



Business Math Practice Sheet: Real-World Scenarios

Instructions: Use the concepts from the "From Scorekeeper to Strategist" guide to answer the following questions.

1. Profit Margin: The U.S. Coffee Shop

- **Question:** A small coffee shop in Austin, Texas, has monthly sales of \$10,000. The cost for all ingredients (coffee beans, milk, syrups) is \$4,000. The cost for rent, utilities, and one barista's salary is \$3,500. What is the coffee shop's profit margin?
- **Answer:** 25%
- **Explanation:**
 1. **Find the Profit:** Sales (\$10,000) - Variable Costs (\$4,000) - Fixed Costs (\$3,500) = \$2,500 Profit.
 2. **Find the Margin:** $(\text{Profit} / \text{Sales}) * 100 = (\$2,500 / \$10,000) * 100 = 0.25 * 100 = 25\%$. This means the shop keeps 25 cents of profit for every \$1 it sells.

2. Return on Investment (ROI): The Japanese Manga Artist

- **Question:** A freelance manga artist in Tokyo is considering buying a new high-end graphics tablet for ¥150,000. They predict this new tool will allow them to work faster, earning them an additional ¥210,000 in profit over the tablet's 3-year life. What is the total ROI on this investment?
- **Answer:** 40%
- **Explanation:**
 1. **Find the Net Gain:** Total Gain (¥210,000) - Investment Cost (¥150,000) = ¥60,000 Net Gain.
 2. **Calculate ROI:** $(\text{Net Gain} / \text{Investment Cost}) * 100 = (\text{¥}60,000 / \text{¥}150,000) * 100 = 0.4 * 100 = 40\%$.

3. Labor Cost (Philippines): The BPO Team

- **Question:** A BPO center in the Philippines hires a new Data Analyst. The offered base salary is P30,000 per month. What is the *minimum* total annual cost the company must budget for this employee's salary (excluding insurance or other bonuses)?
- **Answer:** P390,000
- **Explanation:** The calculation must include the mandatory "13th Month Pay."
 1. **Annual Base Salary:** P30,000 * 12 months = P360,000
 2. **13th Month Pay:** + P30,000 (one full month's salary)
 3. **Total Annual Cost:** P360,000 + P30,000 = P390,000. Budgeting only P360,000 is a common mistake that leads to a cash flow crisis in December.

4. Strategic Decision (Profit Margin): The Food Cart

- **Question:** A food cart owner sells P80,000 worth of *siomai* a month. His costs (ingredients, stall rental) are P60,000, giving him a P20,000 profit (25% margin). He considers switching to a "premium" wrapper that costs P5,000 more per month. He believes this will attract more customers and boost sales to P90,000. Is this a good strategic move *based on profit margin*?
- **Answer:** Yes. His new profit margin is 27.8%.
- **Explanation:**
 1. **New Costs:** P60,000 (Original) + P5,000 (New Wrapper) = P65,000
 2. **New Profit:** P90,000 (New Sales) - P65,000 (New Costs) = P25,000
 3. **New Margin:** (P25,000 / P90,000) * 100 = 27.8%. Since both his total profit (in pesos) and his profit margin (in percentage) increased, the math supports this strategic move.

5. Mean vs. Median: The U.S. Real Estate Agent

- **Question:** A real estate agent's commissions for the last 5 months were: \$4,000, \$4,500, \$5,000, \$3,500, and \$30,000 (from one large, rare sale). When planning his personal monthly budget, which metric is *safer* to use for his "typical" monthly income: the mean (average) or the median (middle)?
- **Answer:** The median.
- **Explanation:** The \$30,000 sale is an "outlier."
 1. **Mean:** ($\$4k + \$4.5k + \$5k + \$3.5k + \$30k$) / 5 = \$9,400. This average is misleadingly high.
 2. **Median:** First, order the numbers: \$3,500, \$4,000, **\$4,500**, \$5,000, \$30,000. The middle number is \$4,500.
 3. Using the median (\$4,500) for budgeting is safer because it represents a "normal" month and prevents him from over-spending based on one lucky sale.

6. Standard Deviation: The Two Cafe Branches

- **Question:** A cafe owner has two branches. Branch A (in a business district) has stable, predictable sales (low standard deviation). Branch B (in a tourist spot) has "boom-and-bust" sales—some days are incredibly busy, others are very slow (high standard deviation). Why does the owner need to keep a larger emergency cash fund for Branch B, even if their monthly average sales are the same?
- **Answer:** Because its sales are "wobbly" and unpredictable.
- **Explanation:** Standard deviation measures "wobbliness." A high standard deviation (Branch B) means the cafe has a high risk of having a "bust" week with very low cash flow. It needs a larger cash reserve to pay for rent, salaries, and supplies during those slow periods. Branch A's income is predictable, so it has a lower risk of a cash shortage.

7. Current Ratio: The Japanese Convenience Store

- **Question:** A small convenience store in Osaka has ¥5,000,000 in its bank account and ¥20,000,000 worth of inventory (drinks, snacks, etc.) that it plans to sell this year. It has a ¥10,000,000 short-term loan due to its suppliers in two months. What is its Current Ratio?
- **Answer:** 2.5
- **Explanation:**
 1. **Current Assets:** ¥5,000,000 (Cash) + ¥20,000,000 (Inventory) = ¥25,000,000
 2. **Current Liabilities:** ¥10,000,000 (Supplier Loan)
 3. **Current Ratio:** Current Assets / Current Liabilities = ¥25,000,000 / ¥10,000,000 = 2.5. This is generally healthy, as it shows the store has ¥2.50 in short-term assets for every ¥1.00 of short-term debt.

8. Debt-to-Equity Ratio: The U.S. Startup Risk

- **Question:** A tech startup in Silicon Valley is funded by \$300,000 of the founder's own money (Equity) and \$600,000 from a bank loan (Liabilities). What is its Debt-to-Equity ratio, and what does this number imply?
- **Answer:** 2. This implies the company is funded by twice as much debt as its own money.
- **Explanation:**
 1. **Formula:** Total Liabilities / Total Equity = \$600,000 / \$300,000 = 2.
 2. **Implication:** A ratio of 2 means the company is heavily "leveraged" or funded by debt, which is common for U.S. startups seeking growth but can be risky. If sales are slow, it could get into financial trouble quickly.

9. Country-Specific Focus: The Multinational Report

- **Question:** A company has a major office in the U.S. and another in Japan. When the U.S. manager presents their quarterly numbers, they focus on "Earnings Per Share" (EPS) and "ESG" (Environmental, Social, Governance) data. When the Japan manager presents, they focus on "tax compliance" and "break-even analysis." According to the guide, why does this difference in focus exist?
- **Answer:** Because business priorities change by country.
- **Explanation:** The guide notes that the U.S. market is heavily focused on **investor disclosure** (what investors want to see, like EPS and ESG). In contrast, Japanese reporting culture has historically been more focused on **tax compliance** and detailed operational analysis, like break-even points, to manage profits according to tax rules.

10. Break-Even Analysis: The Online Tutor

- **Question:** An online tutor pays P3,000 a month for a premium subscription to a webinar platform and scheduling software (Fixed Costs). She charges P500 per session, and her only other cost is a P100 transaction fee per session (Variable Cost). How many sessions must she sell each month just to *break even*?
- **Answer:** 7.5 sessions (or 8, since she can't sell half a session).

- **Explanation:**

1. **Find Profit Per Unit:** $P500$ (Price) - $P100$ (Variable Cost) = $P400$ (Profit per session).
2. **Break-Even Formula:** $\text{Fixed Costs} / \text{Profit Per Unit} = P3,000 / P400 = 7.5$.
3. This means she must sell 8 sessions to cover all her costs. Her 9th session will be her first one that generates actual profit.