

Profit, Loss & Discount

~ Quantitative Aptitude · SSC Exams ~



← circled = key formulas!



Every question here revolves around three prices — **CP, SP & MP**. The golden rule: **profit% and loss% are ALWAYS calculated on the Cost Price (CP)** — never on SP or MP, unless the question says so.

① Cost Price, Selling Price & Profit/Loss (Rs)

- **CP (Cost Price)**: the price at which an article is bought / produced.
- **SP (Selling Price)**: the price at which an article is actually sold.
- **Profit (Gain)** = $SP - CP$, when $SP > CP$. **Loss** = $CP - SP$, when $CP > SP$.
- $SP = CP \Rightarrow$ **Neither profit nor loss** (break-even).

The one rule that runs the whole chapter

- **Profit%** = $(\text{Profit} / CP) \times 100 = [(SP - CP) / CP] \times 100$
- **Loss%** = $(\text{Loss} / CP) \times 100 = [(CP - SP) / CP] \times 100$
- ★ Always on CP — this single fact resolves most confusion in this chapter.

Worked example — CP = Rs.800, SP = Rs.920

Step 1 — Profit = $SP - CP = 920 - 800 = \text{Rs.}120$.

Step 2 — Profit% = $(120 / 800) \times 100$.

Answer → Profit% = **15%**.

Companion example — a loss case

CP = Rs.500, SP = Rs.450 → Loss = 50 → Loss% = $(50 / 500) \times 100 = \text{10\%}$.



If a question ever says “profit on SP” or “loss on MP”, it is a special exception — read the base carefully before applying the formula!

② SP & CP – the Two-Way Formulas $\rightleftarrows$

Learn these four cold

- $SP = CP \times (100+p)/100$ (profit $p\%$)
- $SP = CP \times (100-l)/100$ (loss $l\%$)
- $CP = SP \times 100/(100+p)$ $CP = SP \times 100/(100-l)$

Worked example 1 – find SP

CP = Rs.1200, profit = 8%.

Step 1 – $SP = CP(1+p/100) = 1200 \times 108/100$.

Answer → SP = **Rs.1296**. ✓

Worked example 2 – find CP

SP = Rs.1350, loss = 10%.

Step 1 – $CP = SP \times 100/(100-l) = 1350 \times 100/90$.

Answer → CP = **Rs.1500**. Check: loss = $1500 - 1350 = 150$, $150/1500 = 10\%$. ✓ ✓

CP : SP ratio – memorise for speed

%	CP:SP (Profit)	CP:SP (Loss)
5%	20:21	20:19
10%	10:11	10:9
20%	5:6	5:4
25%	4:5	4:3
33⅓%	3:4	3:2
50%	2:3	2:1



These ratios let you solve “find CP/SP” problems in one line – no percentage arithmetic needed once memorised.

③ Marked Price & Discount

- **MP (Marked Price)**: the printed / labelled price, also called **List Price**.
- **Discount** = $MP - SP$ (the reduction offered to the buyer).
- **Discount%** = $(\text{Discount} / MP) \times 100$ — always on MP, never on CP!

Master formula

- $SP = MP \times (100-d) / 100 = MP(1-d/100)$
- $MP = SP \times 100 / (100-d)$

Worked example — $MP = \text{Rs.}1600$, discount = 15%

Step 1 — $SP = MP(1-d/100) = 1600 \times 0.85$.

Step 2 — $SP = \text{Rs.}1360$.

Check → Discount = $1600 - 1360 = 240$; $240 / 1600 = 15\%$. 

Mini-example — reverse case

$SP = \text{Rs.}969$ after a 15% discount → $MP = 969 \times 100 / 85 = \text{Rs.}1140$. Check: $1140 \times 0.85 = 969$. ✓

Try these

$MP=500$, $d=8\%$ → $SP=460$

$MP=750$, $d=20\%$ → $SP=600$

$SP=592$, $d=26\%$ → $MP=800$

$MP=1000$, $SP=850$ → $d=15\%$



Discount is a percentage of MP, exactly like profit/loss% is a percentage of CP — never mix the two bases up!

④ Marked-Up, then Discounted

A shopkeeper marks CP up by $m\%$ to get MP, then gives a discount of $d\%$ on MP. This is just a successive % change of $(+m\%)$ then $(-d\%)$.

Net effect on CP

$$\bullet \text{ Net Profit/Loss\%} = m - d - (md/100)$$

Positive $\Rightarrow$ profit; negative $\Rightarrow$ loss. Take $CP=100$, $MP=100+m$, $SP=MP(1-d/100)$ to derive it.

Worked example – marked 40% up, 25% discount

Step 1 – $m=40$, $d=25 \rightarrow md/100 = 10$.

Step 2 – $\text{Net\%} = 40 - 25 - 10 = 5$.

Answer $\rightarrow$ **5% profit**. Check: $CP=100, MP=140, SP=140 \times 0.75 = 105$. ✓ 

Mini-example – the break-even case

$m=25$, $d=20 \rightarrow \text{Net\%} = 25 - 20 - 5 = 0$ (no profit no loss). Check:

$CP=100, MP=125, SP=125 \times 0.8 = 100$. ✓

Quick combos $m, d \rightarrow \text{net\%}$

$m=20, d=10 \rightarrow$ **8% profit**

$m=30, d=20 \rightarrow$ **4% profit**

$m=50, d=10 \rightarrow$ **35% profit**

$m=10, d=30 \rightarrow$ **-23% (loss)**



If the net% comes out negative, it's automatically a loss – the formula's sign tells you, no extra check needed.

⑤ Successive Discounts

When two discounts $a\%$ and $b\%$ are offered one after another (e.g. “20% off, then extra 10% off”), they are **NEVER** simply added.

Net equivalent single discount

- $\text{Net\%} = a + b - (ab/100)$
- $\text{SP} = \text{MP} \times (1 - a/100) \times (1 - b/100)$

Worked example – MP=Rs.2000, discounts 10% then 5%

Step 1 — $\text{Net\%} = 10 + 5 - (10 \times 5 / 100) = 15 - 0.5 = 14.5\%$.

Step 2 — $\text{SP} = 2000 \times (1 - 0.145) = 2000 \times 0.855$.

Answer → $\text{SP} = \text{Rs.1710}$. Check: $2000 \times 0.9 \times 0.95 = 1710$. ✓ 

Try these

- 20% & 10% → $\text{net} = 20 + 10 - 2 = 28\%$
- 15% & 15% → $\text{net} = 15 + 15 - 2.25 = 27.75\%$
- 25% & 4% → $\text{net} = 25 + 4 - 1 = 28\%$



Successive discounts of 10% & 5% give 14.5% off, not 15% – the net is always less than the plain sum $a+b$.



The order of the two discounts does not matter – 10% then 5% gives the same SP as 5% then 10%.

⑥ Successive Discounts – Extended

For **three** successive discounts a , b , c : combine a & b first to get an interim net, then combine that with c — or apply all three multipliers directly.

$$SP = MP \times (1 - a/100)(1 - b/100)(1 - c/100)$$

Equal repeated discount $d\%$, n times $\rightarrow SP = MP \times (1 - d/100)^n$.

Worked example — $MP = \text{Rs.}5000$, three 10% discounts

Step 1 — combine first two: $10 + 10 - 1 = 19\%$.

Step 2 — combine 19% with third 10%: $19 + 10 - 1.9 = 27.1\%$.

Answer $\rightarrow SP = 5000 \times 0.729 = \text{Rs.}3645$ (27.1% off). 

Watch this common trap

Two successive 10% discounts (net 19%) are **less** than a single 20% discount — don't assume “10%+10% off” equals “20% off”!

Try these

$MP = 1000$, 20% & 20% $\rightarrow SP = \text{640}$

$MP = 800$, 10%, 10%, 10% $\rightarrow SP = \text{583.2}$



For three or more discounts, build the multiplier chain step by step — it's more reliable than repeatedly applying $a + b - ab/100$.

⑦ Two Articles, Same SP $\triangle\triangle$

Two articles are sold at the **same SP**: one at a profit of $x\%$, the other at a loss of the **same** $x\%$. The result is **always a net loss** — surprisingly, regardless of what SP actually is.

The $x^2/100$ rule

• **Overall Loss%** = $x^2 / 100$ (independent of the actual SP value!)

Worked example — two articles at Rs. 990 each, +10% & -10%

Step 1 — $x=10 \rightarrow \text{Loss}\% = 10^2 / 100 = 1\%$.

Step 2 (verify) — $CP_1 = 990 \times 100 / 110 = 900$; $CP_2 = 990 \times 100 / 90 = 1100$. Total CP = 2000, Total SP = 1980.

Answer $\rightarrow$ Loss = 20, Loss% = $20 / 2000 \times 100 = 1\%$.  Matches!

Try these

$x=20 \rightarrow 4\%$ loss

$x=25 \rightarrow 6.25\%$ loss

$x=5 \rightarrow 0.25\%$ loss



Notice: the actual SP (Rs. 990) never appears in the final answer — it's always $x^2/100$, whatever the price!



This rule needs **BOTH** the SP and the % (x) to be equal — if either differs, fall back to full CP/SP calculation.

⑧ Dishonest Dealer & False Weight

A dealer claims to sell "at cost price" but uses a **faulty weight** (gives less than the labelled amount) — he still gains, silently.

The false-weight formula

- $\text{Gain\%} = \text{Error} / (\text{True Value} - \text{Error}) \times 100$
- $= (\text{True Weight} - \text{False Weight}) / \text{False Weight} \times 100$

Worked example — sells at CP using a 900g weight for 1kg

Step 1 — $\text{Error} = 1000 - 900 = 100\text{g}$.

Step 2 — $\text{Gain\%} = 100 / (1000 - 100) \times 100 = 100 / 900 \times 100$.

Answer → $\text{Gain\%} = 100 / 9\% = 11.11\%$. 

Combined trick — false weight + markup

Uses 800g for 1kg AND marks price 10% above CP. $\text{Weight gain\%} = 200 / 800 \times 100 = 25\%$.

Combine like successive %: $\text{Overall\%} = 25 + 10 + (25 \times 10 / 100) = 25 + 10 + 2.5 = 37.5\%$. 



Combine weight-error gain% with any extra markup using $a + b + ab/100$ — the same successive-% trick as page 4, now with two pluses.

⑨ Selling Goods in Parts

A trader sells one fraction of his goods at cost price (no profit/ no loss) or a different profit/loss%, and the rest at another rate. Find the **overall** profit/loss% on total CP.

Weighted-average formula

- If fraction f_1 of total CP is sold at $p_1\%$ and $f_2=1-f_1$ at $p_2\%$ (loss = negative):
- **Overall% = $f_1 \times p_1 + f_2 \times p_2$** (goods sold "at cost" simply contribute 0)

Worked example – 2/5 at 20% profit, rest at cost price

Step 1 — Overall% = $(2/5) \times 20 + (3/5) \times 0 = 8 + 0$.

Answer → **8% profit**. Check(CP=500): SP=240+300=540, profit=40/500=8%. ✓ 

Worked example – 1/4 at 25% loss, 1/4 at cost, 1/2 at 30% profit

Overall% = $(1/4)(-25) + (1/4)(0) + (1/2)(30) = -6.25 + 0 + 15 = \mathbf{8.75\% \text{ profit}}$.

Check(CP=400): SP=75+100+260=435, profit=35/400=8.75%. ✓ 



"Sold at cost" acts as a zero in the weighted sum – it dilutes the effect of the profitable/loss-making portion without changing it directly.

10 Overall Profit/Loss on Several Items

The one safe formula

- Overall% = $[(\text{Total SP} - \text{Total CP}) / \text{Total CP}] \times 100$
- Only if all CPs are equal can you simply average the individual %'s.

Worked example – unequal CPs (the trap)

Item A: CP=Rs.400, sold at 20% profit → SP=480. Item B: CP=Rs.600, sold at 10% loss → SP=540.

Step — Total CP=1000, Total SP=1020, Profit=20.

Answer → Overall% = $20 / 1000 \times 100 = 2\%$ profit.

⚠ NOT $(20-10)/2 = 5\%$ — that shortcut only works when CPs are equal!

Worked example – equal CPs (average works)

Two items, CP=Rs.500 each, sold at 20% profit & 10% loss.

Overall% = $(20-10)/2 = 5\%$ profit. Check: SP=600+450=1050, CP=1000, profit=50/1000=5%. ✓ 



First check whether CPs are equal or unequal — that single check decides whether you can average %'s or must weight by CP.

⑪ High-Frequency SSC Shortcuts ⚡

Ratio & unit-count shortcuts

- $CP:SP = a:b$ ($b > a$) → $\text{Profit}\% = [(b-a)/a] \times 100$
- $CP:SP = a:b$ ($a > b$) → $\text{Loss}\% = [(a-b)/a] \times 100$
- CP of n articles = SP of m articles ($n > m$) → $\text{Profit}\% = [(n-m)/m] \times 100$

Worked example – CP of 12 articles = SP of 10 articles

Step 1 – $n=12, m=10 \rightarrow \text{Profit}\% = (12-10)/10 \times 100$.

Answer → $\text{Profit}\% = 20\%$.

Check: let $SP_1=1$, SP of 10 = 10 = CP of 12 → $CP_1=5/6$; $\text{profit}=(1-5/6)/(5/6)=20\%$. ✓ 

$CP:SP \rightarrow$ instant %

4:5 → **25% profit**

10:9 → **10% loss**

20:19 → **5% loss**

5:6 → **20% profit**

Bonus shortcut – “If sold for Rs. R more”

Sells gaining $x\%$; if sold for Rs. R more, would gain $y\%$ → $CP = R \times 100 / (y-x)$.



Convert ratio/unit-count questions into a $CP:SP$ pair, then apply $(\text{difference}/CP) \times 100$ – skip separate SP/CP formulas entirely.

Solved Examples – Set A

Q1. CP = Rs.640, sold at 15% profit. Find SP.

$$SP = 640 \times 1.15 = \text{Rs.736.} \quad \checkmark$$

Q2. An article sold for Rs.1350 at 10% loss. Find CP.

$$CP = 1350 \times 100 / 90 = \text{Rs.1500.} \quad \checkmark$$

Q3. MP = Rs.2500, discount = 12%. Find SP.

$$SP = 2500 \times 0.88 = \text{Rs.2200.} \quad \checkmark$$

Q4. Goods marked 60% above CP; discount of 25% given. Find profit%.

$$\text{Net\%} = 60 - 25 - (60 \times 25 / 100) = 60 - 25 - 15 = \text{20\% profit.} \quad \checkmark$$

Q5. Two articles sold at Rs.1200 each, one at 20% gain, other at 20% loss. Find overall loss% and loss amount.

$$\text{Loss\%} = 20^2 / 100 = \text{4\%.} \quad CP_1=1000, CP_2=1500, \text{Total CP}=2500, \text{Total SP}=2400, \text{Loss}=\text{Rs.100.} \quad \checkmark$$

Q6. Dealer sells at CP but uses a 950g weight for 1kg. Find gain%.

$$\text{Error} = 50\text{g} \rightarrow \text{Gain\%} = 50 / (1000 - 50) \times 100 = 50 / 950 \times 100 = 100 / 19\% = \text{5.26\%.} \quad \checkmark$$

✓ Notice how Q4, Q5 & Q6 each reuse a single memorised formula from pages 4, 7 & 8 – that's the whole game in this chapter.

Solved Examples – Set B

Q7. Successive discounts of 20% & 15% on MP=Rs.4000. Find SP and net discount%.

$$\text{Net\%} = 20+15-3 = 32\% \rightarrow \text{SP} = 4000 \times 0.68 = \text{Rs.2720.} \quad \checkmark$$

Q8. A shopkeeper sells $\frac{3}{4}$ of goods at 10% profit and rest at 20% loss. Find overall%.

$$\text{Overall\%} = (\frac{3}{4})(10) + (\frac{1}{4})(-20) = 7.5 - 5 = \text{2.5\% profit. Check(CP=400):}$$

$$\text{SP} = 330 + 80 = 410, \text{profit} = 10 / 400 = 2.5\%. \quad \checkmark$$

Q9. CP of 15 pens = SP of 12 pens. Find profit%.

$$\text{Profit\%} = (15-12) / 12 \times 100 = \text{25\%}. \quad \checkmark$$

Q10. Two horses bought for a total Rs.15000. One sold at 20% profit, other at 10% loss, with no overall gain/loss. Find CP of each.

$$0.2 \times \text{CP}_1 = 0.1 \times \text{CP}_2 \text{ \& } \text{CP}_1 + \text{CP}_2 = 15000 \Rightarrow \text{CP}_2 = 2\text{CP}_1 \rightarrow \text{CP}_1 = \text{Rs.5000}, \text{CP}_2 = \text{Rs.10000. Check:}$$

$$\text{profit} = 1000, \text{loss} = 1000, \text{net} = 0. \quad \checkmark$$

Q11. MP=Rs.1800; after two successive discounts SP=Rs.1224. First discount is 20%. Find the second discount%.

$$\text{After 1st: } 1800 \times 0.8 = 1440. \text{ Then } 1440(1-d/100) = 1224 \rightarrow (1-d/100) = 0.85 \rightarrow d = \text{15\%}. \quad \checkmark$$

Q12. Goods marked 25% above CP; after discount, trader still makes 12.5% profit. Find discount%.

$$12.5 = 25 - d - 0.25d \rightarrow 1.25d = 12.5 \rightarrow d = \text{10\%}. \text{ Check: CP=100, MP=125, SP=125} \times 0.9 = 112.5. \quad \checkmark$$

12 Quick-Fire Formula Recap ⚡

Every formula from pages 1–11, in one place

- Profit/ Loss% always on **CP**; Discount% always on **MP**. $SP = CP(1 \pm p/100)$; $SP = MP(1 - d/100)$.
- Successive discounts: $net = a + b - ab/100$. Marked-up-then-discounted: $net\% = m - d - md/100$.
- Two articles, same SP , $\pm x\%$ $\rightarrow$ net loss $= x^2/100$ (always a loss).
- False weight: $Gain\% = Error / (TrueWt - Error) \times 100$. Overall on parts: weighted by fraction of CP .
- Several items: $Overall\% = (TotalSP - TotalCP) / TotalCP \times 100$ — average %'s only when CP s are equal.

% $\leftrightarrow$ Fraction table – the ultimate speed trick

%	Fraction	%	Fraction	%	Fraction
5%	1/20	12.5%	1/8	40%	2/5
6.25%	1/16	16⅔%	1/6	50%	1/2
8⅓%	1/12	20%	1/5	62.5%	5/8
10%	1/10	25%	1/4	66⅔%	2/3
37.5%	3/8	33⅓%	1/3	75%	3/4
80%	4/5	87.5%	7/8	60%	3/5

Mini-examples using the fraction trick

- $CP = \text{Rs.}960$, profit = 12.5% (= 1/8) $\rightarrow$ profit = $960/8 = 120 \rightarrow SP = \text{Rs.}1080$.
- $MP = \text{Rs.}960$, discount = 12.5% (= 1/8) $\rightarrow$ discount = $960/8 = 120 \rightarrow SP = \text{Rs.}840$.



Dividing by a fraction's denominator is almost always faster than multiplying by a decimal – practise reading 12.5% as “÷8” instantly.

Exercise

12 MCQs · solve on paper first, then check the Answer Key overleaf.

Reminder → Profit/ Loss% on **CP**; Discount% on **MP**; successive% = $a+b-ab/100$; same-SP $\pm x\%$ → $\text{loss} = x^2/100$.

Q1. CP=Rs.750, profit=12%. Find SP.

(a) 820 (b) 830 (c) 840 (d) 850

Q2. Article sold for Rs.1440 at 10% loss. Find CP.

(a) 1584 (b) 1600 (c) 1620 (d) 1650

Q3. MP=Rs.1250, discount=8%. Find SP.

(a) 1130 (b) 1140 (c) 1150 (d) 1160

Q4. Successive discounts 10% & 20% on MP. Net discount%?

(a) 28% (b) 30% (c) 26% (d) 29%

Q5. Goods marked 50% above CP, 20% discount given. Profit%?

(a) 15% (b) 20% (c) 25% (d) 30%

Q6. Two articles at Rs.750 each, +25% & -25%. Overall loss%?

(a) 5% (b) 6% (c) 6.25% (d) 7%

Q7. Dealer uses 800g weight for 1kg, sells at CP. Gain%?

(a) 20% (b) 22.5% (c) 25% (d) 28%

Q8. CP of 18 articles = SP of 15 articles. Profit%?

(a) 15% (b) 18% (c) 20% (d) 25%

Q9. Sells 40% of goods at 10% profit, rest at 5% loss. Overall?

(a) 1% profit (b) 1% loss (c) 2% profit (d) no P/L

Q10. MP=Rs.2000; discounts 10% then d%; SP=Rs.1620. Find d.

(a) 5% (b) 8% (c) 10% (d) 12%

Q11. CP:SP = 5:6. Find profit%.

(a) 16.67% (b) 20% (c) 25% (d) 10%

Q12. Two articles bought for total Rs.9000; sold at 20% profit & 10% loss with no net P/L. Find CP of the profit-article.

(a) 2500 (b) 3000 (c) 3500 (d) 4000



Elimination tip – in ratio & successive-discount MCQs, the “sum-only” option (e.g. plain $a+b$) is always a trap distractor. Rule it out first!

Answer Key

With working

1→(c) 840 (750×1.12) · 2→(b) 1600 ($1440 / 0.9$) · 3→(c) 1150 (1250×0.92) · 4→(a) 28% ($(10+20-2)$) · 5→(b) 20% ($(50-20-10)$) · 6→(c) 6.25% ($(25^2 / 100)$) · 7→(c) 25% ($(200 / 800 \times 100)$) · 8→(c) 20% ($((18-15) / 15 \times 100)$) · 9→(a) 1% profit ($(0.4 \times 10 - 0.6 \times 5)$) · 10→(c) 10% ($(1620 / 1800)$) · 11→(b) 20% ($((6-5) / 5 \times 100)$) · 12→(b) Rs.3000 ($0.3x = 900$).

Quick Revision

- ✓ Profit/Loss% is always on CP; Discount% is always on MP. $SP = CP(1 \pm p/100)$; $SP = MP(1 - d/100)$; $MP = SP \times 100 / (100 - d)$.
- ✓ Successive discounts: $net = a + b - ab/100$ (never simple addition). Marked-up-then-discounted: $net\% = m - d - md/100$.
- ✓ Same-SP $\pm x\% \rightarrow net\ loss = x^2/100$. False weight: $Gain\% = Error / (TrueWt - Error) \times 100$. Several items: weight by CP, don't just average %'s.

One last worked example – the full chain

MP=Rs.2500. Trader gives successive discounts of 10% & 4%, and his CP is such that he still earns 8% profit. Find his CP.

Step 1 — Net discount% = $10 + 4 - 0.4 = 13.6\%$ → $SP = 2500 \times 0.864 = \text{Rs.}2160$.

Step 2 — $CP = SP \times 100 / 108 = 2160 \times 100 / 108 = \text{Rs.}2000$. Check: $2000 \times 1.08 = 2160$. ✓ 

☆ Profit, Loss & Discount – mastered! ☆

@prepyodha · prepyodha.in