VIKRAMADITYA ACADEMY

Sainik School • Rashtriya Military School • RIMC Coaching

ENTRY 9th

ENTRANCE FOR CLASS 9th

ENTRANCE EXAM 2027



A COMPLETE BOOK FOR

MATHEMATICS

SAINIK SCHOOL & RMS

AISSEE • RMS CET

For Admission to Class IX • Strictly as per the Official Syllabus of RMS & Sainik School Society

27	100%	1050+	2700 MCQs
Chapters	Syllabus Covered	Solved Examples	with Answer Keys

➗ Number System & Algebra
Rational Numbers • Exponents • Squares & Cubes • Playing with Numbers • Identities • Factorisation • Linear Equations

₹ Commercial Arithmetic
Ratio • Percentage • Profit & Loss • SI & CI • Time & Work • Pipes & Cisterns • Speed • Boats & Streams

📐 Geometry & Mensuration
Lines & Angles • Triangles • Quadrilaterals • Circles • Area & Volume • Euler's Formula • Data Handling • Statistics • Probability

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Exam Pattern – Mathematics in Class IX Entrance

Exam	Maths Section	Questions	Marks	Other details
AISSEE – Sainik School (Class IX)	Section A – Mathematics	50	4 each = 200	Total paper 400 marks, 180 minutes, English medium only, no negative marking
RMS CET (Class IX)	Paper 2 – Mathematics (with Science)	50	1 each = 50	Paper 2: Maths 50 + Science 50 = 100 marks; 50% to qualify; Class VIII standard; English medium only

Source: AISSEE-2027 Information Bulletin (NTA), Appendix III; RMS CET Information Bulletin – Broader Syllabus for RMSs.

Official Syllabus – AISSEE (Sainik School) Class IX: Mathematics

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

Official Syllabus – RMS CET Class IX: Mathematics

Sl.	Topic	Sl.	Topic
1	Algebraic Expressions and Identities	28	Playing with Numbers
2	Angle sum property of triangles and quadrilaterals	29	Practical Geometry
3	Angles, triangles, circles	30	Profit and Loss
4	Area and Volume	31	Ratio and Proportion
5	Area of Circle	32	Rational Numbers
6	Average	33	Roman Numerals
7	Basic Geometrical Ideas	34	Simple Equations
8	Classification of angles	35	Squares and Square Roots
9	Comparing Quantities	36	Symmetry
10	Congruence of triangles	37	Temperature in °C and °F
11	Conversion of units of Area and Volume	38	The triangle and its properties
12	Cubes and Cube Roots	39	Time and Work, Distance and Displacement
13	Data Handling	40	Triangles, Quadrilaterals and Polygons
14	Direct and Inverse Proportions	41	Understanding Elementary Shapes
15	Exponents and Power	42	Unitary Method
16	Factorisation	43	Visualizing Solid Shapes
17	Fractions and Decimals	44	Volume of Cube and Cuboid
18	Integers	45	Understanding Quadrilaterals
19	Interior and exterior of given figures	46	Euler's Formula
20	Introduction to Graphs	47	Average, Median, Mode
21	Knowing our Numbers	48	Probability
22	Linear Equations in one Variable	49	Pie Chart
23	Lines and Angles	50	Divisibility
24	Mensuration	51	Parallel Lines
25	Number System (Whole, Natural Numbers, Playing with Numbers)	52	Simple Interest and Compound Interest
26	Perimeter and Area	53	Area and Perimeter of Circle
27	Place value and face value of numbers		

Every topic of both official syllabi is covered in the 27 chapters of this book. Each chapter has class notes, exam-special points & shortcuts, type-wise solved examples with full solutions and 100 MCQs of the RMS CET & Sainik School pattern with an answer key.

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CHAPTER 01

UNIT 1 • NUMBER SYSTEM

Number System

Class IX Entrance • RMS CET & Sainik School (AISSEE)

⚡ 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 → 3.

Answer: 3

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

TRICK 2 HCF × LCM = Product of two numbers

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 × 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

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

Example 1: Find $1 + 2 + 3 + \ldots + 50$.

Solution (by trick):

- n = 50 → $50 \times 51 \div 2 = 1275$.

Answer: 1275

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

Solution (by trick):

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

Answer: 400

📘 Class Notes – Number System

Chapter 1

Types of Numbers

⇒ **Natural numbers (N):** 1, 2, 3, 4, ...

⇒ **Whole numbers (W):** 0, 1, 2, 3, ...

⇒ **Integers (Z):** ..., −3, −2, −1, 0, 1, 2, 3, ...

⇒ **Rational numbers (Q):** numbers that can be written as $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

⇒ **Irrational numbers:** numbers that cannot be written as $\frac{p}{q}$; their decimal expansion is non-terminating and non-repeating, e.g. $\sqrt{2}, \sqrt{3}, \pi$.

⇒ **Real numbers (R):** all rational and irrational numbers together.

Rational Numbers between Two Numbers

⇒ One rational number between x and y is $\frac{x+y}{2}$ (their average).

⇒ To find n rational numbers between $\frac{a}{b}$ and $\frac{c}{b}$, multiply the numerator and denominator of both by a suitable number (such as n + 1) and pick the fractions in between.

Illustrative Examples — Exercise 1.1

Example 1: **Represent $\frac{5}{3}$ and $-\frac{5}{3}$ on the number line.**

$$\frac{5}{3} = 1\frac{2}{3}, \qquad -\frac{5}{3} = -1\frac{2}{3}$$

So $\frac{5}{3}$ lies between 1 and 2, and $-\frac{5}{3}$ lies between −2 and −1.

Steps: Draw a number line and mark 0, 1, 2 and −1, −2. Divide each unit into 3 equal parts. Starting from 0, count 5 parts to the right to get $\frac{5}{3}$ and 5 parts to the left to get $-\frac{5}{3}$.

Ans: $\frac{5}{3}$ is the 5th mark to the right of 0; $-\frac{5}{3}$ is the 5th mark to the left of 0.

Example 2: Represent $\frac{8}{5}$ and $-\frac{8}{5}$ on the number line.

$$\frac{8}{5} = 1\frac{3}{5}, \qquad -\frac{8}{5} = -1\frac{3}{5}$$

Steps: Divide each unit between 0 and 2 (and between 0 and −2) into 5 equal parts. Count 8 parts to the right of 0 for $\frac{8}{5}$ and 8 parts to the left of 0 for $-\frac{8}{5}$.

Ans: $\frac{8}{5}$ lies between 1 and 2; $-\frac{8}{5}$ lies between −2 and −1.

Example 3: Find a rational number between −2 and 6.

We know that a rational number between x and y is $\frac{x+y}{2}$.

$$\text{Required number} = \frac{-2+6}{2} = \frac{4}{2} = 2$$

Hence, 2 is a rational number between −2 and 6.

Ans: 2

Example 4: Find three rational numbers between −2 and 5.

$$\text{1st number} = \frac{-2+5}{2} = \frac{3}{2}$$

$$\text{2nd number (between } -2 \text{ and } \frac{3}{2}) = \frac{-2+\frac{3}{2}}{2} = \frac{\frac{-4+3}{2}}{2} = -\frac{1}{4}$$

$$\text{3rd number (between } \frac{3}{2} \text{ and } 5) = \frac{\frac{3}{2}+5}{2} = \frac{\frac{13}{2}}{2} = \frac{13}{4}$$

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.

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**.

Example 2: **Write 1994 in Roman numerals.**
Solution: 1994 = 1000 + 900 + 90 + 4 = M + CM + XC + IV = **MCMXCIV**.

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

Example 4: **If the number 461x72 is divisible by 9, find the digit x.**
Solution: Sum of digits = 4 + 6 + 1 + x + 7 + 2 = 20 + x. The nearest multiple of 9 is 27, so x = **7**.

Example 5: **Three bells ring at intervals of 12, 15 and 20 minutes. They ring together at 8:00 a.m. When will they next ring together?**
Solution: LCM(12, 15, 20) = 60 minutes. They ring together again at **9:00 a.m.**

Example 6: **The HCF of two numbers is 15 and their LCM is 825. If one number is 75, find the other.**
Solution: Other number = (HCF × LCM) ÷ 75 = (15 × 825) ÷ 75 = **165**.

Example 7: **Show that the sum of a two-digit number and the number obtained by reversing its digits is divisible by 11.**
Solution: (10a + b) + (10b + a) = 11a + 11b = 11(a + b), which is a multiple of 11. ∎

Example 8: **A number when divided by 15 but not by 5 — does such a number exist?**
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

Example 27: **Find the HCF and LCM of 96 and 404 by prime factorisation.**

Solution: $96 = 2^5 \times 3$; $404 = 2^2 \times 101$. HCF = product of common factors with smallest powers = **4**. LCM = 96 × 404/HCF = **9,696**.

Example 28: **Find the HCF and LCM of 180 and 252 by prime factorisation.**

Solution: $180 = 2^2 \times 3^2 \times 5$; $252 = 2^2 \times 3^2 \times 7$. HCF = product of common factors with smallest powers = **36**. LCM = 180 × 252/HCF = **1,260**.

Example 29: **Find the HCF and LCM of 1260 and 7344 by prime factorisation.**

Solution: $1260 = 2^2 \times 3^2 \times 5 \times 7$; $7344 = 2^4 \times 3^3 \times 17$. HCF = product of common factors with smallest powers = **36**. LCM = 1260 × 7344/HCF = **257,040**.

Example 30: **Find the least number which is exactly divisible by 12, 16 and 24.**

Solution: Required number = LCM(12, 16, 24) = **48**.

Example 31: **Find the least number which is exactly divisible by 15, 25 and 40.**

Solution: Required number = LCM(15, 25, 40) = **600**.

Example 32: **A floor 624 cm × 468 cm is to be paved with the largest possible identical square tiles. Find the side of each tile and the number of tiles.**

Solution: Side = HCF(624, 468) = **156 cm**. Number of tiles = (624/156) × (468/156) = 4 × 3 = **12**.

Example 33: **A floor 1200 cm × 840 cm is to be paved with the largest possible identical square tiles. Find the side of each tile and the number of tiles.**
Solution: Side = HCF(1200, 840) = **120 cm**. Number of tiles = (1200/120) × (840/120) = 10 × 7 = **70**.

Example 34: **Write 2389 in Roman numerals.**
Solution: 2389 = 2000 + 300 + 80 + 9 = **MMCCCLXXXIX**.

Example 35: **Write 1488 in Roman numerals.**
Solution: 1488 = 1000 + 400 + 80 + 8 = **MCDLXXXVIII**.

Example 36: **Write 3949 in Roman numerals.**
Solution: 3949 = 3000 + 900 + 40 + 9 = **MMMCMXLIX**.

Example 37: **Find the digit(s) x if 7,2x6 is divisible by 9.**
Solution: Sum of digits = 15 + x must be a multiple of 9. So **x = 3**.

Example 38: **Find the digit(s) x if 53,4x2 is divisible by 3.**
Solution: Sum of digits = 14 + x must be a multiple of 3. So **x = 1, 4, 7**.

Example 39: **Simplify: 36 ÷ 4 × 3 − 2 × (8 − 11) + 5.**
Solution: Brackets: 8 − 11 = −3. Then 36 ÷ 4 = 9; 9 × 3 = 27; 2 × (−3) = −6. 27 − (−6) + 5 = **38**.

Example 40: **Find the value of (−18) × (−5) ÷ (−6) + 4.**
Solution: (−18) × (−5) = 90; 90 ÷ (−6) = −15; −15 + 4 = **−11**.

Practice Questions – 100 MCQs (RMS CET & Sainik School AISSEE pattern)

1. The value of (−22 + 17) × (−10) is
(a) 50 **(b)** 45 **(c)** 55 **(d)** 40

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

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. √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

4. What is the value of the Roman numeral "MCMXCIX"? RMS 2024
(a) 1989 **(b)** 1999 **(c)** 2000 **(d)** 1990

5. The value of (−10 + 29) × (−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

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) √10 **(b)** 4.5
(c) (−√81)/3 **(d)** 1.2

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

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

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

21. Find the range of the first five prime numbers. RMS 2018 • Sainik 2024
(a) 2 **(b)** 7 **(c)** 9 **(d)** 11

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

24. How many non-square numbers lie between 11^2 and 12^2? RMS 2018
(a) 21 **(b)** 23 **(c)** 22 **(d)** 20

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

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

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

30. The additive identity for integers is Sainik 2021
(a) 0 **(b)** 1
(c) –1 **(d)** does not exist

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.

32. Which of the following has the least value? RMS 2024
(a) -14×6 **(b)** $12\div(-4)$
(c) $3-6\times(-5)$ **(d)** $-7\times(-6)$

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

38. Associative property of multiplication of integers Sainik 2021
(a) exists **(b)** does not exist
(c) holds without 0 **(d)** None of these

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

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

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

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

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.

51. Every counting number has an infinite number of RMS 2023
(a) Factors **(b)** Multiple
(c) Prime factors **(d)** None of these

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

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

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

62. What is the numerical form of 1000a + 10b + c? RMS 2020
(a) abc **(b)** a0bc **(c)** abc0 **(d)** ab0c

63. Which of the following numbers is divisible by 11?
(a) 2726 **(b)** 2728 **(c)** 2730 **(d)** 2732

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

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

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

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

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

74. The number 342 in Roman numerals is written as
(a) CCCLII **(b)** CCCXLIII
(c) CCCXLII **(d)** CCCXLI

75. Which of the following is a non-zero integer? RMS 2025
(a) −2.6 **(b)** $\sqrt{16}$
(c) 4 + (−1/2) **(d)** 1/2 − 1/2

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