# Chapter 2: The Building Blocks of Accounting—Mastering the Four Basic Operations

Forget complex calculus or algebra. The entire world of finance is built on four operations you learned in grade school: **Addition, Subtraction, Multiplication, and Division**. Our goal in this chapter is to show you how these simple tools are used to answer critical business questions.

Think of this chapter as your foundation. Everything that comes later—from financial statements to profit analysis—starts here. Let's begin.


# 1. Addition: Combining and Totaling

In accounting, addition is used to bring numbers together to get a complete picture. We use it to calculate total sales, total expenses, or the total cost of an item after taxes.

## Common Scenarios:

- Summing up all expenses for a project to understand its total cost.
- Combining sales from different products to find a company's total revenue.
- Calculating a final bill by adding taxes or fees to a base price.


Country-Specific Examples:

## Japan: Expense Reimbursement

- **Scenario:** Patricia, who loves making bracelets, buys supplies for a new design project. She needs to be reimbursed by her company.
- **Calculation:** ¥2,500 (Gel Polish) + ¥1,200 (Beads) + ¥800 (Art Tools) = **¥4,500 (Total Reimbursable Expenses)**
- **Instructor's Note:** This is a perfect example of why keeping accurate receipts is crucial. The total must match the sum of the individual receipts submitted.

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## USA: Sales Tax

- **Scenario:** Patricia finds a rare retro video game for her collection priced at $40.00. In California, where she lives, the sales tax rate is 7.25% (as of 2025).
- **Calculation:** First, find the tax amount: $40.00 × 0.0725 = $2.90. Then, add it to the price: $40.00 (Game Price) + $2.90 (Sales Tax) = **$42.90 (Total Cost)**
- **Instructor's Note:** Sales tax is a great example of location-specific finance. Rates change depending on the state, county, and even city. This is why you might pay a different total for the same item in a different location.


## Philippines: Value-Added Tax (VAT)

- **Scenario:** Cris, a fan of café hopping, orders a coffee and pastry. The menu prices are P180 and P150, respectively. In the Philippines, a 12% VAT is included in most goods and services.
- **Calculation:** First, find the subtotal: P180 + P150 = P330. Then, calculate the VAT: P330 × 0.12 = P39.60. Finally, add it all together: P330.00 (Subtotal) + P39.60 (VAT) = P369.60 (Total Bill)


# 2. Subtraction: Finding the Difference

Subtraction helps us measure change, profit, and what's left over. It's essential for understanding if a business is making money or if we are staying on budget.

## Common Scenarios:

- Calculating a company's profit by subtracting expenses from revenue.
- Determining your take-home pay by subtracting taxes and deductions from your gross salary.
- Finding the difference between a planned budget and actual spending.


Country-Specific Examples:

## Japan: Calculating Net Profit

- **Scenario:** Jenelie, a passionate gardener, sells her organic vegetables at a local market for ¥15,000. Her costs for seeds and supplies were ¥4,000.
- **Calculation:** ¥15,000 (Total Revenue) ¥4,000 (Total Expenses) = **¥11,000 (Net Profit)**
- **Instructor's Note:** This is the most fundamental calculation in business. **Revenue** is the total money you bring in, and **Expenses** are what you spend to earn that revenue. The result, **Net Profit**, is what you truly made.


## USA: Calculating Investment Gains

- **Scenario:** Years ago, Patricia bought a collectible Nintendo DS for $150. As it became rarer, its value increased, and she sold it for $400.
- **Calculation:** $400 (Sale Price/Proceeds) $150 (Original Cost) = **$250 (Capital Gain)**
- **Instructor's Note:** This difference, called a "capital gain," is often taxable. Accounting isn't just about business; it applies to personal investments, too.


## Philippines: Budget Variance

- **Scenario:** Cris's favorite café budgeted P50,000 for coffee bean inventory for the month. They found a new supplier and only spent P45,500.
- **Calculation:** P50,000 (Budgeted Cost) P45,500 (Actual Cost) = **P4,500 (Favorable Variance)**
- **Instructor's Note:** This is called a **favorable variance** because the actual cost was *less* than the budget. If they had spent more, it would have been an **unfavorable variance**. Businesses track variances closely to control costs.

# 3. Multiplication: Scaling Up Costs and Revenues

Multiplication is a shortcut for repeated addition. We use it to calculate the total price of multiple items, payroll for hours worked, or taxes based on a percentage.

## Common Scenarios:

- Calculating total revenue: **Unit Price × Quantity Sold**
- Calculating gross pay: **Hourly Rate × Hours Worked**
- Calculating tax amounts: Taxable Amount × Tax Rate


Country-Specific Examples:

## Japan: Calculating Sales Revenue

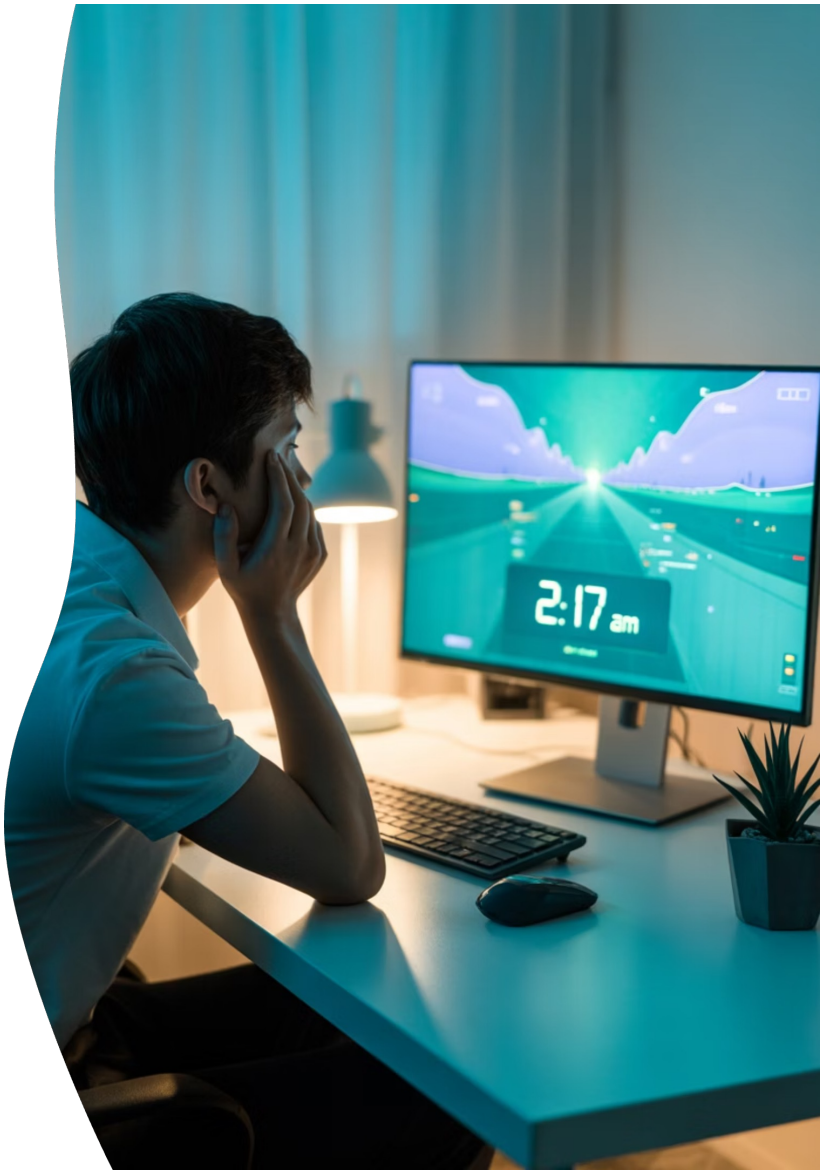
- **Scenario:** Cris writes and illustrates a children's book. The book is priced at ¥1,500, and a school buys 200 copies.
- **Calculation:** ¥1,500 (Price per Book) × 200 (Copies Sold) = ¥300,000 (Total Revenue)


## USA: Calculating Overtime Pay

- **Scenario:** Zyrine works part-time at an editing company for $25 per hour. One week, she works her standard 40 hours plus an additional 5 hours of overtime. By U.S. law, overtime is paid at 1.5 times the regular rate ("time and a half").
- **Calculation:**
  - Regular Pay: $25 × 40 hours = $1,000
  - Overtime Rate: $25 × 1.5 = $37.50 per hour
  - Overtime Pay: $37.50 × 5 hours = $187.50
  - **Total Gross Pay:** $1,000 + $187.50 = $1,187.50

## Philippines: Calculating Night Differential Pay

- **Scenario:** Cris works as an online game moderator from 10 PM to 6 AM. In the Philippines, employees are entitled to a "Night Differential"—an extra 10% on their hourly rate for work performed at night. Her base rate is P300/hour.
- **Calculation:** P300 (Base Rate) × 1.10 (Night Rate Multiplier) × 20 (Hours) = P6,600 (Total Pay)



# 4. Division: Breaking It Down and Finding Rates

Division helps us analyze performance. We use it to find averages, calculate key financial ratios, and understand relationships between different numbers.

## Common Scenarios:

- Calculating an average cost (e.g., cost per item).
- Determining a profit margin (**Profit ÷ Revenue**).
- Figuring out cost per person for an event.


Country-Specific Examples:

## Japan: Cost Per Person

- **Scenario:** The team goes out for Cris's favorite food, chicken wings, to celebrate a project milestone. The total bill for 6 people is ¥18,000.
- **Calculation:** ¥18,000 (Total Bill) ÷ 6 (People) = **¥3,000 per Person**
- **Instructor's Note:** This is a simple but powerful tool for budgeting. Knowing the per-person cost of a meal helps a company plan for future team events.


## USA: Calculating Profit Margin

- **Scenario:** A game studio, inspired by Patricia's love for retro games, has total revenues of $500,000 and a net profit of $80,000. They want to know their profit margin.
- **Calculation:** $80,000 (Net Profit) ÷ $500,000 (Total Revenue) = 0.16. To express this as a percentage, multiply by 100. So, 0.16 × 100 = **16% (Profit Margin)**
- **Instructor's Note:** The **Profit Margin** is one of the most important indicators of a company's health. It tells you how many cents of profit the business generates for every dollar of revenue. A 16% margin means they make $0.16 in profit for every $1.00 in sales.

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## Philippines: Deconstructing a VAT-Inclusive Bill

- **Scenario:** Zyrine orders her favorite Sisig. The total on the receipt is P1,120, which already includes the 12% VAT. How do we find the original price of the food?
- **Calculation:** The total price represents 112% (100% for the food + 12% for the tax) of the base price. To find the base price, we divide by 1.12.
  - P1,120 (Total Bill) ÷ 1.12 = **P1,000 (Base Price of Food)**
  - To find just the VAT amount: P1,120 P1,000 = P120 (VAT Paid)


# 5. Combining Operations: A Real-World Payroll Example

Now, let's see how all four operations work together in one of the most common accounting tasks: payroll.

- **Gross Pay:** The total amount of money you earn before any deductions. *(Uses Multiplication)*
- **Deductions:** Amounts subtracted from your gross pay for taxes, insurance, and other benefits. *(Uses Subtraction)*
- **Net Pay (Take-Home Pay):** The amount of money you actually receive after all deductions.


## USA Payroll Breakdown:

1. **Calculate Gross Pay:** Let's say an employee earns $20/hour and works 40 hours.
   - $20 × 40 hours = $800 (Gross Pay)
2. **Calculate Deductions:** We'll subtract Federal Income Tax ($80), FICA taxes ($61.20), and Health Insurance ($50).
   - $80 + $61.20 + $50 = $191.20 (Total Deductions)

**3. Calculate Net Pay:** $800 (Gross Pay) - $191.20 (Deductions) = $608.80 (Net Pay)


## 6. Common Mistakes to Avoid (Updated for 2025)

- **Japan:** Be careful with the two-tiered consumption tax. The standard rate is 10%, but a reduced rate of 8% applies to certain items like food and beverages (excluding alcohol and dining out). Using the wrong rate is a frequent error.
- **USA:** State and local taxes are complex. A common mistake is only accounting for federal taxes (like FICA) and forgetting state income tax, local income tax, and state disability insurance, which vary significantly.
- **Philippines:** Always confirm that calculations for mandatory contributions (SSS, PhilHealth, Pag-IBIG) are based on the latest 2025 contribution tables. These rates are updated periodically. Also, remember that the **13th Month Pay** is a mandatory benefit and must be accounted for properly.

# 7. Practice Problems

Let's test your knowledge with a few scenarios.

## Q1 (Japan):

Jenelie buys a new guitar for ¥30,000. How much is the total cost after adding the 10% consumption tax?


## Q2 (USA):

Patricia works part-time at a retro game store for $18/hour. One week she works 42 hours (2 of which are overtime paid at 1.5 times the regular rate). What is her total gross pay for the week?

## Q3 (Philippines):

Cris works as a freelance social media manager. For one client, she billed for 20 hours of work at a rate of P500/hour. What is her total revenue before any business expenses?

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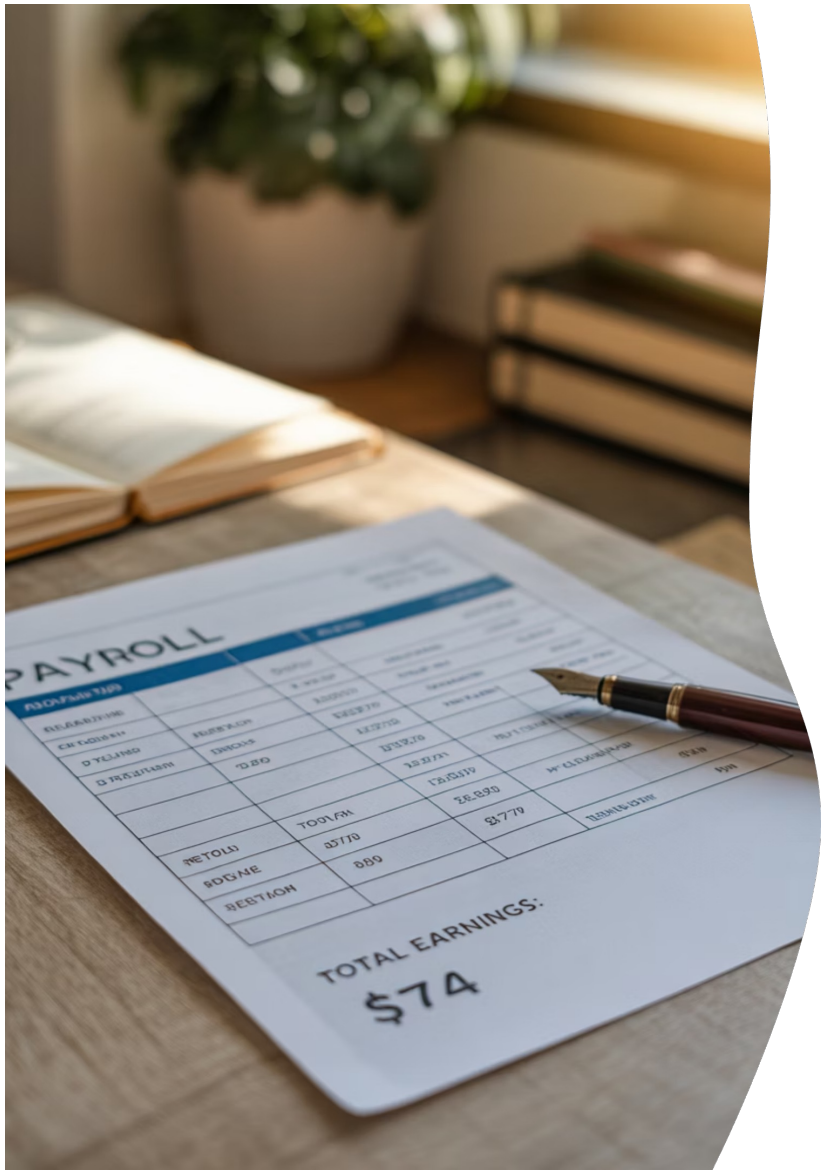
## Q4 (General):

Zyrine's online pet supply business generated $1,000 in revenue. The cost of her materials was $450. What is her **net profit** and her **profit margin**?

# 8. Answers and Explanations

## A1: ¥33,000

- **Explanation:** To find the total price, you add the 10% tax. The fastest way is to multiply the price by 1.10 (which represents 100% of the price + 10% tax).
- ¥30,000 × 1.10 = ¥33,000

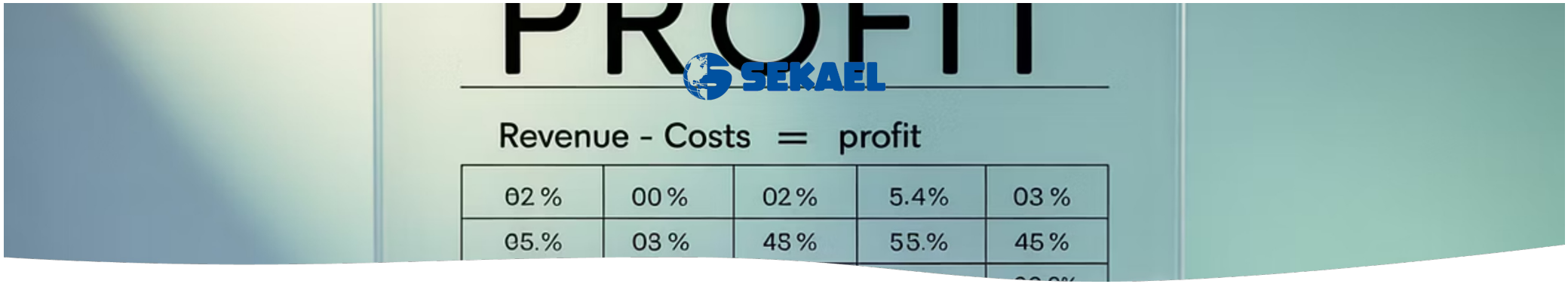



## A2: $774

- **Explanation:** First, calculate her regular pay for 40 hours. Then, calculate her overtime pay for 2 hours at the higher rate. Finally, add them together.
- Regular Pay: $18 × 40 hours = $720
- Overtime Rate: $18 × 1.5 = $27/hour
- Overtime Pay: $27 × 2 hours = $54
- Total Pay: $720 + $54 = $774


## A3: P10,000

- **Explanation:** This is a straightforward revenue calculation. Multiply the hours she worked by her hourly rate.
- 20 hours × P500/hour = P10,000




## A4: Profit is $550; Profit Margin is 55%

- **Explanation:** First, find the profit by subtracting costs from revenue. Then, calculate the profit margin by dividing that profit by the original revenue.
- Profit: $1,000 (Revenue) - $450 (Costs) = $550
- Profit Margin: ($550 ÷ $1,000) × 100 = 55%

# 9. Chapter Summary

- Accounting is built on **addition, subtraction, multiplication, and division**.
- These operations help us answer key questions about sales, expenses, profit, and performance.
- While the math is simple, the **rules for what to add, subtract, multiply, or divide** change based on local laws and business practices (e.g., taxes in Japan, the USA, and the Philippines are all different).
- Mastering these basics is the most important step in your accounting journey.

Congratulations on completing this chapter! You now have the foundational tools every accounting professional uses daily. In the next chapter, we'll build on this by exploring "Ratios and Percentages in Business."