Sure Asmi!
Here are **complete, exam-oriented, easy-to-revise Percentage Notes** with **all formulas, patterns, shortcuts, tricks, and solved examples**.

✅ PERCENTAGE – COMPLETE NOTES FOR GOVT EXAMS

🌟 1. BASIC FORMULAS

1. Percentage Formula

[
$$\text{Percentage} = \frac{\text{Value}}{\text{Total}} \times 100$$
]

2. Value from Percentage

[
$$\text{Value} = \frac{\text{Percentage} \times \text{Total}}{100}$$
]

3. Percentage Change

[
$$\text{Increase \%} = \frac{\text{Increase}}{\text{Original}} \times 100$$
]
[
$$\text{Decrease \%} = \frac{\text{Decrease}}{\text{Original}} \times 100$$
]

🌟 2. POPULAR SHORTCUT VALUES

Fraction	Percentage
1/2	50%

1/3	33.33%
2/3	66.66%
1/4	25%
3/4	75%
1/5	20%
2/5	40%
3/5	60%
4/5	80%
1/8	12.5%
3/8	37.5%
5/8	62.5%
7/8	87.5%
1/10	10%

Remember mixed fractions:

Mixed Fraction	Decimal	Percentage
1 1/4	1.25	125%
1 1/2	1.5	150%
2 1/2	2.5	250%

🌟 3. IMPORTANT PATTERNS IN EXAMS

A. % Increase + % Increase → Net Increase

Formula:
$$
A + B + \frac{AB}{100}
$$

Example: Prices increase by 20% and then 30%.

$$20 + 30 + \frac{20 \times 30}{100} = 56\%$$

B. % Increase + % Decrease → Net Effect

$$A - B - \frac{AB}{100}$$

Example: Increase 20%, decrease 10%:

$$20 - 10 - \frac{20 \times 10}{100} = 8\% \text{ increase}$$

C. Reverse % (Back Calculations)

If A is 20% more than B:

$$B = \frac{A}{1.20}$$

If A is 20% less than B:

$$B = \frac{A}{0.80}$$

D. Conversion Trick

- Increase by x% → multiply by **(1 + x/100)**

- Decrease by x% → multiply by **(1 – x/100)**

Example: 500 increased by 20%
→ 500 × 1.2 = **600**

🌟 4. DIFFERENT QUESTION PATTERNS

Pattern 1: Basic % Questions

Q. What is 20% of 450?
20% = 1/5 → 450 ÷ 5 = **90**

Pattern 2: Percentage Increase / Decrease

Q. Price increases from 800 to 1000. Find % increase.

$$\frac{200}{800}×100 = 25\%$$

Pattern 3: Successive Percentage

Q. Increase by 20% then 10%

$$20 + 10 + \frac{20×10}{100} = 32\%$$

Pattern 4: Population / Salary Increase

Same formula: multiply each year.

Q. Salary increases 10% every year. What after 2 years?
→ Multiply by **1.1 × 1.1 = 1.21**
→ Increase = **21%**

Pattern 5: Exam Marks

Q. He scored 120 marks, which is 40% of total. Find total.

$$\frac{120 × 100}{40} = 300$$

Pattern 6: Comparing Two Numbers

Q. A is 25% more than B. B = ?
If B = 100 → A = 125
So reverse:
[
B = \frac{A}{1.25}
]

Pattern 7: Profit-Loss type % Use

Q. CP = 800. Profit = 25%. SP?
[
SP = 800 × 1.25 = 1000
]

🌟 5. TRENDING EXAM QUESTIONS (VERY IMPORTANT)

Q1. A is 20% more than B. B is how much less than A?

Shortcut:
[
\frac{20}{120}×100 = 16.66%
]

Q2. A number is increased by 20% and then decreased by 20%. Find net % change.

[
20 - 20 - \frac{20×20}{100} = -4%
]

Q3. Population of a village increases 5% then decreases 5%. Net effect?

$$5 - 5 - \frac{25}{100} = -0.25\%$$

Q4. Marks increased from 240 to 300. Find % change.

$$\frac{60}{240} \times 100 = 25\%$$

Q5. A girl scores 40% marks and fails by 30 marks. Passing = 50%. Find max marks.

Difference = 10% = 30 marks
So 1% = 3
Total = **300 marks**

🌟 6. MUST-REMEMBER SHORTCUTS

⭐ Successive % formula (golden)

$$\text{Net \%} = A + B + \frac{AB}{100}$$

⭐ Increase followed by decrease

Always **negative** effect:
$$\text{Net \%} = A - A\left(\frac{x}{100}\right)$$

⭐ Reverse % (super useful)

If A is x% more than B:
B = A / (1 + x/100)

If A is x% less than B:
B = A / (1 − x/100)

🌟 7. PRACTICE QUESTIONS (YOU TRY)

(I can solve after you try)

1. A number is increased by 25% and then increased by 10%. Find net % increase.

2. A student got 180 marks, which is 60% of total. Find total marks.

3. The price of an article decreased from 600 to 450. Find % decrease.

4. A's salary is 20% less than B. B's salary?

5. A shopkeeper gives 10% discount and still earns 20% profit. If CP = 500, find MRP.

Asmi, if you want, I can also make this into a **PDF** for your revision.

Nice — I'll give you a single, **complete, exam-ready cheat-sheet** for **Profit & Loss** that includes:

- All **English trap words** used in exams (with short meanings)

- Every **pattern** you'll meet (with the *fast method* to solve)

- **Adulteration / Cheating / Faulty balance** patterns (with formulas)

- **Step-by-step solved examples** for each important pattern

- Quick **shortcuts** and a 1-line **strategy** you can memorize

I won't ask anything back — here's everything you need right now.

✅ ENGLISH TRAP WORDS (common in government exams)

(Word → short meaning / how it tricks you)

- **Cost Price (CP)** → amount spent to buy/make the item.

- **Selling Price (SP)** → actual amount at which item is sold.

- **Marked Price (MP) / List Price / Labelled Price / Nominal Price** → printed price before discount.

- **Discount / Rebate** → reduction on MP. (Trick: "rebate" sometimes used for tax)

- **Outlay** → *total money spent* (same as total CP / investment).

- **Gain / Profit / Margin** → SP − CP (positive).

- **Loss** → CP − SP (if CP > SP).

- **Gross Profit / Net Profit** → gross: before expenses; net: after expenses.

- **Overhead Charges / Brokerage / Commission** → extra expenses or deductions; sometimes added to CP.

- **Surcharge** → an extra charge (often tax-like) — add to price or cost.

- **Face Value** → written value (like coupon); not always actual market value.

- **Trade Discount** → between wholesaler & retailer (not shown to final buyer usually).

- **Cash Discount** → for immediate payment (applied on invoice).

- **Marked up / Marked up price** → price increased from CP to MP.

- **Underpriced / Overpriced** → relative terms used to confuse.

- **Faulty Balance / Short Weight / Adulteration** → cheating methods (special formulas).

- **Turnover** → total sales revenue (SP × quantity).

- **Break-even point** → no profit/no loss.

- **Net Margin / Profit % on Cost / Profit % on SP** → check which base they want (CP or SP).

Tip: if the question says *"percentage of"*, check the **base** carefully — many traps ask profit% **on cost** vs **on selling price**.

✅ CORE FORMULAS (memorize these multipliers)

- Profit% = $\left(\dfrac{SP-CP}{CP}\times100\right)$

- Loss% = $\left(\dfrac{CP-SP}{CP}\times100\right)$

- SP (with p% profit) = $\left(CP \times\left(1+\dfrac{p}{100}\right)\right)$

- SP (with p% loss) = $\left(CP \times\left(1-\dfrac{p}{100}\right)\right)$

- CP (if SP and profit p% known) = $\left(\dfrac{SP}{1+\frac{p}{100}}\right)$

- CP (if SP and loss p% known) = $\left(\dfrac{SP}{1-\frac{p}{100}}\right)$

- Successive discounts (a%, b%): net = $\left(a+b-\dfrac{ab}{100}\right)$

- Successive percent increases (a%, b%): net = $\left(a + b + \dfrac{ab}{100}\right)$

✅ ADULTERATION / MIXTURE / CHEATING FORMULAS (must know)

1. **Adulteration (mixing cheaper thing — e.g., water with milk) when sold at cost price of pure article**

If seller mixes (x%) of cheap stuff (water) with ((100-x)%) of real one, and sells the mixture at the **cost price of pure article**, gain% =

$$\text{Gain\%} = \frac{x}{100-x}\times100 = \frac{x}{100-x}\times 100\%$$

(Common exam pattern: "If water is mixed to milk by x%, profit?")

2. **Cheating by short weight (gives less weight but charges for full kg)**

If seller gives (W) grams instead of 1000g (or gives (x) kg instead of 1 kg), and charges for 1 kg:

Effective gain% = $\left(\dfrac{\text{Price charged} - \text{Actual cost for given weight}}{\text{Actual cost for given weight}} \times 100\right)$.

If CP per kg = C, seller gives (w) grams (i.e., (w/1000) kg) but charges C:
Cost for (w)g = $\left(C \times \dfrac{w}{1000}\right)$.
Profit% = $\left(\dfrac{C - C \times w/1000}{C \times w/1000} \times 100 = \dfrac{1000-w}{w} \times 100\%\right)$.

3. **Cheating by giving more price but less quantity (general)**

If actual weight given is (x) instead of 1 and selling price = price for 1 unit, gain% = $\left(\dfrac{1-x}{x} \times 100\right)$.

✅ QUICK STRATEGY (one-line)

1. Identify base (CP or SP or MP).

2. Convert all percentages to **multipliers**: +p% → $\left(1+\frac{p}{100}\right)$, −p% → $\left(1-\frac{p}{100}\right)$.

3. Work on a convenient base (1, 100, or CP = 100) to simplify.

4. For adulteration/cheating, convert to **effective cost** for the actual quantity given.

5. Always check whether % is on CP or on SP.

✅ PATTERNS & HOW TO SOLVE (with solved examples)

I'll list the common exam patterns and give a neat, fully-worked example for each.

Pattern A — Basic: find Profit% / Loss% / SP / CP

Example A1: An article bought for ₹600 is sold for ₹750. Find profit% and SP.

Step-by-step:

- CP = 600, SP = 750

- Profit = SP − CP = 750 − 600 = 150

- Profit% = (150/600 \times 100 = 25%).

Answer: Profit 150, Profit% = 25%.

Pattern B — SP when profit% given

Example B1: CP = ₹480, profit = 20%. Find SP.

- SP = CP × (1 + 20/100) = 480 × 1.2 = 576.

Answer: ₹576.

Pattern C — CP when SP and profit% given (reverse %)

Example C1: An item is sold for ₹1320 at 10% profit. Find CP.

- CP = SP / 1.10 = 1320 / 1.1 = 1200.

Answer: ₹1200.

(Work digit-by-digit: 1320 ÷ 1.1 = 13200 ÷ 11 = 1200.)

Pattern D — Marked Price (MP), Discount, then Profit

Example D1: MP = ₹2000. Shopkeeper gives 20% discount and still makes 10% profit. Find CP.

- After 20% discount, SP = MP × (1 − 0.20) = 2000 × 0.8 = ₹1600.

- If SP gives 10% profit, CP = SP / 1.10 = 1600 / 1.1 = 1454.545... → ₹1454.55 (or fraction 1600×10/11 = 16000/11 = 1454 6/11).

- For exams, often they keep integers; but process is important.

Answer: CP = 1600 / 1.1 = 1454.545...

Pattern E — Successive Discounts

Example E1: Two discounts 20% and 10% on MP 1000. Net discount?

- Net discount% = 20 + 10 − (20×10/100) = 30 − 2 = 28%.

- Net SP = MP × (1 − 0.28) = 1000 × 0.72 = ₹720.

Answer: Net discount 28%, SP = ₹720.

Pattern F — Successive Profit/Loss

Example F1: A price increases by 20% then decreases by 10%. Net change?

- Net% = 20 − 10 − (20×10/100) = 10 − 2 = 8% increase.

Answer: 8% net increase.

(Or multiplier: 1.2 × 0.9 = 1.08 → 8% increase.)

Pattern G — Chain transactions (A sells to B sells to C)

Example G1: A buys at ₹500, sells to B at 20% profit. B sells to C at 10% loss. Final SP?

- A→B: SP1 = 500 × 1.2 = ₹600.

- B's CP = 600; B sells at 10% loss → SP2 = 600 × 0.9 = ₹540.

Answer: Final SP = ₹540 (overall A's profit = 540/500 −1 = 8% overall).

Pattern H — Profit% on MP with discount (find MP)

Example H1: CP = ₹400. The shopkeeper wants 25% profit after giving 10% discount on MP. Find MP.

- Let MP = x. After 10% discount, SP = 0.9x.

- Required SP to get 25% profit = CP × 1.25 = 400 × 1.25 = 500.

- So 0.9x = 500 → x = 500 / 0.9 = 555.555... → ₹555.56.

Answer: MP ≈ ₹555.56.

Pattern I — Faulty Balance / Short Weight

Example I1: A shopkeeper sells sugar at price ₹100 per kg (CP = ₹100 per kg). He gives only 950 g but charges for 1 kg. What is his gain% (ignoring other costs)?

- Cost for 950 g = 100 × 950/1000 = ₹95.

- He charges ₹100 (price of 1 kg), so profit = 5.

- Profit% = (5 / 95) × 100 = ($\dfrac{5}{95}\times100 = \dfrac{500}{95}$) ≈ 5.263157...%

- Rounded = 5.263%.

Answer: ≈ 5.263% gain.

(Alternate formula: gain% = (1000 − 950)/950 ×100 = 50/950×100 = 5.263%)

Pattern J — Adulteration (mixing water in milk) — standard

Example J1: A milk seller mixes 10% water to milk and sells the mixture at cost price of pure milk. Gain%?

- x = 10 → gain% = x/(100 − x) ×100 = 10/90 ×100 = 11.111...%

- So gain ≈ 11.11%.

Answer: 11.111...% (i.e., 10/90×100).

Why it works: For 100 kg pure milk (cost = 100 units of money), he actually gives only 90 kg real milk + 10 kg water (water cost 0). He sells 100 kg mixture at price of 100 kg pure milk, so he paid only for 90 kg but got money for 100 kg.

General: if x% adulteration, gain% = $\left(\dfrac{x}{100-x}\times100\right)$.

Pattern K — Adulteration where cheaper ingredient has non-zero cost

If cheaper ingredient has cost (c_2) per unit and expensive has (c_1), and mixed ratio given, compute weighted CP and compare with selling price.

Quick method: compute CP per unit of mixture, then compare SP.

Pattern L — Profit% on SP (rare) vs on CP

- Profit% on CP = $\left(\dfrac{Profit}{CP}\times100\right)$.

- Profit% on SP = $\left(\dfrac{Profit}{SP}\times100\right)$.
  Be careful: exams may ask either — read base.

Example L1: CP = 80, SP = 100. Profit = 20.

- Profit% on CP = 20/80 ×100 = 25%.

- Profit% on SP = 20/100 ×100 = 20%.

Pattern M — Outlay (total CP) and splitting

Example M1: "Total outlay on 5 articles is ₹2500. He sold each at 10% profit. Find SP per article if all sold equally."

- Outlay = total CP = 2500 → CP per item = 500.

- SP per item = 500 × 1.10 = ₹550.

Pattern N — Discount + GST / VAT (modern pattern)

Example N1: MP = ₹1000, discount 10%, GST 18% on net. Find final price.

- After discount: price = 1000 × 0.9 = 900.

- Add GST 18%: final = 900 × 1.18 = 900 + 162 = ₹1062.

(Always check whether GST is on MP or discounted price.)

Pattern O — Two items with different profit% — overall profit%

Example O1: Sold 2 articles: one bought at ₹200 sold at 10% profit, another bought at ₹300 sold at 20% profit. Overall profit%?

- Profit1 = 200 × 0.10 = 20; SP1 = 220.

- Profit2 = 300 × 0.20 = 60; SP2 = 360.

- Total CP = 500; Total SP = 580; Total profit = 80.

- Overall profit% = 80/500 ×100 = 16%.

✅ 12 MOST-LIKELY EXAM QUESTIONS (SOLVED QUICKLY)

1. CP ₹900, sold at 10% loss. SP = 900×0.9 = ₹810.

2. Item sold for ₹660 at 10% profit. CP = 660/1.1 = ₹600.

3. MP ₹2000, discount 25%, SP = 1500. If CP = 1200, profit = 300 → profit% = 25%.

4. Two discounts 30% and 20% on MP ₹1000 → net discount = 30+20 − 6 = 44% → SP = 560.

5. Mix: add 20% water to milk, sell at CP of milk → gain% = 20/80×100 = 25%.

6. Short weight: gives 990g for 1kg → gain% = (1000 − 990)/990×100 = 10/990×100 ≈ 1.0101%.

7. Sold one at 10% profit and another at 10% loss for same CP → overall = 0 (only if CPs equal). If CPs differ, compute totals.

8. Item marked up 40% then 10% discount → net multiplier = 1.4 × 0.9 = 1.26 → 26% profit on CP.

9. If tax (GST) is added after discount, compute discount first, then tax on net.

10. If question says "profit of 20% on selling price" — change base: profit% on SP = p% → profit on CP = p/(100−p)×100. (E.g., profit 20% on SP means profit% on CP = 20/80×100 = 25%).

11. If outlay = ₹x for n articles sold with y% profit overall → SP total = x × (1 + y/100).

12. If a shopkeeper allows 5% discount but still earns 10% profit, and CP known, find MP: SP = CP × 1.10; MP = SP / (1 − 0.05).

✅ TRAPS & QUICK CHECKLIST (before answering any exam Q)

- Does the % refer to CP or SP? (base matters)

- Is "outlay" = total CP? (yes)

- If MP and discount both present, compute SP = MP × (1 − discount%).

- Successive % → use multipliers (not add/subtract except for small trick).

- For adulteration with water (cost 0) use $(x/(100-x)\times100)$.

- Faulty balance → compute actual cost for given weight then compare.

- If commission / brokerage given, treat as added cost to CP or reduce SP accordingly.

- If multiple transactions, use total CP and total SP to find overall %.

✅ MEMORY-AID (one page to memorize)

- Convert percent → multiplier: +p% → $(1+\frac{p}{100})$, −p% → $(1-\frac{p}{100})$.

- Adulteration (water): gain% = $(\dfrac{x}{100-x}\times100)$.

- Short weight: gain% = $(\dfrac{1000-w}{w}\times100)$ (if charging for 1kg but giving w grams).

- Successive discounts: $(a+b-\dfrac{ab}{100})$.

- Successive increases: $(a+b+\dfrac{ab}{100})$.

If you want, I'll **convert this into a one-page printable PDF** and also prepare **30 exam-level mixed P&L questions (with answers and short tricks)** targeted for SSC/Banking/RRB — tell me **PDF** or **Questions** (or both), and I'll make it right away.

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Remember mixed fractions:

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Formula:
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Example: Prices increase by 20% and then 30%.
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Example: Increase 20%, decrease 10%:
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20 - 10 - \frac{20×10}{100} = 8% \text{ increase}
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C. Reverse % (Back Calculations)

If A is 20% more than B:
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B = \frac{A}{1.20}
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If A is 20% less than B:
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B = \frac{A}{0.80}
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D. Conversion Trick

- Increase by x% → multiply by **(1 + x/100)**

- Decrease by x% → multiply by **(1 – x/100)**

Example: 500 increased by 20%
→ 500 × 1.2 = **600**

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Pattern 1: Basic % Questions

Q. What is 20% of 450?
20% = 1/5 → 450 ÷ 5 = **90**

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Q. Price increases from 800 to 1000. Find % increase.
[
\frac{200}{800}×100 = 25%
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Pattern 4: Population / Salary Increase

Same formula: multiply each year.

Q. Salary increases 10% every year. What after 2 years?
→ Multiply by **1.1 × 1.1 = 1.21**
→ Increase = **21%**

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Q. CP = 800. Profit = 25%. SP?
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Always **negative** effect:
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If A is x% more than B:
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If A is x% less than B:
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(I can solve after you try)

1. A number is increased by 25% and then increased by 10%. Find net % increase.

2. A student got 180 marks, which is 60% of total. Find total marks.

3. The price of an article decreased from 600 to 450. Find % decrease.

4. A's salary is 20% less than B. B's salary?

5. A shopkeeper gives 10% discount and still earns 20% profit. If CP = 500, find MRP.

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