

## Demonstration Problem 2-1 Solution

a.1.

| Number of People Attending (a)             | 1,000    | 2,000    | 4,000    |
|--|----------|----------|----------|
| Total Commission Cost (b)                  | \$20,000 | \$20,000 | \$20,000 |
| Average Commission Cost Per Person (b ÷ a) | \$20     | \$10     | \$5      |

Type of cost: because the total commission cost remains constant at \$20,000 regardless of the number of people attending, it is a fixed cost.

a.2.

| Number of People Attending (a)  | 1,000   | 2,000    | 4,000    |
|---------------------------------|---------|----------|----------|
| Total Cost of Books [b=(a x c)] | \$5,000 | \$10,000 | \$20,000 |
| Average Per Unit Book Cost (c)  | \$5     | \$5      | \$5      |

Type of cost: because the total cost changes in direct proportion with the number of people receiving books, it is a variable cost.

b.1.

| Number of Tickets Sold   | 3,600           | % Change | 4,000           | % Change | 4,400           |
|--------------------------|-----------------|----------|-----------------|----------|-----------------|
| Revenue (\$6 Per Ticket) | \$21,600        | ⇐(10%)⇐  | \$24,000        | ⇒+10%⇒   | \$26,400        |
| Commission Cost (Fixed)  | 20,000          |          | 20,000          |          | 20,000          |
| Net Income               | <u>\$ 1,600</u> | ⇐(60%)⇐  | <u>\$ 4,000</u> | ⇒+60%⇒   | <u>\$ 6,400</u> |

Percentage Change in Revenue:  $\pm \$2,400 \div \$24,000 = \pm 10\%$

Percentage Change in Net Income:  $\pm \$2,400 \div \$4,000 = \pm 60\%$

b.2.

| Number of Tickets Sold     | 3,600           | % Change | 4,000           | % Change | 4,400           |
|----------------------------|-----------------|----------|-----------------|----------|-----------------|
| Revenue (\$6 Per Ticket)   | \$21,600        | ⇐(10%)⇐  | \$24,000        | ⇒+10%⇒   | \$26,400        |
| Commission Cost (Variable) | 18,000          |          | 20,000          |          | 22,000          |
| Net Income                 | <u>\$ 3,600</u> | ⇐(10%)⇐  | <u>\$ 4,000</u> | ⇒+10%⇒   | <u>\$ 4,400</u> |

Percentage Change in Revenue:  $\pm \$2,400 \div \$24,000 = \pm 10\%$

Percentage Change in Net Income:  $\pm \$400 \div \$4,000 = \pm 10\%$

## Demonstration Problem 2-1 Solution continued

c.1. (Same as part a.1.)

| Number of People Attending (a)             | 1,000    | 2,000    | 4,000    |
|--|----------|----------|----------|
| Total Commission Cost (b)                  | \$20,000 | \$20,000 | \$20,000 |
| Average Commission Cost Per Person (b ÷ a) | \$20     | \$10     | \$5      |

Type of cost: because the total commission cost remains constant at \$20,000 regardless of the number of people attending, it is a fixed cost.

c.2.

| Number of Exhibitions (a)              | 1        | 2        | 3        |
|--|----------|----------|----------|
| Total Expected Commission Cost (a x b) | \$20,000 | \$40,000 | \$60,000 |
| Cost Per Exhibition (b)                | \$20,000 | \$20,000 | \$20,000 |

Type of cost: because the total cost changes in direct proportion with the number of exhibitions, it is a variable cost.

Note carefully, a given cost (the artist's commission) can be fixed or variable depending upon the context.

## Demonstration Problem 2-2 Solution

a.

|  | My<br>Company    | Your<br>Company  |
|--|------------------|------------------|
| Number of Rafters (a)                  | 4,000            | 4,000            |
| Revenue (\$50 x a)                     | \$200,000        | \$200,000        |
| Cost of Guides My Company              | Fixed (160,000)  |                  |
| Cost of Guides Your Company (\$40 x a) | Variable         | (160,000)        |
| Net income                             | <u>\$ 40,000</u> | <u>\$ 40,000</u> |

b.

|  | My<br>Company    | Your<br>Company  |
|--|------------------|------------------|
| Number of Rafters (a)                  | 6,000            | 2,000            |
| Revenue My Company (\$39 x a)          | \$234,000        |                  |
| Revenue Your Company (\$50 x a)        |                  | \$100,000        |
| Cost of Guides My Company              | Fixed (160,000)  |                  |
| Cost of Guides Your Company (\$40 x a) | Variable         | (80,000)         |
| Net Income                             | <u>\$ 74,000</u> | <u>\$ 20,000</u> |

My Company was able to increase total revenue because the decrease in price was offset by an increase in volume. In other words, 6,000 customers paying \$39 each produce more revenue (\$234,000) than do 4,000 customers paying \$50 (\$200,000). Since My Company's costs are fixed, the increase in the number of customers served does not increase costs. Consequently, the \$34,000 (\$234,000 - \$200,000) increase in revenue produces a corresponding \$34,000 (\$74,000 - \$40,000) increase in net income. Conversely, Your Company's profitability declines in proportion to its loss of customers. In this case Your Company experienced a \$20,000 decline in income (\$40,000 - \$20,000). Using this strategy My Company could eventually run Your Company out of business. My Company stands to gain an

additional \$78,000 ( $\$39 \times 2,000$ ) of revenue when it takes over Your Company's remaining customers. This additional revenue will be pure profit. Indeed, My Company's profitability may increase more dramatically because the company could then raise prices in the absence of competition.

c.

The most common strategy students offer is to create product differentiation. Many variations of this strategy are possible. Your Company could use a different type of raft, travel different routes, schedule different start and stop times, maintain a superior safety record. Product differentiation is a valid answer. However, watch for errors in logic such as "we will provide a free lunch or a free night's lodging." While such items are free to customers, they are not free to the business providing them. Such offerings will increase Your Company's variable cost and thereby intensify the competitive disadvantage.

Students also commonly suggest cutting costs by paying the tour guides less. Students often offer strategies involving employees without considering employee reaction. You may wish to emphasize the importance of establishing good employee relations.

Occasionally someone suggests a merger. The merged company could retain the salaried tour guides and dismiss those paid on a variable basis. Emphasize the effects of operating leverage. When fixed costs remain unchanged and volume increases, profits soar. This may be a hard-hearted approach, but it is highly profitable and illustrates one reason why companies choose to merge.

The response that applies most directly to the subject of cost behavior is for Your Company to match My Company's price and hold firm. As shown in part d, My Company cannot benefit from the price-cutting strategy unless volume increases. If both companies retain their market share of 4,000 customers, both will incur losses at a price of \$39 per rider. In business it is often necessary to incur short-term losses in order to maintain

market share. This situation illustrates one of many reasons that a strong capital structure can be essential for survival.

d.

|   | My<br>Company     | Your<br>Company   |
|---|-------------------|-------------------|
| Number of Rafters (a)                           | 4,000             | 4,000             |
| Revenue (\$39 x a)                              | \$156,000         | \$156,000         |
| Cost of Guides My Company                       | (160,000)         |                   |
| Cost of Guides Your Company (\$40 x a) Variable |                   | (160,000)         |
| Net Loss  | <u>\$ (4,000)</u> | <u>\$ (4,000)</u> |

## Demonstration Problem 2-3 Solution

- a. Income Statement Using a Contribution Margin Format,  
Volume of 100 Deliveries

|  |         |
|--|---------|
| Revenue (\$10 x 100 deliveries)          | \$1,000 |
| Variable Expenses (\$2 x 100 deliveries) | (200)   |
| Contribution Margin                      | 800     |
| Fixed Expenses                           | (600)   |
| Net Income                               | \$ 200  |

- b. Magnitude of Operating Leverage = Contribution Margin ÷  
Net Income:

$$\$800 \div \$200 = 4 \text{ times.}$$

Therefore, a 10% increase in sales will produce a 40% (10% x 4) increase in net income. Similarly, a 10% decrease in sales will produce a 40% decrease in net income.

- c. Income Statement Using a Contribution Margin Format,  
Volume of 110 Deliveries

|  |         |
|--|---------|
| Revenue (\$10 x 110 deliveries)          | \$1,100 |
| Variable Expenses (\$2 x 110 deliveries) | (220)   |
| Contribution Margin                      | 880     |
| Fixed Expenses                           | (600)   |
| Net Income                               | \$ 280  |

$$\begin{aligned} & (\text{Alternative Net Income} - \text{Base Net Income}) \div \text{Base} \\ & (\$280 - \$200) \div \$200 = 40\% \end{aligned}$$

The answer to part c confirms the answer determined in part b.

## Demonstration Problem 2-1 Work Papers

a.1.

| Number of People Attending         | 1,000 | 2,000 | 4,000 |
|------------------------------------|-------|-------|-------|
| Total Commission Cost              |       |       |       |
| Average Commission Cost Per Person |       |       |       |

Type of cost:

a.2.

| Number of People Attending | 1,000 | 2,000 | 4,000 |
|----------------------------|-------|-------|-------|
| Total Cost of Books        |       |       |       |
| Average Per Unit Book Cost |       |       |       |

Type of cost:

b.1.

| Number of Tickets Sold   | 3,600           | % Change                         | 4,000           | % Change                         | 4,400           |
|--------------------------|-----------------|----------------------------------|-----------------|----------------------------------|-----------------|
| Revenue (\$6 Per Ticket) |                 | $\Leftarrow ( \ \% ) \Leftarrow$ |                 | $\Rightarrow + \ \% \Rightarrow$ |                 |
| Commission Cost (Fixed)  |                 |                                  |                 |                                  |                 |
| Net Income               | <u>\$ 1,600</u> | $\Leftarrow ( \ \% ) \Leftarrow$ | <u>\$ 4,000</u> | $\Rightarrow + \ \% \Rightarrow$ | <u>\$ 6,400</u> |

Percentage Change in Revenue:

Percentage Change in Net Income:

b.2.

| Number of Tickets Sold     | 3,600           | % Change                         | 4,000           | % Change                         | 4,400           |
|----------------------------|-----------------|----------------------------------|-----------------|----------------------------------|-----------------|
| Revenue (\$6 Per Ticket)   |                 | $\Leftarrow ( \ \% ) \Leftarrow$ | \$24,000        | $\Rightarrow + \ \% \Rightarrow$ |                 |
| Commission Cost (Variable) |                 |                                  | 20,000          |                                  |                 |
| Net Income                 | <u>\$ 3,600</u> | $\Leftarrow ( \ \% ) \Leftarrow$ | <u>\$ 4,000</u> | $\Rightarrow + \ \% \Rightarrow$ | <u>\$ 4,400</u> |

Percentage Change in Revenue:

Percentage Change in Net Income:

## Demonstration Problem 2-1 Work Papers, continued

c.1. (Same as part a.1.)

| Number of People Attending         | 1,000 | 2,000 | 4,000 |
|------------------------------------|-------|-------|-------|
| Total Commission Cost              |       |       |       |
| Average Commission Cost Per Person |       |       |       |
|                                    |       |       |       |

Type of cost:

c.2.

| Number of Exhibitions (a)      | 1 | 2 | 3 |
|--------------------------------|---|---|---|
| Total Expected Commission Cost |   |   |   |
| Cost Per Exhibition            |   |   |   |
|                                |   |   |   |

Type of cost:



## Demonstration Problem 2-2 Work Papers

a.

|                             | My<br>Company | Your<br>Company |
|-----------------------------|---------------|-----------------|
| Number of Rafter            | 4,000         | 4,000           |
| Revenue                     |               |                 |
| Cost of Guides My Company   |               |                 |
| Cost of Guides Your Company |               |                 |
| Net income                  |               |                 |

b.

|                             | My<br>Company | Your<br>Company |
|-----------------------------|---------------|-----------------|
| Number of Rafter (a)        | 6,000         | 2,000           |
| Revenue My Company          |               |                 |
| Revenue Your Company        |               |                 |
| Cost of Guides My Company   |               |                 |
| Cost of Guides Your Company |               |                 |
| Net Income                  |               |                 |

d.

|                             | My<br>Company | Your<br>Company |
|-----------------------------|---------------|-----------------|
| Number of Rafter            | 4,000         | 4,000           |
| Revenue                     |               |                 |
| Cost of Guides My Company   |               |                 |
| Cost of Guides Your Company |               |                 |
| Net Loss                    |               |                 |

## Demonstration Problem 2-3 Work Papers

- a. Income Statement Using a Contribution Margin Format,  
Volume of 100 Deliveries

|                     |       |
|---------------------|-------|
| Revenue             |       |
| Variable Expenses   | _____ |
| Contribution Margin | _____ |
| Fixed Expenses      | _____ |
| Net Income          | _____ |

- b. Magnitude of Operating Leverage = Contribution Margin ÷  
Net Income:  
\$ \_\_\_\_\_ ÷ \$ \_\_\_\_\_ = \_\_\_\_\_ times.

Therefore, a 10% increase in sales will produce a \_\_\_\_\_  
increase in net income. Similarly, a 10% decrease in sales  
will produce a \_\_\_\_\_ decrease in net income.

- c. Income Statement Using a Contribution Margin Format,  
Volume of 110 Deliveries

|                     |       |
|---------------------|-------|
| Revenue             |       |
| Variable Expenses   | _____ |
| Contribution Margin | _____ |
| Fixed Expenses      | _____ |
| Net Income          | _____ |

(Alternative Net Income – Base Net Income) ÷ Base:

(\$ \_\_\_\_\_ – \$ \_\_\_\_\_) ÷ \$ \_\_\_\_\_ = \_\_\_\_\_ %