Profit, Loss & Discount

Matthew Williams • Math • May 6, 2026

Profit, loss, discount, markup, and tax all compare one amount of money to another. The key is knowing which amount is the base: cost price, selling price, marked price, or discounted price.

CSEC questions often combine these ideas in stages. A product may be marked up, discounted, and then taxed. Work in the order the transaction happens, label each new amount, and state what each percentage is being taken from.

This is where Consumer Arithmetic begins. Every shop, every business, every transaction involves profit, loss, or discount.

Understanding Cost Price and Selling Price

Cost Price (CP): The amount a business pays to GET a product.

Selling Price (SP): The amount a customer PAYS for the product.

Profit or Loss is the difference:

- If SP > CP ’**Profit** (business made money)
- If SP < CP ’**Loss** (business lost money)

Calculating Profit and Loss

Profit and loss compare what a seller receives with what the seller originally paid. Always start by identifying the cost price and selling price.

Profit = Selling Price - Cost Price

$$\text{Profit} = SP - CP$$

Loss = Cost Price - Selling Price

$$\text{Loss} = CP - SP$$

📋 **Example**

A shop buys a phone for 400 dollars and sells it for 550 dollars. What's the profit?

$$\text{Profit} = SP - CP = 550 - 400 = \$150$$

The shop made a **profit of 150 dollars**.

📋 **Example**

A shop buys a laptop for 800 dollars and sells it for 650 dollars. What's the loss?

$$\text{Loss} = CP - SP = 800 - 650 = \$150$$

The shop had a **loss of 150 dollars**.

Profit and Loss as Percentages

Percentage profit or loss uses cost price as the base because it measures the gain or loss compared with what the seller invested.

Profit and loss are MORE useful when expressed as **percentages**. This tells you the actual performance of the business.

$$\text{Profit \%} = \frac{\text{Profit}}{\text{Cost Price}} \times 100\%$$

$$\text{Profit \%} = \frac{\text{SP} - \text{CP}}{\text{CP}} \times 100\%$$

$$\text{Loss \%} = \frac{\text{Loss}}{\text{Cost Price}} \times 100\%$$

$$\text{Loss \%} = \frac{\text{CP} - \text{SP}}{\text{CP}} \times 100\%$$

🧠 **Remember**

Always express profit/loss as a percentage OF THE COST PRICE, not the selling price!

📋 **Example**

A phone is bought for 400 dollars and sold for 550 dollars. What's the profit percentage?

Step 1: Calculate profit

$$\text{Profit} = 550 - 400 = \$150$$

Step 2: Divide by cost price

$$\text{Profit \%} = \frac{150}{400} \times 100\%$$

Step 3: Simplify

$$\text{Profit \%} = 0.375 \times 100\% = 37.5\%$$

The shop made a **37.5% profit**.

This means: For every dollar spent buying phones, the shop made 37.5 cents profit.

📋 **Example**

A laptop bought for 800 dollars is sold for 650 dollars. What's the loss percentage?

Step 1: Calculate loss

$$\text{Loss} = 800 - 650 = \$150$$

Step 2: Divide by cost price

$$\text{Loss \%} = \frac{150}{800} \times 100\%$$

Step 3: Simplify

$$\text{Loss \%} = 0.1875 \times 100\% = 18.75\%$$

The shop had an **18.75% loss**.

Understanding Discount

A discount reduces the marked price before the customer pays. The discount is usually a percentage of the marked price, not of the final sale price.

Discount: A reduction in price. The shop reduces the selling price to attract customers.

Marked Price (MP): The original price shown on the tag.

Discount: The amount taken OFF the marked price.

Selling Price = Marked Price - Discount

$$\text{SP} = \text{MP} - \text{Discount}$$

🧠 **Remember**

Discount is ALWAYS calculated as a percentage OF THE MARKED PRICE, the original price, not the cost price!

$$\text{Discount \%} = \frac{\text{Discount}}{\text{Marked Price}} \times 100\%$$

$$\text{Discount \%} = \frac{\text{MP} - \text{SP}}{\text{MP}} \times 100\%$$

📋 **Example**

A shirt marked at 60 dollars is sold with a 20% discount. What's the selling price?

Step 1: Calculate discount amount

$$\text{Discount} = 20\% \text{ of } 60 = 0.20 \times 60 = \$12$$

Step 2: Calculate selling price

$$\text{SP} = \text{MP} - \text{Discount} = 60 - 12 = \$48$$

The shirt is sold for 48 dollars.

Markup

Markup is added to cost price to create a selling price. Businesses use markup to cover expenses and make profit.

Markup: A percentage increase added to cost price to get the marked (selling) price.

$$\text{Marked Price} = \text{Cost Price} + \text{Markup}$$

Or as a percentage:

$$\text{Markup \%} = \frac{\text{MP} - \text{CP}}{\text{CP}} \times 100\%$$

📋 **Example**

A shop buys a book for 15 dollars and marks it up by 40%. What's the marked price?

Step 1: Calculate markup amount

$$\text{Markup} = 40\% \text{ of } 15 = 0.40 \times 15 = \$6$$

Step 2: Calculate marked price

$$\text{MP} = \text{CP} + \text{Markup} = 15 + 6 = \$21$$

The book is marked at 21 dollars.

Sales Tax

Sales tax is added after the selling price or discounted price has been found. If a discount comes first, calculate tax on the reduced price unless the question says otherwise.

Sales Tax: Money added to the price, usually collected by the government.

Amount after tax = Original Price + Sales Tax

If tax is $t\%$:

$$\text{Total Price} = \text{Price} + \frac{t}{100} \times \text{Price}$$

Or more simply:

$$\text{Total Price} = \text{Price} \times \left(1 + \frac{t}{100}\right)$$

📋 **Example**

A phone costs 500 dollars. Sales tax is 12%. What's the total price?

Step 1: Calculate tax amount

$$\text{Tax} = 12\% \text{ of } 500 = 0.12 \times 500 = \$60$$

Step 2: Calculate total

$$\text{Total} = 500 + 60 = \$560$$

You pay 560 dollars total.

> 📝 **Exam Tip**
>
> **Remember the order**:
>
> - Discount is taken OFF the marked price
> - Tax is ADDED to the price
> - Profit/loss is based on cost price

Solving Complex Profit/Loss Problems

Now let's combine these concepts. Real-world problems often involve multiple steps.

Finding Missing Values

Missing-value questions work backward. Write the usual formula first, substitute what you know, and solve for the unknown.

Sometimes you're given profit %, profit amount, or selling price, and need to find other values.

Key Formulas to Remember:

- $\text{SP} = \text{CP} + \text{Profit}$
- $\text{CP} = \text{SP} - \text{Profit}$

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$$\text{Profit \%} = \frac{\text{Profit}}{\text{CP}} \times 100\%$$

📋 **Example**

A phone is sold for 550 dollars with a profit of 10%. Find the cost price.

Step 1: Set up the relationship

$$\text{Profit \%} = \frac{\text{SP} - \text{CP}}{\text{CP}} \times 100\%$$

Step 2: Substitute what we know

$$10 = \frac{550 - \text{CP}}{\text{CP}} \times 100$$

Step 3: Simplify (divide both sides by 100)

$$0.10 = \frac{550 - \text{CP}}{\text{CP}}$$

Step 4: Multiply both sides by CP

$$0.10 \times \text{CP} = 550 - \text{CP}$$

Step 5: Collect CP terms

$$0.10 \times \text{CP} + \text{CP} = 550$$

$$1.10 \times \text{CP} = 550$$

Step 6: Divide by 1.10

$$\text{CP} = \frac{550}{1.10} = \$500$$

The cost price is 500 dollars.

Check: Profit = 550 - 500 = 50. Profit % = 50/500 × 100% = 10%

📋 **Example**

A shop has a 25% markup on all items. An item costs 80 dollars. What's the marked price? If a customer gets a 10% discount, what do they pay?

Step 1: Find marked price (25% markup on cost price)

$$\text{MP} = 80 + (0.25 \times 80) = 80 + 20 = \$100$$

Step 2: Find selling price (10% discount on marked price)

$$\text{SP} = 100 - (0.10 \times 100) = 100 - 10 = \$90$$

Customer pays 90 dollars.

Step 3: Find profit

$$\text{Profit} = 90 - 80 = \$10$$

$$\text{Profit \%} = \frac{10}{80} \times 100\% = 12.5\%$$

The shop still makes a **12.5% profit** even after the discount!