TYBA COACHING CENTRE, AJMER

RMS CET CLASS VI MATHEMATICS • CHAPTER 11: SIMPLE INTEREST (साधारण ब्याज) — MASTER THEORY NOTES

Director: Narayan Prajapati • Helpline: 6367029449 • Near Teja Chowk, Kotra, Ajmer • 100% Bilingual

PILLAR 1: WHAT IS INTEREST & ITS FOUR COMPONENTS (ब्याज के चार स्तंभ)Weightage: 2–3 Questions in RMS CET

1. Meaning of Interest (ब्याज का अर्थ): When a person borrows money from a bank or lender, they must pay an extra fee for using that money. This extra money paid back along with the borrowed sum is called **Interest**.
जब कोई व्यक्ति किसी बैंक या साहूकार से धन उधार लेता है, तो उपयोग के बदले में चुकाया गया अतिरिक्त धन 'ब्याज' कहलाता है।

2. Principal (P / मूलधन): The original sum borrowed or deposited. It always equals **100%** in percentage-based calculations.
उधार ली गई या बैंक में जमा की गई प्रारंभिक राशि मूलधन कहलाती है।

3. Rate of Interest (R / ब्याज दर): The interest paid on ₹100 for 1 year, expressed as a percentage per annum (p.a.). If rate is given per month (e.g., 2% per month), multiply by 12 to get the annual rate (24% p.a.).
₹100 पर एक वर्ष में लगने वाला ब्याज दर% कहलाता है। यदि दर मासिक दी हो, तो 12 से गुणा करके वार्षिक बनाएँ।

4. Time (T / समय) & Amount (A / मिश्रधन): Time is the period of borrowing in years. Amount is the total repayment: `Amount (A) = Principal (P) + Simple Interest (SI)`, so `SI = A - P`.
अवधि के अंत में लौटाई गई कुल राशि मिश्रधन (A = P + SI) कहलाती है, अतः साधारण ब्याज = A - P।

PILLAR 2: STANDARD SIMPLE INTEREST FORMULA & DERIVATIONS — Core Equations

Unknown Quantity	Formula	Bilingual Explanation
Simple Interest (SI)	`SI = (P × R × T) / 100`	मूलधन, दर और समय के गुणनफल को 100 से भाग दें।
Principal (P)	`P = (SI × 100) / (R × T)`	यदि ब्याज, दर और समय ज्ञात हो तो मूलधन निकालें।
Rate (R)	`R = (SI × 100) / (P × T)`	यदि ब्याज, मूलधन और समय ज्ञात हो तो दर% निकालें।
Time (T)	`T = (SI × 100) / (P × R)`	यदि ब्याज, मूलधन और दर ज्ञात हो तो समय निकालें।

Solved Example 1: Find the Simple Interest and Amount on ₹5,000 at 8% per annum for 3 years.
Solution: SI = (5000 × 8 × 3) / 100 = 50 × 24 = **₹1,200**. Amount = 5,000 + 1,200 = **₹6,200**.
हल: साधारण ब्याज = (5000 × 8 × 3) / 100 = ₹1,200। मिश्रधन = 5000 + 1200 = ₹6,200।

PILLAR 3: TIME CONVERSIONS — MONTHS, DAYS & CALENDAR DATES — महीनों व दिनों का वर्ष में रूपांतरण

1. Converting Months to Years: Divide the number of months by **12**.
• 3 months = 3/12 = 1/4 yr | 4 months = 1/3 yr | 6 months = 1/2 yr | 8 months = 2/3 yr | 9 months = 3/4 yr.
महीनों को वर्ष में बदलने के लिए हमेशा 12 से भाग दें (जैसे 6 माह = 1/2 वर्ष, 9 माह = 3/4 वर्ष)।

2. Converting Days to Years: Divide the number of days by **365**. Notice RMS exams almost always use multiples of **73 days** because 365 ÷ 73 = 5!
• 73 days = 73/365 = **1/5 yr** | 146 days = **2/5 yr** | 219 days = **3/5 yr** | 292 days = **4/5 yr**.
Calendar Date Rule: When counting days between two dates (e.g., 5 March to 17 May), exclude the borrowing date and include the repayment date.
दिनों को वर्ष में बदलने के लिए 365 से भाग दें। 73 के पहाड़े याद रखें: 73 दिन = 1/5 वर्ष, 146 दिन = 2/5 वर्ष।

Solved Example 2: Find the Simple Interest on ₹6,000 at 10% p.a. from 4 April 2026 to 16 June 2026.
Solution: Days in April (30 - 4) = 26 + May (31) + June (16) = 73 days = 1/5 year.
SI = (6000 × 10 × 1) / (100 × 5) = **₹120**.
हल: अप्रैल के 26 दिन + मई के 31 दिन + जून के 16 दिन = 73 दिन (1/5 वर्ष)। ब्याज = (6000 × 10 × 1) / (100 × 5) = ₹120।

PILLAR 4: FINDING PRINCIPAL DIRECTLY FROM AMOUNT — मिश्रधन से सीधा मूलधन निकालना

Percentage-of-Principal Method: Since Principal = 100% and SI = (R × T)%, the Amount is always **(100 + R × T)%** of Principal!

```
P = (Amount × 100) / (100 + R × T)
```

मिश्रधन हमेशा मूलधन का (100 + दर × समय)% होता है। अतः सीधा सूत्र: P = (A × 100) / (100 + R×T)।

Solved Example 3: What sum of money will amount to ₹5,600 in 4 years at 10% p.a. Simple Interest?
Solution: R × T = 10 × 4 = 40%. So Amount = 140% of P = ₹5,600.
P = (5,600 × 100) / 140 = 40 × 100 = **₹4,000**.
हल: कुल ब्याज = 10 × 4 = 40%, अतः मिश्रधन = 140% = ₹5,600। मूलधन = (5600 × 100) / 140 = ₹4,000।

PILLAR 5: SUM DOUBLING / TRIPLING / BECOMING N TIMES — धन का n गुना होने वाला नियम

1. Finding Rate or Time when Sum Becomes n Times: If ₹100 becomes *n* times (₹100n), then SI earned is (*n* - 1) × 100%.
• To find Rate: `R = [(n - 1) × 100] / T`
• To find Time: `T = [(n - 1) × 100] / R`
यदि कोई धन n गुना हो जाए, तो ब्याज (n - 1) × 100% होता है। जैसे दोगुना होने पर 100% ब्याज और तिगुना होने पर 200% ब्याज।

2. Comparison of Two Multiples (n1 times in T1 yrs → n2 times in T2 yrs):
`T2 = [(n2 - 1) / (n1 - 1)] × T1`
यदि कोई धन T1 वर्षों में n1 गुना होता है, तो n2 गुना होने में लगा समय = [(n2 - 1) / (n1 - 1)] × T1।

Solved Example 4: A sum of money doubles itself in 8 years at Simple Interest. In how many years will it become 4 times?
Solution: n1 = 2, T1 = 8, n2 = 4. T2 = [(4 - 1) / (2 - 1)] × 8 = (3 / 1) × 8 = **24 years**.
हल: दोगुना (100% ब्याज) = 8 वर्ष। 4 गुना (300% ब्याज) = 8 × 3 = 24 वर्ष।

PILLAR 6: TWO AMOUNTS AT DIFFERENT TIME PERIODS — दो अलग-अलग वर्षों के मिश्रधन

Core Property of Simple Interest: Simple Interest for every single year is **exactly equal**! Therefore, the difference between Amount after T2 years and Amount after T1 years is purely the Simple Interest for (T2 - T1) years.
`SI for 1 Year = (A2 - A1) / (T2 - T1)` | `Principal = A1 - (T1 × 1-Yr SI)`
साधारण ब्याज हर वर्ष समान रहता है। अतः दो मिश्रधनों का अंतर उनके समय के अंतर का शुद्ध ब्याज होता है।

Solved Example 5: A sum amounts to ₹3,400 in 2 years and ₹3,850 in 5 years at SI. Find Principal and Rate %.
Solution: 3 years SI = 3,850 - 3,400 = ₹450 ⇒ 1 year SI = 450 / 3 = ₹150.
2 years SI = 150 × 2 = ₹300. Principal = 3,400 - 300 = **₹3,100**. Rate = (150 × 100) / (3,100 × 1) = **4.84%**.
हल: 3 वर्ष का ब्याज = ₹450 ⇒ 1 वर्ष का ब्याज = ₹150। 2 वर्ष का ब्याज = ₹300 ⇒ मूलधन = 3400 - 300 = ₹3,100।

PILLAR 7: WHEN RATE AND TIME ARE NUMERICALLY EQUAL (R = T) जब दर और समय संख्यात्मक रूप से बराबर हों

Square Root Formula: When the Simple Interest on a sum is **a/b** of the Principal, and the numerical value of Rate % equals Time in years (R = T):

`R = T = √[(a / b) × 100]`

जब साधारण ब्याज मूलधन का a/b भाग हो और दर (R) व समय (T) बराबर हों, तो R = T = √[(a/b) × 100]।

Solved Example 6: The Simple Interest on a sum of money is 9/25 of the Principal, and the number of years equals the rate percent. Find the rate %.
Solution: R = √[(9 / 25) × 100] = √(9 × 4) = √36 = **6% p.a.** (and Time = 6 years).
हल: R = √[(9/25) × 100] = √36 = 6% वार्षिक।

PILLAR 8: DIFFERENCE IN INTEREST DUE TO CHANGE IN RATE OR TIME दर या समय में परिवर्तन से ब्याज का अंतर

Direct Difference Formula: If a sum is lent at (R + x)% instead of R% for T years, yielding ₹D more interest:

`Principal (P) = (Difference in SI × 100) / (Change in R × T)`

यदि ब्याज दर x% बढ़ने से T वर्षों में ₹D अधिक ब्याज मिलता है, तो मूलधन = (D × 100) / (x × T)।

Solved Example 7: A sum was put at SI at a certain rate for 3 years. Had it been put at 2% higher rate, it would have fetched ₹360 more. Find the sum.
Solution: Extra % = 2% × 3 = 6%. So 6% of P = ₹360 ⇒ P = (360 × 100) / 6 = **₹6,000**.
हल: 3 वर्षों में कुल अतिरिक्त ब्याज = 2% × 3 = 6%। अतः 6% = ₹360 ⇒ 100% (मूलधन) = ₹6,000।

PILLAR 9: HALF-YEARLY, QUARTERLY & MONTHLY INTEREST RATES छमाही, तिमाही और मासिक ब्याज दरें

Rate Conversion Rules (दर रूपांतरण नियम):
• **Monthly Rate to Annual:** Multiply monthly rate by **12** (e.g., 1.5% per month = 18% p.a.).
• **Half-Yearly Rate to Annual:** Multiply half-yearly rate by **2** (e.g., 5% per half-year = 10% p.a.).
• **Quarterly Rate to Annual:** Multiply quarterly rate by **4** (e.g., 3% per quarter = 12% p.a.).
वार्षिक दर बनाने के लिए मासिक दर को 12 से, छमाही दर को 2 से और तिमाही दर को 4 से गुणा करें।

Solved Example 8: Find the Simple Interest on ₹4,000 for 1.5 years at 1% per month.
Solution: Annual Rate = 1% × 12 = 12% p.a. Time = 1.5 years.
SI = (4000 × 12 × 1.5) / 100 = 40 × 18 = **₹720**.
हल: 1% मासिक = 12% वार्षिक। ब्याज = (4000 × 12 × 1.5) / 100 = ₹720।

Solved Example 9: Divide ₹3,000 into two parts such that SI on the 1st part at 5% for 4 years equals SI on the 2nd part at 10% for 3 years.
Solution: 20% of P1 = 30% of P2 ⇒ P1 : P2 = 30 : 20 = 3 : 2.
1st part = (3 / 5) × 3,000 = **₹1,800**; 2nd part = (2 / 5) × 3,000 = **₹1,200**.
हल: P1 का 20% = P2 का 30% ⇒ P1 : P2 = 3 : 2। पहला भाग = ₹1,800, दूसरा भाग = ₹1,200।

Solved Example 10: What annual installment will discharge a debt of ₹4,200 due in 4 years at 10% p.a. SI? (Or simple equal-part repayment check).
Basic Repayment Model: A farmer borrowed ₹8,000 at 9% p.a. SI. After 2.5 years he cleared the account by paying ₹7,000 and a cow. Find the cost of the cow.
Solution: SI = (8000 × 9 × 2.5) / 100 = ₹1,800. Total Amount due = 8,000 + 1,800 = ₹9,800. Cost of cow = 9,800 - 7,000 = **₹2,800**.
हल: ब्याज = ₹1,800, कुल देय राशि = ₹9,800। गाय का मूल्य = 9800 - 7000 = ₹2,800।

PILLAR 10: COMMON RMS EXAM TRAPS & REVISION CHECKLIST — परीक्षा में होने वाली सामान्य गलतियाँ

Common Student Mistake	Correct Mathematical Rule	Hindi Reminder (सावधानी)
Putting Time in months directly into PRT/100	Always divide months by 12 and days by 365 to convert to years.	महीनों को 12 से व दिनों को 365 से भाग देकर वर्ष में बदलें।
Confusing Amount (A) with Simple Interest (SI)	If Amount is given, first find **SI = A - P** before using R or T formula.	मिश्रधन (A) दिया होने पर पहले SI = A - P निकालें।
Using n instead of (n - 1) in doubling problems	Doubling adds 100% interest (n-1 = 1), tripling adds 200% (n-1 = 2).	n गुना होने पर ब्याज (n - 1) × 100% होता है, n × 100% नहीं।
Counting both start and end calendar dates	Exclude the date of deposit/borrowing; include only the final day.	तारीख गिनते समय पहले दिन को छोड़ें और अंतिम दिन को गिनें।
Forgetting to convert monthly rate to annual	Multiply per-month rate by 12 before applying yearly formula.	मासिक दर को 12 से गुणा करके वार्षिक दर में बदलें।

QUICK DAY-TO-YEAR & MONTH-TO-YEAR REFERENCE TABLE — त्वरित समय तालिका

Days / Months	Fraction of Year	Days / Months	Fraction of Year
73 Days	**1 / 5 Year**	3 Months	**1 / 4 Year**
146 Days	**2 / 5 Year**	4 Months	**1 / 3 Year**
219 Days	**3 / 5 Year**	6 Months	**1 / 2 Year**
292 Days	**4 / 5 Year**	8 Months / 9 Months	**2 / 3 Yr | 3 / 4 Yr**

NARAYAN SIR'S FINAL REVISION MANTRA: Simple Interest is the easiest 100% scoring chapter in RMS Class VI Math! Just remember two checks: **(1) Is Time in Years?** and **(2) Is the given figure Principal, SI, or Amount?**
नारायण सर का मंत्र: साधारण ब्याज सबसे आसान अंक देने वाला अध्याय है—बस यह जांचें कि समय 'वर्ष' में हो और दी गई राशि मूलधन, ब्याज या मिश्रधन में से क्या है।