**u05a2 – CVP Analysis, Costing Method**

***P-12.20 CVP Application – What If Questions: Sales Mix Issue.*** This provides a simple illustration of CVP analysis.

CVP application – eliminate product from operations? Body Sculpture, Inc., makes three models of high=performance weight-training benches. Current operating data are summarized here:

|  |  |  |  |
| --- | --- | --- | --- |
|   |  **MegaMuscle** | **PowerGym** | **ProForce** |
| Selling price per unit |  280  | 400 | 580 |
| Contribution margin per unit |  84  | 154 | 116 |
| Monthly sales volume-units |  6,000  | 4,000 | 2,000 |
| Fixed expenses per month  |   | Total of 1,280,000 |   |

**REQUIRED:**

1. Calculate the contribution margin ratio of each product.
2. Calculate the firm’s overall contribution margin ratio.
3. Calculate the firm’s monthly break-even point in sales dollars.
4. Calculate the firm’s monthly operating income.
5. Management is considering the elimination of the ProForce model due to its low sales volume and low contribution margin ratio. As a result, total fixed expenses can be reduced to $1,080,000 per month. Assuming that this change would not affect the other models, would you recommend the elimination of the ProForce model? Explain your answer.
6. Assume the same facts as in part **e**. Assume also that the sales volume for the PowerGym model will increase by 1,000 units per month if the ProForce model is eliminated. Would you recommend eliminating the ProForce model? Explain your answer

***C-12.26 Understanding the Effects of Operations Leverage.*** This provides an illustration of CVP analysis

Understanding the effects of operating leverage. HighTech, Inc., and OldTime Co. compete within the same industry and had the following operating results in 2010:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **HighTech, Inc.** |  | **OldTime Co.** |
| Sales | $2,100,000 |  | $2,100,000 |
| Variable expenses | $420,000 |  | $1,260,000 |
| Contribution margin | $1,680,000 |  | $840,000 |
| Fixed expenses | $1,470,000 |  | $630,000 |
| Operating income | $210,000 |  | $210,000 |
|   |   |   |   |

**REQUIRED:**

1. Calculate the break-even point for each firm in terms of revenue,
2. What observations can you draw by examining the break-even point of each firm given that they earned an equal amount of operating income on identical sales volumes in 2010?
3. Calculate the amount of operating income (or loss) that you would expect each firm to report in 2011 if sales were to

 1. Increase by 20%.

 2. Decrease by 205

1. Using the amount computed in requirement **c**, calculate the increase or decrease in the amount of operating income expected in 2011 from the amount reported in 2010.
2. Explain why an equal percentage increase (or decrease) in sales for each firm would have such differing effects on operating income.
3. Calculate the ratio of contribution margin to operating income for each firm in 2010. *(Hint: Divide contribution margin by operating income).*
4. Multiply the expected increase in sales of 20% for 2011 by the ration of contribution margin to operating income for 2010 computed in requirement **f** for each firm *(Hint: Multiply your answer in requirement* ***f*** *by 0.2).*
5. Multiply your answer in requirement **g** by the operating income of $210,000 reported in 2010 for each firm.
6. Compare your answer in requirement **h** with your answer in requirement **d**. What conclusions can you draw about the effects of operating leverage from the steps you performed in requirements **f**, **g**, and **h**?

***E-13.10 – Product Costing – Manufacturing Overhead – Over/Underapplied.*** This illustrates the issues for allocating manufacturing overhead.

Manufacturing overhead – over/underapplied. LampArt Co. makes specialty table lamps. Manufacturing overhead is applied to production on a direct labor hours basis. During November, the first month of the company’s fiscal year, $173,250 of manufacturing overhead was applied to Work in Process Inventory using the predetermined overhead application rate of $15 per direct labor hour.

REQUIRED:

1. Calculate the number of hours of direct labor used during November.
2. Actual manufacturing overhead costs incurred during November totaled $166,425. Calculate the amount of over or underapplied overhead for November.
3. Identify two possible explanations for the over or underapplied overhead.
4. Explain the accounting appropriate for the over or underapplied overhead at the end of November.

***P-13.16 – Activity-Based Costing Versus Traditional Overhead Allocation Methods.*** This illustrates the differences between activity-based costing and traditional methods.

Activity-based costing versus traditional overhead allocation methods. Galvaset Industries manufactures and sells custom-made windows. Its job costing system was designed using an activity-based costing approach. Direct materials and direct labor costs are accumulated separately, along with information concerning three manufacturing overhead cost drivers (activities). Assume that the direct labor rate is $20 per hour and that there were no beginning inventories. The following information was available for 2010, based on an expected production level of 50,000 units for the year, which will require 200,000 direct labor hours:

|  |  |  |  |
| --- | --- | --- | --- |
| **Activity** | **Budgeted** | **Cost Driver Used** | **Cost** |
| **(Cost Driver** | **Costs for 2010** | **as Allocation base** | **Allocation Rate** |
| Materials handling | $325,000 | Number of parts used | $0.25 per unit |
| Cutting and lathe work | $2,340,000 | Number of parts used | 1.80 per part |
| Assembly and inspection | $5,000,000 | Direct labor hours | 25.00 per hour |

The following production, costs, and activities occurred during the month of March.

|  |  |  |  |
| --- | --- | --- | --- |
| **Units** | **Direct** | **Number** | **Direct** |
| **Produced** | **Materials Costs** | **of Parts Used** | **Labor Hours** |
| 3,800 | $142,000  | 83,600 | 17,180 |

**REQUIRED:**

1. Calculate the total manufacturing costs and the cost per unit of the windows produced during the month of March (using the activity-based costing approach).
2. Assume instead that Galvaset Industries applies manufacturing overhead on a direct labor hours basis (rather than using the activity-based costing systems previously described). Calculate the total manufacturing cost and the cost per unit of the windows produced during the month of March. *(Hint: You will need to calculate the predetermined overhead application rate using the total budgeted overhead costs for 2010).*
3. Compare the per unit figures calculated in parts **a** and **b**. Which approach do you think provides better information for manufacturing managers? Explain your answer.