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QUANTITATIVE APTITUDE · FREE STUDY MATERIAL

Problems on Ages

Formulas & Shortcut Tricks

Every important formula, shortcut and exam trick for Problems on Ages in one place – with solved examples, common mistakes and a one-page revision sheet.

WHAT'S INSIDE

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USEFUL FOR

- Campus placements (TCS, Infosys, Wipro, Accenture, Cognizant)
- SSC CGL / CHSL / MTS
- Bank PO & Clerk (IBPS, SBI, RBI)
- Railways (RRB NTPC, Group D)
- UPSC CSAT & state PSC exams

Practise **Problems on Ages** free on LearnFrenzy – questions with instant explanations →

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1 Topic introduction

What it is, why it matters and how it is asked

Age problems are number problems with one special rule: time passes equally for everyone. In t years every person is t years older, so the difference between two people's ages never changes, while their ratio always does.

That single fact powers the fastest method in this chapter – the ratio-difference method – which solves most "ratio n years ago / hence" questions in one line without an equation.

Why it matters in exams

- Almost every SSC, Railway and bank paper has one or two age questions.
- Placement tests (TCS NQT, Infosys, Cognizant) like ratio shifts and "I was as old as you are now" puzzles.
- The questions are short and highly scoring once the method is fixed.

Where it is used

- Any comparison that changes with time at the same rate for both sides.
- Family-tree and birth-year reasoning puzzles.
- It trains careful translation of "ago", "hence", "when … was born".

Common question patterns

Ratio shift
Ratio now and n years ago or hence.

Past and future
Ratios given at two other times – find present ages.

Times as old
"Father is 5 times as old; after 6 years, 3 times."

Sum with ratio
Sum of ages now or later together with a ratio.

Three people
Chains like "A is 4 years older than B, who is twice C".

Products and percentages
Products of ages, or one age as a percentage of another.

Reversed digits
Father's age is the son's age with digits reversed.

Word puzzles
"When I was your age …", births and marriages.

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2 Important formulas

Cards marked MOST USED are the ones to revise first

The ground rules

The question says	Write (present age = x)
t years ago / before	x − t
t years hence / after / later	x + t
A is k times as old as B	A = k × B
Ages in the ratio a : b	ak and bk
When A was born, B was d years old	B − A = d (always)
Sum of n people's ages after t years	present sum + n × t

The difference between two ages is constant forever. The ratio changes, moving towards 1 : 1 as time passes.

Ratio shifts

Ratio now and t years later (equation method)

MOST USED

Present ages ak, bk; (ak + t)/(bk + t) = c/d → solve for k

Use t years ago with − t instead of + t.

EXAMPLE Ratio 4 : 7 now, 5 : 8 in 6 years → (4k + 6)/(7k + 6) = 5/8 → k = 6 → **24 and 42**.

Ratio-difference method

MOST USED

Make the two ratios have the same difference; then (change in each term) parts = t years

Because the age gap is fixed, equal ratio differences represent the same number of years.

EXAMPLE 4 : 7 and 5 : 8 both differ by 3 → each term rose by 1 part = 6 years → ages 4 × 6 and 7 × 6 = **24 and 42**.

Ratios at two other times

Equalise the differences of the past and future ratios; the part change covers the whole time between them

From t_1 years ago to t_2 years hence is $t_1 + t_2$ years.

EXAMPLE 5 years ago 3 : 5, in 5 years 5 : 7 (both differ by 2) → 2 parts = 10 years → part 5 → then 15, 25 → now **20 and 30**.

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"Times as old" and sums

Times as old – later

MOST USED

Now A = m × B, after t years A = n × B → B = t(n − 1)/(m − n)

Derived from mB + t = n(B + t). Use it to answer in one line.

m – multiple now **n** – multiple later **t** – years later

EXAMPLE Father 3 times son now, twice after 12 years → son = 12 × 1/1 = **12**, father 36.

Times as old – earlier

Now A = m × B, t years ago A = n × B → B = t(n − 1)/(n − m)

Going back in time makes the multiple bigger, so n > m.

EXAMPLE Father 4 times son now, 7 times 5 years ago → son = 5 × 6/3 = **10**, father 40.

Sum of ages over time

Sum after t years = present sum + (number of people) × t

Each person adds t years.

EXAMPLE A family of 4 has a total age of 96; in 6 years the total is 96 + 24 = **120**.

Products, percentages and digits

Products of ages

$(a - t)(b - t) = ab - t(a + b) + t^2$ → gives the sum a + b

Two products at different times give the sum; the sum and product give the ages.

EXAMPLE Product now 240, four years ago 128 → 240 − 4S + 16 = 128 → S = 32 → **12 and 20**.

Percentages of ages

A is p% more than B → A = (1 + p/100) × B

Write the percentage as a fraction, then use the age gap.

EXAMPLE A is 25% older than B and 6 years older → B = 6/0.25 = **24**, A = 30.

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Reversed-digit ages

MOST USED

> **Two-digit ages with reversed digits differ by 9 × (difference of digits)**

So the age gap must be a multiple of 9 – this kills options instantly.

EXAMPLE Ages 61 and 16 differ by 45 = 9 × (6 – 1) = **45**.

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3 Shortcut tricks & smart techniques

Each trick says when to use it – that matters as much as the trick

Ratio-difference method in practice

MOST USED

USE WHEN Two ratios at two times – the most common age question.

1. Write both ratios. If their differences are unequal, scale one so the differences match.
2. Find how many parts each term changed by.
3. Parts changed = years passed → value of one part.

EXAMPLE 7 : 4 now, 4 : 3 in 10 years: scale 4 : 3 to 12 : 9 (difference 3) → each term +5 parts = 10 years → part 2 → **14 and 8**.

Equal differences already

USE WHEN Both ratios happen to have the same difference.

1. Change in one term = number of parts for the time gap.
2. Divide years by parts.

EXAMPLE 5 : 3 now, 3 : 1 four years ago (both differ by 2) → 2 parts = 4 years → part 2 → **10 and 6**.

Test the options

USE WHEN Options give the present ages.

1. Check the present ratio first (cheapest test).
2. Shift by t years and check the second ratio.

EXAMPLE Ratio 3 : 5 now, 1 : 3 eight years ago; options (15, 25), (12, 20), (18, 30) all fit 3 : 5, but eight years back only (4, 12) is 1 : 3 → **12 and 20**.

“When I was as old as you are now”

MOST USED

USE WHEN Puzzles that jump between “my age then” and “your age now”.

1. Let the age gap be d (constant).
2. “When I was your age” = d years ago; “when you are my age” = d years later.
3. Write each statement with d, then solve.

EXAMPLE “I am twice as old as you were when I was as old as you are now”, sum 63 → a = 2(2b – a) → a : b = 4 : 3 → **36 and 27**.

Age gaps add along a chain

USE WHEN “When A was born B was 6; when B was born C was 4.”

1. Each statement is a fixed gap.
2. Add the gaps along the chain.

EXAMPLE A is 20 → B = 26 → C = 30, so C is **10 years** older than A.

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4 Solved examples

The full method on the left, the exam shortcut on the right

1 RATIO SHIFT

The ages of A and B are in the ratio 3 : 5. Eight years ago the ratio was 1 : 3. Find their present ages.

STEP BY STEP

1. Present ages 3k and 5k: (3k − 8)/(5k − 8) = 1/3.
2. 9k − 24 = 5k − 8 → 4k = 16 → k = 4.
3. Ages 12 and 20.

SHORTCUT

3 : 5 and 1 : 3 both differ by 2 → each term fell by 2 parts in 8 years → part 4 → 12, 20.

Why it works: Equal ratio differences mean one part is the same number of years in both ratios.

Answer: 12 and 20

2 PAST AND FUTURE

Four years ago the ratio of A's age to B's was 3 : 4. Six years hence it will be 5 : 6. Find their present ages.

STEP BY STEP

1. Let the ages 4 years ago be 3k and 4k.
2. Six years hence: (3k + 10)/(4k + 10) = 5/6 → 18k + 60 = 20k + 50 → k = 5.
3. Then 15 and 20 → now 19 and 24.

SHORTCUT

Both ratios differ by 1 → 3 → 5 is 2 parts over 10 years → part 5 → then 15, 20 → now 19, 24.

Why it works: From 4 years ago to 6 years hence is 10 years in total.

Answer: 19 and 24

3 TIMES AS OLD

A father is 5 times as old as his son. After 6 years he will be 3 times as old. Find their present ages.

STEP BY STEP

1. Son x, father 5x: 5x + 6 = 3(x + 6).
2. 2x = 12 → x = 6.
3. Son 6, father 30.

SHORTCUT

Son = t(n − 1)/(m − n) = 6 × 2/2 = 6.

Why it works: The formula is just the equation solved once for all numbers.

Answer: 30 and 6

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4 SUM AND PAST MULTIPLE

The sum of the ages of a mother and her daughter is 56. Four years ago the mother was three times as old as the daughter. Find the daughter's present age.

STEP BY STEP

1. m + d = 56 and m − 4 = 3(d − 4).
2. m = 3d − 8 → 3d − 8 + d = 56 → d = 16.
3. Mother 40.

SHORTCUT

Four years ago the sum was 48 and the ratio 3 : 1 → daughter 12 then → 16 now.

Why it works: Shifting the sum to the same time as the ratio turns it into a simple split.

Answer: 16

5 THREE PEOPLE

A is 4 years older than B, B is twice as old as C, and the sum of their ages is 49. Find B's age.

STEP BY STEP

1. Let C = c: B = 2c, A = 2c + 4.
2. 2c + 4 + 2c + c = 49 → 5c = 45 → c = 9.
3. B = 18 (A = 22).

SHORTCUT

Remove the extra 4: 45 shared in 2 : 2 : 1 → C = 9, B = 18.

Why it works: Expressing everyone through the youngest gives one variable.

Answer: 18

6 PRODUCTS

The product of the present ages of two brothers is 240. Four years ago it was 128. Find their ages.

STEP BY STEP

1. (a − 4)(b − 4) = ab − 4(a + b) + 16 = 128.
2. 240 − 4S + 16 = 128 → S = 32.
3. Sum 32, product 240 → 12 and 20.

SHORTCUT

Factor pairs of 240 adding to 32: 12 × 20 ✓ (check 8 × 16 = 128).

Why it works: Two products at different times pin down the sum.

Answer: 12 and 20

7 PERCENTAGES

A's age is 40% more than B's. Five years ago it was 50% more. Find their present ages.

STEP BY STEP

1. A = 1.4B and A − 5 = 1.5(B − 5).
2. 1.4B − 5 = 1.5B − 7.5 → 0.1B = 2.5 → B = 25.
3. A = 35.

SHORTCUT

Ratio 7 : 5 now and 3 : 2 then; scale 3 : 2 to 6 : 4 (difference 2) → each term fell 1 part in 5 years → part 5 → 35, 25.

Why it works: Percentages are ratios in disguise: 140% : 100% = 7 : 5.

Answer: 35 and 25

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8 PUZZLE

"When I was your age, you were 4. When you are my age, I will be 40." Find both present ages.

STEP BY STEP

1. Let my age be a, yours b, gap d = a − b.
2. d years ago you were b − d = 4.
3. In d years I will be a + d = b + 2d = 40.
4. 3d = 36 → d = 12 → b = 16, a = 28.

SHORTCUT

From 4 to 40 the timeline covers three equal gaps → gap 12 → you 16, me 28.

Why it works: The ages 4, b, a, 40 are evenly spaced by the constant gap d.

Answer: 28 and 16

9 REVERSED DIGITS

A father's age is his son's age with the digits reversed, and the father is 45 years older. One year ago the father was four times as old as the son. Find their ages.

STEP BY STEP

1. 45 = 9 × (digit difference) → the digits differ by 5.
2. Candidates (father / son): 50/5, 61/16, 72/27, 83/38, 94/49.
3. One year ago: 61 − 1 = 60 and 4 × (16 − 1) = 60 ✓; no other pair works.
4. Father 61, son 16.

SHORTCUT

Equation: F − 1 = 4(S − 1) with F = S + 45 → S + 44 = 4S − 4 → S = 16.

Why it works: The 9 rule cuts the search to five pairs; the second clue picks one.

Answer: 61 and 16

10 BIRTHS

Ravi's father was 32 when Ravi was born, and his mother is 4 years younger than his father. Ravi's sister, 3 years younger than Ravi, is 9 now. How old is the mother?

STEP BY STEP

1. Ravi = 9 + 3 = 12.
2. Father = 12 + 32 = 44.
3. Mother = 44 − 4 = 40.

SHORTCUT

Add the fixed gaps along the chain: 9 + 3 + 32 − 4 = 40.

Why it works: Every "when … was born" statement is a constant age gap.

Answer: 40

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11 RATIO AND FUTURE SUM

The present ages of P and Q are in the ratio 6 : 5, and in 10 years the sum of their ages will be 64. Find Q's present age.

STEP BY STEP

1. Ages 6k and 5k: 11k + 20 = 64.
2. 11k = 44 → k = 4.
3. Q = 20 (P = 24).

SHORTCUT

Present sum = 64 − 2 × 10 = 44 → 44 in 6 : 5 → Q = 20.

Why it works: Two people add 2 × 10 years to the sum in 10 years.

Answer: 20

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5 Important exam tips

Patterns, traps and habits that save marks

Frequently asked question patterns

- Ratio now and n years ago or hence.
- Ratios at a past and a future time.
- “k times as old” now and later or earlier.
- Sum of ages with a ratio or a multiple.
- Three-person chains and births.
- Products and percentages of ages.
- “When I was your age” and reversed-digit puzzles.

Common mistakes to avoid

- Adding t years to one person only – everyone ages.
- Forgetting that a group’s sum rises by (number of people) × t.
- Using the ratio difference without first making the differences equal.
- Measuring the time between a past and a future ratio as $t_2 - t_1$ instead of $t_1 + t_2$.
- Accepting negative or fractional ages from a quadratic.
- Mixing up “older by” (a difference) with “times as old” (a ratio).

Points to remember

- The age gap never changes.
- Ratios of ages move towards 1 : 1 over time.
- Equal ratio differences → parts changed = years passed.
- Reversed-digit ages differ by a multiple of 9.
- Son = $t(n - 1)/(m - n)$ for “m times now, n times after t years”.

Speed and accuracy

- Use the ratio-difference method before writing any equation.
- Check the present-ratio condition on options first.
- Bring sums and ratios to the same point in time.
- For puzzles, draw a timeline with the constant gap.

Preparation strategy

- Master the ratio-difference method – it covers most exam questions.
- Practise on LearnFrenzy in order: Easy → Medium → Hard → Exam Pattern Mix → Data Sufficiency.
- Aim for 30–45 seconds per age question.
- Keep an error log of “ago / hence” sign mistakes.
- Read the Quick Revision Sheet (next page) the night before the exam.

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6 Quick revision sheet

Everything on one page for the night before the exam

Formulas

t years ago / hence	**x − t / x + t**	Age gap	**constant**
Ratio a : b	**ak, bk**	Ratio after t	**(ak + t)/(bk + t) = c/d**
Ratio-difference	**parts changed = years**	Past ↔ future	**time = $t_1 + t_2$**
m× now, n× after t	**B = t(n − 1)/(m − n)**	m× now, n× t ago	**B = t(n − 1)/(n − m)**
Group sum after t	**sum + n × t**	Products	**ab − t(a + b) + t^2**
p% older	**A = (1 + p/100)B**	Reversed digits	**gap = 9 × digit gap**
“When I was your age”	**d years ago**	“When you are my age”	**d years later**

Shortcut tricks

- Equalise ratio differences first.
- Present ratio test on options.
- Shift sums to the ratio’s year.
- Timeline with constant gap d.
- Gaps add along a chain.
- Reversed ages: gap ÷ 9.

Must-know numbers

Time words	decade = 10 years · score = 20 years · “hence / after” = + · “ago / before” = −
Reversed pairs (gap 9k)	9: 21/12 · 18: 31/13 · 27: 41/14 · 36: 51/15 · 45: 61/16 · 54: 71/17

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7 A message from LearnFrenzy

For everyone preparing for placements, competitive and government exams

Keep going – you are closer than you think

Success in examinations is not just about how many hours you study. It is about how effectively you understand concepts, practise questions, and improve yourself every day.

Every formula you learn, every problem you solve, and every mistake you correct brings you one step closer to your goal.

Whether you are preparing for campus placements, competitive examinations, or government jobs, remember that consistency, confidence, and smart preparation make a real difference.

Don’t just memorize formulas. Understand the concepts, practise smart techniques, and develop the confidence to solve problems independently.

Your hard work today can create the opportunities you dream of tomorrow.

— Team LearnFrenzy

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