**CVP 2**

**3-9 Describe sensitivity analysis. How has the advent of the electronic spreadsheet affected the use of sensitivity analysis?**

**Sensitivity analysis is a ―what-if‖ technique that managers use to examine how an outcome will change if the original predicted data are not achieved or if an underlying assumption changes. The advent of the electronic spreadsheet has greatly increased the ability to explore the effect of alternative assumptions at minimal cost. CVP is one of the most widely used software applications in the management accounting area.**

**3-10 Give an example of how a manager can decrease variable costs while increasing fixed costs.**

**Examples of decreasing variable costs and increasing fixed costs include:**

**Manufacturing––substituting a robotic machine for hourly wage workers**

**3-3**

**Marketing––changing a sales force compensation plan from a percent of sales dollars to a fixed salary**

**Customer service––hiring a subcontractor to do customer repair visits on an annual retainer basis rather than a per-visit basis**

**3-11 Give an example of how a manager can increase variable costs while decreasing fixed costs.**

**Examples of decreasing fixed costs and increasing variable costs include:**

**Manufacturing––subcontracting a component to a supplier on a per-unit basis to avoid purchasing a machine with a high fixed depreciation cost**

**Marketing––changing a sales compensation plan from a fixed salary to percent of sales dollars basis**

**Customer service––hiring a subcontractor to do customer service on a per-visit basis rather than an annual retainer basis**

**3-12 What is operating leverage? How is knowing the degree of operating leverage helpful to managers?**

**Operating leverage describes the effects that fixed costs have on changes in operating income as changes occur in units sold, and hence, in contribution margin. Knowing the degree of operating leverage at a given level of sales helps managers calculate the effect of fluctuations in sales on operating incomes.**

**3-13 ―There is no such thing as a fixed cost. All costs can be ‗unfixed‘ given sufficient time.‖ Do you agree? What is the implication of your answer for CVP analysis?**

**CVP analysis is always conducted for a specified time horizon. One extreme is a very short-time horizon. For example, some vacation cruises offer deep price discounts for people who offer to take any cruise on a day‘s notice. One day prior to a cruise, most costs are fixed. The other extreme is several years. Here, a much higher percentage of total costs typically is variable.**

**CVP itself is not made any less relevant when the time horizon lengthens but many items classified as fixed in the short run may become variable costs with a longer time horizon.**

**3-14 How can a company with multiple products compute its breakeven point?**

**A company with multiple products can compute a breakeven point by assuming there is a constant sales mix of products at different levels of total revenue.**

**3-15 ―In CVP analysis, gross margin is a less-useful concept than contribution margin.‖ Do you agree? Explain briefly.**

**Yes, gross margin calculations emphasize the distinction between manufacturing and nonmanufacturing costs (gross margins are calculated after subtracting variable and fixed manufacturing costs). Contribution margin calculations emphasize the distinction between fixed and variable costs. Hence, contribution margin is a more useful concept than gross margin in CVP analysis.**

**3-4**

**3-16 Jack‘s Jax has total fixed costs of $25,000. If the company‘s contribution margin is 60%, the income tax rate is 25% and the selling price of a box of Jax is $20, how many boxes of Jax would the company need to sell to produce a net income of $15,000?**

**a. 5,625 b. 4,445**

**c. 3,750 d. 3,333**

**SOLUTION**

**Choice "c" is correct. The number of boxes needed to be sold is calculated as follows:**

**Selling Price per box: $20 per box**

**Contribution % = 60%**

**Contribution margin per box: 60% × $20 = $12 per box**

**Fixed costs: $25,000**

**Income after tax: $15,000**

**Tax rate: 25%**

**Operating income before tax: $15,000 ÷ (1 – 0.25) = $15,000 ÷ 0.75 = $20,000**

**Total fixed costs $25,000 + target operating income, $20,000 = $45,000**

**Boxes necessary to produce target operating income: $45,000 / $12 per box = 3,750 boxes Choice "a" is incorrect. The contribution margin of 60% means that variable costs are 40% of the sale price, not 60% of the sales price. Choice "b" is incorrect. The contribution margin needs to cover the fixed costs of $25,000 and the operating income before tax of $20,000. Fixed costs are not subject to the income tax rate in the calculation. Choice "d" is incorrect. Net income of $15,000 is after deducting the income tax expense. Operating income before tax of $20,000 must be generated in order to produce net income of $15,000.**

**3-17 During the current year, XYZ Company increased its variable SG&A expenses while keeping fixed SG&A expenses the same. As a result, XYZ‘s:**

**a. Contribution margin and gross margin will be lower.**

**b. Contribution margin will be higher, while its gross margin will remain the same.**

**c. Operating income will be the same under both the financial accounting income statement and contribution income statement.**

**d. Inventory amounts booked under the financial accounting income statement will be lower than under the contribution income statement.**

**SOLUTION**

**Choice "c" is correct. Operating income is the bottom line figure under both the financial accounting income approach and the contribution margin approach. Both methods take SG&A (fixed and variable) into account, which means both will produce the same bottom line figure.**

**Choice "a" is incorrect. The contribution margin will be lower due to an increase in variable SG&A expenses, but the gross margin (as calculated under the financial accounting income approach) will not be affected because fixed and variable SG&A expenses are deducted after calculating gross income. Choice "b" is incorrect. The gross margin will remain the same, as SG&A expenses do not factor into the gross margin calculation. The contribution margin will be lower (not higher) due to higher variable SG&A expenses. Choice "d" is incorrect. Inventory amounts will be the same under both methods, as SG&A expenses are period costs and will not affect inventory calculations.**