SOLUTION EXERCISES SECTION 3

1 Canton Company produces and sells toasters. The following unit cost information assumes a production and sales volume of 15,000 units:

Direct materials	$9
Direct labor	6
Variable overhead	2
Fixed overhead	3
Variable selling and administrative costs	1
Fixed selling and administrative costs	4

Required:

1) Compute the budgeted selling price per unit assuming Canton uses a cost-plus pricing strategy and a markup equal to 75% of production cost.
2) Compute the firm's total fixed costs.
3) Compute the firm's contribution margin per unit given the budgeted selling price you computed in Requirement 1.
4) Compute the firm's breakeven point in units and dollars, using the selling price you calculated in part 1.
5) Using the unit contribution margin, compute the firm's estimated profit if 18,000 units are sold.

Answers

1) Budgeted selling price = ($9 + $6 + $2 + $3) + {($9 + $6 + $2 + $3) × 75%)} = $35
2) Total fixed costs at 15,000 unit volume: 15,000 × ($3 + $4) = $105,000
3) Contribution margin per unit = $35 - ($9 + $6 + $2 + $1) = $17
4) Break-even point in units = $105,000/$17 = 6,177 units; Break-even point in dollars = 6,177 units × $35 = $216,195
5) Estimated profit when 18,000 units sold = (18,000 - 6,177) × $17 = $200,991

2. Phillips Company can sell 15,000 units of its new product at a selling price of $116. The unit cost is $72. The company's target profit is 40% of sales. The Vice President of Marketing has learned that a competitor plans to introduce a similar product for $104. The Vice President has recommended that Phillips match the competitor's price. She believes the lower selling price will increase sales volume by 20%.

Required:

1) Compute the company's net income assuming the product is sold for $116 and the costs remain at $72. Assume there were no additional costs.
2) Compute the product's target cost if it is sold at a $116 selling price.
3) Compute the company's net income if the target cost computed in Requirement 2 is achieved.
4) Compute the change in income from Requirement 1 if the product is sold for $104, costs remain at $72, and volume is increased by 20%.

Answers

1) Profit assuming $116 selling price and $72 cost: ($116 - $72) × 15,000 = $660,000
2) Target cost for selling price of $116: $116 - ($116 × 40%) = $69.60
3) Profit assuming $116 selling price and $69.60 cost: ($116 - $69.60) × 15,000 = $696,000
4) Profit assuming $104 selling price, $72 cost, and increased sales volume: New sales volume = 15,000 + 20% = 18,000 units; Profit = ($104 - $72) × 18,000 = $576,000. Therefore, there will be an $84,000 ($660,000 - $576,000) reduction in income from the current level.

3. Anton Company produces and sells bicycles for $500. The variable costs per unit are $300 plus a sales commission of 15% of the selling price. Total fixed costs consist of $16,000 in fixed overhead and $9,000 in fixed selling and administrative costs.

Required:

1) Compute the contribution margin per unit.
2) Compute the break-even point in units and dollars.
3) How many units must be sold to earn a profit of $20,000?
4) What would be the break-even point in units if the sales commission is reduced to $20 per unit sold?

Answers

1) Contribution margin per unit = $500 - {$300 + 15%($500)} = $125
2) Break-even point in units = ($16,000 + $9,000)/$125 = 200 units; Break-even point in dollars = 200 × $500 = $100,000
3) Units needed to earn $20,000 = ($16,000 + $9,000 + $20,000)/$125 = 360 units
4) $25,000/$180 contribution margin per unit = 138.9 units = 139 units (rounded)

4. Larimore Company sales are $560,000. The company has variable costs equal to 40% of sales and total fixed costs of $150,000.

Required:

1) What is the company's break-even point in sales dollars?
2) Compute the company's operating leverage at its current sales level.
3) Compute the percentage change in income that will accompany a 10% increase in sales.
4) Compute the company's net income and operating leverage (rounded to one decimal place) if sales increase by 10%.
5) Describe the effect on operating leverage as a company's sales increase and it moves further beyond its break-even point.

Answers

1) Break-even point in sales dollars = $150,000/(100% - 40%) = $250,000
2) Operating leverage = contribution margin/income.
Contribution margin = $560,000 × .6 = $336,000; net income = $336,000 - $150,000 = $186,000;
Operating leverage = $336,000/$186,000 = 1.81
3) Percentage change in income accompanying a 10% increase in sales = 10% × 1.81 = 18.1%
4) Net income and operating leverage when sales increase by 10%:
Net income = ($560,000 + 56,000) × 60% = $369,600 - $150,000 = $219,600;
Operating leverage = $369,600/$219,600 = 1.68
5) Operating leverage falls as a company moves further beyond its break-even point. For example, at a sales level of $560,000 a 10% increase in sales generated an 18.1% increase in income. However, at a sales level of $616,000, a 10% increase in sales only generates a 16.8% increase in profit.

5. The Varsity Club sells souvenir items at university sporting events for $24 each. The souvenir items cost $16 each. The club is negotiating with the university administration to sell the items in a kiosk in the university student center. Three rental arrangements are under consideration:

Option 1: Pay rent of $2,000.
Option 2: Pay rent of $1,200 plus 10% of revenue; and
Option 3: Pay the university 25% of revenue;
The club estimates that it will be able to sell 300 souvenir items during the period.

Required:

1) Compute the break-even point in units for each of the three options.
2) Assuming the club reaches its sales target, which option should be chosen?

Answers

1) Break-even points:
Option 1: ($24X - $16X) - $2,000 = $0
$8X = $2,000
X = 250 units
Option 2: $24X - $16X - (10% × $24X) - $1,200 = $0
$5.60X - $1,200 = $0
$5.60X = $1,200
X = 214.29 units = 215 units
Option 3: Because there are no fixed costs, the Varsity Club will earn a profit at any volume greater than zero.
2) Option 1 profit: ($8 × 300) - $2,000 = $400
Option 2 profit: ($5.60 × 300) - $1,200 = $480
Option 3 profit: 300 × ($24 - $16 - $6) = $600
Therefore, option 3 is the best choice.

6. Lush Lawn, Inc. produces and sells electric lawn trimmers for $120 each. The variable costs of each mower total $80 while total monthly fixed costs are $6,000. Current monthly sales are $48,000. The company is considering a proposal that will decrease the selling price by 10%, increase monthly fixed costs by 50% and increase unit sales to 450 units per month.

Required:

1) Compute the company's current break-even point in units and dollars.
2) What is the company's current margin of safety in units, dollars, and percentage?
3) Compute the company's margin of safety in units assuming the proposal is accepted.
4) Compute the increase or decrease in profit assuming the proposal is accepted.

Answers

1) Break-even point in units: $6,000/($120 - $80) = 150 units; Break-even point in dollars: 150 × $120 = $18,000
2) Margin of safety in units: ($48,000/$120) - 150 = 400 - 150 = 250 units
Margin of safety in dollars ($48,000 - $18,000) = $30,000
Margin of safety ratio: $30,000/$48,000 = 62.5%
3) New selling price = $120 - ($120 × 10%) = $108; New total fixed costs = $6,000 + 50% = $9,000
New unit contribution margin = $108 - $80 = $28
New break-even point = $9,000/$28 = 321.43 units = 322 units
New margin of safety = 450 units - 322 units = 128 units
4) Current profit = {($120 - $80) × 400 units} - $6,000 = $10,000
New profit = ($28 × 450) - $9,000 = $3,600; Therefore profit will decrease by $6,400.

7. Heavener Company produces and sells storage sheds. Its current sales are $500,000. The company's accountant provided the following cost information:

Manufacturing costs	$100,000 + 40% of sales
Selling costs	$30,000 + 10% of sales
Administrative costs	$45,000 + 10% of sales

Required:

1) Compute the product's contribution margin ratio.
2) Compute the company's current net income.
3) Compute the product's break-even point in dollars.
4) Compute the amount of revenue necessary to earn $60,000 in profit.
5) Compute the company's current margin of safety ratio.
6) Should the company accept a proposal that increases sales by 20% and total fixed costs by 25%?

Answers:

1) Contribution margin ratio = total CM/ Total Sales
Tot Var Costs: Manuf. Costs ($100,000 + $ 200,000) = $300.000
Total CM= $ 200,000
Contribution margin ratio = total CM/ Total Sales = $200,000/$500,000= 40%
2) Net income = ($500,000 × 40%) - $175,000 = $25,000
3) Break-even point in dollars = $175,000/40% = $437,500
4) Sales needed for $60,000 profit = ($175,000 + $60,000)/40% = $587,500
5) Margin of safety ratio = ($500,000 - $437,500)/$500,000 = 12.5%
6) No; a sales increase of $100,000 will generate an additional $40,000 in contribution margin but total fixed costs will increase by $43,750. Therefore, income will be reduced by $3,750.

8. Ruiz Company produces and sells a product that has variable costs of $50 and a selling price of $90. Its current sales total $270,000 per month. Fixed manufacturing costs total $40,000 per month and fixed selling and administrative costs total $35,000 per month. The company is considering a proposal that will increase the selling price by 10%, increase the fixed manufacturing costs by 10%, and increase the fixed selling and administrative costs by $1,500.

Required:

1) Compute the company's current break-even point in units.
2) Compute the company's current income and margin of safety in dollars.
3) Compute the break-even point in units assuming the proposal is accepted.
4) Compute the company's income assuming the proposal is accepted and sales total 3,300 units. Should the proposal be accepted?

Answers

1) Current break-even point in units = $75,000/($90 - $50) = 1,875 units.
2) Current income and margin of safety:
Net income = {($270,000/$90) × $40} - ($40,000 + $35,000) = $120,000 - $75,000 = $45,000
Margin of safety = $270,000 - (1,875 × $90) = $270,000 - $168,750 = $101,250
3) New break-even point in units:
New selling price = $90 × 1.1 = $99; New fixed manufacturing costs = $40,000 × 1.1 = $44,000; New fixed S&A costs = $36,500; New total fixed costs = ($44,000 + $36,500) = $80,500; New contribution margin per unit = $99 - $50 = $49;
Break-even point = $80,500/$49 = 1,642.9 = 1,643 units
4) Income under the proposal = (3,300 × $49) - $80,500 = $81,200. Because income will increase from $45,000 to $81,200, the proposal should be accepted.

9. Chicago Company incurs annual fixed costs of $80,000. Variable costs are $3.00 per unit, and the sales price is $10 per unit. Chicago desires to earn an annual profit of $60,000.

Required:

Use the contribution margin ratio approach to determine the sales volume in dollars and units needed to earn the desired profit.

Answers

Contribution margin ratio = ($10 - $3)/$10 = 70%
Sales in dollars = ($80,000 + $60,000)/70% = $200,000
Sales in units = $200,000/$10 per unit = 20,000 units

10. Bleeker Street Company produces and sells two lines of business suits, the Contemporary and the Traditionalist. The following monthly data are provided:

	Contemporary	Traditionalist
Estimated unit sales per month	500	1,000
Selling price	$ 200	$ 175
Variable manufacturing costs	110	100
Variable selling and administrative costs	10	10

Budgeted net income is $45,000 per month.

Required:

1) Calculate the monthly break-even sales in units and dollars based on the budgeted sales mix.
2) Calculate the firm's overall margin of safety in dollars.
3) Compute the firm's profit assuming 1,500 units are sold in a 1:1 sales mix.
4) Explain any difference between the firm's budgeted net income of $45,000 and your answer to Requirement 3.

Answers

Feedback: 1) Total fixed costs = Total contribution margin - budgeted income = {(500 × $80) + (1,000 × $65)} - $45,000 = $60,000.
Weighted-average contribution margin = {(1 × $80) + (2 × $65)}/3 = $70
Break-even point = Total fixed costs/Weighted-average contribution margin = $60,000/$70 = 858 suits (rounded).
Contemporary = 858 × 1/3 = 286 units; In dollars: 286 × $200 = $57,200
Traditionalist = 858 × 2/3 = 572 units; In dollars: 572 × $175 = $100,100
2) Margin of safety = budgeted sales - break-even sales = ((500 × $200) + (1,000 × $175)) - ($57,200 + $100,100) = $275,000 - $157,300 = $117,700
3) Total contribution margin - total fixed costs = ((750 × $80) + (750 × $65)) - $60,000 = $108,750 - $60,000 = $48,750.
4) Net income would be higher by $3,750 ($48,750 - $45,000) because 250 additional Contemporary units would add $20,000 (250 × $80) to earnings while 250 fewer Traditionalist units would decrease earnings by $16,250 (250 × $65), for a net increase of $3,750.