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**Management Accounting, Cdn. 6e (Horngren/Sundem/Stratton/Beaulieu)
Chapter 2 Cost Behaviour and Cost-Volume Relationships**

1) The way in which the activities of an organization affect its costs is called cost behaviour.

Answer: TRUE

Diff: 1 Type: TF Page Ref: 37

Objective: 1

2) Cost drivers are machines that take the place of labour.

Answer: FALSE

Diff: 1 Type: TF Page Ref: 37

Objective: 1

3) A variable cost varies per unit.

Answer: FALSE

Diff: 1 Type: TF Page Ref: 37

Objective: 1

4) A fixed cost is fixed per unit.

Answer: FALSE

Diff: 1 Type: TF Page Ref: 37

Objective: 1

5) The volume of sales at which revenue equals expenses, and net income is zero is known as the break-even point.

Answer: TRUE

Diff: 1 Type: TF Page Ref: 42

Objective: 3

6) The variable cost percentage plus the contribution margin percentage must equal 100 percent.

Answer: TRUE

Diff: 1 Type: TF Page Ref: 42

Objective: 3

7) The break-even point is located at the intersection of the total revenue line and the total expenses line on a cost-volume-profit graph.

Answer: TRUE

Diff: 1 Type: TF Page Ref: 42

Objective: 3

8) If fixed expenses doubled, the break-even point in units would double and the break-even point in

dollars would be cut in half.

Answer: FALSE

Diff: 1 Type: TF Page Ref: 42

Objective: 3

9) An increase in sales price would cause a decrease in the break-even point.

Answer: TRUE

Diff: 1 Type: TF Page Ref: 42

Objective: 3

10) Break-even is the point at which the company achieves its targeted net income.

Answer: FALSE

Diff: 1 Type: TF Page Ref: 42

Objective: 3

11) Sales mix is defined as the relative proportions of products that comprise total sales.

Answer: TRUE

Diff: 1 Type: TF Page Ref: 7

12) When changes occur in the sales mix, there is no effect on the cost-volume-profit relationships.

Answer: FALSE

Diff: 1 Type: TF Page Ref: 7

13) A change in the tax rate will not affect the break-even point.

Answer: TRUE

Diff: 1 Type: TF Page Ref: 8

Objective: 7

14) Gross margin is the same as contribution margin.

Answer: FALSE

Diff: 1 Type: TF Page Ref: 9

Objective: 8

15) In certain situations, gross margin can equal contribution margin.

Answer: TRUE

Diff: 1 Type: TF Page Ref: 42

Objective: 3

16) Activities that affect costs are often called

A) cost drivers.

B) stages of production.

C) fixed activities.

D) variable activities.

Answer: A

Diff: 1 Type: MC Page Ref: 37

Objective: 1

17) As the level of activity increases within the relevant range,

- A) total fixed costs remain unchanged.
- B) fixed costs per unit increases.
- C) total variable costs remain unchanged.
- D) variable costs per unit decreases.

Answer: A

Diff: 1 Type: MC Page Ref: 38

Objective: 2

18) As the level of activity increases within the relevant range,

- A) total fixed costs increases.
- B) fixed costs per unit decreases.
- C) total variable costs remain unchanged.
- D) variable costs per unit decreases.

Answer: B

Diff: 1 Type: MC Page Ref: 38

Objective: 2

19) As the level of activity decreases within the relevant range,

- A) total fixed costs increases.
- B) fixed costs per unit decreases.
- C) total variable costs decreases.
- D) variable costs per unit decreases.

Answer: C

Diff: 1 Type: MC Page Ref: 38

Objective: 2

20) A cost that changes in direct proportion to changes in the cost driver is a

- A) fixed cost.
- B) joint cost.
- C) mixed cost.
- D) variable cost.

Answer: D

Diff: 1 Type: MC Page Ref: 38

Objective: 2

21) If variable costs are increasing in total,

- A) activity is decreasing.
- B) activity is increasing.
- C) variable costs per unit are decreasing.
- D) variable costs per unit are increasing.

Answer: B

Diff: 1 Type: MC Page Ref: 38

Objective: 2

22) As production increases within the relevant range, fixed costs per unit

- A) decrease.
- B) increase.
- C) stay the same.
- D) cannot be determined with the information given.

Answer: A

Diff: 1 Type: MC Page Ref: 38

Objective: 2

23) In defining a cost as fixed, the accountant must consider

- A) the variable costs.
- B) the contribution margin.
- C) the relevant range.
- D) projected sales revenue.

Answer: C

Diff: 1 Type: MC Page Ref: 38

Objective: 2

24) The margin of safety

- A) equals break-even unit sales less actual unit sales.
- B) shows how far sales can fall below the planned level before losses occur.
- C) is the sales price minus all the variable expenses.
- D) is the same as break-even point.

Answer: B

Diff: 1 Type: MC Page Ref: 42

Objective: 3

25) Contribution margin

- A) is not the same as marginal income.
- B) can be calculated as a ratio or per unit.
- C) equals the sales price minus all the fixed expenses.
- D) equals total fixed costs minus total variable costs.

Answer: B

Diff: 1 Type: MC Page Ref: 46

Objective: 3

26) As sales volume in units increases and all other relationships remain constant

- A) break-even increases.
- B) break-even decreases.
- C) total contribution margin decreases.
- D) total contribution margin increases.

Answer: D

Diff: 1 Type: MC Page Ref: 46

Objective: 5

27) If the sales price per unit is \$10.00, the unit contribution margin is \$4.00, and total fixed costs are \$20,000, the break-even point in units is

- A) 5,000.
- B) 1,429.
- C) 2,000.
- D) 3,333.

Answer: A

Diff: 2 Type: MC Page Ref: 46

Objective: 5

28) If the sales price per unit is \$17.00, the unit variable cost is \$13.50, and the break-even point is 78,000 units, then the total fixed costs are

- A) \$105,300.
- B) \$89,140.
- C) \$273,000.
- D) \$156,000.

Answer: C

Diff: 2 Type: MC Page Ref: 46

Objective: 5

29) If the sales price per unit is \$200.00, the unit variable cost is \$148.00, and total fixed costs are \$164,000, then the break-even volume in dollar sales rounded to the nearest whole dollar is

- A) \$630,769.
- B) \$221,622.
- C) \$1,640,000.
- D) \$206,308.

Answer: A

Diff: 2 Type: MC Page Ref: 46

Objective: 5

30) If the sales price per unit is \$48.00, the total fixed costs are \$67,500, and the break-even volume in dollar sales is \$270,000, then the unit variable cost is

- A) \$4.00.
- B) \$6.33.
- C) \$12.00.
- D) \$36.00.

Answer: D

Diff: 2 Type: MC Page Ref: 46

Objective: 5

Reese, Inc. produces pliers. Each pair of pliers sells for \$8.00. Variable costs per unit total \$5.60 of which \$2.50 is for direct materials and \$2.10 is for direct labour.

31) If total fixed costs are \$174,000, then the break-even point in units is

- A) 31,071.
- B) 37,826.
- C) 72,500.
- D) 21,750.

Answer: C

Diff: 2 Type: MC Page Ref: 42

Objective: 3

32) If total fixed costs are \$213,000, then the break-even volume in sales dollars is

- A) \$710,000.
- B) \$304,288.
- C) \$370,432.
- D) \$177,500.

Answer: A

Diff: 2 Type: MC Page Ref: 42

Objective: 3

33) If the break-even volume in sales dollars is \$578,400, then the total fixed costs for the period must be

- A) \$173,520.
- B) \$144,600.
- C) \$206,570.
- D) \$251,747.

Answer: A

Diff: 2 Type: MC Page Ref: 42

Objective: 3

34) If total fixed costs are \$62,000, contribution margin per unit is \$5.00, and targeted after-tax net income is \$12,000 with a 40 percent tax rate, how many units must be sold to break even?

- A) 16,400
- B) 14,800
- C) 12,400
- D) 11,440

Answer: C

Diff: 2 Type: MC Page Ref: 42

Objective: 3

35) If targeted after-tax net income is \$27,000 with a 40 percent tax rate, contribution margin per unit is \$0.80, and total fixed costs are \$148,000, how many units must be sold to break even?

- A) 218,750
- B) 241,250
- C) 185,000
- D) 167,250

Answer: C

Diff: 2 Type: MC Page Ref: 49

Hampton Company, a producer of computer disks, has the following information:

Income tax rate	40 percent
Selling price per unit	\$1.00
Variable cost per unit	\$0.60
Total fixed costs	\$36,000.00

36) What is the contribution margin per unit?

- A) 0.40
- B) 0.60
- C) 1.00
- D) None of the above.

Answer: A

Diff: 2 Type: MC Page Ref: 42

Objective: 3

37) What is the contribution-margin ratio?

- A) 40 percent
- B) 60 percent
- C) 100 percent
- D) None of the above.

Answer: A

Diff: 2 Type: MC Page Ref: 42

Objective: 3

38) What is the break-even point in units?

- A) 36,000
- B) 90,000
- C) 60,000
- D) 54,000

Answer: B

Diff: 2 Type: MC Page Ref: 42

Objective: 3

39) What is the break-even point in dollars?

- A) \$54,000
- B) \$36,000
- C) \$90,000
- D) \$60,000

Answer: C

Diff: 2 Type: MC Page Ref: 42

Objective: 3

40) The horizontal axis on the cost-volume-profit graph is the

- A) dollars of cost.
- B) sales volume.
- C) dollars of revenue.
- D) net income.

Answer: B

Diff: 2 Type: MC Page Ref: 46

Objective: 5

41) The cost-volume-profit graph does NOT show

- A) the break-even point.
- B) the profit or loss at any rate of activity.
- C) the fixed cost per unit.
- D) sales volume.

Answer: C

Diff: 2 Type: MC Page Ref: 46

Objective: 5

42) Which of the following is NOT an underlying assumption of the cost-volume-profit graph?

- A) Expenses are categorized into variable and fixed.
- B) Sales mix will not be constant.
- C) Revenues and expenses are linear over the relevant range.
- D) Efficiency and productivity will be unchanged.

Answer: B

Diff: 1 Type: MC Page Ref: 46

Objective: 5

43) If fixed expenses were doubled and contribution margin per unit was cut in half, then the break-even point would

- A) be cut in half.
- B) double.
- C) triple.
- D) quadruple.

Answer: D

Diff: 2 Type: MC Page Ref: 38

Objective: 2

The following information is for Lyceum, Ltd.:

Total fixed costs	\$142,500
Variable costs (per unit)	\$45
Selling price (per unit)	\$70

44) If management has a targeted net income of \$21,000 (ignore income taxes), then the number of units which must be sold is

- A) 2,036.
- B) 2,336.
- C) 6,540.
- D) 5,700.

Answer: C

Diff: 2 Type: MC Page Ref: 38

Objective: 2

45) If management has a targeted net income of \$27,000 (ignore income taxes), then sales revenue should be

- A) \$263,667.
- B) \$474,600.
- C) \$108,964.
- D) \$169,500.

Answer: B

Diff: 2 Type: MC Page Ref: 49

46) The contribution-margin ratio is

- A) 64.3 percent.
- B) 55.6 percent.
- C) 35.7 percent.
- D) 44.4 percent.

Answer: C

Diff: 2 Type: MC Page Ref: 38

Objective: 3

47) If total fixed costs increased to \$156,750, then break-even volume in dollars would increase by

- A) 12.3 percent.
- B) 20.0 percent.
- C) 34.3 percent.
- D) 10.0 percent.

Answer: D

Diff: 2 Type: MC Page Ref: 38

Objective: 3

Assume the following cost information for Quayle Corporation:

Total fixed costs	\$50,000
Selling price per unit	\$90
Variable costs per unit	\$50
Tax rate	40 percent

48) What volume of sales dollars is required to earn an after-tax net income of \$15,000?

- A) \$196,875
- B) \$157,500
- C) \$135,000
- D) \$168,750

Answer: D

Diff: 2 Type: MC Page Ref: 53

Objective: 8

49) What is the number of units that must be sold to earn an after-tax net income of \$25,500?

- A) 3,700
- B) 2,313
- C) 1,594
- D) 1,063

Answer: B

Diff: 2 Type: MC Page Ref: 53

Objective: 8

50) What is the break-even point in units?

- A) 1,000
- B) 1,250
- C) 556
- D) 500

Answer: B

Diff: 2 Type: MC Page Ref: 42

Objective: 3

51) If fixed costs increased by 10 percent, and management wanted to maintain the original break-even point, then the selling price per unit would have to be increased to

- A) \$99
- B) \$130
- C) \$94
- D) \$97

Answer: C

Diff: 2 Type: MC Page Ref: 42

Objective: 3

52) The change in total results under a new condition, in comparison with some given or known condition, is the definition of

- A) incremental.
- B) detrimental.
- C) conditional.
- D) comparability.

Answer: A

Diff: 2 Type: MC Page Ref: 46

Objective: 5

53) Given a break-even point of 44,000 units and a contribution margin per unit of \$4.80, the total number of units that must be sold to reach a net profit of \$9,048 is

- A) 45,885 units.
- B) 44,000 units.
- C) 1,885 units.
- D) cannot be determined with the above information.

Answer: A

Diff: 2 Type: MC Page Ref: 42

Objective: 3

54) As sales exceed the break-even point, a high contribution-margin percentage

- A) decreases profits faster than does a small contribution-margin percentage.
- B) decreases profits at the same rate as a small contribution-margin percentage.
- C) increases profits at the same rate as a small contribution-margin percentage.
- D) increases profits faster than does a small contribution-margin percentage.

Answer: D

Diff: 2 Type: MC Page Ref: 42

Objective: 3

55) Operating leverage is

- A) the ratio of net income to sales.
- B) the ability of a firm to pay off its debts.
- C) the ratio of fixed costs to variable costs.
- D) also referred to as working capital.

Answer: C

Diff: 1 Type: MC Page Ref: 53

Objective: 8

56) In a highly leveraged company,

- A) fixed costs are low and variable costs are high.
- B) large changes in sales volume result in small changes in net income.
- C) there is a higher possibility of net income or net loss and therefore more risk than a low leveraged firm.
- D) a variation in sales leads to only a small variability in net income.

Answer: C

Diff: 1 Type: MC Page Ref: 53

Objective: 8

57) If the sales price per unit is \$150.00, variable cost per unit is \$80.00, targeted net income is \$44,000, and total fixed costs are \$33,000, the number of units that must be sold is

- A) 513.
- B) 1,100.
- C) 963.
- D) 629.

Answer: B

Diff: 2 Type: MC Page Ref: 49

58) If the contribution-margin ratio is .30, targeted net income is \$64,000, and targeted sales volume in dollars is \$400,000, then total fixed costs are

- A) \$56,000.
- B) \$120,000.
- C) \$36,800.
- D) \$19,200.

Answer: A

Diff: 2 Type: MC Page Ref: 42

Objective: 3

59) If targeted sales volume in units is 124,600, total fixed costs are \$15,600, and contribution margin per unit is \$0.30, then the targeted net income is

- A) \$37,380.
- B) \$32,700.
- C) \$15,600.
- D) \$21,780.

Answer: D

Diff: 2 Type: MC Page Ref: 42

Objective: 3

- 60) The variable-cost ratio is
- A) all variable costs divided by fixed costs.
 - B) net income divided by all variable costs.
 - C) fixed costs divided by all variable costs.
 - D) all variable costs divided by sales.

Answer: D

Diff: 1 Type: MC Page Ref: 38

Objective: 2

- 61) Gross margin is
- A) the excess of gross profit over operating expenses.
 - B) the excess of sales over the cost of goods sold.
 - C) also referred to as net profit.
 - D) the same as contribution margin.

Answer: B

Diff: 1 Type: MC Page Ref: 55

Objective: 9

- 62) The relative proportions or combinations of quantities of products that comprise total sales is called
- A) sales mix.
 - B) gross margin.
 - C) proportional sales.
 - D) product ratio.

Answer: A

Diff: 1 Type: MC Page Ref: 52

Objective: 7

- 63) If the proportions in a sales mix change, the
- A) contribution margin per unit increases.
 - B) break-even point will remain the same.
 - C) cost-volume-profit relationship also changes.
 - D) net income will not be altered.

Answer: C

Diff: 1 Type: MC Page Ref: 52

Objective: 7

- 64) Assuming a constant mix of 3 units of X for every 1 unit of Y, a selling price of \$18 for X and \$24 for Y, variable costs per unit of \$12 for X and \$14 for Y, and total fixed costs of \$89,600, the break-even point in units would be

- A) 9,600 units of X and 3,200 units of Y.
- B) 2,400 units of X and 800 units of Y.
- C) 3,200 units of X and 9,600 units of Y.
- D) 1,867 units of X and 622 units of Y.

Answer: A

Diff: 2 Type: MC Page Ref: 52

Objective: 7

65) If total fixed costs are \$62,000, contribution margin per unit is \$5.00, and targeted after-tax net income is \$12,000 with a 40 percent tax rate, then the number of units that must be sold is

- A) 16,400.
- B) 14,800.
- C) 24,667.
- D) 11,440.

Answer: A

Diff: 2 Type: MC Page Ref: 42

Objective: 3

66) If targeted after-tax net income is \$27,000 with a 40 percent tax rate, contribution margin per unit is \$0.80, and total fixed costs are \$148,000, then the number of units that must be sold is

- A) 218,750.
- B) 241,250.
- C) 160,833.
- D) 167,250.

Answer: B

Diff: 2 Type: MC Page Ref: 42

Objective: 3

67) If total fixed costs are \$420,000, contribution margin per unit is \$6.75, the tax rate is 40 percent, and the number of units to be sold is 130,000, then the after-tax net income will be

- A) \$457,500.
- B) \$877,500.
- C) \$420,000.
- D) \$274,500.

Answer: D

Diff: 2 Type: MC Page Ref: 53

Objective: 8

Hampton Company, a producer of computer disks, has the following information:

Income tax rate	40 percent
Selling price per unit	\$1.00
Variable cost per unit	\$0.60
Total fixed costs	\$36,000.00

68) How many units must be sold to obtain a targeted income before taxes of \$6,000?

- A) 36,000
- B) 42,000
- C) 90,000
- D) 105,000

Answer: D

Diff: 2 Type: MC Page Ref: 53

Objective: 8

69) How many units must be sold to obtain a targeted after-tax income of \$6,000?

- A) 115,000
- B) 42,000
- C) 90,000
- D) 105,000

Answer: A

Diff: 2 Type: MC Page Ref: 53

Objective: 8

70) Barrell Company, a producer of computer disks, has the following information:

Income tax rate	40 percent
Selling price per unit	\$2.00
Variable cost per unit	\$1.20
Total fixed costs	\$72,000.00

What sales volume in dollars is needed to obtain a targeted after-tax income of \$12,000?

- A) \$84,000
- B) \$180,000
- C) \$210,000
- D) \$230,000

Answer: D

Diff: 2 Type: MC Page Ref: 53

Objective: 8

71) The contribution margin ratio equals

- A) revenue minus variable costs.
- B) variable costs divided by revenue.
- C) contribution margin divided by revenue.
- D) variable costs divided by contribution margin.

Answer: C

Diff: 1 Type: MC Page Ref: 46

Objective: 5

- 72) The limiting assumptions of CVP analysis include all of the following EXCEPT
- A) a nonlinear revenue function and a nonlinear cost function.
 - B) that the inventory levels at the beginning of the period are close to the inventory levels at the end of a period.
 - C) selling prices and costs are known with certainty.
 - D) costs can be separated into fixed and variable components.

Answer: A

Diff: 1 Type: MC Page Ref: 46

Objective: 5

Use the following information to answer the next question(s).

Selling price per unit	\$ 100
Variable manufacturing costs per unit	\$ 20
Fixed manufacturing costs per unit	\$ 30
Variable selling costs per unit	\$ 25
Fixed selling costs per unit	\$ 10
Expected production and sales (in units)	1,000

- 73) Contribution margin per unit is

- A) \$15.
- B) \$50.
- C) \$55.
- D) \$80.

Answer: C

Diff: 2 Type: MC Page Ref: 53

Objective: 8

- 74) Breakeven for the product (rounded to the nearest whole unit) is

- A) 727 units.
- B) 888 units.
- C) 1,000 units.
- D) 1,500.

Answer: A

Diff: 2 Type: MC Page Ref: 42

Objective: 3

- 75) The contribution margin ratio is

- A) 15%.
- B) 45%.
- C) 50%.
- D) 55%.

Answer: D

Diff: 2 Type: MC Page Ref: 53

Objective: 8

76) If the firm wants to earn \$70,000 in before-tax profit, sales revenue must equal

- A) \$60,500.
- B) \$110,000.
- C) \$200,000.
- D) \$244,444.

Answer: C

Diff: 2 Type: MC Page Ref: 42

Objective: 3

77) If the firm wants to earn \$70,000 in before-tax profit, contribution margin must equal

- A) \$98,000.
- B) \$110,000.
- C) \$125,000.
- D) \$155,000.

Answer: B

Diff: 2 Type: MC Page Ref: 42

Objective: 3

78) If the tax rate is 40 percent, how many units must be sold to earn an after-tax profit of \$60,000?

- A) 4,000
- B) 1,500
- C) 2,640
- D) 2,546

Answer: D

Diff: 2 Type: MC Page Ref: 42

Objective: 3

79) The manner in which the activities of an organization affect its costs.

Answer: Cost behaviour

Diff: 1 Type: SA Page Ref: 37

Objective: 1

80) Activities that affect costs.

Answer: Cost drivers

Diff: 1 Type: SA Page Ref: 37

Objective: 1

81) A cost that changes in direct proportion to changes in the cost driver.

Answer: Variable cost

Diff: 1 Type: SA Page Ref: 37

Objective: 1

82) A cost that is not immediately affected by changes in the cost driver.

Answer: Fixed cost

Diff: 2 Type: SA Page Ref: 37

Objective: 1

83) The boundaries of cost driver activity within which a specific relationship between costs and the cost driver is valid.

Answer: Relevant range

Diff: 1 Type: SA Page Ref: 38

Objective: 2

84) The study of the effects of output volume on revenue, expenses, and net income.

Answer: Cost-volume-profit analysis

Diff: 1 Type: SA Page Ref: 46

Objective: 3

85) The level of sales at which revenue equals expenses, and net income is zero.

Answer: Break-even point

Diff: 1 Type: SA Page Ref: 42

Objective: 3

86) The sales price minus all the variable expenses per unit.

Answer: Contribution margin

Diff: 1 Type: SA Page Ref: 42

Objective: 3

87) A firm's ratio of fixed and variable costs.

Answer: Operating leverage

Diff: 1 Type: SA Page Ref: 42

Objective: 3

88) The relative proportions of quantities of products that comprise total sales.

Answer: Sales mix

Diff: 1 Type: SA Page Ref: 59

Objective: 7

89) The Alexander Company produces one type of machine. The following information is available for your review:

Selling price per unit	\$4,800
Variable costs per unit	\$3,600
Total fixed costs	\$108,000

Required:

- Compute break-even point in units.
- Compute break-even volume in dollars.
- Compute the margin of safety assuming planned unit sales of 120.

Answer:

- $\$108,000 / (\$4,800 - \$3,600) = 90$ units
- $90 \text{ units} \times \$4,800/\text{unit} = \$432,000$
- $120 \text{ units} - 90 \text{ units} = 30$ units

Diff: 3 Type: ES Page Ref: 42

Objective: 3

90) Given the following information for Baugh Company:

Total fixed costs	\$78,000
Unit variable costs	\$24
Unit selling price	\$36

Required:

- Compute the contribution margin per unit.
- Compute the contribution-margin ratio.
- Compute the break-even point in units.
- Compute the break-even volume in dollars.

Answer:

- $\$36 - \$24 = \$12$ per unit
- $\$12/\$36 = 0.333$
- $\$78,000/\$12 = 6,500$ units
- $6,500 \text{ units} \times \$36 = \$234,000$

Diff: 3 Type: ES Page Ref: 42

Objective: 3

91) Thornburg Corporation manufactures lamps. Given the following financial data:

Total fixed costs	\$25,000
Variable costs per unit	\$8
Selling price per unit	\$13

Required:

- Compute the contribution margin per unit.
- Compute the break-even point in units.
- Compute the break-even volume in dollars.

Answer:

- $\$13 - \$8 = \$5$ per unit
- $\$25,000/\$5 = 5,000$ units
- $5,000 \text{ units} \times \$13 = \$65,000$

Diff: 3 Type: ES Page Ref: 42

Objective: 3

92) Wallace, Inc. produces squirt guns and has provided the following information:

Total fixed costs	\$100,000
Unit variable costs	\$10
Planned unit sales	30,000

The break-even point is 25,000 units.

Required:

- Compute the selling price per unit.
- Compute the contribution-margin ratio.
- Compute the break-even volume in dollars.
- Compute the margin of safety.

Answer:

- $\$100,000/25,000 = \$4 + \$10 = \14
- $\$4/\$14 = 0.2857$
- $25,000 \text{ units} \times \$14 = \$350,000$
- $30,000 - 25,000 = 5,000 \text{ units}$

Diff: 3 Type: ES Page Ref: 42

Objective: 3

93) Dopler Inc. manufactures a product that sells for \$50. The variable costs per unit are:

Direct materials	\$15
Direct labour	5
Variable manufacturing overhead	4

Budgeted fixed manufacturing overhead is estimated at \$500,000 and budgeted fixed selling, general and administrative costs are expected to be \$300,000. Variable selling costs are \$6 per unit.

- Determine the break-even point in units.
- Determine the number of units that must be sold to earn \$100,000 in profit before taxes.
- What dollar amount of sales must be attained in order to earn \$300,000 in profit before taxes?
- If there is a 40 percent tax rate, determine the sales level in dollars that must be attained in order to generate an after-tax profit of \$300,000.

Answer:

$$\begin{aligned} \text{a. Breakeven in Units} &= \text{Fixed Costs/Contribution Margin Per Unit} \\ &= \$800,000/\$20.00^{**} \\ &= 40,000 \text{ units} \end{aligned}$$

*Total fixed costs:

Budgeted fixed manufacturing overhead	\$500,000
Budgeted fixed selling, general & administrative	<u>300,000</u>
Total fixed costs	\$800,000

**Contribution margin per unit:

Selling price per unit	\$50.00	
Variable costs per unit:		
Direct materials	\$15.00	
Direct labour	5.00	
Variable manufacturing overhead	4.00	
Variable selling costs	<u>6.00</u>	<u>30.00</u>
Contribution margin per unit		\$20.00

b. Unit sales necessary to earn \$100,000 in before-tax profit:

$$\begin{aligned} \text{Units} &= (\text{Fixed Costs} + \text{Desired Profit})/\text{Contribution Margin Per Unit} \\ &= (\$800,000 + \$100,000)/\$20.00 = 45,000 \text{ units} \end{aligned}$$

c. Sales dollars necessary to earn before-tax profit of \$300,000:

$$\begin{aligned} \text{Sales Dollars} &= (\text{Fixed Costs} + \text{Desired Profit})/\text{Contribution Margin Percentage} \\ &= (\$800,000 + \$300,000)/40\% = \$2,750,000 \end{aligned}$$

*Contribution margin percentage = \$20.00/\$50.00 = 40%

d. Sales dollars necessary to earn an after-tax profit of \$300,000:

$$\text{Sales Dollars} = \text{Fixed Costs} + [\text{After-Tax Profit}/(1 - \text{Tax Rate})]/\text{Contribution}$$

$$\begin{aligned} &\text{Margin Percentage} \\ &= [\$800,000 + (\$300,000/.60)]/40\% \\ &= (\$800,000 + \$500,000)/40\% = \$3,250,000 \end{aligned}$$

Diff: 3 Type: ES Page Ref: 49

94) The Isbit Company has developed the following income statement using a contribution margin format.

ISBIT COMPANY PROJECTED
INCOME STATEMENT
FOR THE YEAR ENDED DECEMBER 31, 2006

Revenues	\$200,000	
Variable Costs:		
Variable manufacturing costs	\$60,000	
Variable selling costs	<u>20,000</u>	<u>80,000</u>
Contribution Margin		\$120,000
Fixed Costs:		
Fixed manufacturing costs	\$80,000	
Fixed selling, general and administrative costs	<u>25,000</u>	<u>105,000</u>
Income		\$ 15,000

The projected income statement was based upon sales of 10,000 units. Anton has the capacity to produce 15,000 units during the year.

- a. Determine the break-even point in units.
- b. Calculate the margin of safety in dollars.
- c. The sales manager believes the company could increase sales by 1,000 units if advertising expenditures are increased by \$16,000. Should the company increase advertising expenditures?
- d. What is the maximum amount the company could pay for advertising if the advertising would increase sales by 1,000 units?
- e. Management believes that by lowering the selling price to \$17 per unit, the company can increase sales by 2,000 units. Based upon these estimates, would it be profitable for the company to lower its selling price?

Answer:

- a. Breakeven in Units = Fixed Costs/Contribution Margin Per Unit

$$= \$105,000 / \$12^* = 8,750 \text{ units}$$

*Contribution margin per unit:

Selling price per unit (\$200,000/10,000)		\$20
Variable cost per unit:		
Variable manufacturing costs (\$60,000/10,000)	\$6	
Variable selling costs (\$20,000/10,000)	<u>2</u>	<u>8</u>
Contribution margin per unit		<u>\$12</u>

b. Margin of safety in dollars:

$$\begin{aligned}\text{Margin of Safety} &= \text{Expected Sales} - \text{Sales at Breakeven} \\ &= \$200,000 - (8,750 \text{ units} \times \$20) = \$25,000\end{aligned}$$

Sales could decrease by \$25,000 from the expected sales level before the company would reach breakeven.

c. For this alternative to be profitable, the contribution margin from the additional sales of 1,000 units must at least cover the additional advertising expenditure.

Incremental contribution margin from 1,000 units (\$12 × 1,000 units)	\$12,000
Less: Incremental advertising expenditures	<u>16,000</u>
Decrease in income	(\$4,000)

To verify the effect on income, a new income statement that considers the effect on sales and costs could be prepared.

ISBIT COMPANY PROJECTED
INCOME STATEMENT
FOR THE YEAR ENDED DECEMBER 31, 2006

Revenues (11,000 × \$20)		\$220,000
Variable Costs:		
Variable manufacturing costs (11,000 × \$6)	\$66,000	
Variable selling costs (11,000 × \$2)	<u>22,000</u>	<u>88,000</u>
Contribution Margin		\$132,000
Fixed Costs:		
Fixed manufacturing costs	\$80,000	
Fixed selling, general & administrative costs (\$25,000 + \$16,000)	<u>41,000</u>	<u>121,000</u>
Income		\$ 11,000

The Isbit Company's income would decrease from \$15,000 to \$11,000 if the advertising expenditures were made.

d. The maximum amount the company could pay for additional advertising in order to sell 1,000 more units would be \$12,000.

Additional contribution margin from 1,000 units	\$12,000
Less: Additional advertising expenditures	<u>12,000</u>
Effect on income	\$ - 0 -

The company also might want to consider the reliability of the estimates and the effect the advertising might have on sales in later periods.

e. A projected income statement based upon a \$17 selling price and sales of 12,000 units follows:

ISBIT COMPANY PROJECTED
INCOME STATEMENT
FOR THE YEAR ENDED DECEMBER 31, 2006

Revenues (12,000 units × \$17)		\$204,000
Variable Costs:		
Variable manufacturing costs (12,000 × \$6)	\$72,000	
Variable selling costs (12,000 × \$2)	<u>24,000</u>	<u>96,000</u>
Contribution Margin		\$108,000
Fixed costs:		
Fixed manufacturing costs	\$80,000	
Fixed selling, general & administrative costs	<u>25,000</u>	<u>105,000</u>
Income		\$ 3,000

If the company lowers its selling price to \$17 and sells 2,000 more units, income will decrease from \$15,000 to \$3,000.

Diff: 3 Type: ES Page Ref: 53

Objective: 8

95) The Orton Company produces two types of food processors. Information about the two products for 2006 is as follows:

	<u>Regular</u>	<u>Deluxe</u>
Selling price per unit	\$75	\$100
Variable costs per unit	<u>50</u>	<u>50</u>
Contribution margin per unit	\$25	50

The company expects fixed costs to be \$150,000 in 2006. The firm expects 80% of its sales (in units) to be Regular model food processors.

- a. Determine the break-even point in units.
- b. Determine sales in units of Regular and Deluxe models necessary to generate a before-tax profit of \$90,000.
- c. Determine sales in units of Regular and Deluxe models necessary to generate an after-tax profit of \$90,000 if the tax rate is 40 percent.

Answer:

a.	<u>Selling</u>		<u>Variable</u>		<u>Contribution</u>			
	<u>Price</u>	-	<u>Cost</u>	=	<u>Margin</u>	×	<u>Mix</u>	
Regular	\$ 75	-	\$50	=	\$25	×	8	= \$200
Deluxe	100	-	50	=	50	×	2	= <u>100</u>
Contribution margin per package								\$300

$$\begin{aligned} \text{Breakeven in Units} &= \text{Fixed Costs} / \text{Contribution Margin Per Package} \\ &= \$15,000 / \$300 = 500 \text{ packages} \end{aligned}$$

The 500 packages would be divided as follows:

Regular (500 packages × 8 units)	4,000 units
Deluxe (500 packages × 2 units)	<u>1,000 units</u>
Total	5,000 units

b. Sales in units necessary to generate a before-tax profit of \$90,000:

$$\begin{aligned}\text{Units} &= \text{Fixed Costs} + \text{Desired Profit} / \text{Contribution Margin Per Package} \\ &= \$150,000 + 90,000 / \$300 = 800 \text{ packages}\end{aligned}$$

The 800 packages would be divided as follows:

Regular (800 packages × 8 units)	6,400 units
Deluxe (800 packages × 2 units)	<u>1,600</u> units
Total	8,000 units

c. Sales in units necessary to generate an after-tax profit of \$90,000:

$$\begin{aligned}\text{Units} &= \text{Fixed Costs} + [\text{After-Tax Profit} / (1 - \text{Tax Rate})] / \text{Contribution Margin} \\ &= [\$150,000 + (\$90,000 / .60)] / \$300 = 1,000 \text{ packages}\end{aligned}$$

The 1,000 packages would be divided as follows:

Regular (1,000 packages × 8 units)	8,000 units
Deluxe (1,000 packages × 2 units)	<u>2,000</u> units
Total	10,000 units

Diff: 3 Type: ES Page Ref: 53

Objective: 8

96) The Newman Company produces two models of garage door openers, Standard and Deluxe.

The company expects to sell 900 units of the Standard model and 300 units of the Deluxe model (a sales mix of 3:1).

A projected income statement for the firm as a whole for 2006 follows:

THE NEWMAN COMPANY
PROJECTED INCOME STATEMENT
FOR THE YEAR ENDED DECEMBER 31, 2006

Revenue	
\$300,000	
Less: variable costs	<u>120,000</u>
Contribution margin	\$180,000
Less: total fixed costs	<u>60,000</u>
Profit	\$120,000

a. Determine the break-even point in sales for 2006.

b. Determine sales revenue necessary to generate a before-tax profit of \$150,000.

c. Determine sales revenue necessary to generate an after-tax profit of \$210,000 if the tax rate is 30 percent.

Answer:

a. Contribution margin ratio = $\$180,000/\$300,000 = 60\%$

Breakeven in sales revenue = $\$60,000/60\% = \$100,000$

b. $(\$60,000 + \$150,000)/60\% = \$350,000$

c. $[\$60,000 + (\$210,000/(1 - .30))]/60\% = \$600,000$

Diff: 3 Type: ES Page Ref: 49