Profit & Break-Even Practice Sheet

Problem 1: The Subscription Box (US)

A start-up in the US begins a monthly coffee subscription box.

- **Fixed Costs:** $60,000 per year (for website maintenance, storage, and marketing).
- **Sales Price:** $40 per box.
- **Variable Costs:** $20 per box (for the coffee, packaging, and shipping).

Question: What are the company's annual break-even sales in **Dollars ($)**?

Answer: $120,000

Explanation:

1. **Find the Contribution Margin (CM) per box:**
   - *Formula:* Sales Price - Variable Cost
   - *Calculation:* $40 - $20 = $20
2. **Find the Contribution Margin Ratio:**
   - *Formula:* Contribution Margin / Sales Price
   - *Calculation:* $20 / $40 = 0.50 (or 50%)
3. **Calculate Break-Even Sales in Dollars:**
   - *Formula:* Total Fixed Costs / Contribution Margin Ratio
   - *Calculation:* $60,000 / 0.50 = **$120,000**

*(Alternatively, you could find the break-even in units: $60,000 / $20 = 3,000 units. Then, 3,000 units * $40/unit = $120,000.)*

Problem 2: The Ramen Shop (Japan)

A small ramen shop opens in Tokyo.

- **Fixed Costs:** ¥1,200,000 per month (for high city rent and two staff salaries).
- **Sales Price:** ¥1,500 per bowl of ramen.
- **Variable Costs:** ¥600 per bowl (for noodles, broth, and toppings).

Question: How many **units (bowls of ramen)** must the shop sell each month to break even?

Answer: 1,334 bowls

Explanation:

1. **Find the Contribution Margin (CM) per bowl:**
   - *Formula:* Sales Price - Variable Cost
   - *Calculation:* ¥1,500 - ¥600 = ¥900
2. **Calculate Break-Even Sales in Units:**
   - *Formula:* Total Fixed Costs / Contribution Margin per Unit
   - *Calculation:* ¥1,200,000 / ¥900 = 1,333.33...
3. **Round Up:** Since you cannot sell 0.33 of a bowl, you must sell the next full unit to truly cover costs.
   - **Final Answer: 1,334 bowls**

Problem 3: The Design Freelancer (Philippines)

A graphic designer in the Philippines starts a freelance business.

- **Fixed Costs:** PHP 40,000 per month (for software subscriptions, high-speed internet, and a small owner salary).
- **Sales Price:** PHP 5,000 for a logo design package.
- **Variable Costs:** PHP 500 per package (for transaction fees and project-specific cloud storage).

Question: What are the designer's monthly break-even sales in **Pesos (PHP)**?

Answer: PHP 44,445 (rounded)

Explanation:

1. **Find the Contribution Margin (CM) per package:**
   - *Formula:* Sales Price - Variable Cost
   - *Calculation:* PHP 5,000 - PHP 500 = PHP 4,500
2. **Find the Contribution Margin Ratio:**
   - *Formula:* Contribution Margin / Sales Price
   - *Calculation:* PHP 4,500 / PHP 5,000 = 0.90 (or 90%)
3. **Calculate Break-Even Sales in Pesos:**
   - *Formula:* Total Fixed Costs / Contribution Margin Ratio
   - *Calculation:* PHP 40,000 / 0.90 = **PHP 44,444.44...** (or PHP 44,445)

Problem 4: The Local Bookstore (General)

In one month, a local bookstore has the following financial results:

- **Total Revenue:** $50,000
- **Cost of Goods Sold (books):** $25,000

- **Operating Expenses (rent, salaries):** $15,000
- **Income Taxes:** $2,000

Question: What is the store's **Net Income** and **Net Profit Margin** (as a percentage)?

Answer: Net Income = $8,000; Net Profit Margin = 16%

Explanation:

1. **Find the Total Costs:**
   - *Calculation:* $25,000 (COGS) + $15,000 (OpEx) + $2,000 (Taxes) = $42,000
2. **Calculate Net Income (The "Bottom Line"):**
   - *Formula:* Total Revenue - Total Costs
   - *Calculation:* $50,000 - $42,000 = **$8,000**
3. **Calculate Net Profit Margin:**
   - *Formula:* (Net Income / Total Revenue) * 100
   - *Calculation:* ($8,000 / $50,000) * 100 = 0.16 * 100 = **16%**

Problem 5: Business Strategy (Applied)

Look back at **Problem 1 (The Subscription Box)**. The owner wants to lower the break-even point *without* having to sell more boxes.

Question: Based on the module, name **two different strategies** the owner could use to lower the break-even point. Give a specific example for each.

Answer: (Any two of the following)

1. **Strategy 1: Reduce Fixed Costs**
   - *Explanation:* Lowering fixed costs directly reduces the total amount of money the company needs to earn to break even.
   - *Example:* Find a cheaper storage facility, negotiate a lower monthly fee for the website, or reduce the annual marketing budget.
2. **Strategy 2: Reduce Variable Costs**
   - *Explanation:* This increases the contribution margin for each box, meaning every sale contributes more profit toward paying fixed costs.
   - *Example:* Find a cheaper supplier for coffee beans, use less expensive packaging, or negotiate a better shipping rate.
3. **Strategy 3: Increase the Sales Price**
   - *Explanation:* This also increases the contribution margin per box, achieving the same effect as lowering variable costs.
   - *Example:* Raise the price from $40 to $45. This increases the contribution margin from $20 to $25, lowering the number of units needed to break even.

Problem 6: The Four Levels of Profit (Concept)

A small manufacturing company reports the following numbers for the quarter:

- **Total Revenue:** $200,000
- **Cost of Goods Sold (COGS):** $80,000 (raw materials, factory labor)
- **Operating Expenses:** $60,000 (office rent, marketing, admin salaries)
- **Interest Expense:** $5,000 (from a business loan)
- **Income Tax:** $11,250

Question: Calculate the **Gross Profit** and the **Operating Profit** for the company.

Answer: Gross Profit = $120,000; Operating Profit = $60,000

Explanation:

1. **Gross Profit (Your Product Profit):**
   - *Formula:* Revenue - Cost of Goods Sold (COGS)
   - *Calculation:* $200,000 - $80,000 = **$120,000**
2. **Operating Profit (Your Core Business Profit):**
   - *Formula:* Gross Profit - Operating Expenses
   - *Calculation:* $120,000 - $60,000 = **$60,000**

(Bonus: Pre-tax Profit would be $60,000 - $5,000 = $55,000. Net Income would be $55,000 - $11,250 = $43,750.)

Problem 7: Fixed vs. Variable Costs (Concept)

A new bakery has the following monthly costs.

1. Flour and sugar
2. Monthly rent for the shop
3. The baker's fixed monthly salary
4. Cardboard boxes for selling cakes (one box per cake)
5. Facebook ads billed at a flat rate per month

Question: Identify each cost as either **Fixed** or **Variable**.

Answer:

1. **Variable** (Cost goes up with each new item baked)
2. **Fixed** (Cost stays the same regardless of sales)
3. **Fixed** (Cost stays the same regardless of sales)
4. **Variable** (Cost goes up with each new item sold)
5. **Fixed** (Cost stays the same regardless of sales)

Explanation: The key question is: "If I sell one more item, does this cost go up?"

- If **Yes** (like flour and boxes), it's **Variable**.
- If **No** (like rent, salary, and flat-rate ads), it's **Fixed**.

Problem 8: The "Ghost Kitchen" (Philippines)

Cris starts a delivery-only "ghost kitchen" for chicken wings (from the module).

- **Fixed Costs:** PHP 200,000 per month (kitchen rental, marketing).
- **Sales Price:** PHP 500 per order.
- **Variable Costs:** PHP 300 per order (chicken, sauce, packaging, delivery fees).

The owner, Cris, wants to make a **target profit** of PHP 80,000 per month.

Question: How many **units (orders)** must Cris sell to achieve her target profit?

Answer: 1,400 orders

Explanation: This uses the break-even formula but adds profit to the fixed costs.

1. **Find the Contribution Margin (CM) per order:**
    - *Formula:* Sales Price - Variable Cost
    - *Calculation:* PHP 500 - PHP 300 = PHP 200
2. **Find the "Target Sales" in Units:**
    - *Formula:* (Total Fixed Costs + Target Profit) / Contribution Margin per Unit
    - *Calculation:* (PHP 200,000 + PHP 80,000) / PHP 200
    - *Calculation:* PHP 280,000 / PHP 200 = **1,400 orders**

Problem 9: The SaaS Company (US)

A software (SaaS) company has a new product.

- **Fixed Costs:** $1,000,000 per year (salaries, servers, rent).
- **Sales Price:** $50 per month (or $600 per year) for one subscription.
- **Variable Costs:** $5 per month (or $60 per year) for customer support and data processing.

Question: What are the company's annual break-even sales in **Dollars ($)**?

Answer: $1,111,112 (rounded)

Explanation:

1. **Find the Contribution Margin (CM) per user (annual):**
    - *Formula:* Annual Sales Price - Annual Variable Cost
    - *Calculation:* $600 - $60 = $540
2. **Find the Contribution Margin Ratio:**

- *Formula:* Contribution Margin / Sales Price
- *Calculation:* $540 / $600 = 0.90 (or 90%)
3. **Calculate Break-Even Sales in Dollars:**
   - *Formula:* Total Fixed Costs / Contribution Margin Ratio
   - *Calculation:* $1,000,000 / 0.90 = **$1,111,111.11...** (or $1,111,112)

Problem 10: Strategic Choice (Applied)

Company A and Company B both sell widgets for $100.

- **Company A (High Fixed Cost):**
  - Fixed Costs: $1,000,000
  - Variable Cost: $20 per unit (CM = $80)
- **Company B (High Variable Cost):**
  - Fixed Costs: $100,000
  - Variable Cost: $70 per unit (CM = $30)

Question: Which company has the **lower** break-even point (in units)? Which company becomes **more profitable** *after* the break-even point is passed?

Answer:

1. **Lower Break-Even Point: Company B**
2. **More Profitable After Break-Even: Company A**

Explanation:

1. **Break-Even Points:**
   - *Company A:* $1,000,000 / $80 = 12,500 units
   - *Company B:* $100,000 / $30 = 3,334 units (rounded)
   - Company B has a much lower hurdle to become profitable.
2. **Profitability:**
   - Company A makes **$80 in profit** for every unit sold after breaking even.
   - Company B only makes **$30 in profit** for every unit sold after breaking even.
   - This means Company A (high fixed cost, low variable cost) has higher risk but a much higher reward potential if sales are strong.