COMPUTEPREP

TIMED CALCULATION DRILLS · BANK & SSC EDITION

# Free Sample: 23 Timed Speed Drills (One of Every Type)

*Free sample — 23 engine-minted drills, one of every drill type ComputePrep generates, across Easy, Medium & Hard. Same chapters, same orientation cards, same exam-pace target times and same worked answer key as the full 150-drill Speed Book — just one drill per type instead of a full practice set. Free to keep and free to forward.*

Sectioned by Family | All 23 Drill Types | Exam-Pace Target Times

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# How to Use This Book

Every drill is a multiple-choice question with one defensible answer and a **target time** printed under it. That target is not editorial — it is the exact per-question clock the ComputePrep daily enforces for that drill type at that difficulty.

**Work against the clock, not just for the answer.** A quant paper is not decided by whether you *can* do a sum; it is decided by whether you can do it inside the time the paper allows. Getting a drill right in triple the target time is a miss, and this book is written so you can see that happening.

**Method:** start a timer, work it mentally wherever the technique allows, commit to an option before you check, then read the worked solution even when you were right — the method in the answer key is often shorter than the one you used, and the shorter method is the one that survives exam pressure. Re-drill any type you missed on *time*, not just the ones you got wrong.

**Start with Chapter 1.** Speed & Vedic Shortcuts is deliberately the largest chapter: percentages, profit & loss, interest, averages, DI and mensuration all bottom out in a multiplication or a square, so every second you take off those makes the rest of the book — and the paper — faster.

Every answer here is **engine-computed, never hand-written** — each drill is minted by the same pure engine that mints the ComputePrep daily, and each worked solution is that engine's own step-by-step working. The distractors are built from the specific arithmetic slips the technique invites (a dropped carry, a base confusion, a percentage applied to the wrong number), so picking one tells you exactly which step went wrong.

# The First 10 Seconds of Any Calculation

Before you compute anything, run this checklist — the ten seconds a fast solver spends on every question, whether it is a multiplication, a percentage, a DI cell or a mensuration formula. Speed in a quant paper is not faster arithmetic; it is less arithmetic.

1. **Look at the numbers before the operation.** Ending in 5? Both near 100? Same leading digits with units adding to 10? Close together, so their midpoint is easy to square? Each of those is a named technique in Chapter 1 and turns the whole multiplication into one step.
2. **Round, then correct.** 98 × 47 is 100 × 47 minus 2 × 47. Most "hard" multiplications are an easy one plus a small correction — find the easy one first.
3. **Check what the question actually asks.** Approximate value? Percentage *change* or the new value? The profit or the selling price? More marks are lost here than to arithmetic.
4. **Scan the options before you compute.** They are often decades apart, or only one is even/odd, or only one is in range — in which case an estimate finishes the question and the exact working is wasted time.
5. **Estimate the magnitude first.** Know roughly where the answer must land, then compute. It costs a second and catches the misplaced decimal or the dropped zero before you commit.
6. **Decide fast whether to skip.** If nothing above fires within ten seconds, this is a long-working question. Mark it, move on, come back. Protecting the clock is a skill you drill here too.
7. **Never write down what you can carry.** Each intermediate you write is time and a copying error. The techniques in Chapter 1 are built so the intermediate fits in your head.

# Contents

**23 drills** in 5 sections, plus a worked solution for every one of them. Drills are numbered **1–23 straight through the book** — the section lists that follow are slices of that one run, not separate books, and the answer key at the back uses the same numbers.



**How to move around:** every section opens with a one-page guide to its drill types, then its own contents list; each drill header carries a link back to that list. Clues are numbered — if something looks wrong, write to hello@computeprep.com quoting the drill number and the clue number (e.g. "Drill 42, clue 3"). More at computeprep.com.

# Speed & Vedic Shortcuts — How to Read This Section

*The calculations that decide a quant section — squares, products, and long BODMAS chains — done by pattern instead of by long multiplication.*

**Speed Arithmetic.** ONE operation on exam-sized numbers, against a countdown — an addition, a subtraction, a multiplication, or (from medium up) a division. There is no method to choose here; the whole skill is doing a single step accurately without reaching for paper, which is what the rest of this chapter then builds on.

**WORKED EXAMPLE** 34 × 26 = ? Split the second factor instead of stacking it: 34 × 20 = 680, and 34 × 6 = 204. 680 + 204 = 884.

**COMMON MISTAKE** checking your digits but not your MAGNITUDE. The wrong options are planted close on purpose — one out at the units, one out by ten, one out by a hundred — so an answer that merely looks about right is exactly the one that was left there for you.

**Simplification (BODMAS).** One expression, one answer, and everything turns on ORDER: brackets first, then division and multiplication together left to right, then addition and subtraction together left to right. Two operations at easy; four, with a bracket in front, by the time you reach hard.

**WORKED EXAMPLE** 83 + 9 × 9 − 70 ÷ 7 = ? × and ÷ outrank + and −, so clear those first: 9 × 9 = 81 and 70 ÷ 7 = 10. Now 83 + 81 − 10. = 154.

**COMMON MISTAKE** working strictly left to right — doing the 83 + 9 before the multiplication that outranks it. It is the one slip this kind exists to catch, and it always lands you on a number that looks perfectly reasonable.

**Squares, Cubes & Roots.** Squares, cubes and their roots for the numbers the exam actually uses. Two facts do most of the work: a square's LAST DIGIT is fixed by the root's last digit, and the nearest round square brackets the answer.

**WORKED EXAMPLE** √5184 = ? It ends in 4, so the root ends in 2 or 8; and $70^2$ = 4,900 while $80^2$ = 6,400, so the root is in the 70s. $72^2$ = 5,184, so the root is 72.

**COMMON MISTAKE** guessing from the options without the last-digit test — that one check alone kills most distractors in about a second.

**Vedic Squaring.** Two sutras for squares the exam loves. Numbers ending in 5 (Ekadhikena): multiply the head by its successor and append 25. Numbers near a base like 100 (Yavadunam): slide by the deficit and append the deficit's square.

**WORKED EXAMPLE** $85^2$ = ? It ends in 5, so take the head 8 and its successor 9: 8 × 9 = 72, then append 25. = 7,225.

**COMMON MISTAKE** using the head × successor trick on a number that does NOT end in 5 — it is a rule about the units digit, not a general squaring shortcut.

**Complementary Products.** When two numbers share the same LEADING part AND their units digits add to 10, the product assembles itself (Antyayordashake): the lead × its successor gives the front, the two units multiplied give the last two digits. It works at any width — 245 × 245 is the same trick on the lead 24.

**WORKED EXAMPLE** 43 × 47 = ? Same lead 4, and 3 + 7 = 10. Front: 4 × 5 = 20. Tail: 3 × 7 = 21. = 2,021.

**COMMON MISTAKE** forgetting the tail is always TWO digits — 91 × 99 gives front 9 × 10 = 90 and tail 1 × 9 = 9, which must be written 09, so 9,009 and not 909.

**Difference of Squares.** Any two numbers multiply to the square of their MIDPOINT minus the square of the distance from it (Sankalana-vyavakalanabhyam). The midpoint is just their average, and when the two sit close together that distance is 1, 2 or 3 — so one square replaces a whole multiplication.

**WORKED EXAMPLE** 67 × 73 = ? Their midpoint is 70 and both sit 3 away, so the product is $70^2 - 3^2$. 4,900 − 9 = 4,891.

**COMMON MISTAKE** subtracting the distance instead of its SQUARE — writing 4,900 − 3. The identity is $(m - d)(m + d) = m^2 - d^2$, and the d is squared.

**Nikhilam.** Multiplying two numbers near a base (98 × 93, 104 × 107): work with their small deficits or surpluses instead of the numbers themselves. Cross-subtract (or cross-add) for the head; multiply the two deviations for the tail.

**WORKED EXAMPLE** 98 × 93 = ? Deficits from 100 are 2 and 7. Head: 98 − 7 = 91 (93 − 2 gives the same). Tail: 2 × 7 = 14. = 9,114.

**COMMON MISTAKE** letting the tail overflow its two digits without carrying — 87 × 89 has deficits 13 and 11, so the tail is 143: carry the 1 into the head (76 + 1 = 77) and keep 43, giving 7,743.

**Crosswise Multiplication.** Urdhva-Tiryagbhyam, the general-purpose one: a multiplication in a single sweep — vertical on the left, crosswise in the middle, vertical on the right — with nothing written down but the answer. The easy drills are its ×11 special case (add each pair of neighbours); the hard ones run three digits by two.

**WORKED EXAMPLE** 23 × 41 = ? Vertical left: 2 × 4 = 8. Crosswise: 2 × 1 + 3 × 4 = 14. Vertical right: 3 × 1 = 3. Lay them out as 8 | 14 | 3. The middle column carries its ten into the front: 943.

**COMMON MISTAKE** writing the three column results side by side without carrying — 8 | 14 | 3 read straight off gives 8,143 instead of 943.

**Paravartya Division.** Paravartya Yojayet, for dividing by 11: the flag digit (11 = 10 + 1, so the flag is 1) gets NEGATED, then chains leftward — bring down the first digit as-is, and each next quotient digit is the dividend digit plus (−1 × the previous quotient digit). The last digit falls out the same way and gives the remainder for free.

**WORKED EXAMPLE** 475 ÷ 11 = ? Flag digit is 1 (11 = 10 + 1); negate it to −1. Bring down 4, then 7 + (−1 × 4) = 3. Quotient 43, remainder 2 — check: 43 × 11 + 2 = 475.

**COMMON MISTAKE** ADDING the previous quotient digit instead of subtracting it — forgetting to negate the flag digit. The slip doesn't stay local: it cascades, so every digit after the first comes out wrong, not just one.

**Anurupyena Multiplication.** Multiplying two numbers close to a working base that ISN'T a power of ten — 50, since 50 = 100 ÷ 2. Cross-add one number with the other's deviation for a raw left part, then RESCALE it by the base's ratio to 100 (halve it, for base 50). The deviations' own product is the right part, padded to two digits.

**WORKED EXAMPLE** 54 × 52 = ? Deviations from 50: +4 and +2. Cross-add: 54 + 2 = 56, then rescale by the base's ratio to 100 (÷2): 56 ÷ 2 = 28. Right part: 4 × 2 = 08. Join them: 28 | 08 → 2,808.

**COMMON MISTAKE** joining the raw cross-add without rescaling it — writing 56 | 08 straight as 5,608. The working base is 50, not 100, so that left part is always twice too big until you divide it by the base's ratio.

# Section 1 Contents — Speed & Vedic Shortcuts

*Drills 1–10 of this section only. The full book index is at the front.*

## Drill 1 EASY *Speed Arithmetic*

↑ Section index

> **Section 1: Building Pace (Direct Calculation)**

Solve in your head — beat the clock.

**Given:**

> **7 × 8 = ?**

**Options:**

**A** 48

**B** 56

**C** 46

**D** 49

**E** 64

**Target time:** ~15s

⚠ **Common mistake:** 7 × 8 is one step, so the slip is a table error, not a method error — 7 × 9 = 63 and 7 × 7 = 49 are both on the board.

## Drill 2 EASY *Vedic Squaring*

↑ Section index

Squaring a number ending in 5 — beat the clock.

**Given:**

> **$45^2$ = ?**

**Options:**

**A** 2021

**B** 2012

**C** 1625

**D** 2025

**E** 2024

**Target time:** ~15s

⚠ **Common mistake:** Ekadhikena multiplies the head by ONE MORE than itself — 4 × 5, not 4 × 4. The tail is always exactly 25.

## Drill 3 EASY *Complementary Products*

↑ Section index

Units sum to 10, same lead — beat the clock.

**Given:**

> **52 × 58 = ?**

**Options:**

**A** 3007

**B** 3026

**C** 3010

**D** 3016

**E** 2516

**Target time:** ~15s

⚠ **Common mistake:** The left part is the head times ONE MORE than itself (5 × 6), and the right part is a PRODUCT of the units (2 × 8), always written in two digits.

## Drill 4 EASY *Anurupyena Multiplication*

↑ Section index

Multiplying near a working base — beat the clock.

**Given:**

> **52 × 54 = ?**

**Options:**

**A** 5608

**B** 2808

**C** 2800

**D** 2816

**E** 11208

**Target time:** ~15s

⚠ **Common mistake:** The working base is 50 = 100 ÷ 2, so the cross-added left part must be HALVED (56 ÷ 2 = 28) before the deviation product is appended. Skipping the rescale, or doubling instead, is the only mistake this method has.

## Drill 5 MEDIUM *Simplification (BODMAS)*

↑ Section index

> **Section 2: Exam Speed (Applied Shortcuts)**

Simplify — order of operations wins.

**Given:**

> **86 + 5 × 6 − 32 ÷ 8 = ?**

**Options:**

**A** 111

**B** 64

**C** 122

**D** 102

**E** 112

**Target time:** ~30s

⚠ **Common mistake:** BOTH the × and the ÷ resolve before any + or −: settle 5 × 6 = 30 and 32 ÷ 8 = 4 first, then walk the additions. Letting the ÷ 8 swallow the whole expression gives 64.

## Drill 6 MEDIUM *Crosswise Multiplication*

↑ Section index

Crosswise multiplication — beat the clock.

**Given:**

> **73 × 22 = ?**

**Options:**

**A** 1406

**B** 1608

**C** 1611

**D** 1606

**E** 1612

**Target time:** ~30s

⚠ **Common mistake:** The middle band takes BOTH cross-products — 7×2 + 3×2 = 20, not just one of them, and 20 overflows one digit, so it must carry into the tens.

## Drill 7 MEDIUM *Difference of Squares*

↑ Section index

Multiply via the midpoint — beat the clock.

**Given:**

> **15 × 21 = ?**

**Options:**

**A** 285

**B** 326

**C** 333

**D** 324

**E** 315

**Target time:** ~20s

⚠ **Common mistake:** Both operands sit 3 either side of 18, so the answer is $18^2$ MINUS $3^2$ — subtract the small square, never add it, and never stop at $18^2$ alone.

## Drill 8 HARD *Squares, Cubes & Roots*

↑ Section index

> **Section 3: Full Pressure (Multi-Step, Tight Clock)**

Powers and roots — instant recall.

**Given:**

> **$\sqrt[3]{1331}$ = ?**

**Options:**

**A** 13

**B** 12

**C** 11

**D** 21

**E** 10

**Target time:** ~30s

⚠ **Common mistake:** Cubes make the last digit unique: 1331 ends in 1, so the root ends in 1 — no other digit does that. The magnitude pins the rest, so there is nothing to estimate.

### Drill 9 HARD *Nikhilam*

↑ Section index

Nikhilam multiplication — beat the clock.

**Given:**

> **965 × 981 = ?**

**Options:**

**A** 946000

**B** 965981

**C** 1665

**D** 665

**E** 946665

**Target time:** ~35s

⚠ **Common mistake:** Cross-subtract ONCE (965 − 19) — the two cross-steps give the same left part, so doing both is a wasted step — then pad the tail to exactly 3 digits.

### Drill 10 HARD *Paravartya Division*

↑ Section index

Dividing by 11 — beat the clock.

**Given:**

> **45276 ÷ 11 = ?**

**Options:**

**A** 4111

**B** 41160

**C** 4096

**D** 4116

**E** 4918

**Target time:** ~45s

⚠ **Common mistake:** The flag digit is NEGATED — each step subtracts the previous quotient digit, it does not add it. Adding instead cascades the error through every digit that follows.

## End of Section 1 — Speed & Vedic Shortcuts

You have worked drills 1–10 (10 of drills in this book). Any blank space below this line is deliberate — each section begins on a fresh page. Next: Section 2 — Percentages & Commerce, starting overleaf.

# Percentages & Commerce — How to Read This Section

*Percentage, profit, interest, and averages — one family of problems, and every one of them turns on knowing which number the percentage is charged against.*

**Percentages.** Three shapes, and this book drills all of them. Most are a straight 'X% of Y' — convert the percentage to the fraction you already know (10% = 1/10, 20% = 1/5, 25% = 1/4, 50% = 1/2, 75% = 3/4) and one division finishes it. Some ask the reverse, 'A is what percent of B'. The hardest chain two changes in a row, and there the second is charged on the number the first one left behind.

**WORKED EXAMPLE** 800 increased by 50%, then decreased by 10%. Final value? 800 → 1,200 after the rise. The 10% is now charged on 1,200, not on 800 — that is 120. 1,200 − 120 = 1,080.

**COMMON MISTAKE** charging the second change on the ORIGINAL number, or just netting the two percentages (+50 − 10 = +40%) and landing on 1,120. A percentage is meaningless until you name what it is a percentage of, and after the first change that base has moved.

**Profit & Loss.** Cost price, marked price, discount, selling price — four numbers and three percentages between them. Profit % is always on COST; discount is always on MARKED PRICE. Getting those two bases right is most of the topic.

**WORKED EXAMPLE** An article costing ₹250 is marked 40% above cost and sold at a 10% discount. Profit %? Marked price = 350. Selling price = 350 × 0.9 = 315. Profit = 315 − 250 = 65. 65 ÷ 250 = 26%.

**COMMON MISTAKE** taking the discount off the COST instead of the marked price — every percentage in this topic names its own base, and swapping two of them is the standard trap.

**Simple & Compound Interest.** Simple interest is charged on the original principal every year; compound interest is charged on what the principal has grown into. Over 2 years the gap between them is exactly the interest earned on the first year's interest.

**WORKED EXAMPLE** ₹8,000 for 2 years at 10% p.a. — how much more is CI than SI? SI = 8,000 × 10% × 2 = 1,600. CI = 8,000 × ($1.1^2$ − 1) = 8,000 × 0.21 = 1,680. CI exceeds SI by ₹80.

**COMMON MISTAKE** not using the 2-year shortcut as a check: the difference is always P × $(r/100)^2$, which is ₹80 here. If your CI − SI doesn't match it, the arithmetic slipped.

**Averages.** One relation, total = average × count, asked three ways. Read the total straight off a given mean; recover a MISSING number by subtracting the rest from that total; or handle a REPLACEMENT, where you never rebuild the total at all — the average simply moves by (change in total) ÷ (count).

**WORKED EXAMPLE** The average of 8 numbers is 43. One of them, 54, is replaced by 14. New average? The total falls by 54 − 14 = 40, spread over the same 8 numbers — that is 5 off the mean. 43 − 5 = 38.

**COMMON MISTAKE** rebuilding the whole sum for a replacement question. Only the total's CHANGE matters, so it stays one subtraction and one division however large the numbers get.

# Section 2 Contents — Percentages & Commerce

*Drills 11–14 of this section only. The full book index is at the front.*

## Drill 11 EASY *Simple & Compound Interest*

↑ Section index

**Section 1: Building Pace (Direct Calculation)**

QUESTION

**What is the simple interest earned?**

**Given:**

**₹70000 is deposited for 2 years at 25% per annum, simple interest.**

**Options:**

A 35015

B 39375

C 17500

D 105000

E 35000

**Target time:** ~40s

⚠ **Common mistake:** Simple interest never earns on itself — ₹17500 in each of the two years, so ₹35000 in total. Doubling nothing and compounding it anyway gives ₹39375, which is offered; ₹17500 alone is one year and is offered too.

## Drill 12 MEDIUM *Percentages*

↑ Section index

**Section 2: Exam Speed (Applied Shortcuts)**

Percentage drill — no paper.

**Given:**

**30 is 15% of what number?**

**Options:**

A 215

B 185

C 200

D 45

E 120

**Target time:** ~30s

⚠ **Common mistake:** This asks for the WHOLE, not a part — so 30 is DIVIDED by 15% (× 100/15), never multiplied by it. Multiplying gives a number smaller than 30, which cannot be its base.

## Drill 13 MEDIUM *Averages*

↑ Section index

Averages — total and mean, no paper.

**Given:**

> **The average of 5 numbers is 54. The other 4 of them add up to 218. What is the remaining number?**

**Options:**

**A** 42

**B** 54

**C** 270

**D** 52

**E** 218

**Target time:** ~30s

⚠ **Common mistake:** Rebuild the whole total first (5 × 54 = 270) — the missing number is the GAP between it and 218, not the average 54 and not the total itself. Both of those are on the board.

## Drill 14 HARD *Profit & Loss*

↑ Section index

> **Section 3: Full Pressure (Multi-Step, Tight Clock)**

QUESTION

**What is the selling price?**

**Given:**

> **An article costs ₹5000 and is sold at a loss of 5%.**

**Options:**

**A** 250

**B** 5250

**C** 5000

**D** 4750

**E** 5005

**Target time:** ~60s

⚠ **Common mistake:** ₹250 is the loss itself, not the selling price — the question asks for ₹5000 − ₹250, and ₹250 is on the option list. Watch the direction too: a loss moves the price DOWN.

### End of Section 2 — Percentages & Commerce

You have worked drills 11–14 (4 of drills in this book). Any blank space below this line is deliberate — each section begins on a fresh page. Next: Section 3 — Time, Work & Motion, starting overleaf.

# Time, Work & Motion — How to Read This Section

*Work done, distance covered, and a stream helping or fighting you — all three are rate problems, and rates add where times never do.*

**Time & Work.** Take the whole job as a convenient number of units — the LCM of the given times — so each worker's rate comes out whole. Rates ADD when people work together, and the job divided by the combined rate is the answer.

**WORKED EXAMPLE** A alone finishes in 12 days, B alone in 18. Together? Call the work 36 units (LCM): A does 3 a day, B does 2 a day, so together 5 a day. 36 ÷ 5 = 7.2 days.

**COMMON MISTAKE** averaging the two times to get 15 days. Rates add; times do not — two workers are always faster than either one alone, so the answer must be below the smaller time.

**Time, Speed & Distance.** One relation, distance = speed × time, applied to each leg separately. The one thing to check every time is what is held equal between the legs — equal distances and equal times give different answers.

**WORKED EXAMPLE** Half a journey at 40 km/h and half at 60 km/h. Average speed? The DISTANCES are equal, so the average is the harmonic mean: 2 × 40 × 60 ÷ (40 + 60). = 48 km/h, not 50.

**COMMON MISTAKE** averaging the two speeds. That is only right when equal TIMES are spent at each — with equal distances more time is spent at the slower speed, which drags the average down.

**Boats & Streams.** The stream adds to the boat going downstream and subtracts going up. So downstream speed = boat + stream and upstream = boat − stream, which means the boat is the two effective speeds averaged and the stream is half their difference.

**WORKED EXAMPLE** 30 km downstream in 2 hours and 30 km upstream in 3 hours. Boat and stream speeds? Downstream = 15 km/h, upstream = 10 km/h. Boat = (15 + 10) ÷ 2, stream = (15 − 10) ÷ 2. Boat 12.5 km/h, stream 2.5 km/h.

**COMMON MISTAKE** using the still-water speed where the question wants the effective one (or the reverse) — read carefully which of the three speeds is being asked for.

# Section 3 Contents — Time, Work & Motion

*Drills 15–17 of this section only. The full book index is at the front.*

## Drill 15 EASY *Time, Speed & Distance*

↑ Section index

**Section 1: Building Pace (Direct Calculation)**

QUESTION

**How long does the journey take?**

**Given:**

**A train covers 350 km at a steady 50 km/h.**

**Options:**

**A** 4

**B** 6

**C** 1

**D** 300

**E** 7

**Target time:** ~40s

⚠ **Common mistake:** Divide the distance BY the speed: 350 ÷ 50. km ÷ km/h leaves hours; halving or doubling 50 first gives 14, which is on the option list.

## Drill 16 MEDIUM *Boats & Streams*

↑ Section index

**Section 2: Exam Speed (Applied Shortcuts)**

QUESTION

**What is the speed of the boat in still water?**

**Given:**

**A boat travels downstream at 17 km/h and upstream at 9 km/h.**

**Options:**

**A** 4

**B** 26

**C** 53

**D** 18

**E** 13

**Target time:** ~50s

⚠ **Common mistake:** Both halves matter: the boat is the half-SUM (13 km/h) and the stream the half-DIFFERENCE (4 km/h). The question asks for the boat, so 4 — the other half — is a wrong answer sitting on the option list, as is the undivided 26.

## Drill 17 HARD *Time & Work*

↑ Section index

**Section 3: Full Pressure (Multi-Step, Tight Clock)**

QUESTION

**Working together, in how many days will Imran and Shalini finish it?**

**Given:**

1. Imran is 3 times as efficient as Shalini.
2. Shalini alone can finish the work in 24 days.

**Options:**

**A** 3

**B** 8

**C** 72

**D** 6

**E** 16

**Target time:** ~70s

⚠ **Common mistake:** "3 times as efficient" multiplies the RATE and therefore DIVIDES the days — Imran takes 8 days, not 72. Efficiency and time run in opposite directions, and 8 on its own (Imran working alone) is on the option list.

### End of Section 3 — Time, Work & Motion

You have worked drills 15–17 (3 of drills in this book). Any blank space below this line is deliberate — each section begins on a fresh page. Next: Section 4 — Data Interpretation & Equations, starting overleaf.

# Data Interpretation & Equations — How to Read This Section

*Tables, caselets, and paired quadratics — the marks are in reading only what the question asks for, then computing once.*

**Data Interpretation (Table).** A small table and one question about it, and the question is always one of four: a column TOTAL, the DIFFERENCE between two named rows in one column, two columns COMBINED for a single row, or a column's AVERAGE. The table prints far more than any one question needs, so the skill is finding the named cells and ignoring the rest of the page.

**WORKED EXAMPLE** Branch / Men / Women — North 100 | 30, South 130 | 40, East 70 | 80. Total Men across all 3 branches? Only the Men column is in play: 100 + 130 + 70. = 300. The Women column never enters it.

**COMMON MISTAKE** reading down the neighbouring column, or answering the question the table INVITES rather than the one printed. Underline the column name and the row names first — the arithmetic after that is a single addition.

**Data Interpretation (Caselet).** The same data as a table DI, hidden in a paragraph — and always in TWO steps. The paragraph splits a total (by a ratio or by a percentage), then asks for a share of ONE of the parts. Do the split on paper before you even look at what is being asked, and the question becomes a lookup.

**WORKED EXAMPLE** A store holds 48 items, split between imported and locally made in the ratio 5 : 7. Of the imported items, 25% are returned. How many imported items are returned? Step one, the split: 12 parts in all, so one part is 4 and imported = 5 × 4 = 20. Step two: 25% of 20 = 5. The 28 local items were never in the question.

**COMMON MISTAKE** taking that second percentage of the TOTAL instead of the part — 25% of 48 rather than of 20. The paragraph sets the trap by keeping both numbers in the same sentence.

**Quadratic Equations.** Two quadratics, one in x and one in y. Solve both, then compare EVERY root of one against every root of the other. The answer is a definite inequality only if the two sets do not overlap at all.

**WORKED EXAMPLE** $x^2 - 7x + 12 = 0$ and $y^2 - 9y + 20 = 0$. x = 3 or 4; y = 4 or 5. The ranges overlap — x can equal y at 4, and x can also be less. The relation cannot be determined.

**COMMON MISTAKE** comparing only the largest roots, or only the smallest. 'x < y' is true only when every single x is below every single y — one overlapping pair makes it indeterminate.

# Section 4 Contents — Data Interpretation & Equations

*Drills 18–20 of this section only. The full book index is at the front.*

## Drill 18 EASY *Data Interpretation (Caselet)*

↑ Section index

**Section 1: Building Pace (Direct Calculation)**

QUESTION

**How many petrol vehicles are sold on finance?**

**Given:**

1. A dealership holds 40 vehicles, split between petrol and diesel in the ratio 2 : 3.
2. Of the petrol vehicles, 50% are sold on finance.

**Options:**

**A** 7

**B** 2

**C** 8

**D** 20

**E** 1

**Target time:** ~40s

⚠ **Common mistake:** The 50% applies to the petrol group (16), not to all 40 vehicles — applying it to the total is the single commonest caselet slip, and it is on the option list.

## Drill 19 MEDIUM *Quadratic Equations*

↑ Section index

**Section 2: Exam Speed (Applied Shortcuts)**

Solve both equations and state the relation between x and y.

**Given:**

1. I. $x^2 + 19x + 88 = 0$
2. II. $y^2 + 13y + 40 = 0$

**Options:**

**A** $x > y$

**B** $x < y$

**C** $x \geq y$

**D** $x \leq y$

**E** $x = y$ or no relation can be established

**Target time:** ~40s

⚠ **Common mistake:** comparing only the largest roots, or only the smallest. 'x < y' is true only when every single x is below every single y — one overlapping pair makes it indeterminate.

## Drill 20 HARD *Data Interpretation (Table)*

↑ Section index

**Section 3: Full Pressure (Multi-Step, Tight Clock)**

QUESTION

**What is the average Trips per route?**

**Given:**

1. Depot allocation across four routes: (figures in counts)
2. Route Buses Trips
3. R-1 400 1000
4. R-2 800 800
5. R-3 800 600
6. R-4 3600 800

**Options:**

**A** 1400

**B** 805

**C** 800

**D** 811

**E** 3200

**Target time:** ~65s

⚠ **Common mistake:** Divide by 4 — the number of routes — not by 2, the number of columns. Stopping at the total 3200 is the other offered wrong turn, and it is the commoner one.

### End of Section 4 — Data Interpretation & Equations

You have worked drills 18–20 (3 of drills in this book). Any blank space below this line is deliberate — each section begins on a fresh page. Next: Section 5 — Counting & Measurement, starting overleaf.

# Counting & Measurement — How to Read This Section

*Arrangements, chances, and shapes — the topics where the setup is the whole battle and the arithmetic afterwards is trivial.*

**Permutation & Combination.** Ask one question first: does ORDER matter? A committee, a handshake or a selection is a set, so it is a combination; a ranking, a seating or a code is an arrangement, so it is a permutation. Then split any 'at least' condition into cases and add them.

**WORKED EXAMPLE** From 5 men and 4 women, choose a committee of 3 with at least 2 women. Split by cases: exactly 2 women = C(4,2) × C(5,1) = 6 × 5 = 30; exactly 3 women = C(4,3) = 4. 30 + 4 = 34.

**COMMON MISTAKE** using a permutation where order does not matter — a committee of A, B, C is the same committee however you list it, so it is counted once, not six times.

**Probability.** Favourable outcomes over total outcomes, with both counted the same way. Most drills are a single draw — one ball from a bag, one bulb from a box, one card from a pack of 52, or the sum on two dice out of 36 — so the work is counting the favourable cases exactly. Only when two are drawn WITHOUT replacement does the second draw see a changed bag.

**WORKED EXAMPLE** Two fair dice are rolled together. P(the sum is exactly 5)? Total outcomes = 6 × 6 = 36. A sum of 5 happens as 1+4, 2+3, 3+2, 4+1 — four ordered pairs. 4 ÷ 36 = 1/9.

**COMMON MISTAKE** counting 1+4 and 4+1 as one outcome. The 36 in the denominator treats the two dice as distinguishable, so the numerator has to as well — otherwise the two halves of the fraction are counting different experiments.

**Mensuration.** Raw formulas on the standard shapes, and only a handful of them: area and perimeter of a rectangle and a square, the volume of a cuboidal tank, and the area and circumference of a circle. Circle questions hand you π = 22/7, which is itself a hint — the radius will be a multiple of 7, so the 7 always cancels.

**WORKED EXAMPLE** A circular park has a radius of 21 m. (Take π = 22/7.) What is its circumference? C = 2πr = 2 × 22/7 × 21, and 7 goes into 21 three times — so this is 2 × 22 × 3. = 132 m.

**COMMON MISTAKE** answering the OTHER formula for the same shape — the area when it asked for the perimeter, the circumference when it asked for the area, the surface area when it asked for the volume. That answer is always sitting in the options. Read the last four words of the question before you touch a number.

# Section 5 Contents — Counting & Measurement

*Drills 21–23 of this section only. The full book index is at the front.*

## Drill 21 EASY *Permutation & Combination*

↑ Section index

**Section 1: Building Pace (Direct Calculation)**

QUESTION

**In how many ways can it be done?**

**Given:**

**A committee of 2 members is to be formed from 6 people.**

**Options:**

**A** 15

**B** 12

**C** 35

**D** 28

**E** 30

**Target time:** ~45s

⚠ **Common mistake:** using a permutation where order does not matter — a committee of A, B, C is the same committee however you list it, so it is counted once, not six times.

## Drill 22 MEDIUM *Probability*

↑ Section index

**Section 2: Exam Speed (Applied Shortcuts)**

QUESTION

**What is the probability that it is NOT defective?**

**Given:**

1. A box contains 3 defective and 5 good bulbs.
2. One bulb is picked at random.

**Options:**

**A** 5/8

**B** 3/4

**C** 3/5

**D** 1/8

**E** 3/8

**Target time:** ~55s

⚠ **Common mistake:** counting 1+4 and 4+1 as one outcome. The 36 in the denominator treats the two dice as distinguishable, so the numerator has to as well — otherwise the two halves of the fraction are counting different experiments.

## Drill 23 HARD *Mensuration*

↑ Section index

**Section 3: Full Pressure (Multi-Step, Tight Clock)**

QUESTION

**What is its area?**

**Given:**

**A circular park has a radius of 42 m. (Take π = 22/7.)**

**Options:**

**A** 5544

**B** 132

**C** 1764

**D** 5533

**E** 264

**Target time:** ~60s

⚠ **Common mistake:** Area squares the radius (πr², so 42 × 42 inside), while the circumference is linear (2πr = 264 m) — and that circumference is on the option list. A radius divisible by 7 is the signal to use 22/7 rather than 3.14.

### End of Section 5 — Counting & Measurement

You have worked drills 21–23 (3 of drills in this book). Any blank space below this line is deliberate — each section begins on a fresh page. Next: the Solutions — the answer and the full worked method for every puzzle, in the same numbering.

# Solutions

*Worked solutions for every drill — the answer plus the engine's own step-by-step working. Attempt the drill against its target time first; then read the working even if you were right, because the key's method is usually the shorter one.*

## Solution 1 EASY *Speed Arithmetic*

**Q.** Solve in your head — beat the clock.

**Answer: B) 56**

**Why:**

1. Compute directly: 7 × 8 = 56.

## Solution 2 EASY *Vedic Squaring*

**Q.** Squaring a number ending in 5 — beat the clock.

**Answer: D) 2025**

**Why:**

1. Ends in 5 — Ekadhikena: take 4, multiply by one more: 4 × 5 = 20.
2. Append 25: 20 | 25 → 2025.
3. Answer: 2025.

## Solution 3 EASY *Complementary Products*

**Q.** Units sum to 10, same lead — beat the clock.

**Answer: D) 3016**

**Why:**

1. Units 2 + 8 = 10 with the same lead 5 — Antyayordashake applies.
2. Left: 5 × 6 = 30. Right: 2 × 8 = 16 (always two digits).
3. 30 | 16 → 3016.
4. Answer: 3016.

## Solution 4 EASY *Anurupyena Multiplication*

**Q.** Multiplying near a working base — beat the clock.

**Answer: B) 2808**

**Why:**

1. Deviations from 50: 52 → +2, 54 → +4.
2. Cross-add for the raw left part: 52 + 4 = 56.
3. Rescale for the working base: 50 is 100 ÷ 2, so divide by 2: 56 ÷ 2 = 28.

4. Right part — multiply the deviations: (2) × (4) = 8, padded to two digits: 08.
5. Join them: 28 | 08 → 2808.
6. Answer: 2808.

## Solution 5 MEDIUM *Simplification (BODMAS)*

**Q.** Simplify — order of operations wins.

**Answer: E) 112**

**Why:**

1. × and ÷ first: 5 × 6 = 30; 32 ÷ 8 = 4.
2. Then left to right: 86 + 30 − 4 = 112.

## Solution 6 MEDIUM *Crosswise Multiplication*

**Q.** Crosswise multiplication — beat the clock.

**Answer: D) 1606**

**Why:**

1. Units: 3 × 2 = 6.
2. Cross: 7×2 + 3×2 = 20; tens: 7 × 2 = 14 — stack with carries.
3. 1400 + 200 + 6 = 1606.
4. Answer: 1606.

## Solution 7 MEDIUM *Difference of Squares*

**Q.** Multiply via the midpoint — beat the clock.

**Answer: E) 315**

**Why:**

1. 15 and 21 straddle 18 by 3 — Sankalana: $a \times b = m^2 - d^2$.
2. $18^2 - 3^2 = 324 - 9 = 315$.
3. Answer: 315.

## Solution 8 HARD *Squares, Cubes & Roots*

**Q.** Powers and roots — instant recall.

**Answer: C) 11**

**Why:**

1. $11^3 = 1331$, so $\sqrt[3]{1331} = 11$. The last digit of a cube pins the root's last digit uniquely.

## Solution 9 HARD *Nikhilam*

**Q.** Nikhilam multiplication — beat the clock.

**Answer: E) 946665**

**Why:**

1. Choose the base (nearest power of 10): 1000.
2. Distance from base: 965 is 35 below 1000, 981 is 19 below 1000.
3. Cross-subtract: 965 − 19 = 946 (same as 981 − 35).
4. Multiply the distances: 35 × 19 = 665.
5. Base 1000 has 3 zeros, so the right-hand part must occupy exactly 3 digits.
6. 665 fits, padded to 3 digits → 665.
7. Left part: 946. Right part: 665.
8. Write them side by side: 946 | 665 = 946665.

## Solution 10 HARD *Paravartya Division*

**Q.** Dividing by 11 — beat the clock.

**Answer: D) 4116**

**Why:**

1. 45276 ÷ 11 — Paravartya: 11 = 10 + 1, so the flag digit is 1; negate it to −1.
2. Bring down the first digit as-is: 4 (first quotient digit).
3. 5 + (−1 × 4) = 1 (next quotient digit).
4. 2 + (−1 × 1) = 1 (next quotient digit).
5. 7 + (−1 × 1) = 6 (next quotient digit).
6. Last digit gives the remainder the same way: 6 + (−1 × 6) = 0.
7. Quotient 4116, remainder 0 — check: 4116 × 11 + 0 = 45276.
8. Answer: 4116.

## Solution 11 EASY *Simple & Compound Interest*

**Q.** What is the simple interest earned?

**Answer: E) 35000**

**Why:**

1. Simple interest = P × R × T ÷ 100 = ₹70000 × 25 × 2 ÷ 100 = ₹35000.
2. Each year earns the same ₹17500 under simple interest.
3. Answer: 35000.

## Solution 12 MEDIUM *Percentages*

**Q.** Percentage drill — no paper.

**Answer: C) 200**

**Why:**

1. 15% of the number is 30, so 1% is 30 ÷ 15 = 2.
2. 100% = 2 × 100 = 200.

## Solution 13 MEDIUM *Averages*

**Q.** Averages — total and mean, no paper.

**Answer: D) 52**

**Why:**

1. All 5 together: 5 × 54 = 270.
2. Subtract the 4 you were given: 270 − 218 = 52. The remaining number is 52.

## Solution 14 HARD *Profit & Loss*

**Q.** What is the selling price?

**Answer: D) 4750**

**Why:**

1. Loss = 5% of ₹5000 = ₹250.
2. SP = ₹5000 − ₹250 = ₹4750.
3. Answer: 4750.

## Solution 15 EASY *Time, Speed & Distance*

**Q.** How long does the journey take?

**Answer: E) 7**

**Why:**

1. Time = distance ÷ speed = 350 ÷ 50 = 7 hours.
2. Answer: 7 hours.

## Solution 16 MEDIUM *Boats & Streams*

**Q.** What is the speed of the boat in still water?

**Answer: E) 13**

**Why:**

1. Downstream = boat + stream, upstream = boat − stream.
2. Adding: boat = (17 + 9) ÷ 2 = 13 km/h. (The stream is the HALF-DIFFERENCE, 4 km/h.)
3. Answer: 13 km/h.

## Solution 17 HARD *Time & Work*

**Q.** Working together, in how many days will Imran and Shalini finish it?

**Answer: D) 6**

**Why:**

1. 3× the efficiency means 3× the work per day, so Imran needs 24 ÷ 3 = 8 days alone.
2. Per day: Shalini does 1/24, Imran does 1/8 — together 4/24 of the job.
3. So the job takes 24 ÷ 4 = 6 days.
4. Answer: 6 days.

## Solution 18 EASY *Data Interpretation (Caselet)*

**Q.** How many petrol vehicles are sold on finance?

**Answer: C) 8**

**Why:**

1. The ratio 2 : 3 has 5 parts, so one part = 40 ÷ 5 = 8.
2. Petrol vehicles = 2 × 8 = 16.
3. 50% of 16 = 8 — take the percentage on the PART, never the total.
4. Answer: 8.

## Solution 19 MEDIUM *Quadratic Equations*

**Q.** Solve both equations and state the relation between x and y.

**Answer: D) $x \leq y$**

**Why:**

1. Factorise I: $x^2 + 19x + 88 = 0 \rightarrow (x + 11)(x + 8) = 0$, so x = -11 and -8.
2. Factorise II: $y^2 + 13y + 40 = 0 \rightarrow (y + 8)(y + 5) = 0$, so y = -8 and -5.
3. Compare every x against every y — one pair is never enough.
4. The largest x equals the smallest y (-8), and every other x is smaller — so $x \leq y$, not $x < y$.

## Solution 20 HARD *Data Interpretation (Table)*

**Q.** What is the average Trips per route?

**Answer: C) 800**

**Why:**

1. Column total = 1000 + 800 + 600 + 800 = 3200.
2. Average = 3200 ÷ 4 = 800 — divide by the number of rows, not by the number of columns.
3. Answer: 800.

## Solution 21 EASY *Permutation & Combination*

**Q.** In how many ways can it be done?

**Answer: A) 15**

**Why:**

1. A committee has no order — SELECTIONS, so use nCr, not nPr.
2. 6C2 = 6P2 ÷ 2! = 30 ÷ 2 = 15.
3. Answer: 15.

## Solution 22 MEDIUM *Probability*

**Q.** What is the probability that it is NOT defective?

**Answer: A) 5/8**

**Why:**

1. P(not defective) = 1 − P(defective) = 1 − 3/8.
2. That is the 5 good bulbs out of 8: 5/8.
3. Answer: 5/8.

## Solution 23 HARD *Mensuration*

**Q.** What is its area?

**Answer: A) 5544**

**Why:**

1. Area = $\pi r^2$ = (22/7) × 42 × 42 = 5544 $m^2$.
2. Answer: 5544 $m^2$.

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