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SPEED MATHEMATICS

*A Complete Guide to Mental Calculation
for Exams and Everyday Life*

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About This Book

Every year, millions of students sit for competitive examinations in which mathematics carries a heavy weight — banking exams, SSC, railway recruitment, and countless other aptitude tests. In nearly all of these examinations, the mathematical concepts being tested are not advanced. A student who has completed secondary school already knows what percentages are, what profit and loss means, and how simple interest works. What separates a selected candidate from an unselected one is rarely conceptual knowledge. It is speed — the ability to perform arithmetic calculations quickly, accurately, and without wasting the limited time available in an examination hall.

This book exists to close that gap.

It does not attempt to re-teach basic arithmetic from the beginning, the way a primary-school textbook would. Instead, it assumes you already know how to add, subtract, multiply, and divide using the standard “column” methods you learned in school — and it teaches you a second, faster layer of thinking that sits on top of that foundation. This second layer is often called mental mathematics, Vedic mathematics, or speed mathematics: a collection of number patterns and shortcuts that let you calculate in your head, without paper, in a fraction of the time a standard method would take.

The techniques in this book are not tricks in the sense of being unreliable shortcuts that work only sometimes. Every technique presented here is a genuine mathematical identity — a true statement about how numbers behave — that has simply been organised into a memorable, teachable form. Once you understand why a technique works, you will find it far easier to remember and far more flexible to apply, because you will recognise it even when a question disguises it in an unfamiliar form.

CHAPTER 01

01

The Foundations of Mental Mathematics

Learning Objectives

By the end of this chapter, you should be able to:

- Explain why calculation speed matters in competitive examinations
- Describe the difference between “basic” arithmetic methods and “approach-based” mental mathematics
- Identify the concept of a base number and explain why it is central to almost every technique in this book
- Begin training yourself to add and subtract common round numbers without conscious calculation

Why This Topic Matters

Consider a typical banking examination. A candidate is given twenty minutes to answer thirty-five quantitative aptitude questions — an average of well under thirty-five seconds per question. Within that thirty-five seconds, the candidate must read the question, understand what is being asked, decide on a method, and then carry out the arithmetic needed to reach an answer.

If the arithmetic itself — the actual multiplying, dividing, adding, and subtracting — eats up twenty or thirty of those thirty-five seconds, there is almost no time left for reading, understanding, and reasoning. This is the single most common reason capable students fail to finish competitive mathematics sections in time: not because they don’t understand the concepts, but because the raw calculation swallows the clock.

KEY CONCEPT**The Two Halves of a Mathematics Question**

Every quantitative aptitude question has two components: (1) understanding what to calculate, and (2) actually performing the calculation. Students spend years training the first skill in school. Almost nobody is formally trained in the second. This book is entirely devoted to the second half.

Prerequisite Knowledge

This book assumes you are already comfortable with:

- The standard column methods for addition, subtraction, multiplication, and division
- Basic multiplication tables, ideally up to 12×12 , though the techniques here will help you go well beyond that
- Simple fractions and decimals

If any of these feel shaky, it is worth spending a short amount of time revising them in a standard arithmetic textbook before working through this book, since the techniques here are meant to speed up calculation, not to teach it from zero.

Main Lesson**1.1 What Makes “Approach-Based” Mathematics Different**

Standard arithmetic, as taught in primary school, is built around a single universal procedure for each operation. To add two three-digit numbers, you line up the digits, add column by column from the right, and carry when a column exceeds nine. This procedure always works, for any two numbers — which is exactly why it is taught first. Its strength is generality; its weakness is speed. It treats $999 + 999$ exactly the same way it treats $483 + 271$, even though most people can see instantly that $999 + 999$ is “1,000 twice minus 2,” a calculation that takes barely a second to picture, while the column method forces you to carry three times.

Approach-based mathematics — sometimes called Vedic mathematics, speed mathematics, or mental mathematics — takes the opposite strategy. Instead of one universal method, it offers a toolkit of specialised methods, each suited to a particular pattern of numbers. Recognising which tool fits a given pair of numbers is itself a skill, and it is one this book will train through repeated, categorised examples.

Comparison Table: Standard Method vs. Approach-Based Method

Feature	Standard Column Method	Approach-Based Method
Number of procedures	One universal procedure per operation	Many specialised techniques, chosen by pattern

Feature	Standard Column Method	Approach-Based Method
Speed on “friendly” numbers	Same as any other number	Very fast — often instant
Speed on “unfriendly” numbers	Same as any other number	Falls back to standard method
Requires pattern recognition	No	Yes — this is the core skill being trained
Best used	As a universal fallback	As the first attempt, with the standard method as backup

REMEMBER THIS

Approach-based mathematics is not meant to replace the standard methods you already know. It is meant to sit in front of them. When you see a calculation, your first instinct should be to check whether a specialised approach applies. If none does, you simply fall back on the standard method you already know. You lose nothing by trying; you save enormous time whenever a pattern matches.

1.2 The Central Idea: Base Numbers

Almost every technique in this book, from simple addition to advanced square roots, rests on one single idea: numbers that are close to a round number (10, 50, 100, 200, 1,000, and so on) can be calculated more easily by first calculating with the round number, and then adjusting for the small difference.

This round number is called a base. The distance between your actual number and the nearest base is called the gap (some students prefer the word deviation).

Example 1.1 — Introducing the Base

Suppose you must calculate $98 + 47$.

A student using the standard method would add $8 + 7$, carry, and so on. A student trained in approach-based mathematics instead notices that 98 is very close to the base 100 — its gap is 2 (that is, $98 = 100 - 2$).

$$98 + 47 = (100 - 2) + 47 = 100 + 47 - 2 = 147 - 2 = 145$$

The entire calculation can be performed in your head in under two seconds once this pattern becomes automatic, because adding to 100 and then subtracting a small number is far easier than adding to 98 directly.

Example 1.2 — A Second Base

Calculate $576 + 90$.

Here, 90 is close to the base 100, with a gap of 10.

$$576 + 90 = 576 + 100 - 10 = 676 - 10 = 666$$

Notice the pattern: whenever you are adding a number just below a base, add the base instead, and then subtract the gap.

DID YOU KNOW?

The idea of “rounding and adjusting” is not a modern invention. Merchants throughout history — long before calculators or even widespread written numeral systems — used exactly this kind of mental shortcut to total up prices quickly in markets. The techniques in this book have a long practical history behind them; they were used by people for whom fast, accurate mental arithmetic was a matter of daily livelihood.

1.3 Training Your “Instant Recall” for Round Numbers

Before any of the advanced techniques in later chapters can work quickly, you need one foundational skill to become completely automatic: adding and subtracting multiples of ten without any conscious “carrying” step at all.

Most students, when asked to compute $70 + 80$, mentally perform a small column addition: $7 + 8 = 15$, so the answer is 150. This is not wrong, but it is a full calculation step, and it is too slow to repeat dozens of times inside a longer problem. The goal of this section is to make sums like $70 + 80 = 150$ feel like a fact you know, the same way you know that $2 + 2 = 4$, rather than a calculation you perform.

Practice Drill Table: Round-Number Addition Facts

Expression	Answer	Expression	Answer
$50 + 60$	110	$30 + 90$	120
$70 + 80$	150	$60 + 70$	130
$50 + 70$	120	$40 + 80$	120
$80 + 50$	130	$90 + 60$	150

Example 1.7 — Combining Base Thinking with Instant Recall

Calculate $67 + 80$.

$$67 + 80 = 60 + 80 + 7 = 140 + 7 = 147$$

CASE STUDY | The Market Vendor

Priya runs a small vegetable stall. A customer buys potatoes for ₹47, onions for ₹60, and tomatoes for ₹38. Priya must tell the customer the total instantly, without reaching for a calculator, while continuing to serve the next customer in line.

Using base-number thinking: ₹47 is close to ₹50 (gap 3 below); ₹60 is already round; ₹38 is close to ₹40 (gap 2 below).

$$47 + 60 + 38 = (50 - 3) + 60 + (40 - 2) = 150 - 5 = 145$$

Priya announces “₹145” within a second of the last item being placed on the scale — exactly the kind of fluency this book aims to build, whether the setting is a market stall or an examination hall.

Discussion prompt: Which single technique from this chapter did Priya rely on most? Could the calculation have been done just as quickly using the Complementary-Pairs approach from Chapter 2 instead?

Multiple-Choice Questions

- Which of the following is the base most naturally used for the number 97? A) 90 B) 95 C) 100 D) 1000
- What is the gap between 686 and its nearest base? A) 86 B) 14 C) 6 D) 4
- $80 + 70 = ?$ A) 140 B) 150 C) 160 D) 130
- Approach-based mathematics is best described as: A) A replacement for standard arithmetic methods B) A toolkit of specialised methods used before falling back on standard methods C) A method only useful for algebra D) A method that removes the need for practice
- $39 + 60 = ?$ A) 89 B) 99 C) 109 D) 96

MCQ Answer Key: 1=c, 2=b (686 is 14 below 700), 3=b, 4=b, 5=b

CHAPTER 02

02

Addition Techniques

Learning Objectives

By the end of this chapter, you should be able to:

- Apply the “complement” method to quickly add numbers close to a base
- Use the “add-more-subtract-back” method for adding 90, 190, 900, and similar near-base numbers
- Recognise and apply the Neighbour Approach for numbers close to one another
- Recognise and apply the Twin (reversed-digit) Approach for two-digit numbers whose digits are reversed
- Search for complementary pairs (numbers summing to 100, 200, and so on) inside longer addition problems

Why This Topic Matters

Addition appears inside virtually every other calculation you will ever perform — it is the operation hiding inside multiplication, inside percentage problems, inside data-interpretation tables, and inside almost every word problem you will meet in an examination. A student who can add quickly gains speed everywhere, automatically, without needing to learn anything else. This is why addition is the natural starting point for a course in mental mathematics.

THANK YOU FOR PREVIEWING

This Was Just the Beginning

You've seen the foundations — base numbers, instant recall, and the start of Chapter 1's addition techniques. The complete edition of *Speed Mathematics* continues with 10 more full chapters, over 100 pages of worked examples, drills, and exam-ready shortcuts.

What's waiting in the full book:

- | | |
|------------------|---|
| Ch. 02-03 | Addition & Subtraction Techniques
Neighbour, Twin, River-Crossing, and Overshoot-and-Correct methods |
| Ch. 04 | Multiplication Techniques
Eleven shortcuts — $\times 11$, $\times 5$, $\times 25$, $\times 125$, the Duck & Turtle approaches, and more |
| Ch. 05 | Division Techniques
Turn awkward divisions into simple multiplication |
| Ch. 06-07 | Squares, Square Roots, Cubes & Cube Roots
Instant squaring, bracketing, and the partition method |
| Ch. 08-10 | Fractions, Decimals & Powers
Cross-cancellation, the Shark approach, and power comparisons |
| Ch. 11 | Your Personal Practice System
A daily routine and decision checklist to make every technique automatic |

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and start building real calculation speed today.*