Unit Summaries

Unit 3.1 – Breakeven Analysis
Using Universal Sports Exchange’s results from 2014, the unit presents the breakeven point calculation first using the profit equation \((Sales - VC - FC = OI)\) and then using the formula \(\frac{Total\ Fixed\ Expenses}{Contribution\ Margin\ per\ Unit}\). Breakeven graphs are also introduced. The Reality Check provides an example of breakeven analysis in two service settings – an airline and an art gallery.

Unit 3.2 – Cost-Volume-Profit Analysis
This unit begins with introducing the concept of target income and how the profit equation or breakeven formula can be used to determine the sales volume required to achieve the target income. CVP analysis is then introduced through some “what if” scenarios that Universal Sports Exchange might face.

Unit 3.3 – Multiproduct CVP Analysis
This unit expands CVP into a multiproduct environment using the profit equation.

Unit 3.4 – Pricing Decisions
The final unit in this chapter introduces pricing concepts. We include this unit at this point because many CVP analyses include changes in the sales price. Cost-plus pricing and target costing provide an introduction to pricing decisions and the use of markups. The discussion of pricing should be based on customer value rather than solely focusing on achieving a target markup.

Running Case Recap
In Chapter 2, students learned about Universal Sports Exchange’s costs, and this chapter will explore how Universal’s managers can use this information to evaluate decision alternatives.

Motivating the Chapter with The Business Decision and Context
This chapter focuses on C&C Sports’ customer Universal Sports Exchange. After experiencing a sales volume that was 10% lower than expected and reporting a lower than expected operating income, managers are interested in learning more about how to predict operating results. Vice president for sales Martin Keck is preparing for a meeting to discuss the operating income impacts of spending an additional $50,000 in advertising and reducing sales prices by 10%. This chapter discusses tools that will help Martin Keck complete his assessment and choose a strategy for improving operating income.

While this chapter focuses on retailer Universal Sports Exchange, students need to understand that actions taken by one link in the supply chain affect other links. For example, if C&C Sports raises the price it charges to Universal Sports Exchange, Universal’s profits will decrease unless it increases its sales price to the final customer.
## Assignment Classification by Learning Objective

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<td>M</td>
<td>20-25</td>
<td>AN</td>
<td>E</td>
<td>DM</td>
<td>PS</td>
<td>DA</td>
<td></td>
</tr>
</tbody>
</table>
Chapter Summary

Unit 3.1

LO 1  Calculate the break even point in units and sales dollars.
The break even point is the level of sales at which sales revenue equals total expense and profit is $0. This point can be calculated in terms of units or sales revenue using either the profit equation or the contribution margin formula, as follows:

\[
\frac{\text{Total fixed expenses}}{\text{Contribution margin per unit}} = \text{Breakeven point in units}
\]

\[
\frac{\text{Total fixed expenses}}{\text{Contribution margin ratio}} = \text{Breakeven point in Sales dollars}
\]

Unit 3.2

LO 2  Calculate the level of activity required to meet a target income.
To calculate the sales level required to meet a certain level of operating income, use one of the following formulas. If you are working with a target level of net income, divide it by (1 minus the tax rate) to convert it to operating income before using one of the formulas.

\[
\frac{\text{Total fixed expenses} + \text{Target operating income}}{\text{Contribution margin per unit}} = \text{Breakeven point in Units}
\]

\[
\frac{\text{Total fixed expenses} + \text{Target operating income}}{\text{Contribution margin ratio}} = \text{Breakeven point in sales dollars}
\]

LO 3  Determine the effects of changes in cost, volume, and profit on operating income.
Using the following equations, you should be able to solve for any unknown factors that would help in evaluating the financial impact of certain managerial decisions.

\[
\text{Revenues} - \text{Expenses} = \text{Operating income}
\]

\[
\text{Revenues} - \text{Variable expenses} - \text{Fixed expenses} = \text{Operating income}
\]

\[
(\text{SP per unit} \times \# \text{ units sold}) - (\text{VC per unit} \times \# \text{ units sold}) - \text{Fixed expenses} = \text{Operating income}
\]

\[
[((\text{SP per unit} - \text{VC per unit}) \times \# \text{ units sold}) - \text{Fixed expenses} = \text{Operating income}
\]

\[
(\text{Contribution margin per unit} \times \# \text{ units sold}) - \text{Fixed expenses} = \text{Operating income}
\]

Other relationships that you will find helpful in solving these problems include the contribution margin ratio (the contribution margin divided by sales revenue) and the variable cost ratio (variable cost divided by sales revenue). The sum of the contribution margin ratio and the variable cost ratio is 1.

LO 4  Define operating leverage and explain the risks associated with the tradeoff between variable and fixed cost.
Operating leverage indicates the change in operating income that will result from a change in sales; it is directly affected by the ratio of fixed expenses to variable expenses. The degree of operating leverage at a particular level of sales can be calculated as follows:

\[
\frac{\text{Contribution margin}}{\text{Operating income}} = \text{Degree of operating leverage}
\]
Companies with relatively high contribution margins (meaning low variable costs) and high fixed expenses generate profits quickly once they pass the breakeven point. However, if their sales fall below the breakeven point, their losses mount quickly. To reduce the risk of covering fixed expenses, some companies prefer to carry relatively high levels of variable costs, so that expenses are incurred only as products are sold.

Unit 3.3

LO 5  **Calculate the multi-product breakeven point and level of activity required to meet a target income.**
Companies that sell more than one product must consider their sales mix in order to solve breakeven and other problems. Holding the sales mix constant for \( n \) products, the breakeven point and target operating income can be calculated using the modified profit formula:

\[
CM_1 + CM_2 + \ldots + CM_n - \text{Fixed expenses} = \text{Operating income}
\]

Unit 3.4

LO 6  **Define markup and explain cost-plus pricing.**
A markup is the difference between the cost of a product or service and the price a company charges for it. The markup percentage can be calculated as

\[
\frac{\text{Sales price - Cost per unit}}{\text{Cost per unit}} = \text{markup \%}
\]

Cost-plus pricing begins with the cost of a product and adds a markup to determine the price to charge. The flaw in this method is that the resulting price does not reflect the value of the product to the customer. After the price has been calculated, managers must still compare it to the price of a comparable product or service. If the price is too high relative to competitors’ prices, the company is unlikely to be able to sell the product.

LO 7  **Explain target costing and calculate a target cost.**
Target costing begins with the price a customer is willing to pay for a product or service and works backward to the maximum cost the company can incur to deliver the product or service to market. Assume, for example, that a company is considering a new product that marketing research suggests customers will pay no more than $25 for. If the company needs a 40% gross profit margin to cover its operating expenses and contribute to profit, then managers must be able to acquire or make the product for no more than $15: $25 – ($25 \times 40\%) = $15. If managers conclude that they can deliver the product for $15, then they should go ahead with the new venture. If they can’t, then they need to halt the project before the company sinks any more funds into it.

Related Reading


This article discusses how retailers are changing the products they offer, thus changing the sales mix. The article can provide a foundation for discussing the effects of the sales mix change on contribution margin and breakeven point.


This article discusses how clothing retailers are pushing more sales of accessories to improve sales and profits. Accessories typically have higher margins than clothing. The article can be used to discuss how the
move toward higher margin products changes the sales mix, and thus the contribution margin and breakeven point.

This article discusses how companies responded to economic hardships by cutting sales prices to just cover variable costs. Ryan provides five signs that may indicate a company’s pricing strategy needs examining. There is a brief discussion of pricing in response to strategic choice. Available online at http://www.cfo.com/article.cfm/14456855.

This article provides cost information for producing Apple’s iPhone 5. Using this information, students can calculate the markup used to reach the $649 retail price (at the time of the article) for both the iPhone 5 and iPhone 4. This would be a nice companion to Exercise 3-23.

Kate Plourd, “On The Record: Marc Stolsman, CFO, Blue Nile Inc.,” CFO, February 2009.
This interview with Blue Nile, Inc.’s CFO provides additional company information to complement Case 3-42. Available online at http://www.cfo.com/article.cfm/13003936?f=search.

Additional Cases

This case provides an opportunity to practice breakeven analysis and to learn and improve EXCEL skills. While the breakeven analysis in the case is based on a manufacturing setting, you can simply provide students with the appropriate cost behavior classifications in order to complete the assignment. The assignment contains several components, some of which have not been covered at this point in the text, so you will need to provide revised instructions to students about which components to complete.

This case provides a relatively simple scenario for identifying fixed and variable costs, preparing a contribution format income statement, and conducting CVP analysis.

This case illustrates how variable and fixed costs in a small business influence pricing practices. The context of a t-shirt shop is one that students can understand easily.

Critical Thinking Exercises

Alternatively, provide this brief statement about the article’s content.

The Wall Street Journal reported on January 26, 2010, that Ford Motor Co. was going to announce the addition of a second shift at its Chicago plant that would create 1,200 jobs. However, under a new union agreement that allows a two-tiered wage system, as many as 600 of these workers will earn an average of $14/hour, which is about half of the current new hire wage.

Questions
• What effect will this new lower wage rate have on Ford’s contribution margin?
   The lower wage rate will reduce the variable cost per vehicle, which will increase the contribution margin.
How will it affect Ford’s breakeven point?

The higher contribution margin will reduce the company’s breakeven point.


Questions

Discuss the mechanics of fixed price contracts and cost-plus price contracts.

In a cost-plus contract, the buyer pays a set amount above the costs incurred by the seller. For example, if the contract is cost plus 20% and the seller incurs $100 in costs to deliver the product or service, the buyer will pay $120. If the seller incurs only $80 in costs, the buyer will pay only $96. In a fixed-price contract, the buyer pays a set amount, regardless of the costs incurred by the seller to deliver the product or service.

Prepare a table that compares the advantages and disadvantages of each pricing method from the perspective of the buyer and then the seller.

<table>
<thead>
<tr>
<th>Buyer</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed price contract</td>
<td>• Knows the amount that will have to be paid for the goods&lt;br&gt;• Eliminates uncertainty as to price</td>
<td>• Seller may cut corners to achieve a desired profit margin</td>
</tr>
<tr>
<td>Cost-plus contract</td>
<td>• Price is limited by the amount of costs incurred by the seller&lt;br&gt;• Can work with seller to control price by choosing lower cost services or products&lt;br&gt;• Seller has little incentive to cut corners on quality&lt;br&gt;• Price may be lower than fixed-price contract because seller does not need inflate the price to cover unexpected cost increases</td>
<td>• Seller has no incentive to control costs, so buyer may end up paying more than expected&lt;br&gt;• Buyer must monitor costs to insure only allowed costs are included in the cost basis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Seller</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed price contract</td>
<td>• Seller can increase profit margin if costs of products and services can be reduced</td>
<td>• May have to bear the risk of unexpected cost increases that cannot be passed on to the buyer</td>
</tr>
<tr>
<td>Cost-plus contract</td>
<td>• Seller can pass on all unexpected cost increases to the buyer&lt;br&gt;• Profit margin is protected from unexpected cost increases</td>
<td>• No way to improve the profit margin on the sale</td>
</tr>
</tbody>
</table>

Read Arik Hesseldahl, “Phone 5 Costs Stay in Check,” The Wall Street Journal, September 24, 2012

Questions

Using the cost information in the article, calculate the markup percentage Apple used to reach the $649 suggested retail price for both the iPhone 5 and iPhone 4s.

$$\frac{($649 - $197)}{$197} = 229.4\% \text{ markup on reported cost for iPhone 5}$$
Identify additional variable costs that Apple will likely incur on each iPhone 5 it sells and estimate those costs. Using these estimates and assuming that the $197 costs for the iPhone 5 are all variable, calculate the iPhone 5’s contribution margin per unit. Other variable costs might include production labor, shipping and sales commission. Students’ estimates of these costs will vary, as will the calculated contribution margin per unit.

What might have led Apple to hold the price on the iPhone 5 at the same level as the iPhone 4s, even though the cost of components increased? It is possible that Apple’s market research indicates that $649 is the value that consumers place on the iPhone, and thus the price that it can charge in the market.

Stories such as this generally appear with the release of new phone and tablet models. Similar exercises can be created using any of the following articles. Another interesting assignment would be to compare the markups for similar products across different manufacturers or for a single product line across generations.

- “Toting up the Tab,” The Wall Street Journal, March 15, 2011 (for the iPad2)


Questions
Visit the web site of Barnes & Noble, Borders, or Amazon.com and find the price of both the hardcover and e-book editions of a best seller.

- Explain why a consumer is willing pay a higher price for the hardcover edition than the e-book edition. A customer is willing to pay a higher price for the hardcover edition because he/she values the hardcover book more than the e-book. This value may arise from the ability to share the hardcover book, the ability to “touch” the physical book, or the inability to accidentally “delete” the hardcover book, among other valued characteristics. These valued characteristics may differ between customers.

- Using this new pricing model, a $12.99 e-book will generate $3.90 in gross margin for the retailer, with the remaining $9.09 going to the publisher. Estimate the contribution margin on this $3.90. There would be very little in additional variable costs incurred by the seller; therefore, the contribution margin would be very close to $3.90 for each e-book sold.

- Explain what likely will happen to retailers’ breakeven point as more readers move from hardcover books to e-books. As customers move from hardcover books to e-books, the retailer’s sales mix will change. This will in turn affect the breakeven point. The direction of the change will depend on the relationship between the contribution margin ratios of the two products. If e-books have a higher contribution margin ratio, the breakeven point will decrease.
• How do the resources required for distributing hardcover books compare to those of distributing e-books?

*To distribute hardcover books, a retailer will need physical warehouse space to store books, and inventory management system, a point-of-sales system, and perhaps a retail store with sales. To distribute e-books, a retailer needs a computer system to store the e-book files and a point-of-sale system. No physical retail space is required.*

• How would a move from distributing hardcover books to distributing e-books likely affect the degree of operating leverage for the retailer? For the publisher?

*The retailer incurs very little cost to distribute e-books. As a retailer moves from hardcover to e-books, investment in physical stores may be reduced as less physical inventory of hardcover books is required. The cost structure will move from fixed costs to more variable costs. In addition to the costs incurred to acquire the manuscript from the author, publishers incur costs to print and distribute hardcover books. The e-book requires little additional cost to produce and distribute.*
Use this slide to motivate Chapter 3 in the context of what Universal Sports Exchange is planning to do in order to increase sales. Remind students that Universal Sports Exchange is a customer of C&C Sports (use the supply chain picture below The Pitch). You could ask additional questions such as “How many additional jerseys must Universal Sports Exchange sell to make the $50,000 investment in additional advertising a worthwhile expenditure?”

This unit teaches the breakeven point calculation.

Before showing the bullet points, ask students to define “break even” in their own words. Talk about how they might use breakeven in their personal lives. Stress that there is only one sales volume at which breakeven is achieved.

Work through the algebra of the profit equation with the students to reinforce how it can be used to solve for the breakeven point. Point out that $\text{SP}(x) - \text{VC}(x)$ is the contribution margin.
This Universal Sports Exchange contribution format income statement is Exhibit 3-1 from the textbook. Use it to complete the profit equation and calculate the breakeven point of 42,000 jerseys.

Derive this shortcut formula by once again showing the algebra in the profit equation from the previous slide. Then have students calculate Universal Sports Exchange’s breakeven point in units using the information from Exhibit 3-1.

Derive this shortcut formula by once again showing the algebra in the profit equation from the previous slide. Then have students calculate Universal Sports Exchange’s breakeven point in dollars using the information from Exhibit 3-1.

This breakeven graph based on Universal Sports Exchange’s information from Exhibit 3-1 is Exhibit 3-2 in the textbook. Explain that the total expenses line intersects the y-axis at the amount of total fixed expenses. From that point, the total cost line increases at a slope equal to the variable cost per unit. Explain that the total sales revenue line begins at the origin because if no units are sold, there is no sales revenue. From the origin, the total sales revenue line increases at a slope equal to the sales price per unit. The point at which the two lines intersect is the breakeven point.

Show the calculation of margin of safety. Explain the concept of margin of safety. This is the “sales cushion” above the breakeven sales volume. Then have students calculate Universal Sports Exchange’s margin of safety. Based on the information shown, Universal Sports Exchange can experience a $210,000 decline in sales revenue before it suffers an operating loss.
Exercise 3-2 is a simple example of breakeven calculations. Taking a few minutes to allow students to complete this exercise individually or in groups will provide an indication of their level of understanding.

This unit teaches cost-volume-profit analysis from a retailer’s point of view. This allows students to focus on simple cost structures while learning how to do CVP.

Review the profit equation to reinforce the difference between variable expenses and fixed expenses.

Remind students that while breakeven calculations are useful, organizations are typically hoping to do more than break even. So a helpful question to ask is “how much do I have to sell to make $X?” Use the profit equation to derive the shortcut formula shown on the slide.
Explain to students that since an organization must pay income taxes, you need to take that into consideration when looking at a target income situation. Demonstrate how to “gloss up” net income to determine the amount of operating income that must be achieved.

This simple example (Exercise 3-10) can be used to walk through the calculations with a concrete example. The solution can be done individually or can be led by the instructor.

To get students thinking about the implications of their answer, inform them that Wimpee’s has never sold more than 21,000 hamburgers in a month. Then ask how likely it is that Wimpee’s will achieve the required level of sales. Ask what actions managers could take to help achieve the desired $6,000 operating income.

Explain the basic premise behind C-V-P analysis. This tool allows managers to quickly assess the bottom-line impact a particular decision alternative will have. Stress that developing an understanding of how to conduct C-V-P analysis is vital to all majors. It is not just a tool for accountants.

Describe the three ways CVP analysis may be approached. Encourage students to use the first method as they are learning the basics of CVP. As they get more comfortable, they may want to move to an incremental approach.
Have students think about how C&C’s C-V-P decisions affect Universal Sports Exchange. For example, a price increase by C&C will increase Universal’s variable COGS. Then have the students think about how Universal’s decisions affect C&C Sports. For example, if Universal is trying to reduce its costs, it may try to negotiate a lower price from C&C or look for a cheaper supplier. If Universal chooses another supplier, C&C may produce fewer jerseys, which means less fabric ordered from Bradley Textiles, and so on down the supply chain.

Operating leverage is a difficult concept for students to grasp. Using the Reality Check in this unit about Circuit City’s switch from commissions to salaries will provide a relatively simple example for students to think about as you discuss the topic. Once you define operating leverage, use the next slide to show it graphically.

Use the example in this graph to show how changing from a variable cost structure to a more fixed cost structure changes the breakeven point. Then discuss how the change affects the speed at which you reach a profit level. Once you reach the breakeven point, a fixed cost structure, with its higher contribution margin per unit, will generate profits more quickly than the variable cost structure. Be sure to discuss behavioral issues. Just because you change the operating structure doesn’t mean that employees will respond favorably to the change.

Exercise 3-6 is a simple example of CVP calculations. Taking a few minutes to allow students to complete this exercise individually or in groups will provide an indication of their level of understanding.
This unit addresses CVP in a multi-product setting, focusing on the breakeven point calculation. Some instructors may consider this an “extra” topic and choose not to cover it.

Refer to Landon Sports, one of Universal’s competitors. Talk about Landon Sports’ two product lines. Since jerseys and athletic shoes have different contribution margins, the approach to breakeven and CVP analysis learned in previous units must be enhanced.

Explain the sales mix concept. For a visual prop, consider bringing in a shopping bag filled with some products and then pull them out to illustrate sales mix.

Demonstrate that the profit equation still works with multiple products.
Talk about Landon Sports’ 4:1 sales mix for jerseys and athletic shoes. Have students write the profit equation before showing the answer. Emphasize that the sales mix allows you to express contribution margin for the company in terms of a single product’s sales volume.

Use the profit equation derived on the previous slide to calculate the breakeven point. Emphasize again that with multiple products, you have to solve in terms of one product and then calculate the required sales of the remaining products using the sales mix.

While CVP is a useful tool, it is important to understand that it does have limitations. Discuss each of these to ensure students understand the limitations. But emphasize that in spite of its limitations, CVP is a widely-used tool in managerial decision making.

Talk about the different changes that can be examined through CVP analysis. Emphasize that students should use the “constant” forms of sales price per unit, variable cost per unit, and total fixed costs. Use specific examples from Universal Sports Exchange data, such as facing an increase in the purchase price of the C&C baseball jersey, giving employees a raise, facing an increase in store rent, etc.

Exercise 3-14 is a simple example of multi-product breakeven point calculations. Taking a few minutes to allow students to complete this exercise individually or in groups will provide an indication of their level of understanding.
This unit teaches introductory pricing concepts using cost-plus pricing and target costing. Understanding pricing concepts and issues is a natural complement to CVP analysis, particularly when such analysis examines the financial impact of changing prices on operating profit.

Review the basic economic theory behind supply and demand. Companies will want to price their products so as to achieve market equilibrium.

Explain the concept of markup. Ask students why companies include a markup to arrive at the sales price. Explain that there are many ways to define cost – variable, total, etc. – and that markups can be calculated using any definition of cost. This means that it is important to understand the cost definition used in the markup calculation.

Illustrate markup percentage calculation using Universal Sports Exchange data.
Illustrate calculation of cost-plus price using Universal Sports Exchange data on athletic shoes introduced to the product line in Unit 3.3. Universal purchases the shoes for $36 and wants to maintain the same 35% markup it has on jerseys. That markup results in a sales price of $48.60. Discuss whether Universal can sell the shoes at this price given Landon’s $45 sales price. If not, Universal may need to accept a lower markup percentage. Have students figure out the markup percentage (25%) that Universal would use to match Landon’s $45 sales price.

Discuss some of the issues associated with cost-plus pricing.

Explain the basic premise of target costing. Emphasize that this process is done before a product is actually produced.

Exercise 3-18 is a simple example of pricing calculations. Taking a few minutes to allow students to complete this exercise individually or in groups will provide an indication of their level of understanding.
Problem 3-20 is a comprehensive CVP problem that provides students with practice in evaluating changes in various factors. Taking a few minutes to allow students to complete this problem individually or in groups will provide an indication of their level of understanding.

### PROBLEM 3-20(A) SOLUTION

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Per unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>current sales volume</td>
<td>$600,000</td>
<td>$12</td>
</tr>
<tr>
<td>new sales volume</td>
<td>50,000 x 95 = 4,750 units</td>
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</tr>
<tr>
<td>new sales price</td>
<td>$12.00 x 1.10 = $13.20</td>
<td></td>
</tr>
<tr>
<td>Sales</td>
<td>$627,000</td>
<td>$13.20</td>
</tr>
<tr>
<td>Less variable expenses</td>
<td>352,000</td>
<td>7.00</td>
</tr>
<tr>
<td>Contribution margin</td>
<td>295,000</td>
<td>$5.90</td>
</tr>
<tr>
<td>Less fixed expenses</td>
<td>175,000</td>
<td></td>
</tr>
<tr>
<td>Operating income</td>
<td>$118,500</td>
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</tr>
</tbody>
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### PROBLEM 3-20(B) SOLUTION

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Per unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>new sales price</td>
<td>$12.00 x 1.10 = $13.20</td>
<td></td>
</tr>
<tr>
<td>new variable cost per unit</td>
<td>$7.00 x 1.06 = $7.35</td>
<td></td>
</tr>
<tr>
<td>Sales</td>
<td>$600,000</td>
<td>$13.20</td>
</tr>
<tr>
<td>Less variable expenses</td>
<td>367,500</td>
<td>7.35</td>
</tr>
<tr>
<td>Contribution margin</td>
<td>292,500</td>
<td>$5.40</td>
</tr>
<tr>
<td>Less fixed expenses</td>
<td>175,000</td>
<td></td>
</tr>
<tr>
<td>Operating income</td>
<td>$117,000</td>
<td></td>
</tr>
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</table>

### PROBLEM 3-20(C) SOLUTION

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Per unit</th>
</tr>
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<tbody>
<tr>
<td>new sales price</td>
<td>$12.00 x 90 = $108.00</td>
<td></td>
</tr>
<tr>
<td>new sales volume</td>
<td>50,000 x 1.20 = 60,000 units</td>
<td></td>
</tr>
<tr>
<td>Sales</td>
<td>$548,000</td>
<td>$10.80</td>
</tr>
<tr>
<td>Less variable expenses</td>
<td>420,000</td>
<td>7.00</td>
</tr>
<tr>
<td>Contribution margin</td>
<td>228,000</td>
<td>$3.80</td>
</tr>
<tr>
<td>Less fixed expenses</td>
<td>175,000</td>
<td></td>
</tr>
<tr>
<td>Operating income</td>
<td>$53,000</td>
<td></td>
</tr>
</tbody>
</table>

### PROBLEM 3-20(D) SOLUTION

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Per unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>new fixed expenses</td>
<td>$175,000 + $20,000 = $195,000</td>
<td></td>
</tr>
<tr>
<td>Sales</td>
<td>$548,000</td>
<td>$10.80</td>
</tr>
<tr>
<td>Less variable expenses</td>
<td>420,000</td>
<td>7.00</td>
</tr>
<tr>
<td>Contribution margin</td>
<td>228,000</td>
<td>$3.80</td>
</tr>
<tr>
<td>Less fixed expenses</td>
<td>175,000</td>
<td></td>
</tr>
<tr>
<td>Operating income</td>
<td>$30,000</td>
<td></td>
</tr>
</tbody>
</table>

3-22
### PROBLEM 3-20(E) SOLUTION

new sales price: $12.00 \times 1.10 = $13.20 
new variable cost per unit: $7.10 \times 1.10 = $7.80 
new fixed expenses: $175,000 + $25,000 = $200,000 
new sales volume: 50,000 \times .90 = 45,000 \text{ units}

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Per unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$654,000</td>
<td>$13.30</td>
</tr>
<tr>
<td>Less variable expenses</td>
<td>346,500</td>
<td>7.70</td>
</tr>
<tr>
<td>Contribution margin</td>
<td>347,500</td>
<td>7.55</td>
</tr>
<tr>
<td>Less fixed expenses</td>
<td>200,000</td>
<td></td>
</tr>
<tr>
<td>Operating income</td>
<td>147,500</td>
<td></td>
</tr>
</tbody>
</table>
Supplemental Instruction Guide

Unit 3.1 – Breakeven Analysis

Unit Summary

Using Universal Sports Exchange’s results from 2014, the unit presents the breakeven point calculation first using the profit equation \( \text{Sales} - \text{VC} - \text{FC} = \text{OI} \) and then using the formula \( \frac{\text{Total Fixed Expenses}}{\text{Contribution Margin per Unit}} \). Breakeven graphs are also introduced. The Reality Check provides an example of breakeven analysis in a service setting (an art gallery).

Learning Objectives

LO 1  Calculate the breakeven point in units and sales dollars.

The breakeven point is the level of sales at which sales revenue equals total expense and profit is $0. This point can be calculated in terms of units or sales revenue using either the profit equation or the contribution margin formula, as follows:

\[
\text{(Sales price per unit} \times \# \text{ units sold)} - \text{(Variable cost per unit} \times \# \text{ units sold)} - \text{Fixed expenses} = 0
\]

\[
\frac{\text{Total fixed expenses}}{\text{Contribution margin per unit}} = \text{Breakeven point in units}
\]

\[
\frac{\text{Total fixed expenses}}{\text{Contribution margin ratio}} = \text{Breakeven point in Sales dollars}
\]

Discussion Points

A firm’s breakeven point is the level of sales at which total sales revenue = total costs, i.e. where profits = 0. At this point, the firm is just covering its variable and fixed costs. Stress that there is only one level of sales at which this occurs. This can be expressed in the following equations:

\[
\text{Total Revenue} - \text{Total Variable Costs - Total Fixed Costs} = 0
\]

\[
(Sales \ \text{Price} \times \text{Units Sold}) - (Unit \ \text{Variable Cost} \times \text{Units Sold}) - \text{Total Fixed Costs} = 0
\]

There are three simple calculations that can be done to determine the breakeven point for a firm. The one you choose to use will depend on the information that is available. Also remind students that breakeven points must be stated in whole units, so they may have to round up.

1. Use the second equation in the previous section. Substitute the sales price, unit variable cost and total fixed costs and solve for the units sold. The algebra is outlined below. Note that you must set profits equal to 0 for this method to work. Many students have trouble seeing the algebra in the equations so consider explicitly working through the math below.

\[
(Sales \ \text{Price} \times \text{Units Sold}) - (Unit \ \text{Variable Cost} \times \text{Units Sold}) - \text{Total Fixed Costs} = 0
\]

\[
(Sales \ \text{Price} - Unit \ \text{Variable Cost}) \times \text{Units Sold} - \text{Total Fixed Costs} = 0
\]

\[
(Sales \ \text{Price} - Unit \ \text{Variable Cost}) \times \text{Units Sold} = \text{Total Fixed Costs}
\]

\[
\text{Units Sold} = (\text{Total Fixed Costs})/(Sales \ \text{Price} - Unit \ \text{Variable Cost})
\]

“Units Sold” will be the breakeven quantity. Also notice that you can replace \( (Sales \ \text{Price} - Unit \ \text{Variable Cost}) \) with the unit contribution margin.

2. Use the contribution margin per unit in the following formula:
3. Use the contribution margin ratio in the following formula:

\[
\frac{\text{Fixed Costs}}{\text{Contribution margin ratio}} = \text{Breakeven point in sales dollars}
\]

**NOTE:** This formula gives you the break-even point in terms of sales dollars. To get the breakeven point in terms of units, divide the breakeven point in dollars by the sales price per unit.

**Example**

The Chadley Company sells one product at a sales price of $5.00 per unit. The company has gathered the following information for the past year. What is Chadley’s breakeven point in units? In dollars?

**Sales**

- $50,000

**Cost of Goods Sold (100% variable)**

- 26,000

**Selling Expenses (20% variable)**

- 8,000

**Administrative Expenses (60% variable)**

- 12,000

**Answer**

First, you need to calculate how many units were sold to generate this income statement. Since the sales price is $5.00 per unit, there were 10,000 units sold ($50,000 sales revenue/$5.00 per unit).

Next, calculate the fixed and variable costs. Variable costs would be variable cost of goods sold ($26,000 × 100%), variable selling ($8,000 × .2), and variable administrative ($12,000 × .6) or $34,800. Since 10,000 units were sold, the variable cost per unit is $3.48 ($34,800/10,000 units).

Fixed costs would be the selling and administrative expenses that aren’t variable: (8,000 × .8) + (12,000 × .4), or $11,200.

\[
\frac{11,200}{5.00 - 3.48} = 7,368.421 \text{ units, which you round up to 7,369}
\]

\[
\frac{11,200}{(5.00 - 3.48)/5.00} = 36,842.105 \text{ (also could calculate as 7,369 × 5.00 = 36,845)}
\]

**Good Text Book Exercises to Review:** 3-1, 3-2
Unit 3.2 – Cost-Volume-Profit Analysis

Unit Summary

This unit begins with introducing the concept of target income and how the profit equation or breakeven formula can be used to determine the sales volume required to achieve the target income. CVP analysis is then introduced through some “what if” scenarios that Universal Sports Exchange might face. The Reality Check explores Circuit City’s move from commission-based sales compensation to salary compensation, a move from variable costs to fixed costs. While this move was not successful in turning the company around, competitor Best Buy earlier had been successful making the same switch.

Learning Objectives

LO 2 Calculate the level of activity required to meet a target income.
To calculate the sales level required to meet a certain level of operating income, use one of the following formulas. If you are working with a target level of net income, divide it by (1 minus the tax rate) to convert it to operating income before using one of the formulas.

\[
\frac{(SP \text{ per unit} \times \# \text{ units sold}) - (VC \text{ per unit} \times \# \text{ units sold}) - \text{Fixed expenses}}{\text{Total fixed expenses} + \text{Target operating income}} = \text{Breakeven point in Units}
\]

\[
\frac{\text{Contribution margin per unit}}{\text{Total fixed expenses} + \text{Target operating income}} = \text{Breakeven point in sales dollars}
\]

LO 3 Determine the effects of changes in cost, volume, and profit on operating income.
Using the following equations, you should be able to solve for any unknown factors that would help in evaluating the financial impact of certain managerial decisions.

\[
\text{Revenues} - \text{Expenses} = \text{Operating income}
\]

\[
\text{Revenues} - \text{Variable expenses} - \text{Fixed expenses} = \text{Operating income}
\]

\[
\frac{(SP \text{ per unit} \times \# \text{ units sold}) - (VC \text{ per unit} \times \# \text{ units sold}) - \text{Fixed expenses}}{\text{Contribution margin per unit} \times \# \text{ units sold} - \text{Fixed expenses}} = \text{Operating income}
\]

Other relationships that you will find helpful in solving these problems include the contribution margin ratio (the contribution margin divided by sales revenue) and the variable cost ratio (variable cost divided by sales revenue). The sum of the contribution margin ratio and the variable cost ratio is 1.

LO 4 Define operating leverage and explain the risks associated with the tradeoff between variable and fixed cost.
Operating leverage indicates the change in operating income that will result from a change in sales; it is directly affected by the ratio of fixed expenses to variable expenses. The degree of operating leverage at a particular level of sales can be calculated as follows:

\[
\frac{\text{Contribution margin}}{\text{Operating income}} = \text{Degree of operating leverage}
\]

Companies with relatively high contribution margins (meaning low variable costs) and high fixed expenses generate profits quickly once they pass the breakeven point. However, if their sales fall below the breakeven point, their losses mount quickly. To reduce the risk of covering fixed expenses, some companies prefer to carry relatively high levels of variable costs, so that expenses are incurred only as products are sold.
Discussion Points

We can use the break-even formulas to determine how many units we must sell to make a certain level of operating income. To do so, we treat the target net income as we do fixed expenses:

\[
\frac{Fixed \ Costs + Target \ operating \ income}{Contribution \ margin \ per \ unit} = \text{number of units to reach target operating income}
\]

\[
\frac{Fixed \ Costs + Target \ operating \ income}{Contribution \ margin \ ratio} = \text{sales dollars to reach target operating income}
\]

Cost-Volume-Profit (CVP) analysis is a tool for determining the impact of changes in volume, cost or sales mix on net income. In doing CVP analysis, there are three basic approaches you can take, each yielding the same result.

1. Prepare a contribution format income statement before and after implementing the change and compare the results.
2. Prepare a partial contribution format income statement that reflects only those items that change and examine the results of the change. This is referred to as the differential or incremental approach since you are only concerned with the items that changed.
3. Compare the present contribution margin with a new contribution margin calculated to incorporate the changes. This is then adjusted for any changes in fixed costs to produce the net effect on profit.

Types of changes that you need to be able to handle in CVP analysis:

1. Change in sales price
2. Change in sales volume
3. Change in variable costs
4. Change in fixed costs
5. Change in sales mix
6. Any combination of the above

Example

The Grager Company currently sells its product for $10 and has variable costs of $6 per unit. Fixed costs are $30,000.

Required: Answer the following questions, considering each independently.

a. What is the break-even point in (a) units and (b) dollars?
b. If fixed costs rise by 20%, what is the break-even point in (a) units and (b) dollars?
c. If variable costs decline to $4, what is the break-even point in (a) units and (b) dollars?
d. If the selling price per unit declines by 10%, what is the break-even point in (a) units and (b) dollars?
e. If the events described in questions b, c, and d all occur, what is the break-even point in (a) units and (b) dollars?
f. What sales dollars are required to earn $50,000 in profit?
g. If fixed costs increase by 20% and variable costs decline by $1 per unit, what sales dollars are required to earn $50,000 profit?
ANSWER

a. \( \text{CM/unit} = \$10 - \$6 = \$4 \quad \text{CMR} = \frac{\$4 \text{ CM/unit}}{\$10 \text{ SP/unit}} = .4 \)

\[ \text{Break even units:} \quad \frac{\$30,000}{\$4} = 7,500 \text{ units} \]
\[ \text{Break even $:} \quad \frac{\$30,000}{.4} = \$75,000 \]

b. Fixed costs are now $36,000 ($30,000 \times 1.2)

\[ \text{Break even units:} \quad \frac{\$36,000}{\$4} = 9,000 \text{ units} \]
\[ \text{Break even $:} \quad \frac{\$36,000}{.4} = \$90,000 \]

c. CM/unit is now $6 ($10 SP/unit - $4 VC/unit) and CMR is \( \frac{\$6}{\$10} = .6 \)

\[ \text{Break even units:} \quad \frac{\$30,000}{\$6} = 5,000 \text{ units} \]

d. Selling price is now $9/unit ($10 \times .9), CM/unit is $3 and CMR = .34

\[ \text{Break even units:} \quad \frac{\$30,000}{\$3} = 10,000 \text{ units} \]
\[ \text{Break even $:} \quad \frac{\$30,000}{.34} = \$90,000 \]

e. Selling price is $9/unit, CM is $5/unit, CMR = .56, fixed costs are $36,000

\[ \text{Break even units:} \quad \frac{\$36,000}{\$5} = 7,200 \text{ units} \]
\[ \text{Break even $:} \quad \frac{\$36,000}{.56} = \$64,800 \]

f. \( \$30,000 + \$50,000 \quad \frac{\$4 \text{ / unit}}{} = 20,000 \text{ units} \)

g. Fixed costs are $36,000 ($30,000 \times 1.2), CM/unit = $5 and CMR = .5

\[ \text{Break even units:} \quad \frac{\$36,000 + \$50,000}{\$5} = 17,200 \text{ units} \]
\[ \text{Break even $:} \quad \frac{\$36,000 + \$50,000}{.5} = \$172,000 \]
**EXAMPLE**

The Barco Company provides the following cost information:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sale price per cup</td>
<td>$.25</td>
<td>100%</td>
</tr>
<tr>
<td>Variable expense per cup</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commission to State University</td>
<td>$.06</td>
<td></td>
</tr>
<tr>
<td>Soft drink in each cup</td>
<td>.05</td>
<td></td>
</tr>
<tr>
<td>Cost of each paper cup</td>
<td>.02</td>
<td>.13</td>
</tr>
<tr>
<td>Contribution margin per cup</td>
<td>$.12</td>
<td>48%</td>
</tr>
<tr>
<td>Fixed expenses (per game)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lease cost of booth</td>
<td>$200</td>
<td></td>
</tr>
<tr>
<td>Wages of 15 hawkers at $10 each</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>Liability insurance</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$360</td>
<td></td>
</tr>
</tbody>
</table>

**Required:**

a. What would be the break-even point for the booth in number of cups sold, and in dollars of sales?

b. If The Barco Company needs a minimum $600 in profits per game, how many cups will have to be sold? What will the dollar sales be?

c. If the booth is very successful and State University decides to double the lease cost, what will be the effect on the break-even point? How many cups will have to be sold to yield the minimum required $600 in profits?

d. Assuming the original data, if the cost of each paper cup doubles what will be the effect on the break-even point in number of cups sold? How many cups will have to be sold to yield the minimum required $600 in profits?

e. Assume that the booth is rented, and that 10,000 drinks are being sold each game. The Barco Company managers estimate that hiring five additional hawkers will result in an additional 1,000 drinks being sold each game. Should the five additional hawkers be hired?

f. Assume again that the booth is rented, and that 10,000 drinks are being sold each game. The Barco Company is contemplating increasing the sale price of each cup of drink from $.25 to $.30. The company estimates, however, that if the price is increased the number of drinks sold may decrease by as much as 30 percent. Should the price increase be made? If the price increase is made, by how much can volume decrease and the company still earn at least the profits that were being earned before?

g. Assume again that the booth is rented, and that 10,000 drinks are being sold each game. The Barco Company is contemplating placing the hawkers on a commission basis, rather than a flat $10-per-game salary. The commission would be $.02 per cup sold. The company estimates that if the hawkers are placed on a commission basis they will sell 15 percent more drinks each game. Should the hawkers be paid a commission rather than a flat salary?

**ANSWER**

a. $360

\[
\frac{\$360}{\$12 / \text{cup}} = 3,000 \text{ cups}
\]

$360 = $750

\[
.48
\]

b. $360 + $600

\[
\frac{\$360 + \$600}{\$12 / \text{cup}} = 8,000 \text{ cups}
\]

\[
\frac{\$360 + \$600}{\$12 / \text{cup}} = 2,000 \text{ cups}
\]

3-29
c. $400 + $150 + $10 \over \$12/cup = 4,667 \text{ cups} \\
$400 + $150 + $10 + $600 \over \$12/cup = 9,667 \text{ cups}$

d. \$360 \over \$1/cup = 3,600 \text{ cups} \\
$360 + $600 \over \$1/cup = $9,600$

e. Fixed costs will increase by $50 (% more hawkers at $10 each). They will generate additional CM of $120 (1,000 cups \times 0.12/cup) for a net gain of $70.

f. Before: ($0.25 - 0.13) - $360 = $840 profit \\
After: ($0.30 - 0.13) \times (10,000 \times 0.7) - $360 = $830 profit \\
THEREFORE DO NOT INCREASE PRICE!

g. ($0.25 - 0.15) \times (10,000 \times 1.15) - ($360 - $150) = $940 profit \\
THEREFORE GO TO A COMMISSION PLAN!

GOOD TEXT BOOK EXERCISES TO REVIEW: 3-5, 3-6, 3-32
Unit 3.3 – Multiproduct CVP Analysis

Unit Summary
This unit expands CVP into a multiproduct environment using the profit equation.

Learning Objective

LO 5 **Calculate the multi-product breakeven point and level of activity required to meet a target income.**

Companies that sell more than one product must consider their sales mix in order to solve breakeven and other problems. Holding the sales mix constant for \( n \) products, the breakeven point and target operating income can be calculated using the modified profit formula:

\[
CM_1 + CM_2 + \ldots + CM_n - \text{Fixed expenses} = \text{Operating income}
\]

Discussion Points

If a firm sells more than one product, an additional concern arises when doing breakeven and CVP analysis. This is the **sales mix**, or the relative combination of a firm's products. What you have to do is calculate a weighted average contribution margin. You can then use this average contribution margin to calculate breakeven. Note, however, that the breakeven point is in terms of sales mix, not units.

Review how to include multiple products in the profit equation to calculate multi-product breakeven points. Use the sales mix ratio.

**Example**

*Assume Baylor Bookstore sells the following items:*

<table>
<thead>
<tr>
<th>Percent of Sales Volume</th>
<th>Contribution Margin per unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Textbooks 50%</td>
<td>$50.00</td>
</tr>
<tr>
<td>T-shirts 40%</td>
<td>$8.00</td>
</tr>
<tr>
<td>Supplies 10%</td>
<td>$2.00</td>
</tr>
</tbody>
</table>

If the bookstore incurs $568,000 in fixed costs, what is the breakeven point in sales units?

**Answer**

Let \( x \) = the number of supplies sold at breakeven.

\[
x(2) + 4x(8) + 5x(50) - 568,000 = 0
\]

\[
2x + 32x + 250x = 568,000
\]

\[
284x = 568,000
\]

\[
x = 2,000
\]

So breakeven sales in units is

- 2,000 supplies
- 8,000 t-shirts
- 10,000 textbooks

**Good textbook exercises to review:** 3-21, 3-38
Unit 3.4 – Pricing Decisions

Unit Summary

The final unit in this chapter introduces pricing concepts. We include this unit at this point because many CVP analyses include changes in the sales price. Cost-plus pricing and target costing provide an introduction to pricing decisions and the use of markups. The discussion of pricing should be based on customer value rather than solely focusing on achieving a target markup.

Learning Objectives

LO 6 Define markup and explain cost-plus pricing.
A markup is the difference between the cost of a product or service and the price a company charges for it. The markup percentage can be calculated as

\[
\text{Sales price - Cost per unit} \div \text{Cost per unit} = \text{markup \%}
\]

Cost-plus pricing begins with the cost of a product and adds a markup to determine the price to charge. The flaw in this method is that the resulting price does not reflect the value of the product to the customer. After the price has been calculated, managers must still compare it to the price of a comparable product or service. If the price is too high relative to competitors’ prices, the company is unlikely to be able to sell the product.

LO 7 Explain target costing and calculate a target cost.
Target costing begins with the price a customer is willing to pay for a product or service and works backward to the maximum cost the company can incur to deliver the product or service to market. Assume, for example, that a company is considering a new product that marketing research suggests customers will pay no more than $25 for. If the company needs a 40% gross profit margin to cover its operating expenses and contribute to profit, then managers must be able to acquire or make the product for no more than $15: $25 – ($25 \times 40\%) = $15. If managers conclude that they can deliver the product for $15, then they should go ahead with the new venture. If they can’t, then they need to halt the project before the company sinks any more funds into it.

Discussion Points

Markup percentage can be based on a variety of bases, so be sure you know the desired base before calculating the markup. For instance, is the markup based on direct materials cost or total product cost? To calculate a sales price, multiply the markup base by the desired markup percentage. Just because you want to price an item at a desired markup percentage, that doesn’t mean that you can actually charge that price. If the market won’t purchase at the price calculated based on the desired markup percentage, you may need to alter the markup percentage.

Example

John Smith, LTD is trying to set a price for a new product that costs him $30 to make.

a. If he sets the sales price at $75, what is the markup percentage?
b. If he uses a markup percentage of 175%, what sales price will he set?
c. If market research indicates consumers will pay a maximum sales price of $66, what must John reduce the cost to if he wants to maintain the 175% markup?
**Answer**

a. \[
\frac{\$75-\$30}{\$30} = 150%
\]

b. \[
\$30 + (\$30 \times 175\%) = \$82.50
\]

c. \[
x + (x \times 175\%) = \$66
\]
\[
2.75x = \$66
\]
\[
x = \$24
\]

**Good textbook exercises to review:** 3-24, 3-40
Chapter 3 Quiz

Use the following information to answer questions 1 – 3.

Acme, Inc. manufactures Mighty Big Pencils which sell for $7.50 each. Acme expects to sell 82,000 pencils next quarter. At this level of sales, variable expenses will total $184,500 and fixed expenses will total $242,130.

1. How many pencils will Acme have to sell next quarter to break even?
   a. 32,284
   b. 46,120
   c. 56,884
   d. 82,000

2. If Acme wants to earn $160,125 in operating profit next quarter, what will sales revenue have to be?
   a. $76,620
   b. $228,750
   c. $470,880
   d. $574,650

3. The marketing department forecasts that sales volume will increase by 40% next quarter if Acme changes the name on the package to Super Size Pencils. This change will not affect the cost structure for the pencils. What will be the dollar amount change in operating income if Acme implements the name change?
   a. $861,000
   b. $360,750
   c. $246,000
   d. $172,200

Use the following information to answer questions 4 and 5.

The Searfoss Co. had the following income statement in February. The firm’s contribution margin ratio at its current selling price of $20 is 40%.

<table>
<thead>
<tr>
<th>Sales</th>
<th>$150,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expenses</td>
<td>$170,000</td>
</tr>
<tr>
<td>Operating Income</td>
<td>($20,000)</td>
</tr>
</tbody>
</table>

4. What is the firm’s breakeven point in sales dollars?
   a. $90,000
   b. $200,000
   c. $246,000
   d. $280,000

5. What are total expenses if the firm sells 8,000 units?
   a. $96,000
   b. $80,000
   c. $176,000
   d. $186,000

6. It costs Mayer Manufacturing $15 to produce one can of premium floor paint. If the company uses a 165% markup in pricing its products, what is the sales price for a can of paint?
   a. $15.00
   b. $24.75
   c. $39.75
   d. $16.65
7. Hill Company sells 4 t-shirts for every pair of tennis shoes it sells. T-shirts are priced at $10 and cost Hill Company $5. Tennis shoes sell for $50 and cost Hill Company $30. What is Hill Company’s breakeven point in units if the company incurs $100,000 in fixed expenses?
   a. 2,500 t-shirts and 10,000 pairs of tennis shoes
   b. 10,000 t-shirts and 2,500 pairs of tennis shoes
   c. 2,500 t-shirts and 2,500 pairs of tennis shoes
   d. 40,000 t-shirts and 10,000 pairs of tennis shoes

8. If the variable cost per unit increases,
   a. the breakeven point increases.
   b. the contribution margin per unit increases.
   c. the markup percentage increases.
   d. all of the above are true.

9. The margin of safety is
   a. the excess of actual sales revenue over actual variable expenses.
   b. the excess of actual sales revenue over actual fixed expenses.
   c. the excess of actual sales revenue over the breakeven sales revenue.
   d. the excess of actual sales revenue over the total contribution margin.

10. To lower a company’s breakeven point, managers should
    a. increase the sales price of the product.
    b. decrease fixed expenses.
    c. decrease variable expenses.
    d. take any or all of the above actions.
Chapter 3 Quiz Answers

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