Build the model first

The fastest reliable calculation begins with a correct relationship. Before using a formula, name the unknown, the given quantities and the unit or base for each.

A six-step routine

Restate the question. Define variables. Draw a simple diagram or equation. Choose a short route. Calculate with units visible. Check the result against the wording, constraints and an estimate.

Common foundations

Arithmetic: fractions, percentages, ratios, averages, profit and loss, time, speed and work. Algebra: linear and quadratic relationships, identities and inequalities. Geometry: lengths, areas, angles and similarity. Number properties: divisibility, remainders and factors. Learn the underlying meaning before timed shortcuts.

> A percentage is incomplete without a base. "20% increase" means 20% of the old value; a later decrease is usually a percentage of the changed value.

Use options intelligently

Back-substitution and estimation can reduce work when answer options are supplied. Still check that the selected value meets every condition, including range, integer restrictions and units. A matching option alone is not proof.

Worked example: changing percentage bases

A product is discounted by 20%. By what percentage must the discounted price rise to return to its original price?

Represent

Choose an original price of 100. After a 20% discount the price is 80. To return to 100, it must rise by 20. The increase percentage is measured against 80.

Execute and check

Required increase = 20/80 x 100 = 25%. Check: 25% of 80 is 20; 80 + 20 = 100. A 20% rise would make only 96.

The reverse of a decrease of d% is an increase of 100d/(100-d)%, provided d is below 100. Derive it from a base of 100 whenever the formula is forgotten.

Try two variations

1. A price increases by 25%. What decrease restores the original?
2. A quantity falls by 10%. What increase restores it?

Answers: 1. Start 100, become 125, fall 25/125 = 20%. 2. Start 100, become 90, rise 10/90 = 11 1/9%.

> Error to watch: using the original base for both percentage changes. After the first change, the second percentage uses the new starting value.

Worked example: combined work rate

A completes a task alone in 6 hours. B completes it alone in 3 hours. How long do they take together at constant rates?

Identify the unit

A's rate is 1/6 task per hour. B's rate is 1/3 task per hour. Rates can be added because both are measured in the same task per hour.

Calculate

Together they complete 1/6 + 1/3 = 1/2 task per hour. Time for one task = 1 divided by 1/2 = 2 hours.

Check the answer

The combined time must be less than 3 hours, the faster person's solo time. Two hours satisfies that range. Adding 6 and 3 or averaging them would have ignored that time and rate are different quantities.

Try a variation

If A takes 4 hours and B takes 12 hours, what is their combined time? Rates add to 1/4 + 1/12 = 1/3 task per hour, so the time is 3 hours.

> Whenever a question describes flow, speed, production or work, ask whether a rate per unit time is the useful representation. Add compatible rates; do not add completion times.

Timed QA and error review

The RCMB mocks allot 40 minutes to QA. Choose questions by whether you can see a valid model, not by whether the topic name looks familiar.

During a timed section

Scan the question for the exact unknown and any constraints. Begin with a tractable model. If a calculation expands without progress, check whether you chose the wrong variable or could use estimation or options. Mark a stalled question and return if time remains.

After the section

Classify each miss: concept, translation into an equation, arithmetic, units/base, missed constraint or question selection. Retry without looking at the solution. Then compare your first decisive step with the worked method.

Practice prompts

1. The average of five numbers is 18. What is their total? 2. A 30 km trip takes 45 minutes. What is the average speed in km/h? 3. A number leaves remainder 2 when divided by 5. Which of 12, 15, 18 and 20 can it be?

Answers: 1. 5 x 18 = 90. 2. 45 minutes = 0.75 hour; 30/0.75 = 40 km/h. 3. 12 leaves remainder 2.

> Do not rush the check. An impossible sign, a percentage above a sensible bound or a combined work time longer than the faster solo time often reveals a setup error.

First review edition, 24 September 2026. Independently created RCMB practice material; not an official CAT publication or IIM endorsement. Practice timings and scoring apply to the accompanying RCMB mocks. Check current official instructions at iimcat.ac.in. Faculty review is recommended before public release.