum property	17.	View of 2D & 3D shapes	29.	Divisibility test
6.	Pythagoras theorem	18.	Euler's Formula	30.	Statistics
7.	Square & Square roots	19.	Mensuration	31.	Mean, mode, median of raw data
8.	Cubes & Cube roots	20.	Area & perimeter	32.	Probability
9.	Comparing quantities	21.	Volume & Surface area	33.	Parallel lines
10.	Percentage	22.	Exponents & powers	34.	Time & work
11.	Profit & loss	23.	Direct and inverse proportion		
12.	Algebraic expression	24.	Factorization		

TOPICS COVERED IN CLASS IX: INTELLIGENCE

Total Question- 25 **Max Marks- 50**

Sl.	Topics	Sl.	Topics
1	Analogies (Mathematical & Verbal)	5.	Series and Sequences
2.	Pattern (Spatial and Mathematical)	6.	Critical Thinking and Problem Solving
3.	Classification	7.	Familial Relations
4.	Visual & Logical Reasoning		

TOPICS COVERED IN CLASS IX: ENGLISH

Total Question- 25 **Max Marks- 50**

Sl.	Topics	Sl.	Topics	Sl.	Topics	Sl.	Topics
1.	Spotting Errors	10.	Modals	19.	Phrase and Clauses	28.	Voices
2.	Comprehension Passage	11.	Confusing Words	20.	Kinds of Noun	29.	Types of Sentences
3.	Antonyms	12.	Subject-Verb Agreement	21.	Adjectives	30.	Personal Pronoun
4.	Synonyms	13.	Correct Spellings	22.	Interjection	31.	Change of Gender
5.	Prepositions	14.	Order of words in a sentence	23.	Question Tags	32.	Change of Number
6.	Articles	15.	Idioms and Phrases	24.	Adverbs		
7.	Types of Verbs	16.	Sentence Improvement	25.	Conjunctions		
8.	Tense Form	17.	Change of sentence as directed	26.	Conditions		
9.	Narration	18.	Sentence Formation	27.	Comparison of Adjectives		

Official Syllabus & Exam Scheme — NTA Information Bulletin (3/3)

ALL INDIA SAINIK SCHOOLS ENTRANCE EXAMINATION - 2027

TOPICS COVERED IN CLASS IX: GENERAL SCIENCE

Total Question- 25 **Max Marks- 50**

Sl.	Topics	Sl.	Topics	Sl.	Topics
1.	Fossil Fuel: Coal and Petroleum	10.	Chemical Effects of Electric Current	19.	Cropping Seasons
2.	Combustion and Flame	11.	Stars and Solar Systems	20.	Agricultural Practices
3.	Cell Structure and Function	12.	Pollution of Air and Water	21.	Conservation of Plants and Animals
4.	Reproduction in Plants & Animals	13.	Global Warming	22.	Biosphere Reserves, National Parks and Sanctuaries
5.	Force, Friction and Pressure	14.	Micro-Organisms	23.	Reaching the age of Adolescence
6.	Sound and its basics	15.	Some Natural Phenomenon	24.	Changes during Puberty
7.	Reflection and Dispersion of Light	16.	How to find calorific value of fuel?	25.	Endocrine Glands and Hormones
8.	Metals and Non Metals	17.	Electroplating and Artificial Jewellery		
9.	Synthetic Fibers and Plastics	18.	Relation between types of friction.		

TOPICS COVERED IN CLASS IX: SOCIAL SCIENCE

Total Question- 25 **Max Marks- 50**

Sl.	Topics	Sl.	Topics
1.	Geographical diversity of India	13.	Understanding Market
2.	Resource & their conservation	14.	Economic activity around us
3.	Weather & Climate	15.	The beginning of Indian Civilization
4.	Land form & life	16.	India's cultural root
5.	Locating places on the earth	17.	New beginnings – City & State
6.	Ocean & Continents	18.	The rise of empire
7.	From the Rules to the ruled: Type of Government	19.	Age of re-organization
8.	The Constitution of India	20.	The Gupta Era: an age of tireless creativity
9.	Universal franchise & India's electoral system	21.	Reshaping India's political map
10.	The parliament system: legislature & executive	22.	The rise of Marathas
11.	Grassroot democracy: local & self Government	23.	The colonial era in India
12.	From barter to money		

AISSEE Class 9 • Section A • 50 Questions • 200 Marks (4 each)

Mathematics

The highest-scoring section — short tricks, exam-special formulas, PYQs, fully solved examples and practice MCQs with answer keys.

OFFICIAL SYLLABUS (as per Information Bulletin)

1	Rational Numbers	13	Simple Interest	25	Data Handling
2	Linear Equations in One Variable	14	Compound Interest	26	Bar Graph
3	Understanding Quadrilaterals	15	Discount	27	Line Graph
4	Triangles & its Properties	16	Visualizing Solid Shapes	28	Playing with Numbers
5	Angle Sum Property	17	View of 2D & 3D Shapes	29	Divisibility Test
6	Pythagoras Theorem	18	Euler's Formula	30	Statistics
7	Square & Square Roots	19	Mensuration	31	Mean, Mode, Median of Raw Data
8	Cubes & Cube Roots	20	Area & Perimeter	32	Probability
9	Comparing Quantities	21	Volume & Surface Area	33	Parallel Lines
10	Percentage	22	Exponents & Powers	34	Time & Work
11	Profit & Loss	23	Direct and Inverse Proportion		
12	Algebraic Expression	24	Factorization		

CHAPTER 01

Number System

SAINIK SCHOOL • CLASS 9 • Mathematics

Chapter Description & Key Points

⚡

Short Tricks – Number System (with fully solved examples)

TRICK 1 Unit digit of a power (cyclicity 4)

Unit digits of powers repeat in a cycle of 4. Divide the power by 4 and use the remainder r (if r = 0, use 4): unit digit of a^n = unit digit of (last digit of a^r).

Example 1: Find the unit digit of 7^{95}.

Solution (by trick):

- Cycle of 7: 7, 9, 3, 1.
- 95 ÷ 4 gives remainder 3.
- So unit digit = unit digit of $7^3 = 343 \rightarrow 3$.

Answer: 3

TRICK 2 HCF × LCM = Product of two numbers

Example 2: Find the unit digit of 2^{50}.

Solution (by trick):

- Cycle of 2: 2, 4, 8, 6.
- 50 ÷ 4 gives remainder 2.
- Unit digit = unit digit of $2^2 = 4$.

Answer: 4

For any two numbers a and b: HCF × LCM = a × b.

Example 1: HCF of two numbers is 12 and LCM is 360. One number is 72. Find the other.

Solution (by trick):

- Other number = (HCF × LCM) ÷ first number
- = (12 × 360) ÷ 72 = 4320 ÷ 72 = 60.

Answer: 60

Example 2: The product of two numbers is 2400 and their HCF is 20. Find their LCM.

Solution (by trick):

- LCM = Product ÷ HCF = 2400 ÷ 20 = 120.

Answer: 120

TRICK 3 Largest number that divides and leaves remainders

Same given remainder r: answer = HCF(a − r, b − r, …). Same but unknown remainder: answer = HCF of the differences (b − a), (c − b), ….

Example 1: Find the largest number that divides 245 and 1029 leaving remainder 5 in each case.

Solution (by trick):

- Subtract the remainder: 245 − 5 = 240, 1029 − 5 = 1024.
- HCF(240, 1024): $240 = 2^4 \times 15$, $1024 = 2^{10}$.
- HCF = $2^4 = 16$.

Answer: 16

Example 2: Find the largest number which divides 43, 91 and 183 leaving the same remainder.

Solution (by trick):

- Differences: 91 − 43 = 48, 183 − 91 = 92, 183 − 43 = 140.
- HCF(48, 92, 140) = 4.

Answer: 4

TRICK 4 Smallest number that leaves remainders

Same remainder r when divided by a, b, c: answer = LCM(a, b, c) + r. If each remainder is k less than the divisor: answer = LCM − k.

Example 1: Find the smallest number which when divided by 12, 15 and 20 leaves remainder 4 in each case.

Solution (by trick):

- LCM(12, 15, 20) = 60.
- Answer = 60 + 4 = 64.

Answer: 64

Example 2: Find the smallest number which when divided by 6, 8 and 9 leaves remainders 4, 6 and 7 respectively.

Solution (by trick):

- 6 − 4 = 2, 8 − 6 = 2, 9 − 7 = 2 → each remainder is 2 less than its divisor.
- LCM(6, 8, 9) = 72.
- Answer = 72 − 2 = 70. (Check: 70 = 6×11+4 = 8×8+6 = 9×7+7.)

Answer: 70

TRICK 5 Quick sums

1 + 2 + … + n = n(n + 1)/2 • Sum of first n odd numbers = n^2 • Sum of first n even numbers = n(n + 1).

Example 1: Find 1 + 2 + 3 + … + 50.

Solution (by trick):

- n = 50 → 50 × 51 ÷ 2 = 1275.

Answer: 1275

Example 2: Find the sum of the first 20 odd numbers.

Solution (by trick):

- Sum = $n^2 = 20^2 = 400$.

Answer: 400

Exam Special – Important Points, Formulas & Shortcuts

Types of Numbers

- **Natural numbers (N):** 1, 2, 3, 4, … (counting numbers). Smallest natural number = 1.
- **Whole numbers (W):** 0, 1, 2, 3, … Smallest whole number = 0. Every natural number is a whole number, but 0 is not a natural number.
- **Integers (Z):** …, −3, −2, −1, 0, 1, 2, 3, … Positive integers, negative integers and zero.
- **Even numbers** are divisible by 2; **odd numbers** are not.
- **Prime numbers** have exactly two factors (1 and itself): 2, 3, 5, 7, 11, 13, … **2 is the only even prime.** 1 is neither prime nor composite.
- **Composite numbers** have more than two factors: 4, 6, 8, 9, …
- **Co-prime numbers** have HCF = 1, e.g. (8, 15).
- There are **25 prime numbers** between 1 and 100.

Place Value, Face Value & Roman Numerals

Face value of a digit is the digit itself. **Place value** = digit × value of its place. In 7,864 the place value of 6 is 60 and its face value is 6.

Indian system: 1,00,00,000 (one crore).
International system: 10,000,000 (ten million). 1 lakh = 100 thousand; 1 million = 10 lakh; 1 crore = 10 million.

Roman numerals: I = 1, V = 5, X = 10, L = 50, C = 100, D = 500, M = 1000.

- A symbol repeated adds its value (XX = 20); no symbol is repeated more than three times; V, L, D are never repeated.
- A smaller symbol to the **right** adds (XV = 15); to the **left** subtracts (IX = 9). Only I, X, C are subtracted: I from V and X; X from L and C; C from D and M.
- Examples: XL = 40, XC = 90, CD = 400, CM = 900, MCMXCIX = 1999.

Integers & BODMAS

- (+) × (+) = (+); (−) × (−) = (+); (+) × (−) = (−). Same rules for division.
- Order of operations — **BODMAS**: Brackets → Of → Division → Multiplication → Addition → Subtraction.

- Additive identity = 0; multiplicative identity = 1. Integers are closed under +, −, ×, but not under ÷.

Divisibility Tests

By	Rule
2	Units digit is 0, 2, 4, 6 or 8
3	Sum of digits divisible by 3
4	Number formed by last two digits divisible by 4
5	Units digit is 0 or 5
6	Divisible by both 2 and 3
8	Number formed by last three digits divisible by 8
9	Sum of digits divisible by 9
10	Units digit is 0
11	(Sum of digits at odd places) − (sum at even places) = 0 or a multiple of 11

If a number is divisible by two **co-prime** numbers, it is divisible by their product (e.g. by 3 and 4 ⇒ by 12).

Playing with Numbers (General Form)

- Two-digit number with tens digit a and units digit b = **10a + b**; reversed = 10b + a.
- (10a + b) + (10b + a) = 11(a + b) ⇒ always divisible by 11.
- (10a + b) − (10b + a) = 9(a − b) ⇒ always divisible by 9.
- Three-digit number abc = 100a + 10b + c; abc + bca + cab = 111(a + b + c) = 3 × 37 × (a + b + c).
- A number like 357357 = 357 × 1001 = 357 × 7 × 11 × 13, so it is divisible by 7, 11 and 13.

HCF and LCM

- **HCF** = product of common prime factors with the *smallest* powers. **LCM** = product of all prime factors with the *greatest* powers.
- **HCF × LCM = product of the two numbers.**
- Bells / lights / runners meeting together ⇒ use **LCM**. Largest equal pieces / greatest size of tile ⇒ use **HCF**.
- HCF of fractions = HCF of numerators ÷ LCM of denominators; LCM of fractions = LCM of numerators ÷ HCF of denominators.

Previous Year Questions (RMS CET / Sainik School)

2. A number ending in 9 will have the unit place of its square as RMS 2023

(a) 3 (b) 9 (c) 1 (d) 6

4. What is the value of the Roman numeral "MCMXCIX"? RMS 2024

(a) 1989 (b) 1999 (c) 2000 (d) 1990

8. If one-fourth, half, and one-fifth of a number added to itself becomes 39, then what is the number? RMS 2024

(a) 24 (b) 20 (c) 26 (d) 30

9. Which of the following evaluates to an integer? RMS 2025

(a) $\sqrt{10}$ (b) 4.5
(c) $(-\sqrt{81})/3$ (d) 1.2

13. The number of zeroes at the end of the number 1 × 2 × 3 × 4 × ... × 20 is Sainik 2024

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

21. Find the range of the first five prime numbers. RMS 2018 • Sainik 2024

(a) 2 (b) 7 (c) 9 (d) 11

24. How many non-square numbers lie between 11^2 and 12^2? RMS 2018

(a) 21 (b) 23 (c) 22 (d) 20

27. Out of the following numbers which one is known as the Hardy-Ramanujan Number? Sainik 2022

(a) 1297 (b) 1729 (c) 1927 (d) 7219

30. The additive identity for integers is Sainik 2021

(a) 0 (b) 1
(c) −1 (d) does not exist

32. Which of the following has the least value? RMS 2024

(a) −14×6 (b) 12÷(−4)
(c) 3−6×(−5) (d) −7×(−6)

38. Associative property of multiplication of integers Sainik 2021

(a) exists (b) does not exist
(c) holds without 0 (d) None of these

40. If the HCF and LCM of two numbers a and b are x and y respectively and a + b = x + y, then $x^2 + y^2$ =? Sainik 2022

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

41. 1X2Y6Z is a six-digit number divisible by 9. The least value of X + Y + Z is: RMS 2019 • Sainik 2019

(a) 0 (b) 1 (c) 2 (d) 3

48. Assertion (A): The product of any two positive integers is always positive.
Reason (R): Multiplying two negative integers always gives a positive number. RMS 2025

(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

51. Every counting number has an infinite number of RMS 2023

(a) Factors (b) Multiple
(c) Prime factors (d) None of these

59. On children's day, sweets were to be equally distributed among 160 children in a school. Actually on the children's day 40 children were absent and therefore each child got 10 sweets extra. Total number of sweets were RMS 2023

(a) 3200 **(b)** 2400 **(c)** 4000 **(d)** 4800

62. What is the numerical form of 1000a + 10b + c? RMS 2020

(a) abc **(b)** a0bc **(c)** abc0 **(d)** ab0c

64. If a and b are two positive integers, then HCF(a, b) × LCM(a, b) =? RMS 2018

(a) a × b **(b)** a + b **(c)** a – b **(d)** a/b

67. If 3x5 is a multiple of 9 (x being a digit), then x =

(a) 2 **(b)** 4 **(c)** 1 **(d)** 0

68. How many natural numbers lie between 8^2 and 9^2? RMS 2021

(a) 16 **(b)** 17 **(c)** 18 **(d)** 19

69. A spider is climbing a wall. It climbs up 5 cm, falls back 3 cm, climbs up another 4 cm, falls back 6 cm and climbs up another 5 cm. How far has the spider climbed from its starting point? Sainik 2019

(a) 5 cm **(b)** 6 cm **(c)** 4 cm **(d)** 23 cm

73. At a busy intersection, three traffic lights turn red every 24, 36, and 54 seconds. After how many seconds will all three turn red together? RMS 2025

(a) 432 s **(b)** 316 s **(c)** 486 s **(d)** 216 s

75. Which of the following is a non-zero integer? RMS 2025

(a) –2.6 **(b)** √16
(c) 4 + (–1/2) **(d)** 1/2 – 1/2

77. Three times a number is equal to the number plus 18. What is the number? RMS 2025

(a) 6 **(b)** 7
(c) 9 **(d)** None of the options

89. Solve the Roman numeral expression: LXXV - XXIV =? RMS 2025

(a) L **(b)** LI
(c) LII **(d)** None of the options

100. The value of (–10/3) × (–15/2) × (17/19) × 0 is: RMS 2023

(a) 0 **(b)** 22.66 **(c)** 20 **(d)** 35

Answers — PYQs

2. (c)	**4.** (b)	**8.** (b)	**9.** (c)	**13.** (b)
21. (c)	**24.** (c)	**27.** (b)	**30.** (a)	**32.** (a)
38. (a)	**40.** (c)	**41.** (a)	**48.** (b)	**51.** (b)
59. (d)	**62.** (b)	**64.** (a)	**67.** (c)	**69.** (a)
73. (d)	**75.** (b)	**77.** (c)	**89.** (b)	**100.** (a)

Solved Examples

Solved Examples – Concept Based

Example 1: Find the difference between the place value of 6 in 7,864 and the face value of 9 in 9,332.

Solution: Place value of 6 = 60, face value of 9 = 9. Difference = 60 – 9 = **51**.

Write 1994 in Roman numerals.

Example 2:

Solution: 1994 = 1000 + 900 + 90 + 4 = M + CM + XC + IV = MCMXCIV.

Simplify: 56 + 8 × 3 − 10.

Example 3:

Solution: By BODMAS, multiply first: 8 × 3 = 24. Then 56 + 24 − 10 = 70.

If the number 461x72 is divisible by 9, find the digit x.

Example 4:

Solution: Sum of digits = 4 + 6 + 1 + x + 7 + 2 = 20 + x. The nearest multiple of 9 is 27, so x = 7.

Three bells ring at intervals of 12, 15 and 20 minutes. They ring together at 8:00 a.m. When

Example 5:

will they next ring together?

Solution: LCM(12, 15, 20) = 60 minutes. They ring together again at 9:00 a.m.

The HCF of two numbers is 15 and their LCM is 825. If one number is 75, find the other.

Example 6:

Solution: Other number = (HCF × LCM) ÷ 75 = (15 × 825) ÷ 75 = 165.

Show that the sum of a two-digit number and the number obtained by reversing its digits is

Example 7:

divisible by 11.

Solution: (10a + b) + (10b + a) = 11a + 11b = 11(a + b), which is a multiple of 11. ∎

A number when divided by 15 but not by 5 — does such a number exist?

Example 8:

Solution: Every multiple of 15 is a multiple of 5 (15 = 3 × 5). Hence such a number does not exist.

Solved Examples (Sainik School & RMS CET pattern, full solutions)

Example 9: Three bells ring at intervals of 14, 20 and 28 minutes. If they ring together at 8:00 a.m., when will they next ring together?

(a) 10:20 a.m. **(b)** 10:50 a.m.
(c) 11:20 a.m. **(d)** 12:40 p.m.

Solution: LCM of 14, 20, 28 = 140 minutes, so they ring together again 140 minutes after 8:00 a.m., i.e. at 10:20 a.m..

Answer: (a) 10:20 a.m.

Example 10: The HCF of 91 and 208 is

(a) 13 **(b)** 26 **(c)** 15 **(d)** 11

Solution: 91 = 13 × 7 and 208 = 13 × 16 with 7, 16 co-prime, so HCF = 13.

Answer: (a) 13

Example 11: **The HCF of 133 and 304 is**

(a) 15 **(b)** 38 **(c)** 21 **(d)** 19

Solution: 133 = 19 × 7 and 304 = 19 × 16 with 7, 16 co-prime, so HCF = 19.

Answer: (d) 19

Example 12: **Three bells ring at intervals of 4, 8 and 14 minutes. If they ring together at 8:00 a.m., when will they next ring together?**

(a) 9:26 a.m. **(b)** 8:56 a.m.

(c) 9:56 a.m. **(d)** 8:32 a.m.

Solution: LCM of 4, 8, 14 = 56 minutes, so they ring together again 56 minutes after 8:00 a.m., i.e. at 8:56 a.m..

Answer: (b) 8:56 a.m.

Example 13: **The number 360 in Roman numerals is written as**

(a) CCCLXI **(b)** CCCLIX **(c)** CCCLXX **(d)** CCCLX

Solution: 360 = CCCLX.

Answer: (d) CCCLX

Example 14: **What is the difference between the place value and the face value of 7 in 9,78,425?**

(a) 69,993 **(b)** 6,993 **(c)** 70,007 **(d)** 70,000

Solution: Place value of 7 = 70,000; face value = 7. Difference = 69,993.

Answer: (a) 69,993

Example 15: **The LCM of 75 and 165 is**

(a) 825 **(b)** 15 **(c)** 165 **(d)** 12,375

Solution: LCM = HCF × 5 × 11 = 15 × 5 × 11 = 825. (Check: HCF × LCM = 75 × 165)

Answer: (a) 825

Example 16: **The number 94 in Roman numerals is written as**

(a) CIV **(b)** XCIII **(c)** XCV **(d)** XCIV

Solution: 94 = XCIV.

Answer: (d) XCIV

Example 17: **What is the difference between the place value and the face value of 1 in 7,18,265?**

(a) 999 **(b)** 10,000 **(c)** 10,001 **(d)** 9,999

Solution: Place value of 1 = 10,000; face value = 1. Difference = 9,999.

Answer: (d) 9,999

Example 18: **Which of the following numbers is divisible by both 11 and 2?**

(a) 8,359 **(b)** 8,358 **(c)** 8,353 **(d)** 8,338

Solution: 8,338 = 22 × 379, so it is divisible by 11 and by 2. The others are not multiples of 22.

Answer: (d) 8,338

Example 19: **The LCM of 18 and 99 is**

(a) 198 **(b)** 1,782 **(c)** 99 **(d)** 9

Solution: LCM = HCF × 2 × 11 = 9 × 2 × 11 = 198. (Check: HCF × LCM = 18 × 99)

Answer: (a) 198

Example 20: **Which of the following numbers is divisible by both 3 and 5?**

(a) 4,719 **(b)** 4,712 **(c)** 4,713 **(d)** 4,710

Solution: 4,710 = 15 × 314, so it is divisible by 3 and by 5. The others are not multiples of 15.

Answer: (d) 4,710

Example 21: **What is the value of the Roman numeral CCCXCIII?**

(a) 403 **(b)** 393 **(c)** 493 **(d)** 383

Solution: CCCXCIII = 393.

Answer: (b) 393

Example 22: **What is the value of the Roman numeral CLXIX?**

(a) 269 **(b)** 179 **(c)** 169 **(d)** 159

Solution: CLXIX = 169.

Answer: (c) 169

Example 23: **What is the value of the Roman numeral CCCLXXXVI?**

(a) 386 **(b)** 396 **(c)** 376 **(d)** 486

Solution: CCCLXXXVI = 386.

Answer: (a) 386

Example 24: **What is the value of the Roman numeral MMXXIV?**

(a) 2,024 **(b)** 2,014 **(c)** 2,034 **(d)** 2,124

Solution: MMXXIV = 2024.

Answer: (a) 2,024

Example 25: **What is the value of the Roman numeral MMDCXXXVI?**

(a) 2,636 **(b)** 2,626 **(c)** 2,736 **(d)** 2,646

Solution: MMDCXXXVI = 2636.

Answer: (a) 2,636

Example 26: **What is the value of the Roman numeral MMCCCXCIII?**

(a) 2,383 **(b)** 2,493 **(c)** 2,403 **(d)** 2,393

Solution: MMCCCXCIII = 2393.

Answer: (d) 2,393

Practice MCQs

1. The value of $(-22 + 17) \times (-10)$ is

(a) 50 **(b)** 45 **(c)** 55 **(d)** 40

3. Which of the following statements are true?
A. The sum of two irrational numbers is always irrational.
B. The product of a non-zero rational number and an irrational number is irrational.
C. $\sqrt{9}$ is an irrational number.
D. π is an irrational number.

(a) C and D only **(b)** A and B only
(c) A, B and D only **(d)** B and D only

5. The value of $(-10 + 29) \times (-4)$ is

(a) 76 **(b)** −80 **(c)** −76 **(d)** −126

6. The LCM of 18 and 99 is

(a) 198 **(b)** 1,782 **(c)** 99 **(d)** 9

7. The LCM of 98 and 28 is

(a) 2,744 **(b)** 28 **(c)** 14 **(d)** 196

10. The number of factors of 36 is

(a) 8 **(b)** 6 **(c)** 12 **(d)** 9

11. The least number which when divided by 18, 24 and 32 leaves a remainder 3 in each case is

(a) 285 **(b)** 288 **(c)** 291 **(d)** 579

12. What is the difference between the place value and the face value of 7 in 9,78,425?

(a) 69,993 **(b)** 6,993 **(c)** 70,007 **(d)** 70,000

14. The number 146 in Roman numerals is written as

(a) CXLVII **(b)** CLVI **(c)** CXLV **(d)** CXLVI

15. The sum of the first five prime numbers is

(a) 26 **(b)** 18 **(c)** 28 **(d)** 39

16. Three bells ring at intervals of 5, 6 and 30 minutes. If they ring together at 8:00 a.m., when will they next ring together?

(a) 8:30 a.m. **(b)** 9:00 a.m.
(c) 9:30 a.m. **(d)** 8:33 a.m.

17. The least number which when divided by 6, 8 and 12 leaves a remainder 3 in each case is

(a) 27 **(b)** 51 **(c)** 21 **(d)** 24

18. The sum of a two-digit number and the number formed by reversing its digits is always divisible by

(a) 11 **(b)** 10 **(c)** 2 **(d)** 9

19. The LCM of 24 and 36 is

(a) 12 **(b)** 72 **(c)** 36 **(d)** 864

20. Which of the following statements are true?
A. A number divisible by 9 is always divisible by 3.
B. A number divisible by 3 is always divisible by 9.
C. A number divisible by both 4 and 6 is always divisible by 24.
D. A number divisible by both 2 and 5 is always divisible by 10.

(a) A, C and D only **(b)** A and B only
(c) A and D only **(d)** B and C only

22. A sum of ₹ 500 is made up of ₹ 10 and ₹ 50 notes. If the total number of notes is 18, the number of ₹ 50 notes is

(a) 6 **(b)** 10 **(c)** 8 **(d)** 12

23. The LCM of 12, 18 and 30 is

(a) 90 **(b)** 360 **(c)** 180 **(d)** 6480

25. The HCF of 133 and 171 is

(a) 21 **(b)** 38 **(c)** 19 **(d)** 15

26. Which of the following statements are true?
A. Every whole number is a natural number.
B. Every natural number is a whole number.
C. Zero is neither positive nor negative.
D. −5 is a whole number.

(a) A and B only **(b)** B and C only
(c) A, B and C only **(d)** B, C and D only

28. The LCM of 18 and 30 is

(a) 30 **(b)** 540 **(c)** 6 **(d)** 90

29. MCDXLIV in Hindu-Arabic numerals is

(a) 1644 **(b)** 1444 **(c)** 1446 **(d)** 1464

31. Three bells ring at intervals of 4, 21 and 28 minutes. If they ring together at 8:00 a.m., when will they next ring together?

(a) 9:54 a.m. **(b)** 9:24 a.m.
(c) 10:24 a.m. **(d)** 9:32 a.m.

33. The value of $48 \div 8 \times 3 - 2 \times (5 - 9)$ is

(a) 26 **(b)** −6 **(c)** 14 **(d)** 10

34. Three bells ring at intervals of 4, 8 and 14 minutes. If they ring together at 8:00 a.m., when will they next ring together?

(a) 9:26 a.m. **(b)** 8:56 a.m.
(c) 9:56 a.m. **(d)** 8:32 a.m.

35. Three bells ring at intervals of 4, 10 and 11 minutes. If they ring together at 8:00 a.m., when will they next ring together?

(a) 8:40 a.m. **(b)** 12:10 p.m.
(c) 12:40 p.m. **(d)** 11:40 a.m.

36. The largest 3-digit number divisible by 7 is

(a) 987 **(b)** 997 **(c)** 999 **(d)** 994

37. The HCF of 775 and 496 is

(a) 33 **(b)** 62 **(c)** 31 **(d)** 27

39. The place value of 7 in 4,87,32,105 is

(a) 7,00,00,000 **(b)** 7
(c) 70,00,000 **(d)** 7,00,000

42. If one-third of one-fourth of a number is 15, then three-tenths of that number is

(a) 36 **(b)** 45 **(c)** 60 **(d)** 54

43. The LCM of 42 and 70 is

(a) 14 **(b)** 2,940 **(c)** 70 **(d)** 210

44. Three bells ring at intervals of 8, 15 and 24 minutes. If they ring together at 8:00 a.m., when will they next ring together?

(a) 10:30 a.m. **(b)** 10:00 a.m.
(c) 11:00 a.m. **(d)** 10:12 a.m.

45. Three bells ring at intervals of 4, 8 and 20 minutes. If they ring together at 8:00 a.m., when will they next ring together?

(a) 8:40 a.m. **(b)** 9:10 a.m.
(c) 9:40 a.m. **(d)** 8:32 a.m.

46. The number 2989 in Roman numerals is written as

(a) MMCMXCIX **(b)** MMCMLXXXVIII
(c) MMCMXC **(d)** MMCMLXXXIX

47. The HCF of 368 and 253 is

(a) 46 **(b)** 23 **(c)** 25 **(d)** 19

49. $-12 \times (-8) \div (-4) + 15 =$

(a) 9 **(b)** 39 **(c)** −39 **(d)** −9

50. Three bells ring at intervals of 14, 20 and 28 minutes. If they ring together at 8:00 a.m., when will they next ring together?

(a) 10:20 a.m. **(b)** 10:50 a.m.
(c) 11:20 a.m. **(d)** 12:40 p.m.

52. The LCM of 15, 20 and 24 is

(a) 60 **(b)** 120 **(c)** 240 **(d)** 7200

53. The LCM of 9, 15 and 21 is

(a) 318 **(b)** 630 **(c)** 2835 **(d)** 315

54. The HCF of 91 and 208 is

(a) 13 **(b)** 26 **(c)** 15 **(d)** 11

55. The LCM of 36 and 60 is

(a) 180 **(b)** 60 **(c)** 12 **(d)** 2,160

56. The smallest prime number greater than 50 is

(a) 53 **(b)** 51 **(c)** 57 **(d)** 59

57. The HCF of 187 and 272 is

(a) 19 **(b)** 34 **(c)** 17 **(d)** 13

58. The number 360 in Roman numerals is written as

(a) CCCLXI **(b)** CCCLIX **(c)** CCCLXX **(d)** CCCLX

60. The least number which when divided by 10, 15 and 20 leaves a remainder 3 in each case is

(a) 57 **(b)** 123 **(c)** 63 **(d)** 60

61. The number 251 in Roman numerals is written as

(a) CCLXI **(b)** CCLII **(c)** CCL **(d)** CCLI

63. Which of the following numbers is divisible by 11?

(a) 2726 **(b)** 2728 **(c)** 2730 **(d)** 2732

65. The sum of all prime numbers between 1 and 30 is

(a) 127 **(b)** 129 **(c)** 130 **(d)** 100

66. The HCF of 133 and 304 is

(a) 15 **(b)** 38 **(c)** 21 **(d)** 19

70. The largest number that divides 245 and 1029 leaving a remainder 5 in each case is

(a) 16 **(b)** 8 **(c)** 24 **(d)** 12

71. The product of the HCF and LCM of 18 and 24 is

(a) 432 **(b)** 216 **(c)** 72 **(d)** 144

72. The least square number which is divisible by each of 8, 12 and 15 is

(a) 14400 **(b)** 1440 **(c)** 3600 **(d)** 900

74. The number 342 in Roman numerals is written as

(a) CCCLII **(b)** CCCXLIII
(c) CCCXLII **(d)** CCCXLI

76. Which of the following statements are true?
A. 2 is the only even prime number.
B. 1 is a prime number.
C. Every natural number is a whole number.
D. 0 is a natural number.

(a) B and D only **(b)** A and B only
(c) A and C only **(d)** A, C and D only

78. The value of $(-24 + 8) \times (-12)$ is

(a) 180 **(b)** 173 **(c)** 211 **(d)** 192

79. The LCM of 36 and 84 is

(a) 84 **(b)** 3,024 **(c)** 12 **(d)** 252

80. The value of $(-19 + 11) \times (-4)$ is

(a) 28 **(b)** 35 **(c)** 32 **(d)** 29

81. The number 386 in Roman numerals is written as

(a) CCCLXXXVII **(b)** CCCXCVI
(c) CCCLXXXV **(d)** CCCLXXXVI

82. The value of $(-23 + 20) \times (-6)$ is

(a) 17 **(b)** 19 **(c)** 12 **(d)** 18

83. The value of $(-14 + 8) \times (-7)$ is

(a) 38 **(b)** 42 **(c)** 35 **(d)** 46

84. The value of $(-21 + 22) \times (-11)$ is

(a) −11 **(b)** −263 **(c)** 11 **(d)** −22

85. The number 2003 in Roman numerals is written as

(a) MMIII **(b)** MMIV **(c)** MMII **(d)** MMXIII

86. The greatest 4-digit number exactly divisible by 12, 15 and 20 is

(a) 9980 **(b)** 9999 **(c)** 9960 **(d)** 9900

87. The number 94 in Roman numerals is written as

(a) CIV **(b)** XCIII **(c)** XCV **(d)** XCIV

88. The HCF of 272 and 459 is

(a) 13 **(b)** 34 **(c)** 19 **(d)** 17

90. Which of the following statements are true?
A. Every rational number can be written as a terminating decimal.
B. 1/3 is a non-terminating repeating decimal.
C. √2 is an irrational number.
D. There are infinitely many rational numbers between any two rational numbers.

(a) A, B, C and D **(b)** A, B and C only
(c) A and D only **(d)** B, C and D only

91. Which of the following statements are true?
A. Every integer is a rational number.
B. Every rational number is an integer.
C. 0 is a rational number.
D. √2 is a rational number.

(a) A and C only **(b)** A and B only
(c) A, C and D only **(d)** B and D only

92. The LCM of 8, 12 and 18 is
(a) 36 **(b)** 72 **(c)** 1728 **(d)** 144

93. The HCF of 161 and 207 is
(a) 23 **(b)** 46 **(c)** 25 **(d)** 19

94. Three bells ring at intervals of 5, 12 and 18 minutes. If they ring together at 8:00 a.m., when will they next ring together?
(a) 11:30 a.m. **(b)** 11:00 a.m.
(c) 12:00 p.m. **(d)** 9:00 a.m.

95. The number of prime numbers between 1 and 50 is
(a) 25 **(b)** 15 **(c)** 14 **(d)** 16

Answer Key — Practice MCQs

1. (a)	**3.** (d)	**5.** (c)	**6.** (a)	**7.** (d)
10. (d)	**11.** (c)	**12.** (a)	**14.** (d)	**15.** (c)
16. (a)	**17.** (a)	**18.** (a)	**19.** (b)	**20.** (c)
10. (d)	**22.** (c)	**23.** (c)	**25.** (c)	**26.** (b)
28. (d)	**29.** (b)	**31.** (b)	**33.** (a)	**34.** (b)
35. (d)	**36.** (d)	**37.** (c)	**39.** (d)	**42.** (d)
43. (d)	**44.** (b)	**45.** (a)	**46.** (d)	**47.** (b)
49. (d)	**50.** (a)	**52.** (b)	**53.** (d)	**54.** (a)
55. (a)	**56.** (a)	**57.** (c)	**58.** (d)	**60.** (c)
61. (d)	**63.** (b)	**65.** (b)	**66.** (d)	**70.** (a)
71. (a)	**72.** (c)	**74.** (c)	**76.** (c)	**78.** (d)
79. (d)	**80.** (c)	**81.** (d)	**82.** (d)	**83.** (b)
84. (a)	**85.** (a)	**86.** (c)	**87.** (d)	**88.** (d)
90. (d)	**91.** (a)	**92.** (b)	**93.** (a)	**94.** (b)
95. (b)				

CHAPTER 02

Playing with Numbers

SAINIK SCHOOL • CLASS 9 • Mathematics

Chapter Description & Key Points

⚡ **Short Tricks – Playing with Numbers** (with fully solved examples)

TRICK 1 Two-digit number and its reverse

ab + ba = 11(a + b) • ab − ba = 9(a − b).

Example 1: The sum of a two-digit number and the number formed by reversing its digits is 121. Find the sum of its digits.

Solution (by trick):
- 11(a + b) = 121 → a + b = 121 ÷ 11 = 11.

Answer: 11

TRICK 2 Three-digit number and its reverse

Example 2: The difference between a two-digit number and its reverse is 54. Find the difference of its digits.

Solution (by trick):
- 9(a − b) = 54 → a − b = 6.

Answer: 6

abc − cba = 99(a − c) • abc + bca + cab = 111(a + b + c) = 3 × 37 × (a + b + c).

Example 1: Find 742 − 247 without subtracting column by column.

Solution (by trick):
- a = 7, c = 2 → 99 × (7 − 2) = 99 × 5 = 495.

Answer: 495

TRICK 3 Missing digit with the test of 9 (or 3)

Example 2: Find 123 + 231 + 312 quickly.

Solution (by trick):
- 111 × (1 + 2 + 3) = 111 × 6 = 666.

Answer: 666

A number is divisible by 9 (or 3) when the sum of its digits is divisible by 9 (or 3).

Example 1: Find the digit x if 5x24 is divisible by 9.

Solution (by trick):
- Sum of digits = 5 + x + 2 + 4 = 11 + x.
- 11 + x must be 18 → x = 7. (5724 ÷ 9 = 636.)

Answer: 7

Example 2: Find all possible digits x if 31x5 is divisible by 3.

Solution (by trick):
- Sum = 3 + 1 + x + 5 = 9 + x must be a multiple of 3.
- x = 0, 3, 6, 9.

Answer: 0, 3, 6, 9