

## Multiple Choice

1. CVP Analysis is an important decision making tool for which reason?
  - a) Determining product mix
  - b) Setting selling price
  - c) Maximizing use of facilities
  - d) All of the above
2. A Company has a contribution margin of 40% and fixed costs of \$120,000. What is the break-even point in dollars?
  - a) \$48,000
  - b) \$300,000
  - c) \$200,000
  - d) \$72,000
3. P Company has fixed costs of \$200,000, sales price of \$50, and variable cost of \$30 per unit. How many units must be sold to earn profit of \$50,000?
  - a) 2,500
  - b) 10,000
  - c) 12,500
  - d) 25,000
4. B Company has fixed costs of \$20,000 and a contribution margin ratio of 40%. Currently, sales are \$75,000. What is Bowl's margin of safety?
  - a) \$20,000
  - b) \$25,000
  - c) \$30,000
  - d) \$50,000
5. Z Company makes two different products, Product A and Product B. They currently sell 2,000 units of product A and 3,000 units of product B. What is the sales mix percentages?
  - a) Product A= 40%, Product B= 60%
  - b) Product A= 60%, Product B= 40%
  - c) Product A= 67%, Product B= 33%
  - d) Product A= 33%, Product B= 67%

6. Degree of operating leverage is calculated as
- Net income divided by contribution margin
  - Break-even sales divided by net income.
  - Net income divided by break-even sales.
  - Contribution margin divided by net income
7. N Company sells two products. Product A sells for \$100 per unit, and has unit variable costs of \$60. Product B sells for \$70 per unit, and has unit variable costs of \$50. Currently, N Company sells three units of product A for every one unit of product B sold. N Company has fixed costs of \$750,000. How many units would N Company have to sell to earn a profit of \$300,000?
- 7,500 units of A and 22,500 units of B
  - 22,500 units of A and 7,500 units of B
  - 17,600 units of A and 12,400 units of B
  - 12,400 units of A and 17,600 units of B
8. Pear Company sells three products. Pear is having difficulty making all of the required products because it only has limited hours available on the machine that is used to produce all products. Determine the order in which the products should be made to produce the most profit based on the below information.

|                        | Tablets | Phones | Computers |
|------------------------|---------|--------|-----------|
| Sales per unit         | \$1000  | \$800  | \$2,500   |
| Variable cost per unit | \$600   | \$250  | \$1,000   |
| Machine Hours per unit | 1       | .5     | 1.5       |
|                        |         |        |           |

- Tablets, Phones, Computers
  - Computer, Phones, Tablet
  - Phones, Computer, Tablet
  - Computer, Tablet, Phone
9. Goat Company provide the following CVP income statement. What is the degree of operating leverage?
- |                     |                |
|---------------------|----------------|
| Sales               | \$850,000      |
| Variable Costs      | <u>325,000</u> |
| Contribution Margin | 525,000        |
| Fixed Costs         | <u>300,000</u> |
| Net Income          | <u>225,000</u> |

- a) 2.33
- b) 1.61
- c) 1.08
- d) 0.57

10. A high degree of operating leverage means which of the following?
- a) A company has higher fixed costs relative to variable costs
  - b) A company has higher variable costs relative to fixed costs
  - c) A company has higher net income in comparison to sales
  - d) A company has higher sales in comparison to net income

## Practice Problems

### **Practice Problem #1**

W Company sells only one product with a selling price of \$200 and a variable cost of \$80 per unit. The company's monthly fixed expense is \$60,000.

- Required:
- A) Determine the breakeven point in units sold and sales dollars.
  - B) Determine the breakeven point in units sold and sales dollars if the company wants a net income of \$30,000.
  - C) Determine margin of safety if current sales are \$175,000.

### **Practice Problem #2**

The H Company had wine sales for December as follows:

|                       | <u>Red</u> | <u>White</u> |
|-----------------------|------------|--------------|
| Bottles sold          | 100        | 40           |
| Average selling price | \$80       | \$45         |
| Average variable cost | \$40       | \$15         |

The only other cost is the wine director's salary of \$36,000 per year.

- Required:
- a) Prepare an income statement by type of wine and in total for December.

- b) Calculate breakeven in sales dollars by type of wine using the weighted average contribution margin ratio. Calculate breakeven in sales dollars by type of wine using the weighted average unit contribution margin.

### **Practice Problem #3**

F Company is debating whether to purchase new equipment that would increase fixed costs from \$96,000 to \$196,000, and decrease variable costs from \$14 per unit to \$8 per unit. If it were to implement the change at its current production level of 100,000, profit would not change. Selling price is \$20 per unit.

- Required:
- Prepare an income statement showing the changes to fixed and variable costs
  - Calculate the degree of operating leverage for each situation and explain the change.

### **Practice Problem #4**

K Company produces three picnic products: coolers, baskets and grills. Each product requires a limited resource of materials. In which order should the products be produced to maximize profits? A product line income statement for the year is shown below:

|                   | <u>Koolers</u> | <u>Baskets</u> | <u>Grills</u>  | <u>Total</u>   |
|-------------------|----------------|----------------|----------------|----------------|
| Units Sold        | 2,000          | 2,500          | 1,500          |                |
| Sales             | \$360,000      | \$600,000      | \$240,000      | \$1,200,000    |
| Variable expenses | <u>198,000</u> | <u>420,000</u> | <u>120,000</u> | <u>738,000</u> |
| CM                | 162,000        | 180,000        | 120,000        | 462,000        |
| Fixed expenses    |                |                |                | <u>240,000</u> |
| Operating income  |                |                |                | \$262,000      |
| Materials         | 8lbs           | 6lbs           | 4lbs           |                |

## Solutions

1. D
2. B
3. C
4. B
5. A
6. D
7. B
8. C
9. A
10. A

### **Solution #1**

A)

$$\begin{aligned}
 \text{CM ratio} &= \frac{\text{Sales} - \text{variable expenses}}{\text{Sales}} = \frac{\$200 - 80}{\$200} = \frac{120}{200} \\
 &= 60\% \\
 \\ 
 \text{Breakeven sales} &= \frac{\text{Fixed expenses} + \text{operating income}}{\text{Contribution margin ratio}} = \frac{\$60,000 + \$0}{60\%} \\
 &= \$100,000 \\
 \\ 
 \text{Breakeven units} &= \frac{\text{Fixed expenses} + \text{operating income}}{\text{Contribution margin \$ per unit}} = \frac{\$60,000 + \$0}{\$120} \\
 &= 500 \text{ units}
 \end{aligned}$$

B)

|           |                                                                                                  |                                     |           |
|-----------|--------------------------------------------------------------------------------------------------|-------------------------------------|-----------|
| CM ratio  | $\frac{\text{Sales} - \text{variable expenses}}{\text{Sales}}$                                   | $\frac{\$200 - 80 = 120}{\$200}$    | 60%       |
| Sales     | $\frac{\text{Fixed expenses} + \text{operating income}}{\text{Contribution margin ratio}}$       | $\frac{\$60,000 + \$30,000}{60\%}$  | \$150,000 |
| Units     | $\frac{\text{Fixed expenses} + \text{operating income}}{\text{Contribution margin \$ per unit}}$ | $\frac{\$60,000 + \$30,000}{\$120}$ | 750 units |
| <b>OR</b> |                                                                                                  |                                     |           |
| Units     | $\frac{\text{Sales}}{\text{Selling price per unit}}$                                             | $\frac{\$150,000}{\$200}$           | 750 units |

C)

Actual Sales- Breakeven Sales= Margin of Safety

$$\$175,000 - 100,000 = \$75,000$$

**Solution #2**a) Current income statement:

|                       | <u>Red</u> | <u>White</u> | <u>Total</u>   |
|-----------------------|------------|--------------|----------------|
| Bottles sold          | 100        | 40           |                |
| Average selling price | \$80       | \$45         |                |
| Total sales           | \$8,000    | \$1,800      | \$9,800        |
| Average cost          | \$40       | \$15         |                |
| Total Cost            | \$4,000    | \$600        | 4,600          |
| Contribution margin   | \$4,000    | \$1,200      | 5,200          |
| Fixed expenses        |            |              | 3,000          |
| Operating income      |            |              | <u>\$2,200</u> |

**Break-even in Sales Dollars**

|               | Red   | White |
|---------------|-------|-------|
| Sales Dollars | 8,000 | 1,800 |
| Total Sales   | 9,800 | 9,800 |
| Sales Mix     | 82%   | 18%   |

|                                            |       |       |       |
|--------------------------------------------|-------|-------|-------|
| Contribution Margin                        | 4,000 | 1,200 |       |
| Sales                                      | 8,000 | 1,800 |       |
| Contribution Margin Ratio                  | 50%   | 67%   |       |
| Sales Mix                                  | 82%   | 18%   |       |
|                                            |       |       | Total |
| Weighted Average Contribution Margin Ratio | 41%   | 12%   | 53%   |

Fixed Cost 3,000  
 / Weighted Average Contribution Margin Ratio 53%  
 = Break-even in Sales Dollars \$ 5,653.85

|              | Sales Mix  | * Break-even       | Break-even in Sales Dollars Per Product |
|--------------|------------|--------------------|-----------------------------------------|
| <b>Red</b>   | <b>82%</b> | <b>\$ 5,653.85</b> | <b>\$ 4,615.38</b>                      |
| <b>White</b> | <b>18%</b> | <b>\$ 5,653.85</b> | <b>\$ 1,038.46</b>                      |

**Break-even in units**

|                                             | Red      | White   |          |
|---------------------------------------------|----------|---------|----------|
| Units Sold                                  | 100      | 40      |          |
| Total Units                                 | 140      | 140     |          |
| Sales Mix                                   | 71%      | 29%     |          |
| Contribution Margin per unit                | 40       | 30      |          |
| Sales Mix                                   | 71%      | 29%     |          |
|                                             |          |         | Total    |
| Weighted Average Unit Contribution Margin   | \$ 28.57 | \$ 8.57 | \$ 37.14 |
| Fixed Cost                                  | 3,000    |         |          |
| / Weighted Average Unit Contribution Margin | 37.14    |         |          |
| = Break-even in Units                       | 80.77    |         |          |

|       | Sales Mix | * Break-even | Break-even in unit Per Product | Verify with Breakeven in sales dollars |         |
|-------|-----------|--------------|--------------------------------|----------------------------------------|---------|
|       |           |              |                                |                                        | 4615.38 |
| Red   | 71%       | 80.77        | 57.69                          | 80                                     | 5       |
|       |           |              |                                |                                        | 1038.46 |
| White | 29%       | 80.77        | 23.08                          | 45                                     | 2       |

**Solution #3**

|                   |                |                |               |                |
|-------------------|----------------|----------------|---------------|----------------|
| <i>Units Sold</i> |                | <i>20,000</i>  |               | <i>20,000</i>  |
| Sales             | \$20.00        | \$400,000      | \$20.00       | \$400,000      |
| Variable          | <u>\$14.00</u> | <u>280,000</u> | <u>\$8.00</u> | <u>160,000</u> |
| CM                | \$6.00         | 140,000        | \$12.00       | 240,000        |
| Fixed             |                | <u>96,000</u>  |               | <u>196,000</u> |
| Net               |                | \$44,000       |               | \$44,000       |
| Income            |                |                |               |                |
| Degree of         |                | 3.18           |               | 5.45           |
| Operating         |                |                |               |                |
| Leverage          |                |                |               |                |

A higher degree of operating leverage exposes a company to greater earnings volatility risk. They will earn more as sales increase, but have potential to lose more if there is a decrease in sales.

**Solution #4**

K Company produces three picnic products: coolers, baskets and grills. Each product requires a limited resource of materials. In which order should the products be produced to maximize profits? A product line income statement for the year is shown below:

|                   | <u>Koolers</u> | <u>Baskets</u> | <u>Grills</u>  |
|-------------------|----------------|----------------|----------------|
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| Variable expenses | <u>198,000</u> | <u>420,000</u> | <u>120,000</u> |
| CM                | 162,000        | 180,000        | 120,000        |
| CM per unit       | 81             | 72             | 80             |
| Materials         | 8lbs           | 6lbs           | 4lbs           |
| CM per Material   | 10.13          | 12             | 20             |

Production order: Grills, Baskets, Koolers