Unit 7 · Simple Interest

STUDY NOTES

WHAT THE BLE ASKS

- **CDC's grid:** Arithmetic (Units 2, 3, 4, 5, 6, 7 together): 14 of 50 marks
- **In our 10 model papers:** 1-mark ×12 · 2-mark ×8
- **Model paper, Arithmetic: one 5-mark question** (Rs 1,00,000 for 2 years at Rs 5 on every Rs 100 a year)
  - **a. knowledge (1):** the rate as a percent per year: 5%
  - **b. application (2):** the interest in 2 years: Rs 10,000
  - **c. higher ability (2):** shares in the ratio of two ages (Unit 4): how much more the elder gets

Key terms

Principal (सावाँ), P: the money borrowed, lent or deposited.

Interest (ब्याज), I: the extra money paid after a fixed time; the rent for using money.

Time (समय), T: the fixed period the money is used for.

Rate of interest (ब्याजदर), R: the interest on Rs 100 for one year.

Amount (मिश्रधन), A: principal and interest added together.

Per annum (p.a.): by the year.

Simple interest: interest worked out always on the first principal.

Formulas

$I = \frac{P \times T \times R}{100}$	T in **years**, R in % a year **Use:** the interest
$P = \frac{100 \times I}{T \times R}$	from the same formula **Use:** the principal
$T = \frac{100 \times I}{P \times R}$	from the same formula **Use:** the time
$R = \frac{100 \times I}{P \times T}$	from the same formula **Use:** the rate
$A = P + I$	principal + interest **Use:** the amount
$A = P\left(\frac{100 + TR}{100}\right)$	Rs 100 grows to Rs $(100 + TR)$ **Use:** the amount in one step

What a rate means

- 8% a year = Rs 100 earns Rs 8 in one year
- one fair question for any deal: **what does Rs 100 earn in one year?**
- a deposit: the bank is the borrower, so it pays you
- Bhumika: Rs 5,000, 2 years, Rs 800: $R = 800 \times 100 \div (5000 \times 2) = 8\%$

By the unitary method

The interest on	is
Rs 100 for 1 year	Rs R
Rs 1 for 1 year	Rs $R/100$
Rs 1 for T years	Rs $T \times R/100$
Rs P for T years	Rs $P \times T \times R/100$

- count boxes: each box is one Rs 100 for one year
- interest varies directly with each of P, T, R: double P and $T \rightarrow$ four times

Months into years

- T in years, because the rate is per year: months ÷ 12
- 6 months = 6/12 = 0.5 year
- 30 months = 30/12 = 2.5 years
- 40 months = 40/12 = 10/3 years
- 6 or 30 put straight in: interest 12 times too big

Finding the fourth

- know three of I, P, T, $R \rightarrow$ the fourth
- put them in the formula and solve: safest; or use the short forms

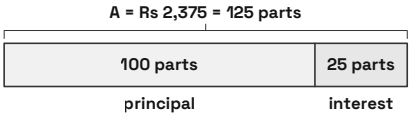
Amount

- derivation: $A = P + PTR/100 = P(1 + TR/100)$
- TR: the interest on Rs 100 for the whole time

- 8% for 3 years: Rs 100 → Rs 124; Rs 10,000 → Rs 12,400
- simple interest adds the same block every year: the amount grows in a straight line
- a sum **doubles** when $I = P$: $T = 100 \div R$; **triples** when $I = 2P$: at 10%, $T = 20$ years

Interest or amount?

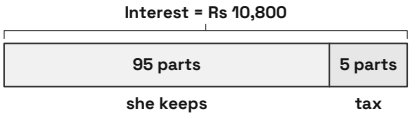
- "Rs 610 as interest" → I
- → A
  - "a total of"
  - "a lump sum"
  - "in all"
  - "to clear the loan"
- from A back to P: use the amount's formula



Rs 2,375 at 7.5% for 40 months: $TR = 25$, so the amount is 125 parts and the principal 100: $P = 2375 \times 100 \div 125 =$ Rs 1,900.

Tax on interest

- interest is income, so a tax is taken from it
- the tax is a percent of the **interest**, not of the principal
- received = P + 95% of I for a 5% tax



The tax comes out of the interest alone: 5 parts of 100 go, 95 are kept.

Rate first, then rupees

- always ask for the rate per year
- "5 rupees on the hundred" a month = $5 \times 12 =$ 60% a year: seven and a half times 8%
- Rs 3 a month on Rs 100 = 36% a year; a bank's 14% costs far less
- *meter byaj* (मिटर ब्याज): 5% a month; about 28,000 cases by 2023; a crime now to charge interest of more than the principal
- July 2026, one large bank: 2.75% on most savings, 3% on fixed deposits of 1–2 years
- a bank in the middle: saver gets 8%, borrower pays 12% → on Rs 100 each year the bank keeps Rs 12 − Rs 8 = Rs 4, for its work and risks
- banks work out most by compound interest, but quote a rate per year
- savings groups, cooperatives: interest stays in the village

COMMON MISTAKES

✗ months put in the formula
✓ change them to years first.

✗ the interest when the amount is asked, or the reverse
✓ read the last line.

✗ an amount put in $I = PTR/100$
✓ it gives a wrong principal that looks reasonable.

✗ a tax taken from the amount
✓ from the interest.

✗ "Rs" or "%" left off the final answer
✓ write it.