RRB NTPC 2026 · CBT-1 & CBT-2 · MATHEMATICS

RRB NTPC 2026 Maths

20-Second Formulas & Type-Wise Questions

Every formula and short cut for the Mathematics section of the computer-based tests, graduate and undergraduate levels, with questions arranged type by type and every answer worked out

343 questions · English

Subash · Liternational Press

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The 54-Second Rule and Negative Marking

> CBT-1 gives 90 minutes for 100 questions — **54 seconds a question**. With a third of a mark lost for each wrong answer, speed must not cost accuracy.

A time plan for CBT-1

Section	Questions	Suggested time
General awareness	40	15–20 minutes
Reasoning	30	25–30 minutes
Mathematics	30	30–35 minutes
Review of marked questions	—	5–10 minutes

- Answer the quick types first (percentages, LCM and HCF, averages, ratios); mark the long ones (mixtures, mensuration, three-year compound interest) for later.
- Check the units in the question and the options first: km/h or m/s, months or years, sq cm or sq m.

When is it worth guessing?

Each question has four options. A right answer earns 1 mark; a wrong one costs 1/3.

Options you can rule out	Chance of a right guess	Expected marks from guessing
none	1 in 4	$1/4 \times 1 - 3/4 \times 1/3 =$ **0**
one	1 in 3	$1/3 \times 1 - 2/3 \times 1/3 =$ **1/9**
two	1 in 2	$1/2 \times 1 - 1/2 \times 1/3 =$ **1/3**

> A blind guess gains nothing on average. Guess only after you have struck out at least one option — and the more you can strike out, the better the guess.

Striking out options without solving

- **Unit digit:** a product of whole numbers ends in the last digit of the product of their last digits.
- **Divisibility:** an answer that must divide by 9 (or 11, or 4) rules out options that do not.
- **Size:** a share cannot exceed the total; a discount price must be less than the marked price; a speed in m/s is smaller than the same speed in km/h.

CHAPTER 1

Number System

Types of numbers, divisibility, unit digits, remainders, factors and zeros — about two questions in a CBT-1 Mathematics section, and the base of every other chapter.

Kinds of numbers

Kind	Meaning	Examples
Natural numbers	counting numbers	1, 2, 3, ...
Whole numbers	natural numbers and 0	0, 1, 2, ...
Integers	whole numbers and their negatives	..., −2, −1, 0, 1, 2, ...
Rational numbers	p/q with p, q integers and q ≠ 0; their decimals end or repeat	3/4, −5, 0.333...
Irrational numbers	decimals that neither end nor repeat	√2, √3, π
Prime numbers	exactly two factors, 1 and itself	2, 3, 5, 7, 11, 13
Composite numbers	more than two factors	4, 6, 8, 9, 10
Co-prime numbers	HCF is 1	8 and 15

1 is neither prime nor composite. 2 is the only even prime. There are 25 primes below 100.

Divisibility rules

Divisible by	Test
2	last digit even
3	sum of digits divisible by 3
4	number formed by the last two digits divisible by 4
5	last digit 0 or 5
6	divisible by both 2 and 3
8	number formed by the last three digits divisible by 8
9	sum of digits divisible by 9
11	(sum of digits in odd places) − (sum in even places) is 0 or a multiple of 11
25	last two digits 00, 25, 50 or 75

Unit digit of a power

Only the last digit of the base matters, and the last digits of its powers repeat in short cycles.

Last digit	Cycle of last digits	Cycle length
0, 1, 5, 6	stays the same	1
4	4, 6	2
9	9, 1	2
2	2, 4, 8, 6	4
3	3, 9, 7, 1	4
7	7, 9, 3, 1	4
8	8, 4, 2, 6	4

Divide the power by the cycle length and use the remainder; a remainder of 0 means the last digit of the cycle.

Example. Unit digit of 37^{47}. The cycle of 7 is 7, 9, 3, 1. $47 = 4 \times 11 + 3$, so take the third digit: **3**.

Factors, zeros and sums

If $N = p^a \times q^b \times r^c$ (primes), the number of factors of N is $(a + 1)(b + 1)(c + 1)$.

Zeros at the end of n! = $[n/5] + [n/25] + [n/125] + \ldots$ (count the fives).

$1 + 2 + \ldots + n = n(n + 1)/2 \cdot$ first n odd numbers $= n^2 \cdot$ first n even numbers $= n(n + 1) \cdot 1^2 + 2^2 + \ldots + n^2 = n(n + 1)(2n + 1)/6$.

Example. $360 = 2^3 \times 3^2 \times 5$, so it has $(3 + 1)(2 + 1)(1 + 1) =$ **24** factors.

Example. Zeros at the end of 100! = $[100/5] + [100/25] = 20 + 4 =$ **24**.

Remainders and the largest or smallest multiple

- If a number leaves remainder r when divided by D, and d divides D, then its remainder by d is the remainder of r by d.
- Largest 4-digit number divisible by d: 9,999 − (remainder of 9,999 by d). Smallest 5-digit number: 10,000 + (d − remainder of 10,000 by d).

CHAPTER 5

Percentage

Three or four questions a shift, and the language of profit and loss, interest and data questions too. Learn the fraction table in "Tables to Know by Heart" and most percentages become mental arithmetic.

The basics

- x% means x/100; x% of y = xy/100; "what per cent of b is a" = a/b × 100.
- A number increased by r% becomes (100 + r)/100 of itself; decreased by r%, (100 − r)/100 of itself.

Successive changes of a% and b% give a net change of a + b + ab/100 per cent (a decrease counts as negative).

Example. A price rises 20% and then falls 20%: 20 − 20 − (20 × 20)/100 = **−4%**, a decrease of 4%.

"More than" and "less than"

If A is r% more than B, then B is r/(100 + r) × 100 per cent less than A.
If A is r% less than B, then B is r/(100 − r) × 100 per cent more than A.

Example. A's salary is 25% more than B's, so B's is 25/125 × 100 = **20%** less than A's.

If a price rises by r%, consumption must fall by r/(100 + r) × 100 per cent to keep spending the same.

Example. Sugar costs 25% more: cut consumption by 25/125 × 100 = **20%**.

Population, depreciation, elections and examinations

- Population after n years at r% growth = $P(1 + r/100)^n$; a value after n years of r% depreciation = $P(1 − r/100)^n$.

Example. 10,000 people growing at 10% a year: after 2 years, 10,000 × 1.1 × 1.1 = **12,100**.

CHAPTER 17

Maths Test 1

30 questions. Allow yourself 30 minutes. Mark every answer before you check the key; score 1 for a right answer and minus 1/3 for a wrong one.

Maths Test 1 (30 questions, 30 minutes)

1. **Two numbers are in the ratio 6 : 11 and their HCF is 12. What is their LCM?**
(1) 66 **(2)** 792 **(3)** 1,584 **(4)** 204

2. **What is the least number that leaves remainders 10, 13 and 16 when divided by 12, 15 and 18 respectively?**
(1) 178 **(2)** 170 **(3)** 182 **(4)** 180

3. **What is the HCF of 72, 360 and 450?**
(1) 9 **(2)** 72 **(3)** 36 **(4)** 18

4. **A room is 9 m long and 6.6 m wide. What is the least number of equal square tiles that will cover the floor exactly?**
(1) 180 **(2)** 5,940 **(3)** 330 **(4)** 165

5. **How many zeros are there at the end of 45! (the product 1 × 2 × 3 × … × 45)?**
(1) 10 **(2)** 12 **(3)** 9 **(4)** 4

6. **What is the largest 4-digit number that is exactly divisible by 47?**
(1) 9,965 **(2)** 9,964 **(3)** 9,987 **(4)** 9,917

7. **Find the value of 0.75 × 1.6 ÷ 0.02**
(1) 60 **(2)** 600 **(3)** 6 **(4)** 0.024

8. **Simplify: 1 1/2 + 4 2/3 − 2 1/4**
(1) 8 5/12 **(2)** 3 5/12 **(3)** 4 11/12 **(4)** 3 11/12

9. **The population of a town is 50,000. If it falls by 4% every year, what will it be after 2 years?**
(1) 48,000 **(2)** 46,000 **(3)** 46,580 **(4)** 46,080

10. **If 35% of a number is 84, what is 70% of the number?**
(1) 154 **(2)** 240 **(3)** 178 **(4)** 168