TYBA COACHING CENTRE, AJMER

RMS CET CLASS VI MATHEMATICS • CHAPTER 10: PROFIT AND LOSS (लाभ एवं हानि) — MASTER THEORY NOTES

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PILLAR 1: FUNDAMENTAL CONCEPTS & EFFECTIVE COST PRICE (मूलभूत अवधारणाएँ) — Weightage: 2–3 Questions in RMS CET

1. Cost Price (CP / क्रय मूल्य): The amount paid by a buyer or shopkeeper to purchase an article is called its Cost Price.
वह धनराशि जो किसी वस्तु को खरीदने के लिए चुकाई जाती है, क्रय मूल्य (CP) कहलाती है।

2. Overhead Expenses & Effective CP (ऊपरी खर्च एवं वास्तविक क्रय मूल्य): Extra expenses such as transportation, cartage, octroi, repair, or installation incurred after buying an article are added to the purchase price to find the **Effective CP**.

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Effective CP = Purchase Price + Overhead Expenses
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वस्तु खरीदने के बाद उसकी मरम्मत, भाड़ा, या रखरखाव पर किया गया अतिरिक्त खर्च क्रय मूल्य में जोड़ा जाता है, जिसे वास्तविक क्रय मूल्य कहते हैं।

3. Selling Price (SP / विक्रय मूल्य): The price at which an article is finally sold to a customer.
वह मूल्य जिस पर दुकानदार किसी वस्तु को ग्राहक को बेचता है, विक्रय मूल्य (SP) कहलाता है।

4. Profit / Gain (लाभ) vs Loss (हानि):
• If **SP > CP**, there is a **Profit**: `Profit = SP - CP`
• If **CP > SP**, there is a **Loss**: `Loss = CP - SP`
• If **SP = CP**, there is **No Profit, No Loss** (Break-even).
यदि विक्रय मूल्य अधिक हो तो लाभ (SP - CP) होता है; यदि क्रय मूल्य अधिक हो तो हानि (CP - SP) होती है; दोनों बराबर होने पर न लाभ, न हानि होती है।

PILLAR 2: PERCENTAGE PROFIT & LOSS FORMULAS (लाभ व हानि प्रतिशत) — Always on CP

Target Quantity	Standard Formula	Bilingual Note (हिंदी व्याख्या)
Profit % (लाभ %)	`Profit % = (Profit / CP) × 100`	लाभ प्रतिशत हमेशा वास्तविक क्रय मूल्य (CP) पर निकाला जाता है।
Loss % (हानि %)	`Loss % = (Loss / CP) × 100`	हानि प्रतिशत भी हमेशा वास्तविक क्रय मूल्य (CP) पर निकाला जाता है।
Profit Amount	`Profit = (Profit % × CP) / 100`	लाभ राशि = क्रय मूल्य का लाभ%।
Loss Amount	`Loss = (Loss % × CP) / 100`	हानि राशि = क्रय मूल्य का हानि%।

Solved Example 1: A shopkeeper buys a fan for ₹1,150 and spends ₹50 on its transport. He sells it for ₹1,500. Find his profit percentage.
Solution: Effective CP = 1,150 + 50 = ₹1,200. SP = ₹1,500. Profit = 1,500 - 1,200 = ₹300. Profit % = (300 / 1,200) × 100 = **25%**.
हल: कुल क्रय मूल्य = 1150 + 50 = ₹1200। लाभ = 1500 - 1200 = ₹300। लाभ % = (300/1200) × 100 = 25%।

PILLAR 3: FINDING SELLING PRICE (SP) FROM CP & GAIN/LOSS % — 100% Concept Clarity

Rule for SP: Think of Cost Price (CP) as **100%**.
• If there is a **Profit of P%**, then SP becomes **(100 + P)% of CP**: `SP = CP × (100 + P) / 100`
• If there is a **Loss of L%**, then SP becomes **(100 - L)% of CP**: `SP = CP × (100 - L) / 100`
क्रय मूल्य (CP) को हमेशा 100% मानें। P% लाभ पर विक्रय मूल्य (100+P)% होता है तथा L% हानि पर विक्रय मूल्य (100-L)% होता है।

PILLAR 4: FINDING COST PRICE (CP) FROM SP & GAIN/LOSS % — Most Tested in RMS

Rule for CP: Never calculate Profit% or Loss% directly on SP! Use the reverse unitary formula:
• When sold at **P% Profit**: `CP = (SP × 100) / (100 + P)`
• When sold at **L% Loss**: `CP = (SP × 100) / (100 - L)`
विक्रय मूल्य से क्रय मूल्य निकालते समय कभी भी SP पर सीधा प्रतिशत न निकालें; सदैव (SP × 100)/(100 ± P/L) सूत्र का उपयोग करें।

Solved Example 2: An article is sold for ₹720 at a gain of 20%. Find its Cost Price.
Solution: 120% of CP = ₹720 ⇒ CP = (720 × 100) / 120 = 6 × 100 = **₹600**.
हल: 20% लाभ का अर्थ है कि 120% = ₹720। अतः 100% (क्रय मूल्य) = (720 × 100) / 120 = ₹600।

Solved Example 3: A chair is sold for ₹510 at a loss of 15%. At what price should it be sold to gain 15%?
Solution: 85% of CP = ₹510 ⇒ CP = (510 × 100) / 85 = ₹600. New SP for 15% gain = 600 × (115 / 100) = **₹690**.
Shortcut: `New SP = Old SP × (100 + New%) / (100 - Old%)` = 510 × (115 / 85) = 6 × 115 = **₹690**.
हल: 85% का मान ₹510 है, तो 115% का मान = (510 / 85) × 115 = 6 × 115 = ₹690।

PILLAR 5: MARKED PRICE (MP), DISCOUNT & SUCCESSIVE DISCOUNTS — अंकित मूल्य एवं बट्टा (छूट)

1. Marked Price (MP / List Price / अंकित मूल्य): The price printed on the label/tag of an item.
2. Discount (बट्टा / छूट): Reduction given by the shopkeeper on the Marked Price.
`Discount = MP - SP` | `Discount % = (Discount / MP) × 100` | `SP = MP × (100 - D%) / 100`
छूट हमेशा अंकित मूल्य (MP) पर दी जाती है। छूट घटाने के बाद जो मूल्य बचता है, वही विक्रय मूल्य (SP) होता है।

3. Single Equivalent Discount for Two Successive Discounts (क्रमिक छूट): If two successive discounts of d1% and d2% are offered on MP, the single equivalent discount is:
`Equivalent Discount % = d1 + d2 - (d1 × d2) / 100`
यदि d1% तथा d2% की दो क्रमिक छूट दी जाएँ, तो कुल एकल समतुल्य छूट = d1 + d2 - (d1 × d2) / 100 होती है।

Solved Example 4: Find a single discount equivalent to two successive discounts of 20% and 10%.
Solution: Net Discount = 20 + 10 - (20 × 10) / 100 = 30 - 2 = **28%**. (Notice it is 28%, NOT 30%!)
हल: समतुल्य छूट = 20 + 10 - (200/100) = 30 - 2 = 28%। (ध्यान दें: यह 30% नहीं होती!)

PILLAR 6: CP-SP ARTICLE COMPARISON TRICK (वस्तु-आधारित तुलना) — Frequently Asked in RMS

Case: If the Cost Price of **x** articles is equal to the Selling Price of **y** articles:
• If **x > y**, there is a **Profit**: `Profit % = [(x - y) / y] × 100`
• If **x < y**, there is a **Loss**: `Loss % = [(y - x) / y] × 100`
यदि x वस्तुओं का क्रय मूल्य, y वस्तुओं के विक्रय मूल्य के बराबर हो, तो हमेशा y (विक्रय वस्तुओं की संख्या) को हर (denominator) में रखें।

Solved Example 5: If the Cost Price of 20 mangoes is equal to the Selling Price of 25 mangoes, find the loss percentage.
Solution: Here x = 20, y = 25 (x < y ⇒ Loss). Loss % = [(25 - 20) / 25] × 100 = (5 / 25) × 100 = **20% Loss**.
हल: यहाँ x = 20, y = 25। हानि % = [(25 - 20) / 25] × 100 = (5/25) × 100 = 20% हानि।

PILLAR 7: SAME SELLING PRICE WITH EQUAL GAIN & LOSS % समान विक्रय मूल्य नियम

Universal RMS Theorem: When two articles are sold at the **same Selling Price (SP)**, one at a profit of **x%** and the other at a loss of **x%**, the seller **ALWAYS suffers a net loss**:

`Net Loss % = (x² / 100) %`

Important Caution: If both articles have the **same Cost Price (CP)**, then there is **No Profit, No Loss (0%)**!

यदि दो वस्तुओं को समान विक्रय मूल्य पर x% लाभ और x% हानि पर बेचा जाए, तो हमेशा $(x^2/100)\%$ की हानि होती है। लेकिन यदि दोनों का क्रय मूल्य (CP) समान हो, तो न लाभ न हानि (0%) होती है।

Solved Example 6: A dealer sells two horses at ₹12,000 each. On one he gains 20% and on the other he loses 20%. Find his overall gain or loss %.

Solution: Same SP, x = 20%. Net Loss % = $(20^2 / 100)\%$ = (400 / 100)% = **4% Loss**.

हल: दोनों का विक्रय मूल्य समान है और x = 20%। अतः कुल हानि % = (20 × 20) / 100 = 4% हानि।

PILLAR 8: DIFFERENCE IN SELLING PRICES & DISHONEST DEALER अंतर विधि एवं त्रुटिपूर्ण बाट

1. Two SPs Difference Rule: If selling an article at P2% profit instead of P1% profit (or L1% loss) yields ₹D more:

- Same side (both profit or both loss): `CP = (D × 100) / |P2 - P1|`
- Opposite side (one loss, one profit): `CP = (D × 100) / (L1 + P2)`

यदि लाभ-लाभ या हानि-हानि हो तो प्रतिशत का अंतर लें; यदि एक हानि व एक लाभ हो तो दोनों प्रतिशत को जोड़ दें।

2. Dishonest Shopkeeper (False Weight): If a shopkeeper claims to sell at CP but uses a false weight (e.g., 900g instead of 1000g):

`Profit % = [Error / (True Weight - Error)] × 100 = [Error / Weight Used] × 100`

बेईमान दुकानदार द्वारा कम तौलने पर: लाभ % = [बचाया गया वजन / तौला गया वजन] × 100।

Solved Example 7: A trader sells rice at CP but uses a weight of 800 g instead of 1 kg (1000 g). Find his profit %.

Solution: Error = 1000 - 800 = 200 g. Weight used = 800 g. Profit % = (200 / 800) × 100 = **25%**.

हल: 1000 ग्राम के स्थान पर 800 ग्राम तौला, अतः लाभ = 200 ग्राम। लाभ % = (200 / 800) × 100 = 25%।

PILLAR 9: FRACTIONAL & UNIT-RATE PROFIT/LOSS PROBLEMS — दर्जन एवं इकाई दर वाले प्रश्न

Toffees / Lemons / Oranges Rate Method: When articles are bought at "*a* for ₹*b*" and sold at "*c* for ₹*d*", always equalize the quantity or find the CP and SP of **1 article** (or LCM of quantities).

Cross-Multiplication Trick:

CP quantity = *a*, CP price = *b* | SP quantity = *c*, SP price = *d*

`CP value = b × c` | `SP value = a × d` ⇒ `Gain/Loss % = [(ad - bc) / bc] × 100`

जब वस्तुएँ अलग-अलग दरों से खरीदी व बेची जाएँ (जैसे ₹10 में 11 खरीदकर ₹11 में 10 बेचना), तो वस्तुओं की संख्या समान करके लाभ/हानि % निकालें।

Solved Example 8: A vendor buys bananas at 6 for ₹10 and sells them at 4 for ₹8. Find his gain %.
Solution: LCM of 6 and 4 = 12 bananas. CP of 12 bananas = 10 × 2 = ₹20. SP of 12 bananas = 8 × 3 = ₹24. Profit = 24 - 20 = ₹4. Profit % = (4 / 20) × 100 = **20%**.
हल: 6 और 4 का ल.स. = 12 केले। 12 केलों का क्रय मूल्य = ₹20, विक्रय मूल्य = ₹24। लाभ % = (4/20) × 100 = 20%।

Solved Example 9: A man sold a watch at 5% loss. Had he sold it for ₹150 more, he would have gained 10%. Find CP.
Solution: Opposite sides (5% loss to 10% gain) ⇒ Gap = 5 + 10 = 15%. So, 15% of CP = ₹150 ⇒ CP = (150 × 100) / 15 = **₹1,000**.
हल: 5% हानि से 10% लाभ तक कुल अंतर = 15%। अतः 15% = ₹150, तो 100% (क्रय मूल्य) = ₹1,000।

Solved Example 10: A shopkeeper marks his goods 40% above CP and gives a discount of 20%. Find his net profit %.
Solution: Let CP = ₹100. Then MP = ₹140. Discount = 20% of 140 = ₹28. SP = 140 - 28 = ₹112. Profit = 112 - 100 = **12%**.
हल: माना CP = ₹100, तो MP = ₹140। 20% छूट = ₹28, अतः SP = 140 - 28 = ₹112। शुद्ध लाभ = 12%।

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

Common Student Mistake	Correct Mathematical Rule	Hindi Reminder (सावधानी)
Calculating Profit% on SP instead of CP	Always divide Profit/Loss by **CP**, never by SP.	लाभ या हानि % हमेशा क्रय मूल्य (CP) के आधार पर निकालें।
Forgetting repair/transport cost in CP	Add all overhead costs to Purchase Price before % calculation.	मरम्मत व भाड़ा हमेशा क्रय मूल्य में जोड़कर वास्तविक CP बनाएँ।
Adding successive discounts (20%+10% = 30%)	Apply second discount on the reduced price (Net = 28%).	क्रमिक छूट को सीधे न जोड़ें; दूसरी छूट घटे हुए मूल्य पर लगती है।
Assuming 10% gain & 10% loss on same SP = 0%	Same SP gives **$(x^2/100)$% Loss**; only Same CP gives 0%.	समान विक्रय मूल्य पर सदैव हानि होती है; समान क्रय मूल्य पर 0% होता है।
Applying Discount on CP instead of MP	Discount is ALWAYS subtracted from **Marked Price (MP)**.	छूट (बट्टा) हमेशा अंकित मूल्य (MP) पर दी जाती है, CP पर नहीं।

QUICK FRACTION-TO-PERCENTAGE CONVERSION TABLE FOR SPEED — तुरंत गणना हेतु तालिका

Fraction	Percentage	Fraction	Percentage	Fraction	Percentage
1/2	**50%**	1/5	**20%**	1/8	**12.5%**
1/3	**33(1/3)%**	1/6	**16(2/3)%**	1/10	**10%**
1/4	**25%**	1/7	**14(2/7)%**	1/12	**8(1/3)%**

NARAYAN SIR'S FINAL REVISION MANTRA: Before solving any Profit & Loss word problem in the RMS CET exam, underline three values in 3 seconds: **(1) CP, (2) SP, and (3) Whether % is Profit, Loss, or Discount**. Use the 100-assumption method whenever CP or MP is unknown!

नारायण सर का मंत्र: प्रश्न पढ़ते समय 3 सेकंड में CP, SP और प्रतिशत का प्रकार रेखांकित करें। जब CP या MP अज्ञात हो, तो 100 मानकर हल करने की विधि सबसे तेज होती है।