



Class 8 Maths: Chapter 1 — Fractions in Disguise

NCERT Class 8

Comprehensive Handwritten Revision Notes • Ganita Prakash Part-II

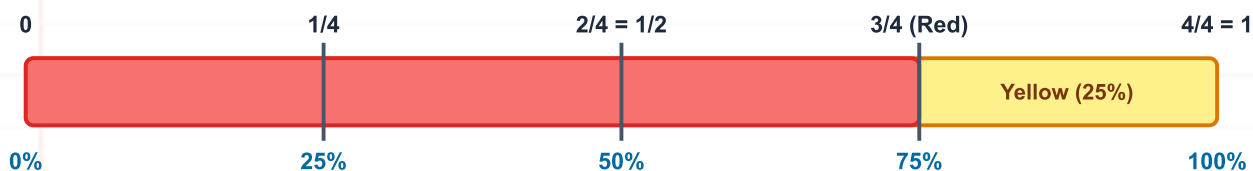
1. The Concept: Fractions in Disguise (Percentages)

The word **percent** comes from Latin *per centum*, meaning "out of a hundred". The symbol % simply means a fraction whose denominator is fixed at 100.

$$x\% = x \div 100 = x \times (1/100) \quad | \quad \text{Fraction to \%} = (\text{Numerator} / \text{Denominator}) \times 100\%$$

Why do we standardize to 100?

Comparing fractions like $9/34$ vs $13/45$ is difficult at a glance. But converting them to percentages: **26.47%** vs **28.88%** immediately shows which is greater! Standardizing to 100 fits our base-10 decimal system perfectly.



The FDP Trio (Fractions, Decimals, Percentages):

Every percentage is easily converted across three forms:

- $50\% = 1/2 = 0.5$ • $25\% = 1/4 = 0.25$ • $75\% = 3/4 = 0.75$ • $20\% = 1/5 = 0.2$
- $10\% = 1/10 = 0.1$ • $1\% = 1/100 = 0.01$ • $100\% = 1$ • $200\% = 2$

HANDWRITTEN WORKED EXAMPLE 1

Q: Surya mixes paint where red paint makes up $3/4$ of the mixture. What percentage is red, and what percentage is yellow?

Method 1 (Equivalent Fraction): $(3 \times 25) / (4 \times 25) = 75 / 100 = 75\%$.

Method 2 (Unit Fraction): $3/4 \times 100\% = 75\%$. Yellow = $100\% - 75\% = 25\%$.

2. Mental Math Strategies & Percentages > 100%

Free-Hand Mental Computation

- **10% of a number:** Shift the decimal point 1 place left! (e.g., 10% of 240 = 24).
- **5% of a number:** Half of 10% (e.g., 5% of 240 = 12).
- **20% of a number:** Double of 10% (e.g., 20% of 240 = 48).
- **15% of a number:** $10\% + 5\% = 24 + 12 = 36$.
- **Commutative Rule:** $x\% \text{ of } y = y\% \text{ of } x$ (e.g., 16% of 250 = 250% of 16 = $2.5 \times 16 = 40$).

Percentages Greater than 100%

- **Target = 100% (The Base).**
- **> 100%** means the value has exceeded its original base.
- **200%** = 2 times original.
- **250%** = 2.5 times original.
- If target is ₹5000 and sales = ₹6000:
Achieved = $(6000/5000) \times 100 = 120\%$ (20% over target!).

3. Commercial Mathematics: Profit, Loss & Discounts

Profit = SP – CP (when SP > CP) | Loss = CP – SP (when SP < CP)
Profit % = (Profit / CP) × 100 | Loss % = (Loss / CP) × 100 (Base is ALWAYS CP!)

Discounts & Marked Price (MP)

- **Discount = MP – SP**
- **Discount % = (Discount / MP) × 100** (Base is Marked Price!)
- **Trap** "30% + 20% Off" ≠ 50% Off! Successive discount is applied sequentially: $100 \rightarrow (\text{less } 30\%) \rightarrow 70 \rightarrow (\text{less } 20\% \text{ of } 70 = 14) \rightarrow \text{₹}56$ (effective 44% off, not 50%).

Taxes (GST)

- **GST (Goods & Services Tax)** is added to the bill by the seller.
- **Final Bill = Price + GST Amount**
- If price = ₹8250 and GST = 18%:
Final Bill = $8250 \times 1.18 = \text{₹}9,735$.

THE FAMOUS 50% PROFIT & 50% DISCOUNT TRAP

Q: Surbhi marks goods at 50% profit margin, then offers a 50% discount. Does she break even?

Answer: Let CP = 100. Marked Price = $100 + 50\% = 150$. Discount of 50% on 150 = 75. Selling Price = $150 - 75 = 75$.

She incurs a **loss of 25%**! (Because the 50% discount was taken on a larger base than the original cost!).

4. Growth & Compounding vs Simple Growth

Money deposited in banks earns **Interest (I)** on the **Principal (P)** at an annual rate **r (p.a.)** for time **t years**.

Linear (No Compounding): ₹6000 @ 10%

Yr 1: +600

Yr 2: +600

Yr 3: +600

Total = ₹7,800 (+30%)

Compounding (Interest on Interest): ₹6000 @ 10%

Yr 1: +600

Yr 2: +660

Yr 3: +726

Total = ₹7,986 (+33.1%)

Feature	Without Compounding (Simple)	With Compounding (Compound Growth)
Principal Base	P remains constant for every term	Interest adds back to P, increasing the base!
Formula for Amount (A)	$A = P(1 + rt)$	$A = P(1 + r)^t$
Type of Growth	Linear growth (straight line)	Exponential growth (curves upward!)

5. Decline & Depreciation (Negative Compounding)

Depreciation: Gradual reduction in value of an asset (vehicles, electronics, machinery) due to wear and tear over time.

$$\text{Value after } t \text{ years} = P(1 - r)^t$$

Example: A TV bought for ₹21,000 depreciates at 5% per annum. After 1 year, Value = $21,000 \times (1 - 0.05) = 21,000 \times 0.95 = ₹19,950$.

6. Chapter Practice Questions (Self-Assessment)

Test your understanding of every core concept. Solve each on scratch paper before checking Page 5.

Q1. [FDP Conversions] Express the following as percentages: (i) $\frac{3}{5}$, (ii) $\frac{72}{150}$, (iii) $\frac{5}{11}$. Convert 0.045 into a percentage.

Q2. [The Commutative Percentage Trick] Evaluate mentally: (i) 16% of 250, (ii) 24% of 50, (iii) 45% of 200. State the algebraic property used.

Q3. [Ratio to Percentage & Volume] Millet and water are mixed in the ratio 2 : 7 to make porridge. What percentage does millet constitute? How many ml of millet is needed to prepare 450 ml of porridge?

Q4. [Unknown Whole / Distance Model] A cyclist completed 40% of his trip from Delhi to Agra, which was 92 km. How many more kilometers must he cycle to reach Agra?

Q5. [Percentages Exceeding 100%] A garment shop aims for daily sales of ₹5,000. On Saturday, the sales recorded were ₹9,550. What percentage of the target did the shopkeeper achieve?

Q6. [Comparing Proportions - Test Performance] Eesha scored 42 out of 50 on an English test and 70 out of 80 on a Science test. In which subject did she perform better? Explain.

Q7. [Commercial Math - Milkman's Deal] A milkman sold two buffaloes for ₹80,000 each. On one, he made a profit of 5%, and on the other, a loss of 10%. Find his overall gain or loss in rupees and percentage.

Q8. [Compounding vs Simple Growth] Compare the returns on ₹20,000 invested for 2 years at 10% per annum: (a) without compounding, (b) with annual compounding. What is the difference in interest?

Q9. [Marketing Illusion: Successive vs Flat Discount] Bakery Cakely offers "30% + 20% Off", while Bakery Cakify offers a flat "50% Off". On a cake marked at ₹400, how much will you pay at each bakery?

Q10. [The Left-Handed Paradox] In a room of 100 people, 99% are left-handed. How many left-handed people must leave the room to bring the percentage down to 98%?

7. Detailed Step-by-Step Solutions & Answers

Ans 1: (i) $(3/5) \times 100\% = 60\%$.

(ii) $(72/150) \times 100\% = (72 \times 2)/3 = 48\%$.

(iii) $(5/11) \times 100\% = 500/11 = 45.45\%$ (or 45 5/11%).

(iv) $0.045 \times 100\% = 4.5\%$.

Ans 2: We use $x\%$ of $y = y\%$ of x because $(x/100) \times y = (y/100) \times x$.

(i) 16% of 250 = 250% of 16 = $2.5 \times 16 = 40$.

(ii) 24% of 50 = 50% of 24 = 12.

(iii) 45% of 200 = 200% of 45 = $2 \times 45 = 90$.

Ans 3: Total parts = $2 + 7 = 9$ parts. Fraction of millet = $2/9$.

Percentage of millet = $(2/9) \times 100\% = 22.22\%$.

For 450 ml porridge: Amount of millet = $(2/9) \times 450 \text{ ml} = 100 \text{ ml}$.

Ans 4: Let total distance be D . 40% of $D = 92 \text{ km} \Rightarrow 0.40 \times D = 92 \Rightarrow D = 92 / 0.40 = 230 \text{ km}$.

Remaining distance = 60% of $D = 230 - 92 = 138 \text{ km}$.

Mental check: If $40\% = 92 \text{ km}$, then $20\% = 46 \text{ km}$. Rest (60%) = $92 + 46 = 138 \text{ km}$.

Ans 5: Percentage achieved = $(\text{Actual Sales} / \text{Target}) \times 100 = (9550 / 5000) \times 100 = 191\%$.

(This means he achieved 100% of his target plus an extra 91%!).

Ans 6: English % = $(42 / 50) \times 100 = 84\%$.

Science % = $(70 / 80) \times 100 = 7/8 \times 100 = 87.5\%$.

Since $87.5\% > 84\%$, **Eesha performed better in Science**. (Absolute marks lost is misleading due to different maximum marks).

Ans 7: Buffalo 1 (5% Profit): $SP = 80,000$. $CP_1 = 80,000 / 1.05 = ₹76,190.48$.

Buffalo 2 (10% Loss): $SP = 80,000$. $CP_2 = 80,000 / 0.90 = ₹88,888.89$.

Total $SP = ₹1,60,000$. Total $CP = 76,190.48 + 88,888.89 = ₹1,65,079.37$.

Overall Result: **Loss of ₹5,079.37** (approx **3.08% loss**).

Ans 8: (a) Without Compounding: Simple Interest = $(20,000 \times 10 \times 2) / 100 = ₹4,000$. Total = ₹24,000.

(b) With Compounding: Amount = $20,000 \times (1.10)^2 = 20,000 \times 1.21 = ₹24,200$. Interest = ₹4,200.

Difference: Compounding pays **₹200 more** over 2 years!

Ans 9: • **Cakely (30% + 20%):** After 30% off, price = $400 - 120 = ₹280$. After 20% off on 280, price = $280 - 56 = ₹224$.

• **Cakify (50% Flat):** Price = $400 - 50\% = ₹200$.

Cakify is cheaper by ₹24! (Successive discounts do not simply add up).

Ans 10: Initial: 99 left-handed and 1 right-handed person (Total = 100).

No right-handed people leave. For 1 person to constitute $(100 - 98)\% = 2\%$ of the new total N :

2% of $N = 1 \Rightarrow 0.02 \times N = 1 \Rightarrow N = 50$ people.

New left-handed count = $50 - 1 = 49$. Number of left-handed people who must leave = $99 - 49 = 50$ people!

✓ Chapter 1 "Fractions in Disguise" Revision Notes Complete!

Mastered FDP, Commercial Math & Compounding! 🌟