CHAPTER 5

COST-VOLUME-PROFIT

SUMMARY OF QUESTIONS BY LEARNING OBJECTIVES AND BLOOM'S TAXONOMY

Item	LO	BT	Item	LO	BT	Item	LO	BT	Item	LO	BT	Item	LO	BT
True-False Statements														
1.	1	K	9.	2	C	17.	4	K	25.	6	K	[sg]33.	3	K
2.	1	K	10.	3	K	18.	5	K	26.	6	AP	[sg]34.	5	C
3.	1	K	11.	3	K	19.	5	K	27.	7	K	[sg]35.	6	K
4.	1	C	12.	3	C	20.	5	K	28.	7	K	[sg]36.	7	AP
5.	1	C	13.	3	K	21.	5	K	29.	8	K	[sg]37.	8	K
6.	1	C	14.	3	C	22.	5	K	30.	8	K			
7.	2	K	15.	3	K	23.	6	K	[sg]31.	1	K			
8.	2	K	16.	4	K	24.	6	K	[sg]32.	1	K			
Multiple Choice Questions														
38.	1	C	62.	2	C	86.	5	AP	110.	6	C	134.	7	AP
39.	1	K	63.	2	C	87.	5	K	111.	6	K	135.	7	AP
40.	1	K	64.	3	AP	88.	5	AP	112.	6	AP	136.	7	AP
41.	1	C	65.	3	K	89.	5	C	113.	6	AP	137.	7	AP
42.	1	C	66.	3	AP	90.	5	AP	114.	6	AP	138.	7	AP
43.	1	K	67.	3	AP	91.	5	AP	115.	6	AP	139.	7	AP
44.	1	C	68.	3	C	92.	5	AP	116.	6	AP	140.	8	AP
45.	1	C	69.	3	C	93.	5	AP	117.	6	AP	141.	8	AP
46.	1	K	70.	3	K	94.	5	AP	118.	6	AP	142.	8	AP
47.	1	C	71.	3	C	95.	5	AP	119.	6	AP	143.	8	K
48.	1	C	72.	3	AP	96.	5	AP	120.	6	AP	144.	8	C
49.	1	K	73.	3	AP	97.	5	AP	121.	6	AP	[sg]145.	2	K
50.	1	C	74.	3	AP	98.	5	AP	122.	6	AP	[st]146.	3	K
51.	1	K	75.	3	K	99.	5	C	123.	6	C	[sg]147.	3	AP
52.	1	C	76.	3	K	100.	5	K	124.	7	AP	[st]148.	4	K
53.	1	C	77.	3	C	101.	5	K	125.	7	AP	[sg]149.	5	C
54.	1	C	78.	3	AP	102.	5	AP	126.	7	AP	[st]150.	5	K
55.	1	C	79.	3	AP	103.	6	AP	127.	7	AP	[sg]151.	5	AP
56.	2	C	80.	4	K	104.	6	AP	128.	7	AP	[st]152.	6	AP
57.	2	K	81.	4	K	105.	6	K	129.	7	AP	[sg]153.	6	K
58.	2	C	82.	4	C	106.	6	C	130.	7	AP	[st]154.	7	AP
59.	2	C	83.	4	K	107.	6	C	131.	7	AP	[sg]155.	7	K
60.	2	C	84.	4	C	108.	6	AP	132.	7	AP	[sg]156.	8	AP
61.	2	K	85.	4	C	109.	6	AP	133.	7	AP			
Brief Exercises														
157.	3	AP	159.	5	AP	161.	6	AP	163.	6	AP	165.	8	AP
158.	5	AP	160.	5	AP	162.	6	AP	164.	8	AP	166.	8	AP

[sg] This question also appears in the Study Guide.
[st] This question also appears in a self-test at the student companion website.
[a] This question covers a topic in an appendix to the chapter.

SUMMARY OF QUESTIONS BY LEARNING OBJECTIVES AND BLOOM'S TAXONOMY

Exercises														
167.	1,3	AP	173.	4	AN	179.	5,6,7	AN	185.	5,7	AP	191.	6,7	AP
168.	1,3,6,8,	AP	174.	4	E	180.	5,6	AP	186.	6	AP	192.	7	AP
169.	1,3,5,6,	AN	175.	4,6,7	AN	181.	5,6,8	AP	187.	6,7,8	AP	193.	8	AP
170.	3	AP	176.	5	AP	182.	5,6	AP	188.	6,7	AP			
171.	3	AP	177.	5	AP	183.	5,6,8	AP	189.	6,7	C			
172.	3	AP	178.	5,6,7	AN	184.	5,6,8	AP	190.	6,7	AP			
Completion Statements														
194.	1	K	197.	1	K	199.	2	K	201.	5	K	203.	6	K
195.	1	K	198.	1	K	200.	3	K	202.	6	K	204.	8	K
196.	1	K												
Matching Statements														
205.	1	K												
Short-Answer Essay														
206.	4	S	208.	1	S	210.	3	S						
207.	5	S	209.	3	S	211.	1	S						

SUMMARY OF LEARNING OBJECTIVES BY QUESTION TYPE

Item	Type	Item	Type	Item	Type	Item	Type	Item	Type	Item	Type	Item	Type
Learning Objective 1													
1.	TF	31.	TF	42.	MC	48.	MC	54.	MC	195.	C	211.	SA
2.	TF	32.	TF	43.	MC	49.	MC	55.	MC	196.	C		
3.	TF	38.	MC	44.	MC	50.	MC	167.	Ex	197.	C		
4.	TF	39.	MC	45.	MC	51.	MC	168.	Ex	198.	C		
5.	TF	40.	MC	46.	MC	52.	MC	169.	Ex	205.	MA		
6.	TF	41.	MC	47.	MC	53.	MC	194.	C	208.	SA		
Learning Objective 2													
7.	TF	9.	TF	57.	MC	59.	MC	61.	MC	63.	MC	199.	C
8.	TF	56.	MC	58.	MC	60.	MC	62.	MC	145.	MC		
Learning Objective 3													
10.	TF	15.	TF	67.	MC	72.	MC	77.	MC	157.	BE	171.	Ex
11.	TF	33.	TF	68.	MC	73.	MC	78.	MC	167.	Ex	172.	Ex
12.	TF	64.	MC	69.	MC	74.	MC	79.	MC	168.	Ex	200.	C
13.	TF	65.	MC	70.	MC	75.	MC	146.	MC	169.	Ex	209.	SA
14.	TF	66.	MC	71.	MC	76.	MC	147.	MC	170.	Ex	210.	SA
Learning Objective 4													
16.	TF	80.	MC	82.	MC	84.	MC	148.	MC	174.	Ex	206.	SA
17.	TF	81.	MC	83.	MC	85.	MC	173.	Ex	175.	Ex		
Learning Objective 5													
18.	TF	86.	MC	92.	MC	98.	MC	150.	MC	177.	Ex	183.	Ex
19.	TF	87.	MC	93.	MC	99.	MC	151.	MC	178.	Ex	184.	Ex
20.	TF	88.	MC	94.	MC	100.	MC	158.	BE	179.	Ex	185.	Ex
21.	TF	89.	MC	95.	MC	101.	MC	159.	BE	180.	Ex	201.	C
22.	TF	90.	MC	96.	MC	102.	MC	160.	BE	181.	Ex	207.	SA
34.	TF	91.	MC	97.	MC	149.	MC	176.	Ex	182.	Ex		

Learning Objective 6													
22.	TF	100.	MC	108.	MC	116.	MC	152.	MC	178.	Ex	187.	Ex
23.	TF	101.	MC	109.	MC	117.	MC	153.	MC	179.	Ex	188.	Ex
24.	TF	102.	MC	110.	MC	118.	MC	161.	BE	180.	Ex	189.	Ex
25.	TF	103.	MC	111.	MC	119.	MC	162.	BE	181.	Ex	190.	Ex
26.	TF	104.	MC	112.	MC	120.	MC	163.	BE	182.	Ex	191.	Ex
35.	TF	105.	MC	113.	MC	121.	MC	168.	Ex	183.	Ex	202.	C
98.	MC	106.	MC	114.	MC	122.	MC	169.	Ex	184.	Ex	203.	C
99.	MC	107.	MC	115.	MC	123.	MC	175.	Ex	186.	Ex		
Learning Objective 7													
27.	TF	126.	MC	131.	MC	136.	MC	155.	MC	187.	Ex	192.	Ex
28.	TF	127.	MC	132.	MC	137.	MC	175.	Ex	188.	Ex		
36.	TF	128.	MC	133.	MC	138.	MC	178.	Ex	189.	Ex		
124.	MC	129.	MC	134.	MC	139.	MC	179.	Ex	190.	Ex		
125.	MC	130.	MC	135.	MC	154.	MC	185.	Ex	191.	Ex		
Learning Objective 8													
29.	TF	140.	MC	143.	MC	164.	BE	168.	Ex	184.	Ex	204.	C
30.	TF	141.	MC	144.	MC	165.	BE	181.	Ex	187.	Ex		
37.	TF	142.	MC	156.	MC	166.	BE	183.	Ex	193.	Ex		

Note: TF = True-False BE = Brief Exercise C = Completion
MC = Multiple Choice Ex = Exercise MA = Matching
SA = Short-Answer Essay

CHAPTER LEARNING OBJECTIVES

1. ***Distinguish between variable and fixed costs.*** Variable costs are costs that vary in total directly and proportionately with changes in the activity index. Fixed costs are costs that remain the same in total regardless of changes in the activity index.

2. ***Explain the significance of the relevant range.*** The relevant range is the range of activity in which a company expects to operate during a year. It is important in CVP analysis because the behavior of costs is assumed to be linear throughout the relevant range.

3. ***Explain the concept of mixed costs.*** Mixed costs increase in total but not proportionately with changes in the activity level. For purposes of CVP analysis, mixed costs must be classified into their fixed and variable elements. One method that management may use to classify these costs is the high-low method.

4. ***List the five components of cost-volume-profit analysis.*** The five components of CVP analysis are (a) volume or level of activity, (b) unit selling prices, (c) variable cost per unit, (d) total fixed costs, and (e) sales mix.

5. ***Indicate what contribution margin is and how it can be expressed.*** Contribution margin is the amount of revenue remaining after deducting variable costs. It is identified in a CVP income statement, which classifies costs as variable or fixed. It can be expressed as a total amount, as a per unit amount, or as a ratio.

6. ***Identify the three ways to determine the break-even point.*** The break-even point can be (a) computed from a mathematical equation, (b) computed by using a contribution margin technique, and (c) derived from a CVP graph.

7. ***Give the formulas for determining sales required to earn target net income.*** The general formula for required sales is: Required sales = Variable costs + Fixed costs + Target net income. Two other formulas are: Required sales in units = (Fixed costs + Target net income) ÷ Contribution margin per unit, and Required sales in dollars = (Fixed costs + Target net income) ÷ Contribution margin ratio.

8. ***Define margin of safety, and give the formulas for computing it.*** Margin of safety is the difference between actual or expected sales and sales at the break-even point. The formulas for margin of safety are: Actual (expected) sales – Break-even sales = Margin of safety in dollars; Margin of safety in dollars ÷ Actual (expected) sales = Margin of safety ratio.

TRUE-FALSE STATEMENTS

1. An activity index identifies the activity that has a causal relationship with a particular cost.

Ans: T, LO: 1, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

2. A variable cost remains constant per unit at various levels of activity.

Ans: T, LO: 1, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

3. A fixed cost remains constant in total and on a per unit basis at various levels of activity.

Ans: F, LO: 1, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

4. If volume increases, all costs will increase.

Ans: F, LO: 1, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

5. If the activity index decreases, total variable costs will decrease proportionately.

Ans: T, LO: 1, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

6. Changes in the level of activity will cause unit variable and unit fixed costs to change in opposite directions.

Ans: F, LO: 1, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

7. For CVP analysis, both variable and fixed costs are assumed to have a linear relationship within the relevant range of activity.

Ans: T, LO: 2, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

8. The relevant range of activity is the activity level where the firm will earn income.

Ans: F, LO: 2, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

9. Costs will not change in total within the relevant range of activity.

Ans: F, LO: 2, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

10. The high-low method is used in classifying a mixed cost into its variable and fixed elements.

Ans: T, LO: 3, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

11. A mixed cost has both selling and administrative cost elements.

Ans: F, LO: 3, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

12. The fixed cost element of a mixed cost is the cost of having a service available.

Ans: T, LO: 3, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

13. For planning purposes, mixed costs are generally grouped with fixed costs.

Ans: F, LO: 3, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

14. The difference between the costs at the high and low levels of activity represents the fixed cost element of a mixed cost.

Ans: F, LO: 3, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

15. When applying the high-low method, the variable cost element of a mixed cost is calculated before the fixed cost element.

Ans: T, LO: 3, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

16. An assumption of CVP analysis is that all costs can be classified as either variable or fixed.

Ans: T, LO: 4, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

17. In CVP analysis, the term “cost” includes manufacturing costs, and selling and administrative expenses.

Ans: T, LO: 4, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

18. Contribution margin is the amount of revenues remaining after deducting cost of goods sold.

Ans: F, LO: 5, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

19. Unit contribution margin is the amount that each unit sold contributes towards the recovery of fixed costs and to income.

Ans: T, LO: 5, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

20. The contribution margin ratio is calculated by multiplying the unit contribution margin by the unit sales price.

Ans: F, LO: 5, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

21. Both variable and fixed costs are included in calculating the contribution margin.

Ans: F, LO: 5, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

22. A CVP income statement shows contribution margin instead of gross profit.

Ans: T, LO: 5, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

23. The break-even point is where total sales equal total variable costs.

Ans: F, LO: 6, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Legal/Regulatory Perspective, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

24. The break-even point is where total sales equal total variable costs.

Ans: F, LO: 6, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

25. The break-even point is equal to the fixed costs plus net income.

Ans: F, LO: 6, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

26. If the unit contribution margin is $1 and unit sales are 10,000 units above the break-even volume, then net income will be $10,000.

Ans: T, LO: 6, Bloom: AP, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

27. A target net income is calculated by taking actual sales minus the margin of safety.

Ans: F, LO: 7, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Legal/Regulatory Perspective, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

28. Target net income is the income objective for an individual product line.

Ans: T, LO: 7, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Legal/Regulatory Perspective, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

29. The margin of safety is the difference between sales at breakeven and sales at a determined activity level.

Ans: T, LO: 8, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

30. The margin of safety is the difference between contribution margin and fixed costs.

Ans: F, LO: 8, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

31. The activity level is represented by an activity index such as direct labor hours, units of output, or sales dollars.

Ans: T, LO: 1, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

32. The trend in most companies is to have more variable costs and fewer fixed costs.

Ans: F, LO: 1, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

33. For purposes of CVP analysis, mixed costs must be classified into their fixed and variable elements.

Ans: T, LO: 3, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

34. The contribution margin ratio of 40% means that 60 cents of each sales dollar is available to cover fixed costs and to produce a profit.

Ans: F, LO: 5, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Legal/Regulatory Perspective, AICPA FN: Reporting, AICPA PC: None, IMA: Business Economics

35. A cost-volume-profit graph shows the amount of net income or loss at each level of sales.

Ans: T, LO: 6, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Legal/Regulatory Perspective, AICPA FN: Reporting, AICPA PC: None, IMA: Business Economics

36. If variable costs per unit are 70% of sales, fixed costs are $290,000 and target net income is $70,000, required sales are $1,200,000.

Ans: T, LO: 7, Bloom: AP, Difficulty: Medium, Min: 2, AACSB: None, AICPA BB: Legal/Regulatory Perspective, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

37. The margin of safety ratio is equal to the margin of safety in dollars divided by the actual or (expected) sales.

Ans: T, LO: 8, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

Answers to True-False Statements

Item	Ans.	Item	Ans.	Item	Ans.	Item	Ans.	Item	Ans.	Item	Ans.	Item	Ans.
1.	T	7.	T	13.	F	19.	T	25.	F	31.	T	37.	T
2.	T	8.	F	14.	F	20.	F	26.	T	32.	F		
3.	F	9.	F	15.	T	21.	F	27.	F	33.	T		
4.	F	10.	T	16.	T	22.	T	28.	T	34.	F		
5.	T	11.	F	17.	T	23.	F	29.	T	35.	T		
6.	F	12.	T	18.	F	24.	F	30.	F	36.	T		

MULTIPLE CHOICE QUESTIONS

38. For an activity base to be useful in cost behavior analysis,
    a. the activity should always be stated in dollars.
    b. there should be a correlation between changes in the level of activity and changes in costs.
    c. the activity should always be stated in terms of units.
    d. the activity level should be constant over a period of time.

Ans: B, LO: 1, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

39. A variable cost is a cost that
    a. varies per unit at every level of activity.
    b. occurs at various times during the year.
    c. varies in total in proportion to changes in the level of activity.
    d. may or may not be incurred, depending on management's discretion.

Ans: C, LO: 1, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

40. A cost which remains constant per unit at various levels of activity is a
    a. variable cost.
    b. fixed cost.
    c. mixed cost.
    d. manufacturing cost.

Ans: A, LO: 1, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

41. Two costs at Bradshaw Company appear below for specific months of operation.

	Month	Amount	Units Produced
Delivery costs	September	$ 40,000	40,000
	October	55,000	60,000
Utilities	September	$ 84,000	40,000
	October	126,000	60,000

Which type of costs are these?
a. Delivery costs and utilities are both variable.
b. Delivery costs and utilities are both mixed.
c. Utilities are mixed and delivery costs are variable.
d. Delivery costs are mixed and utilities are variable.

Ans: D, LO: 1, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Quantitative Methods

42. An increase in the level of activity will have the following effects on unit costs for variable and fixed costs:

	Unit Variable Cost	Unit Fixed Cost
a.	Increases	Decreases
b.	Remains constant	Remains constant
c.	Decreases	Remains constant
d.	Remains constant	Decreases

Ans: D, LO: 1, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

43. A fixed cost is a cost which
a. varies in total with changes in the level of activity.
b. remains constant per unit with changes in the level of activity.
c. varies inversely in total with changes in the level of activity.
d. remains constant in total with changes in the level of activity.

Ans: D, LO: 1, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

44. Fixed costs normally will *not* include
a. property taxes.
b. direct labor.
c. supervisory salaries.
d. depreciation on buildings and equipment.

Ans: B, LO: 1, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

45. The increased use of automation and less use of the work force in companies has caused a trend towards an increase in
a. both variable and fixed costs.
b. fixed costs and a decrease in variable costs.
c. variable costs and a decrease in fixed costs.
d. variable costs and no change in fixed costs.

Ans: B, LO: 1, Bloom: C, Difficulty: Easy, Min: 1, AACSB: Technology, AICPA BB: Industry/Sector Perspective, AICPA FN: Leverage Technology, AICPA PC: None, IMA: Business Economics

46. Cost behavior analysis is a study of how a firm's costs
    a. relate to competitors' costs.
    b. relate to general price level changes.
    c. respond to changes in the level of business activity.
    d. respond to changes in the gross national product.

Ans: C, LO: 1, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

47. Cost behavior analysis applies to
    a. retailers.
    b. wholesalers.
    c. manufacturers.
    d. all entities.

Ans: D, LO: 1, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

48. If a firm increases its activity level,
    a. costs should remain the same.
    b. most costs will rise.
    c. no costs will remain the same.
    d. some costs will change, others will remain the same.

Ans: D, LO: 1, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

49. An activity index might be referred to as a cost
    a. driver.
    b. multiplier.
    c. element.
    d. correlation.

Ans: A, LO: 1, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

50. Cost activity indexes might help classify costs as
    a. temporary.
    b. permanent.
    c. variable.
    d. transient.

Ans: C, LO: 1, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

51. Which of the following is *not* a cost classification?
    a. Mixed
    b. Multiple
    c. Variable
    d. Fixed

Ans: B, LO: 1, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

52. If the activity level increases 10%, total variable costs will
    a. remain the same.
    b. increase by more than 10%.
    c. decrease by less than 10%.
    d. increase 10%.

Ans: D, LO: 1, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

53. Which of the following costs are variable?

Cost	10,000 Units	30,000 Units
1.	$100,000	$300,000
2.	40,000	240,000
3.	90,000	90,000
4.	50,000	150,000

a. 1 and 2
b. 1 and 4
c. only 1
d. only 2

Ans: B, LO: 1, Bloom: C, Difficulty: Medium, Min: 2, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Quantitative Methods

54. Changes in activity have a(n) _____ effect on fixed costs per unit.
a. positive
b. negative
c. inverse
d. neutral

Ans: C, LO: 1, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

55. Which of the following is *not* a fixed cost?
a. Direct materials
b. Depreciation
c. Lease charge
d. Property taxes

Ans: A, LO: 1, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

56. Why is identification of a relevant range important?
a. It is required under GAAP.
b. Cost behavior outside of the relevant range is not linear, which distorts CVP analysis.
c. It directly impacts the number of units of product a customer buys.
d. It is a cost that is incurred by a company that must be accounted for.

Ans: B, LO: 2, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

57. The relevant range of activity refers to the
a. geographical areas where the company plans to operate.
b. activity level where all costs are curvilinear.
c. levels of activity over which the company expects to operate.
d. level of activity where all costs are constant.

Ans: C, LO: 2, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

58. Which of the following is *not* a plausible explanation of why variable costs often behave in a curvilinear fashion?
a. Labor specialization
b. Overtime wages
c. Total variable costs are constant within the relevant range
d. Availability of quantity discounts

Ans: C, LO: 2, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: None, AICPA PC: None, IMA: Business Economics

59. Firms operating at 100% capacity
    a. are common.
    b. are the exception rather than the rule.
    c. have no fixed costs.
    d. have no variable costs.

Ans: B, LO: 2, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Performance Measurement

60. Which of the following would be the least controllable fixed costs?
    a. Property taxes
    b. Rent
    c. Research and development
    d. Management training programs

Ans: A, LO: 2, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

61. Which one of the following is a name for the range over which a company expects to operate?
    a. Mixed range
    b. Fixed range
    c. Variable range
    d. Relevant range

Ans: D, LO: 2, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

62. If graphed, fixed costs that behave in a curvilinear fashion resemble a(n)
    a. S-curve.
    b. inverted S-curve.
    c. straight line.
    d. stair-step pattern.

Ans: D, LO: 2, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

63. The graph of variable costs that behave in a curvilinear fashion will
    a. approximate a straight line within the relevant range.
    b. be sharply kinked on both sides of the relevant range.
    c. be downward sloping.
    d. be a stair-step pattern.

Ans: A, LO: 2, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

64. Frazier Manufacturing Company collected the following production data for the past month:

Units Produced	Total Cost
1,600	$44,000
1,300	38,000
1,500	45,000
1,100	33,000

    If the high-low method is used, what is the monthly total cost equation?
    a. Total cost = $8,800 + $22/unit
    b. Total cost = $11,000 + $20/unit
    c. Total cost = $0 + $30/unit
    d. Total cost = $6,600 + $24/unit

Ans: A, LO: 3, Bloom: AP, Difficulty: Medium, Min: 2, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Performance Measurement

65. A mixed cost contains
    a. a variable element and a fixed element.
    b. both selling and administrative costs.
    c. both retailing and manufacturing costs.
    d. both operating and nonoperating costs.

Ans: A, LO: 3, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

66. At the high level of activity in November, 7,000 machine hours were run and power costs were $16,000. In April, a month of low activity, 2,000 machine hours were run and power costs amounted to $8,000. Using the high-low method, the estimated fixed cost element of power costs is
    a. $16,000.
    b. $8,000.
    c. $4,800.
    d. $11,200.

Ans: C, LO: 3, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Performance Measurement

67. Gribble Company's high and low level of activity last year was 60,000 units of product produced in May and 20,000 units produced in November. Machine maintenance costs were $104,000 in May and $40,000 in November. Using the high-low method, determine an estimate of total maintenance cost for a month in which production is expected to be 45,000 units.
    a. $90,000
    b. $96,000
    c. $78,000
    d. $80,000

Ans: D, LO: 3, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Performance Measurement

68. Which of the following is *not* true about the graph of a mixed cost?
    a. It is possible to determine the amount of the fixed cost from the graph.
    b. There is a total cost line on the graph.
    c. The fixed cost portion of the graph is the same amount at all levels of activity.
    d. The variable cost portion of the graph is rectangular in shape.

Ans: D, LO: 3, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Performance Measurement

69. Which of the following is *not* a mixed cost?
    a. Car rental fee
    b. Electricity
    c. Depreciation
    d. Telephone Expense

Ans: C, LO: 3, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

70. In using the high-low method, the fixed cost
    a. is determined by subtracting the total cost at the high level of activity from the total cost at the low activity level.
    b. is determined by adding the total variable cost to the total cost at the low activity level.
    c. is determined before the total variable cost.
    d. may be determined by subtracting the total variable cost from either the total cost at the low or high activity level.

Ans: D, LO: 3, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

71. If Qualls Quality Airline cuts its domestic fares by 30%,
    a. its fixed costs will decrease.
    b. profit will increase by 30%.
    c. a profit can only be earned by decreasing the number of flights.
    d. a profit can be earned either by increasing the number of passengers or by decreasing variable costs.

Ans: D, LO: 3, Bloom: C, Difficulty: Medium, Min: 2, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Business Economics

72. In applying the high-low method, which months are relevant?

Month	Miles	Total Cost
January	80,000	$144,000
February	50,000	120,000
March	70,000	141,000
April	90,000	195,000

    a. January and February
    b. January and April
    c. February and April
    d. February and March

Ans: C, LO: 3, Bloom: AP, Difficulty: Medium, Min: 2, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Business Economics

73. In applying the high-low method, what is the unit variable cost?

Month	Miles	Total Cost
January	80,000	$144,000
February	50,000	120,000
March	70,000	141,000
April	90,000	195,000

    a. $2.16
    b. $1.88
    c. $2.40
    d. Cannot be determined from the information given.

Ans: B, LO: 3, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Business Economics

74. In applying the high-low method, what is the fixed cost?

Month	Miles	Total Cost
January	80,000	$144,000
February	50,000	120,000
March	70,000	141,000
April	90,000	195,000

a. $26,250
b. $54,000
c. $21,000
d. $75,000

Ans: A, LO: 3, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Business Economics

75. For analysis purposes, the high-low method usually produces a(n)
a. reasonable estimate.
b. precise estimate.
c. overstated estimate.
d. understated estimate.

Ans: A, LO: 3, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

76. The high-low method is criticized because it
a. is not a graphical method.
b. is a mathematical method.
c. ignores much of the available data by concentrating on only the extreme points.
d. doesn't provide reasonable estimates.

Ans: C, LO: 3, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

77. The high-low method is often employed in analyzing
a. fixed costs.
b. mixed costs.
c. variable costs.
d. conversion costs.

Ans: B, LO: 3, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

78. Portman Company's activity for the first three months of 2013 are as follows:

	Machine Hours	Electrical Cost
January	2,100	$3,600
February	2,600	$4,350
March	2,900	$4,800

Using the high-low method, how much is the cost per machine hour?
a. $1.50
b. $2.25
c. $1.69
d. $1.34

Ans: A, LO: 3, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

79. Ponszko Nursery used high-low data from June and July to determine its variable cost of $18 per unit. Additional information follows:

Month	Units produced	Total costs
June	2,000	$48,000
July	1,000	30,000

If Ponszko's produces 2,300 units in August, how much is its total cost expected to be?
a. $12,000
b. $59,400
c. $41,400
d. $53,400

Ans: D, LO: 3, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

80. In CVP analysis, the term "cost"
a. includes only manufacturing costs.
b. means cost of goods sold.
c. includes manufacturing costs plus selling and administrative expenses.
d. excludes all fixed manufacturing costs.

Ans: C, LO: 4, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

81. Which one of the following is *not* an assumption of CVP analysis?
a. All units produced are sold.
b. All costs are variable costs.
c. Sales mix remains constant.
d. The behavior of costs and revenues are linear within the relevant range.

Ans: B, LO: 4, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

82. CVP analysis does *not* consider
a. level of activity.
b. fixed cost per unit.
c. variable cost per unit.
d. sales mix.

Ans: B, LO: 4, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

83. Which of the following is *not* an underlying assumption of CVP analysis?
a. Changes in activity are the only factors that affect costs.
b. Cost classifications are reasonably accurate.
c. Beginning inventory is larger than ending inventory.
d. Sales mix is constant.

Ans: C, LO: 4, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

84. CVP analysis is *not* important in
a. calculating depreciation expense.
b. setting selling prices.
c. determining the product mix.
d. utilizing production facilities.

Ans: A, LO: 4, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

85. To which function of management is CVP analysis most applicable?
    a. Planning
    b. Motivating
    c. Directing
    d. Controlling

Ans: A, LO: 4, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

86. Hollis Industries produces flash drives for computers, which it sells for $20 each. Each flash drive costs $12 of variable costs to make. During April, 1,000 drives were sold. Fixed costs for March were $2 per unit for a total of $1,000 for the month. How much is the contribution margin ratio?
    a. 30%
    b. 40%
    c. 60%
    d. 70%

Ans: B, LO: 5, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

87. Contribution margin
    a. is always the same as gross profit margin.
    b. excludes variable selling costs from its calculation.
    c. is calculated by subtracting total manufacturing costs per unit from sales revenue per unit.
    d. equals sales revenue minus variable costs.

Ans: D, LO: 5, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

88. If a company had a contribution margin of $750,000 and a contribution margin ratio of 40%, total variable costs must have been
    a. $1,125,000.
    b. $450,000.
    c. $1,875,000.
    d. $300,000.

Ans: A, LO: 5, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

89. Which of the following would *not* be an acceptable way to express contribution margin?
    a. Sales minus variable costs
    b. Sales minus unit costs
    c. Unit selling price minus unit variable costs
    d. Contribution margin per unit divided by unit selling price

Ans: B, LO: 5, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

90. A company has contribution margin per unit of $90 and a contribution margin ratio of 40%. What is the unit selling price?
    a. $150
    b. $225
    c. $36
    d. Cannot be determined.

Ans: B, LO: 5, Bloom: AP, Difficulty: Medium, Min: 2, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

91. Sales are $500,000 and variable costs are $350,000. What is the contribution margin ratio?
    a. 43%
    b. 30%
    c. 70%
    d. Cannot be determined because amounts are not expressed per unit.

Ans: B, LO: 5, Bloom: AP, Difficulty: Medium, Min: 2, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

92. Dunbar Manufacturing's variable costs are 30% of sales. The company is contemplating an advertising campaign that will cost $44,000. If sales are expected to increase $80,000, by how much will the company's net income increase?
    a. $36,000
    b. $56,000
    c. $24,000
    d. $12,000

Ans: D, LO: 5, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Legal/Regulatory Perspective, AICPA FN: Reporting, AICPA PC: Problem Solving, IMA: Reporting

93. Weatherspoon Company has a product with a selling price per unit of $200, the unit variable cost is $90, and the total monthly fixed costs are $300,000. How much is Weatherspoon's contribution margin ratio?
    a. 55%
    b. 45%
    c. 150%
    d. 222%

Ans: A, LO: 5, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Legal/Regulatory Perspective, AICPA FN: Reporting, AICPA PC: Problem Solving, IMA: Reporting

94. Armstrong Industries has a contribution margin of $300,000 and a contribution margin ratio of 30%. How much are total variable costs?
    a. $90,000
    b. $700,000
    c. $210,000
    d. $1,000,000

Ans: B, LO: 5, Bloom: AP, Difficulty: Medium, Min: 2, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

95. Zehms, Inc. has a contribution margin per unit of $21 and a contribution margin ratio of 60%. How much is the selling price of each unit?
    a. $35.00
    b. $52.50
    c. $12.60
    d. Cannot be determined without more information.

Ans: A, LO: 5, Bloom: AP, Difficulty: Medium, Min: 2, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

96. A division sold 100,000 calculators during 2013:

Sales		$2,000,000
Variable costs:		
Materials	$380,000	
Order processing	150,000	
Billing labor	110,000	
Selling expenses	60,000	
Total variable costs		700,000
Fixed costs		1,000,000

How much is the contribution margin per unit?
a. $2
b. $7
c. $17
d. $13

Ans: D, LO: 5, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

97. At the break-even point of 2,000 units, variable costs are $110,000, and fixed costs are $64,000. How much is the selling price per unit?
a. $87
b. $23
c. $32
d. Not enough information

Ans: A, LO: 5, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

98. The following information is available for Wade Corp.:

Sales	$550,000	Total fixed expenses	$150,000
Cost of goods sold	390,000	Total variable expenses	360,000

A CVP income statement would report
a. gross profit of $160,000.
b. contribution margin of $400,000.
c. gross profit of $190,000.
d. contribution margin of $190,000.

Ans: D, LO: 5, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

99. Which is the true statement?
a. In a CVP income statement, costs and expenses are classified only by function.
b. The CVP income statement is prepared for both internal and external use.
c. The CVP income statement shows contribution margin instead of gross profit.
d. In a traditional income statement, costs and expenses are classified as either variable or fixed.

Ans: C, LO: 5, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

100. The equation which reflects a CVP income statement is
   a. Sales = Cost of goods sold + Operating expenses + Net income.
   b. Sales + Fixed costs = Variable costs + Net income.
   c. Sales – Variable costs + Fixed costs = Net income.
   d. Sales – Variable costs – Fixed costs = Net income.

Ans: D, LO: 5, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

101. The CVP income statement
   a. is distributed internally and externally.
   b. classifies costs by functions.
   c. discloses contribution margin in the body of the statement.
   d. will reflect a different net income than the traditional income statement.

Ans: C, LO: 5, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Legal/Regulatory Perspective, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

102. O'Malley Company sells 100,000 units for $13 a unit. Fixed costs are $350,000 and net income is $250,000. What should be reported as variable expenses in the CVP income statement?
   a. $600,000.
   b. $700,000.
   c. $950,000.
   d. $1,050,000.

Ans: B, LO: 5, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

103. A company has total fixed costs of $200,000 and a contribution margin ratio of 20%. The total sales necessary to break even are
   a. $800,000.
   b. $1,000,000.
   c. $250,000.
   d. $240,000.

Ans: B, LO: 6, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

104. A company sells a product which has a unit sales price of $5, unit variable cost of $3 and total fixed costs of $180,000. The number of units the company must sell to break even is
   a. 90,000 units.
   b. 36,000 units.
   c. 360,000 units.
   d. 60,000 units.

Ans: A, LO: 6, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

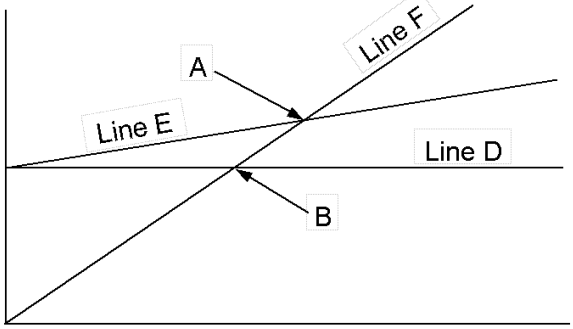
105. The break-even point is where
   a. total sales equal total variable costs.
   b. contribution margin equals total fixed costs.
   c. total variable costs equal total fixed costs.
   d. total sales equal total fixed costs.

Ans: B, LO: 6, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

106. The break-even point cannot be determined by
   a. computing it from a mathematical equation.
   b. computing it using contribution margin.
   c. reading the prior year's financial statements.
   d. deriving it from a CVP graph.

Ans: C, LO: 6, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

107. Select the correct statement concerning the cost-volume-profit graph at right:
   a. The point identified by "B" is the break-even point.
   b. Line F is the variable cost line.
   c. At point B, profits equal total costs.
   d. Line E is the total cost line.



Ans: D, LO: 6, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

108. Fixed costs are $600,000 and the variable costs are 75% of the unit selling price. What is the break-even point in dollars?
   a. $1,400,000
   b. $1,800,000
   c. $2,400,000
   d. $800,000

Ans: C, LO: 6, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

109. Fixed costs are $2,400,000 and the contribution margin per unit is $150. What is the break-even point?
   a. $6,000,000
   b. $16,000,000
   c. 6,000 units
   d. 16,000 units

Ans: D, LO: 6, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

110. Nelson Manufacturing has the following data:

   Variable costs are 60% of the unit selling price.
   The contribution margin ratio is 40%.
   The contribution margin per unit is $500.
   The fixed costs are $300,000.

   Which of the following does not express the break-even point?
   a. $300,000 + .60X = X
   b. $300,000 + .40X = X
   c. $300,000 ÷ $500 = X
   d. $300,000 ÷ .40 = X

Ans: B, LO: 6, Bloom: C, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

111. A CVP graph does not include a
   a. variable cost line.
   b. fixed cost line.
   c. sales line.
   d. total cost line.

Ans: A, LO: 6, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

112. Boswell company reported the following information for the current year: Sales (50,000 units) $1,000,000, direct materials and direct labor $500,000, other variable costs $50,000, and fixed costs $270,000. What is Boswell's contribution margin ratio?
   a. 68%.
   b. 45%.
   c. 32%.
   d. 55%.

Ans: B, LO: 6, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

113. Boswell company reported the following information for the current year: Sales (50,000 units) $1,000,000, direct materials and direct labor $500,000, other variable costs $50,000, and fixed costs $270,000. What is Boswell's break-even point in units?
   a. 24,546.
   b. 30,000.
   c. 38,334.
   d. 42,188.

Ans: B, LO: 6, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

114. Walters Corporation sells radios for $50 per unit. The fixed costs are $420,000 and the variable costs are 60% of the selling price. As a result of new automated equipment, it is anticipated that fixed costs will increase by $100,000 and variable costs will be 50% of the selling price. The new break-even point in units is:
   a. 21,000
   b. 20,800
   c. 20,600
   d. 16,800

Ans: B, LO: 6, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

115. Cunningham, Inc. sells MP3 players for $60 each. Variable costs are $40 per unit, and fixed costs total $90,000. What sales are needed by Cunningham to break even?
   a. $120,000.
   b. $225,000.
   c. $270,000.
   d. $360,000.

Ans: C, LO: 6, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

116. Cunningham, Inc. sells MP3 players for $60 each. Variable costs are $40 per unit, and fixed costs total $90,000. How many MP3 players must Cunningham sell to earn net income of $210,000?
a. 15,000.
b. 5,250.
c. 3,750.
d. 4,500.

Ans: A, LO: 6, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

117. Gall Manufacturing sells a product for $50 per unit. The fixed costs are $735,000 and the variable costs are 60% of the selling price. As a result of new automated equipment, it is anticipated that fixed costs will increase by $175,000 and variable costs will be 50% of the selling price. The new break-even point in units is:
a. 36,750.
b. 36,400.
c. 36,050.
d. 29,400.

Ans: B, LO: 6, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

118. Pascal, Inc. is planning to sell 800,000 units for $1.50 per unit. The contribution margin ratio is 20%. If Pascal will break even at this level of sales, what are the fixed costs?
a. $240,000.
b. $560,000.
c. $800,000.
d. $960,000.

Ans: A, LO: 6, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

119. April Industries sells a product with a contribution margin of $12 per unit, fixed costs of $148,800, and sales for the current year of $200,000. How much is April's break-even point?
a. 9,200 units
b. $51,200
c. 12,400 units
d. 4,267 units

Ans: C, LO: 6, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

120. Kaplan, Inc. produces flash drives for computers, which it sells for $20 each. The variable cost to make each flash drive is $13. During April, 700 drives were sold. Fixed costs for April were $2 per unit for a total of $1,400 for the month. How much is the monthly break-even level of sales in dollars for Kaplan?
a. $200
b. $4,000
c. $14,000
d. $8,400

Ans: B, LO: 6, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

121. Vintage Wines has fixed costs of $15,000 per year. Its warehouse sells wine with variable costs of 80% of its unit selling price. How much in sales does Vintage need to break even per year?
    a. $12,000
    b. $3,000
    c. $18,750
    d. $75,000

Ans: D, LO: 6, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

122. Bruno & Court is a nonprofit organization that captures stray deer bewildered within residential communities. Fixed costs are $15,000. The variable cost of capturing each deer is $10 each. Bruno & Court is funded by a local philanthropy in the amount of $48,000 for 2013. How many deer can Bruno & Court capture during 2013?
    a. 3,300
    b. 4,800
    c. 6,300
    d. 3,000

Ans: A, LO: 6, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

123. At the break-even point of 2,000 units, variable costs are $55,000, and fixed costs are $32,000. How much is the selling price per unit?
    a. $43.50
    b. $11.50
    c. $16.00
    d. $27.50

Ans: A, LO: 6, Bloom: C, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

124. Variable costs for Abbey, Inc. are 25% of sales. Its selling price is $80 per unit. If Abbey sells one unit more than break-even units, how much will profit increase?
    a. $60
    b. $20
    c. $25
    d. $320

Ans: A, LO: 7, Bloom: AP, Difficulty: Medium, Min: 2, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

125. A company requires $1,360,000 in sales to meet its net income target. Its contribution margin is 30%, and fixed costs are $240,000. What is the target net income?
    a. $408,000
    b. $312,000
    c. $560,000
    d. $168,000

Ans: D, LO: 7, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

126. Montoya Manufacturing has fixed costs of $2,500,000 and variable costs are 40% of sales. What are the required sales if Montoya desires net income of $250,000?
   a. $4,583,333
   b. $4,166,667
   c. $6,875,000
   d. $6,250,000

Ans: A, LO: 7, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

127. Aero, Inc. requires sales of $2,000,000 to cover its fixed costs of $400,000 and to earn net income of $500,000. What percent are variable costs of sales?
   a. 25%
   b. 55%
   c. 20%
   d. 45%

Ans: B, LO: 7, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

128. Lansbury Manufacturing produces hair brushes. The selling price is $20 per unit and the variable costs are $8 per brush. Fixed costs per month are $4,800. If Lansbury sells 25 more units beyond breakeven, how much does profit increase as a result?
   a. $300
   b. $500
   c. $200
   d. $1,000

Ans: A, LO: 7, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

129. Hayduke Corporation reported the following results from the sale of 6,000 units in May: sales $300,000, variable costs $180,000, fixed costs $90,000, and net income $30,000. Assume that Hayduke increases the selling price by 10% on June 1. How many units will have to be sold in June to maintain the same level of net income?
   a. 4,800.
   b. 5,160.
   c. 5,400.
   d. 6,000.

Ans: A, LO: 7, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

130. Keene, Inc. produces flash drives for computers, which it sells for $20 each. Each flash drive costs $6 of variable costs to make. During March, 1,000 drives were sold. Fixed costs for March were $4.90 per unit for a total of $4,900 for the month. If variable costs decrease by 10%, what happens to the break-even level of units per month for Keene?
   a. It is 10% higher than the original break-even point.
   b. It decreases about 14 units.
   c. It decreases about 35 units.
   d. It depends on the number of units the company expects to produce and sell.

Ans: B, LO: 7, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

131. Reliable Manufacturing wants to sell a sufficient quantity of products to earn a profit of $80,000. If the unit sales price is $10, unit variable cost is $8, and total fixed costs are $160,000, how many units must be sold to earn income of $80,000?
    a. 120,000 units
    b. 80,000 units
    c. 30,000 units
    d. 1,200,000 units

Ans: A, LO: 7, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

132. How much sales are required to earn a target income of $160,000 if total fixed costs are $200,000 and the contribution margin ratio is 40%?
    a. $600,000
    b. $400,000
    c. $900,000
    d. $660,000

Ans: C, LO: 7, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

133. Farmers' Industries has fixed costs of $400,000 and variable costs are 60% of sales. How much will Farmers report as sales when its net income equals $40,000?
    a. $1,100,000
    b. $733,333
    c. $1,040,000
    d. $264,000

Ans: A, LO: 7, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

134. Murphy Company produces flash drives for computers, which it sells for $20 each. Each flash drive costs $8 of variable costs to make. During April, 700 drives were sold. Fixed costs for April were $4 per unit for a total of $2,800 for the month. How much does Murphy's operating income increase for each $1,000 increase in revenue per month?
    a. $600
    b. $400
    c. $14,000
    d. Not enough information to determine the answer.

Ans: A, LO: 7, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

135. Greg's Golf Carts produces two models: Model 24 has sales of 500 units with a contribution margin of $40 each; Model 26 has sales of 350 units with a contribution margin of $50 each. If sales of Model 26 increase by 100 units, how much will profit change?
    a. $5,000 increase
    b. $17,500 increase
    c. $22,500 increase
    d. $35,000 increase

Ans: A, LO: 7, Bloom: AP, Difficulty: Hard, Min: 5, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

136. Wendy Industries produces only one product. Monthly fixed expenses are $12,000, monthly unit sales are 2,500, and the unit contribution margin is $10. How much is monthly net income?
a. $25,000
b. $37,000
c. $0
d. $13,000

Ans: D, LO: 7, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

137. A company desires to sell a sufficient quantity of products to earn a profit of $300,000. If the unit sales price is $20, unit variable cost is $12, and total fixed costs are $600,000, how many units must be sold to earn net income of $300,000?
a. 168,750 units
b. 112,500 units
c. 90,000 units
d. 67,500 units

Ans: B, LO: 7, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

138. Stephanie, Inc. sells its product for $40. The variable costs are $18 per unit. Fixed costs are $16,000. The company is considering the purchase of an automated machine that will result in a $2 reduction in unit variable costs and an increase of $5,000 in fixed costs. Which of the following is true about the break-even point in units?
a. It will remain unchanged.
b. It will decrease.
c. It will increase.
d. It cannot be determined from the information provided.

Ans: C, LO: 7, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

139. How much sales are required to earn a target net income of $160,000 if total fixed costs are $200,000 and the contribution margin ratio is 40%?
a. $500,000
b. $810,000
c. $900,000
d. $400,000

Ans: C, LO: 7, Bloom: AP, Difficulty: Medium, Min: 2, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

140. The following monthly data are available for Lumberyard Company. which produces only one product: Selling price per unit, $42; Unit variable expenses, $14; Total fixed expenses, $84,000; Actual sales for the month of June, 4,000 units. How much is the margin of safety for the company for June?
a. $84,000
b. $42,000
c. $126,000
d. $1,000

Ans: B, LO: 8, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

141. Danny's Lawn Equipment has actual sales of $800,000 and a break-even point of $600,000. How much is its margin of safety ratio?
    a. 25%
    b. 33%
    c. 67%
    d. 75%

Ans: A, LO: 8, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

142. The following monthly data are available for Seasons Company which produces only one product: Selling price per unit, $42; Unit variable expenses, $14; Total fixed expenses, $84,000; Actual sales for the month of June, 5,000 units. How much is the margin of safety for the company for June?
    a. $56,000
    b. $84,000
    c. $126,000
    d. $2,000

Ans: B, LO: 8, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

143. The amount by which actual or expected sales exceeds break-even sales is referred to as
    a. contribution margin.
    b. unanticipated profit.
    c. margin of safety.
    d. target net income.

Ans: C, LO: 8, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

144. In evaluating the margin of safety, the
    a. break-even point is not relevant.
    b. higher the margin of safety ratio, the greater the margin of safety.
    c. higher the dollar amount, the lower the margin of safety.
    d. higher the margin of safety ratio, the lower the fixed costs.

Ans: B, LO: 8, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

145. Within the relevant range, the variable cost per unit
    a. differs at each activity level.
    b. remains constant at each activity level.
    c. increases as production increases.
    d. decreases as production increases.

Ans: B, LO: 2, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

146. An example of a mixed cost is
    a. direct materials.
    b. supervisory salaries.
    c. utility costs.
    d. property taxes.

Ans: C, LO: 3, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

147. In the Restin Company, maintenance costs are a mixed cost. At the low level of activity (160 direct labor hours), maintenance costs are $600. At the high level of activity (400 direct labor hours), maintenance costs are $1,100. Using the high-low method, what is the variable maintenance cost per unit and the total fixed maintenance cost?

	Variable Cost Per Unit	Total Fixed Cost
a.	$2.08	$268
b.	$2.08	$500
c.	$2.75	$220
d.	$2.75	$400

Ans: A, LO: 3, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

148. Cost-volume-profit analysis includes all of the following assumptions *except*
   a. the behavior of costs is curvilinear throughout the relevant range.
   b. costs can be classified accurately as either variable or fixed.
   c. changes in activity are the only factors that affect costs.
   d. all units produced are sold.

Ans: A, LO: 4, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

149. The contribution margin ratio increases when
   a. fixed costs increase.
   b. fixed costs decrease.
   c. variable costs as a percentage of sales decrease.
   d. variable costs as a percentage of sales increase.

Ans: C, LO: 5, Bloom: C, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

150. Contribution margin is
   a. the amount of revenue remaining after deducting fixed costs.
   b. available to cover fixed costs and contribute to income for the company.
   c. sales less fixed costs.
   d. unit selling price less unit fixed costs.

Ans: B, LO: 5, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

151. Chung, Inc. sells 100,000 wrenches for $18 per unit. Fixed costs are $525,000 and net income is $375,000. What should be reported as variable expenses in the CVP income statement?
   a. $810,000
   b. $900,000
   c. $1,425,000
   d. $1,275,000

Ans: B, LO: 5, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Legal/Regulatory Perspective, AICPA FN: Reporting, AICPA PC: Problem Solving, IMA: Reporting

152. Sweet Manufacturing is planning to sell 400,000 hammers for $3 per unit. The contribution margin ratio is 20%. If Sweet will break even at this level of sales, what are the fixed costs?
    a. $240,000
    b. $560,000
    c. $800,000
    d. $960,000

Ans: A, LO: 6, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

153. At the break-even point,
    a. sales equal total variable costs.
    b. contribution margin equals total variable costs.
    c. contribution margin equals total fixed costs.
    d. sales equal total fixed costs.

Ans: C, LO: 6, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

154. Wilton Co. reported the following results from the sale of 5,000 hammers in May: sales $200,000, variable costs $120,000, fixed costs $60,000, and net income $20,000. Assume that Wilton increases the selling price of hammers by 10% on June 1. How many hammers will have to be sold in June to maintain the same level of net income?
    a. 4,000
    b. 4,300
    c. 4,500
    d. 5,000

Ans: A, LO: 7, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Legal/Regulatory Perspective, AICPA FN: Reporting, AICPA PC: Problem Solving, IMA: Reporting

155. Required sales in dollars to meet a target net income is computed by dividing
    a. fixed costs plus target net income by contribution margin per unit.
    b. variable costs plus target net income by contribution margin per unit.
    c. fixed costs plus target net income by contribution margin ratio.
    d. total costs plus target net income by contribution margin ratio.

Ans: C, LO: 7, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Legal/Regulatory Perspective, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

156. Bolton Industries had actual sales of $750,000 when break-even sales were $600,000. What is the margin of safety ratio?
    a. 20%
    b. 25%
    c. 75%
    d. 80%

Ans: A, LO: 8, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Answers to Multiple Choice Questions

Item	Ans.	Item	Ans.	Item	Ans.	Item	Ans.	Item	Ans.	Item	Ans.	Item	Ans.
38.	b	55.	a	72.	c	89.	b	106.	c	123.	a	140.	b
39.	c	56.	b	73.	b	90.	b	107.	d	124.	a	141.	a
40.	a	57.	c	74.	a	91.	b	108.	c	125.	d	142.	b
41.	d	58.	c	75.	a	92.	d	109.	d	126.	a	143.	c
42.	d	59.	b	76.	c	93.	a	110.	b	127.	b	144.	b
43.	d	60.	a	77.	b	94.	b	111.	a	128.	a	145.	b
44.	b	61.	d	78.	a	95.	a	112.	b	129.	a	146.	c
45.	b	62.	d	79.	d	96.	d	113.	b	130.	b	147.	a
46.	c	63.	a	80.	c	97.	a	114.	b	131.	a	148.	a
47.	d	64.	a	81.	b	98.	d	115.	c	132.	c	149.	c
48.	d	65.	a	82.	b	99.	c	116.	a	133.	a	150.	b
49.	a	66.	c	83.	c	100.	d	117.	b	134.	a	151.	b
50.	c	67.	d	84.	a	101.	c	118.	a	135.	a	152.	a
51.	b	68.	d	85.	a	102.	b	119.	c	136.	d	153.	c
52.	d	69.	c	86.	b	103.	b	120.	b	137.	b	154.	a
53.	b	70.	d	87.	d	104.	a	121.	d	138.	c	155.	c
54.	c	71.	d	88.	a	105.	b	122.	a	139.	c	156.	a

BRIEF EXERCISES

BE 157

Dollywood Corporation accumulates the following data concerning a mixed cost, using miles as the activity level.

	Miles Driven	Total Cost		Miles Driven	Total Cost
January	10,000	$15,000	March	9,000	$12,500
February	8,000	$14,500	April	7,500	$12,000

Instructions

Compute the variable and fixed cost elements using the high-low method.

Ans: N/A, LO: 3, Bloom: AP, Difficulty: Medium, Min: 4, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 157 (4 min.)

$$\frac{\$15{,}000 - \$12{,}000}{10{,}000 - 7{,}500} = \underline{\$1.20 = \text{variable cost}} \text{ per mile}$$

$1.20 (10,000) + FC = $15,000
Fixed cost = $3,000

Or

$1.20 (7,500) + FC = $12,000
Fixed cost = $3,000

BE 158

Sandel Company makes 2 products, footballs and baseballs. Additional information follows:

	Footballs	Baseballs
Units	4,000	2,500
Sales	$60,000	$25,000
Variable costs	36,000	7,000
Fixed costs	9,000	9,000
Net income	$15,000	$ 9,000
Profit per unit	$3.75	$3.60

Instructions
Sandel has unlimited demand for both products. Therefore, which product should Sandel tell his sales people to emphasize?

Ans: N/A, LO: 5, Bloom: AP, Difficulty: Medium, Min: 5, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 158 (5 min.)

Contribution margin per unit:

Footballs: [$60,000 – $36,000] ÷ 4,000 = $6
Baseballs: [$25,000 – $7,000] ÷ 2,500 = $7.20

Sandel should tell his sales people to sell more baseballs due to the higher contribution margin per unit.

BE 159

Determine the missing amounts.

	Unit Selling Price	Unit Variable Costs	Contribution Margin per Unit	Contribution Margin Ratio
1.	$300	$195	A.	B.
2.	$600	C.	$150	D.
3.	E.	F.	$480	40%

Ans: N/A, LO: 5, Bloom: AP, Difficulty: Medium, Min: 6, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 159 (6 min.)

A. $300 – $195 = $105

B. $120 ÷ $300 = 35%

C. $600 – $150 = $450

D. $150 ÷ $600 = 25%

E. $480 ÷ 40% = $1,200

F. If 40% = CM ratio, then 60% = variable cost percentage; $1,200 × 60% = $720
Or $1,200 – $480 = $720

BE 160

Kipling Company has sales of $1,500,000 for the first quarter of 2013. In making the sales, the company incurred the following costs and expenses.

	Variable	Fixed
Product costs	$500,000	$550,000
Selling expenses	100,000	75,000
Administrative expenses	80,000	67,000

Instructions
Calculate net income under CVP for 2013.

Ans: N/A, LO: 5, Bloom: AP, Difficulty: Medium, Min: 4, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 160 (4 min.)

$1,500,000 − [$500,000 + $100,000 + $80,000] − [$550,000 + $75,000 + $67,000] = $128,000

BE 161

Hurly Co. has fixed costs totaling $132,000. Its contribution margin per unit is $1.50, and the selling price is $5.50 per unit.

Instructions
Compute the break-even point in units.

Ans: N/A, LO: 6, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 161 (3 min.)

$1.50X – $132,000 = 0
X = 88,000 units

BE 162

Salem Bakery sells boxes of donuts each with a variable cost percentage of 35%. Its fixed costs are $54,600 per year.

Instructions
Determine the sales dollars Salem needs to break even per year.

Ans: N/A, LO: 6, Bloom: AP, Difficulty: Medium, Min: 3, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 162 (3 min.)

Contribution margin ratio = 100% – 35% = 65%
.65x – $54,600 = 0
X = $84,000 of sales dollars

BE 163

Cannon Co. has a unit selling price of $500, variable cost per unit $300, and fixed costs of $210,000.

Instructions
Compute the break-even point in units and in sales dollars.

Ans: N/A, LO: 6, Bloom: AP, Difficulty: Medium, Min: 4, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 163 (4 min.)

$500X − $300X − $210,000 = 0
BEP in units = X = 1,050 units

BEP in dollars = 1,050 units × $500 = $525,000

BE 164

Oakbrook, Inc. reported actual sales of $2,000,000, and fixed costs of $350,000. The contribution margin ratio is 25%.

Instructions
Compute the margin of safety in dollars and the margin of safety ratio.

Ans: N/A, LO: 8, Bloom: AP, Difficulty: Medium, Min: 4, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 164 (4 min.)

BEP in dollars: $350,000 ÷ 25% = $1,400,000
Margin of safety in dollars: $2,000,000 − $1,400,000 = $600,000
Margin of safety ratio: $600,000 ÷ $2,000,000 = 30%

BE 165

The following monthly data are available for Fortner Industries which produces only one product which it sells for $18 each. Its unit variable costs are $8, and its total fixed expenses are $16,000. Actual sales for the month of May totaled 2,000 units.

Instructions
Compute the margin of safety in dollars for the company for May.

Ans: N/A, LO: 8, Bloom: AP, Difficulty: Medium, Min: 4, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 165 (4 min.)

BEP in units: $18X – $8X – $16,000 = 0
BEP in units = X = 1,600 units
Units at current sales level = 2,000
Margin of safety = (2,000 – 1,600) × $18 = $7,200
Sales can drop by $7,200 before the company incurs a loss

BE 166

At break-even point, a company sells 1,200 widgets. Its selling price is $6 per widget, variable cost is $2 per widget, and its fixed cost is $4 per widget.

Instructions
If it sells 200 additional widgets, determine the company's incremental profit.

Solution 166 (4 min.)

$6(1,200) – $2(1,200) – X = 0
Total fixed costs = X = $4,800
Incremental profit = 200 × ($6 – $2) = $800

Ans: N/A, LO: 8, Bloom: AP, Difficulty: Medium, Min: 4, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

EXERCISES

Ex. 167

Sandburg Manufacturing manufactures a single product. Annual production costs incurred in the manufacturing process are shown below for the production of 2,000 units. The Utilities and Maintenance are mixed costs. The fixed portions of these costs are $300 and $200, respectively.

	Costs Incurred	
Production in Units	2,000	4,000
Production Costs		
a. Direct Materials	$ 4,000	?
b. Direct Labor	16,000	?
c. Utilities	1,000	?
d. Rent	3,000	?
e. Indirect Labor	4,200	?
f. Supervisory Salaries	1,500	?
g. Maintenance	900	?
h. Depreciation	2,500	?

Instructions
Calculate the expected costs to be incurred when production is 4,000 units. Use your knowledge of cost behavior to determine which of the other costs are fixed or variable.

Ans: N/A, LO: 1,3, Bloom: AP, Difficulty: Medium, Min: 12, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 167 (12–18 min.)

	Costs Incurred	
Production in Units	2,000	4,000
Production Costs		
a. Direct Materials	$ 4,000	$ 8,000
b. Direct Labor	16,000	32,000
c. Utilities	1,000	1,700
d. Rent	3,000	3,000
e. Indirect Labor	4,200	8,400
f. Supervisory Salaries	1,500	1,500
g. Maintenance	900	1,600
h. Depreciation	2,500	2,500

a. Variable $4,000 ÷ 2,000 = $2.00 per unit; 4,000 × $2.00 = $8,000
b. Variable $16,000 ÷ 2,000 = $8.00 per unit; 4,000 × $8.00 = $32,000
c. Mixed $1,000 – $300 = $700; $700 ÷ 2,000 = $.35 per unit of variable costs; 4,000 × $.35 = $1,400 + $300 (fixed) = $1,700
d. Fixed $3,000
e. Variable $4,200 ÷ 2,000 = $2.10 per unit; 4,000 × $2.10 = $8,400
f. Fixed $1,500
g. Mixed $900 – $200 = $700 variable portion; $700 ÷ 2,000 = $.35 4,000 × $.35 = $1,400 + $200 (fixed portion) = $1,600
h. Fixed $2,500

Ex. 168

Bill Braddock is considering opening a Fast ‘n Clean Car Service Center. He estimates that the following costs will be incurred during his first year of operations: Rent $9,200, Depreciation on equipment $7,000, Wages $16,400, Motor oil $2.00 per quart. He estimates that each oil change will require 5 quarts of oil. Oil filters will cost $3.00 each. He must also pay The Fast ‘n Clean Corporation a franchise fee of $1.10 per oil change, since he will operate the business as a franchise. In addition, utility costs are expected to behave in relation to the number of oil changes as follows:

Number of Oil Changes	Utility Costs
4,000	$ 6,000
6,000	$ 7,300
9,000	$ 9,600
12,000	$12,600
14,000	$15,000

Bill Braddock anticipates that he can provide the oil change service with a filter at $25 each.

Instructions

(a) Using the high-low method, determine variable costs per unit and total fixed costs.
(b) Determine the break-even point in number of oil changes and sales dollars.
(c) Without regard to your answers in parts (a) and (b), determine the oil changes required to earn net income of $20,000, assuming fixed costs are $32,000 and the contribution margin per unit is $8.

Ans: N/A, LO: 1,3,6,8,, Bloom: AP, Difficulty: Hard, Min: 19, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 168 (19–24 min.)

(a) Separation of mixed costs:

$$\text{Change in cost/Change in quantity: } \frac{(\$15{,}000 - \$6{,}000)}{(14{,}000 - 4{,}000)} = \frac{\$9{,}000}{10{,}000} = \$.90 \text{ per oil change}$$

Variable costs:		Fixed costs:	
Oil (5 quarts × $2.00)	$10.00	Rent	$ 9,200
Filter	3.00	Depreciation	7,000
Franchise fee	1.10	Wages	16,400
Utility costs (variable)	.90	Utility costs	2,400*
Total variable	$15.00	Total	$35,000

*$6,000 – (4,000 × .90) = $2,400

(b) (1) Break-even oil changes in units:

$$\frac{\text{Fixed costs}}{\text{Contribution margin per unit}} = \frac{\$35{,}000}{\$10.00^*} = 3{,}500 \text{ oil changes}$$

(2) Break-even sales in dollars:

$$\frac{\text{Fixed costs}}{\text{Contribution margin ratio}} = \frac{\$35{,}000}{.40} = \$87{,}500$$

*Selling price per unit (a)	$25
Variable cost per unit	15
Contribution margin per unit (b)	$10
Contribution margin ratio (b) ÷ (a)	40%

(c) $$\frac{\text{Fixed costs + Net income}}{\text{Contribution margin per unit}} = \frac{\$32{,}000 + \$20{,}000}{\$8} = 6{,}500 \text{ oil changes}$$

Ex. 169

Jane Botosan operates a bed and breakfast hotel in a resort area near Lake Michigan. Depreciation on the hotel is $60,000 per year. Jane employs a maintenance person at an annual salary of $32,000 and a cleaning person at an annual salary of $24,000. Real estate taxes are $10,000 per year. The rooms rent at an average price of $60 per person per night including breakfast. Other costs are laundry and cleaning service at a cost of $10 per person per night and the cost of food which is $5 per person per night.

Ex. 169 (Cont.)

Instructions

(a) Determine the number of rentals and the sales revenue Jane needs to break even using the contribution margin technique.

(b) If the current level of rentals is 3,500, by what percentage can rentals decrease before Jane has to worry about having a net loss?

(c) Jane is considering upgrading the breakfast service to attract more business and increase prices. This will cost an additional $3 for food costs per person per night. Jane feels she can increase the room rate to $66 per person per night. Determine the number of rentals and the sales revenue Jane needs to break even if the changes are made.

Ans: N/A, LO: 1,3,5,6,, Bloom: AN, Difficulty: Hard, Min: 22, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 169 (22–27 min.)

(a)

Variable costs per person per night:		Fixed costs:	
Laundry and cleaning	$10	Depreciation	$ 60,000
Breakfast	5	Maintenance	32,000
Total variable	$15	Cleaning	24,000
		Real estate tax	10,000
		Total fixed	$126,000

Break-even number of persons per night rentals:

$$\frac{\text{Fixed costs}}{\text{Contribution margin per person per night}} = \frac{\$126{,}000}{\$45^*} = 2{,}800 \text{ rentals}$$

*Sales price per unit	$60
Variable cost per unit	15
Contribution margin per unit	$45

Break-even sales in dollars:

$$\frac{\text{Fixed costs}}{\text{Contribution margin ratio}} = \frac{\$126{,}000}{75\%^{**}} = \$168{,}000$$

**Contribution margin per unit (a)	$45
Sales price per unit (b)	$60

Contribution margin ratio (a) ÷ (b) = 75%

(b) Margin of safety:

$$\frac{\text{Actual rentals - Break-even rentals}}{\text{Actual rentals}} = \frac{(3{,}500 - 2{,}800)}{3{,}500} = 20\%$$

Solution 169 (Cont.)

(c) Variable costs per person per night:		Fixed costs:	
Laundry and cleaning	$10.00	Depreciation	$ 60,000
Breakfast	8.00	Maintenance	32,000
Total variable	$18.00	Cleaning	24,000
		Real estate tax	10,000
		Total fixed	$126,000

Break-even number of persons per night rentals:

$$\frac{\text{Fixed costs}}{\text{Contribution margin per person per night}} = \frac{\$126,000}{\$48^*} = 2,625 \text{ rentals}$$

*Sales price per unit	$66
Variable cost per unit	18
Contribution margin per unit	$48

Break-even point in sales dollars: 2,625 × $66 = $173,250

Ex. 170

Corris Co. accumulates the following data concerning a mixed cost, using miles as the activity level.

	Miles Driven	Total Cost
January	10,000	$17,000
February	8,000	13,500
March	9,000	14,400
April	7,000	12,500

Instructions
Compute the variable and fixed cost elements using the high-low method.

Ans: N/A, LO: 3, Bloom: AP, Difficulty: Medium, Min: 5, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 170 (5 min.)

$$\frac{\$17,000 - \$12,500}{10,000 - 7,000} = \$1.50 = \text{variable cost per mile}$$

($1.50 x 10,000) + fixed cost = $17,000
Fixed cost = $2,000

Ex. 171

Moresan Co. gathered the following information on power costs and factory machine usage for the last six months:

Month	Power Cost	Factory Machine Hours
January	$24,400	13,900
February	29,200	17,600
March	29,000	16,800
April	22,340	13,200
May	19,900	11,600
June	14,900	6,600

Instructions
Using the high-low method of analyzing costs, answer the following questions and show computations to support your answers.

(a) What is the estimated variable portion of power costs per factory machine hour?

(b) What is the estimated fixed power cost each month?

(c) If it is estimated that 10,000 factory machine hours will be run in July, what is the expected total power cost for July?

Ans: N/A, LO: 3, Bloom: AP, Difficulty: Medium, Min: 10, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 171 (10–15 min.)

(a) Variable power cost per factory machine hour:

$$\frac{\$29,200 - \$14,900}{17,600 - 6,600} = \frac{\$14,300}{11,000} = \$1.30 \text{ per factory machine hour}$$

(b) Monthly fixed power cost:

	High (February)	Low (June)
Total costs	$29,200	$14,900
Less: Variable costs		
17,600 × $1.30	22,880	
6,600 × $1.30		8,580
Total fixed costs	$ 6,320	$ 6,320

(c) Estimated total power costs for July:

Variable cost (10,000 × $1.30)	$13,000
Fixed cost	6,320
Total estimated power cost	$19,320

Ex. 172

The Bradshaw Law Office has the following monthly telephone records and costs:

Calls	Costs
2,000	$2,400
1,500	2,000
2,200	2,600
2,500	2,800
2,300	2,700
1,700	2,200

Instructions
Identify the fixed and variable cost elements using the high-low method.

Ans: N/A, LO: 3, Bloom: AP, Difficulty: Medium, Min: 10, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 172 (10–15 min.)

High calls minus low calls: 2,500 – 1,500 = 1,000

Change in cost: $2,800 – $2,000 = $800

$800 ÷ 1,000 = $.80 variable cost per call

	High	Low
Total Cost	$2,800	$2,000
Less: Variable costs		
2,500 × $.80	2,000	
1,500 × $.80		1,200
Total fixed costs	$ 800	$ 800

Ex. 173

Determine the missing amounts.

	Unit Selling Price	Unit Variable Costs	Contribution Margin Per Unit	Contribution Margin Ratio
1.	$300	$180	A	B
2.	$600	C	$210	D
3.	E	F	$300	30%

Ans: N/A, LO: 4, Bloom: AN, Difficulty: Medium, Min: 10, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 173 (10 min.)

A. $300 – $180 = $120
B. $120 ÷ $300 = 40%
C. $600 – $210 = $390
D. $210 ÷ $600 = 35%
E. $300 ÷ 30% = $1,000
F. If 30% = CM ratio, then 70% = variable cost percentage
$1,000 × 70% = $700

Ex. 174

Henderson Farms reports the following results for the month of November:

Sales (10,000 units)	$600,000
Variable costs	420,000
Contribution margin	180,000
Fixed costs	110,000
Net income	$ 70,000

Management is considering the following independent courses of action to increase net income.
1. Increase selling price by 5% with no change in total variable costs.
2. Reduce variable costs to 66⅔% of sales.
3. Reduce fixed costs by $10,000.

Instructions
If maximizing net income is the objective, which is the best course of action?

Ans: N/A, LO: 4, Bloom: E, Difficulty: Medium, Min: 15, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 174 (15–20 min.)

1. Current selling price is: $600,000 ÷ 10,000 units = $60

   Increase $60 by 5%: $60 × 1.05 = $63

Revised sales	$630,000
Variable costs	420,000
Contribution margin	210,000
Fixed costs	110,000
Net income	$100,000

2.

Sales	$600,000
Variable costs (reduce variable costs to 66⅔% of sales)	400,000
Contribution margin	200,000
Fixed costs	110,000
Net income	$ 90,000

3.

Sales	$600,000
Variable costs	420,000
Contribution margin	180,000
Fixed costs (reduce fixed costs by $10,000)	100,000
Net income	$ 80,000

Increasing the price will increase net income from $70,000 to $100,000. Option (2) will increase net income to only $90,000, and Option (3) will increase net income to only $80,000.

Ex. 175

Marvin Co. had a net loss of $150,000 in 2012 when the selling price per unit was $20, the variable costs per unit were $14, and the fixed costs were $600,000. Management expects per unit data and total fixed costs to be the same in 2013. Management has set a goal of earning net income of $150,000 in 2013.

Instructions

(a) Compute the units sold in 2012.

(b) Compute the number of units that would have to be sold in 2013 to reach management's desired net income level.

(c) Assume that Marvin Co. sells the same number of units in 2013 as it did in 2012. What would the selling price have to be in order to reach the target net income? Use the mathematical equation.

Ans: N/A, LO: 4,6,7, Bloom: AN, Difficulty: Medium, Min: 15, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 175 (15–20 min.)

$$\text{(a) Units sold in 2012} = \frac{\text{Fixed costs – Net loss}}{\text{Contribution margin per unit}} = \frac{\$600{,}000 - \$150{,}000}{\$20 - \$14}$$

$$= \$450{,}000 \div \$6 = 75{,}000 \text{ units}$$

$$\text{(b) Units sold in 2013} = \frac{\text{Fixed costs + Net income}}{\text{Contribution margin per unit}} = \frac{\$600{,}000 + \$150{,}000}{\$20 - \$14}$$

$$= \$750{,}000 \div \$6 = 125{,}000 \text{ units}$$

$$\text{(c) Selling price needed in 2013} = \frac{\text{Variable costs + Fixed costs + Net income}}{75{,}000 \text{ units}}$$

$$\text{Selling price needed in 2013} = \frac{75{,}000(\$14) + \$600{,}000 + \$150{,}000}{75{,}000 \text{ units}}$$

$$= \$1{,}800{,}000 \div 75{,}000 = \$24$$

Ex. 176

In the month of September, Matlock Industries sold 800 units of product. The average sales price was $30. During the month, fixed costs were $6,300 and variable costs were 70% of sales.

Instructions

(a) Determine the contribution margin in dollars, per unit, and as a ratio.

(b) Using the contribution margin technique, compute the break-even point in dollars and in units.

Ans: N/A, LO: 5, Bloom: AP, Difficulty: Medium, Min: 12, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 176 (12–17 min.)

(a) Contribution margin (in dollars)

Sales (800 × $30)	$24,000
Less: Variable costs ($24,000 × 70%)	16,800
Contribution margin	$ 7,200

Contribution margin per unit

Unit sales price	$30
Less: Variable cost per unit ($30 × 70%)	21
Contribution margin per unit	$ 9

Contribution margin ratio
$9 ÷ $30 = 30%

(b) Break-even sales (in dollars)
Fixed costs ÷ Contribution margin ratio
$6,300 ÷ 30% = $21,000

Break-even sales (in units)
Fixed costs ÷ Contribution margin per unit
$6,300 ÷ $9 = 700 units

Ex. 177

In 2012, Stallman Co. had a break-even point of $800,000 based on a selling price of $10 per unit and fixed costs of $240,000. In 2013, the selling price and variable costs per unit did not change, but the break-even point increased to $850,000.

Instructions
(a) Compute the variable cost per unit and the contribution margin ratio for 2012.
(b) Using the contribution margin ratio, compute the increase in fixed costs for 2013.

Ans: N/A, LO: 5, Bloom: AP, Difficulty: Medium, Min: 15, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 177 (15–20 min.)

$$\text{(a) Unit contribution margin} = \frac{\text{Fixed Costs}}{\text{Break-even Sales in units}} = \frac{\$240{,}000}{(\$800{,}000 \div \$10)}$$

$$= \frac{\$240{,}000}{80{,}000} = \$3$$

Variable cost per unit = $10 – $3 = $7
Contribution margin ratio = $3 ÷ $10 = 30%

(b) Fixed costs = Break-even Sales × CM Ratio
= $850,000 × 30% = $255,000

Therefore, fixed costs increased $15,000 ($255,000 – $240,000).

Ex. 178

The income statement for Bradford Machine Company for 2012 appears below.

BRADFORD MACHINE COMPANY
Income Statement
For the Year Ended December 31, 2012

Sales (40,000 units)	$1,000,000
Variable expenses	700,000
Contribution margin	300,000
Fixed expenses	360,000
Net income (loss)	$ (60,000)

Instructions
Answer the following independent questions and show computations using the contribution margin technique to support your answers:

1. What was the company's break-even point in sales dollars in 2012?
2. How many additional units would the company have had to sell in 2013 in order to earn net income of $45,000?
3. If the company is able to reduce variable costs by $2.50 per unit in 2013 and other costs and unit revenues remain unchanged, how many units will the company have to sell in order to earn a net income of $45,000?

Ans: N/A, LO: 5,6,7, Bloom: AN, Difficulty: Medium, Min: 15, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 178 (15–20 min.)

1. $\frac{\$360,000}{30\%} = \$1,200,000$

2. $\frac{\$360,000 + \$45,000}{30\%} = \$1,350,000$ Total sales needed.

$\frac{\$1,350,000}{\$25} = 54,000$ total units to be sold

40,000 actual units sold
14,000 additional units to be sold

Note: Required sales in units can be obtained directly by dividing fixed costs plus profit by contribution margin per unit:
($360,000 + $45,000) ÷ ($25 – $17.50) = 54,000 units

3. 2012 Variable cost per unit = $17.50 ($700,000 ÷ 40,000 units)
Variable cost reduction = 2.50
2013 Variable cost per unit $15.00

Expected contribution margin $10 ($25 – $15)

$\frac{\$360,000 + \$45,000}{\$10} = 40,500$ units

Ex. 179

Webber, Inc. developed the following information for its product:

	Per Unit
Sales price	$90
Variable cost	63
Contribution margin	$27
Total fixed costs	$1,080,000

Instructions
Answer the following independent questions and show computations using the contribution margin technique to support your answers.

1. How many units must be sold to break even?
2. What is the total sales that must be generated for the company to earn a profit of $60,000?
3. If the company is presently selling 45,000 units, but plans to spend an additional $108,000 on an advertising program, how many additional units must the company sell to earn the same net income it is now making?
4. Using the original data in the problem, compute a new break-even point in units if the unit sales price is increased 20%, unit variable cost is increased by 10%, and total fixed costs are increased by $210,000.

Ans: N/A, LO: 5,6,7, Bloom: AN, Difficulty: Medium, Min: 15, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 179 (15–20 min.)

1. $\frac{\$1,080,000}{\$27}$ = 40,000 units must be sold to break even.

2. Contribution margin ratio = 30% ($27 ÷ $90).

$$\frac{\$1,080,000 + \$60,000}{.30} = \$3,800,000 \text{ total sales}$$

3. $\frac{\$108,000}{\$27}$ = 4,000 additional units

4.

New sales price	$108.00	($90 × 1.20)
New variable cost	69.30	($63 × 1.10)
New contribution margin	$38.70	

New total fixed costs $1,290,000 ($1,080,000 + $210,000)

$$\frac{\$1,290,000}{38.70} = 33,333 \text{ units (rounded) is the new break-even point.}$$

Ex. 180

Werth & Garza Manufacturing's sales slumped badly in 2013 due to so many people purchasing gifts online. The company's income statement showed the following results from selling 500,000 units of product: net sales $2,125,000; total costs and expenses $2,500,000; and net loss $375,000. Costs and expenses consisted of the following:

	Total	Variable	Fixed
Cost of goods sold	$2,000,000	$1,300,000	$700,000
Selling expenses	200,000	50,000	150,000
Administrative expenses	300,000	150,000	150,000
	$2,500,000	$1,500,000	$1,000,000

Management is considering the following alternative for 2013:

Purchase new automated equipment that will change the proportion between variable and fixed expenses sold to 45% variable and 55% fixed.

Instructions

(a) Compute the break-even point in dollars for 2013.
(b) Compute the break-even point in dollars under the alternative course of action.

Ans: N/A, LO: 5,6, Bloom: AP, Difficulty: Medium, Min: 8, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 180 (8–10 min.)

(a) Selling price = $2,125,000 ÷ 500,000 = $4.25 per unit
Variable cost per unit = $1,500,000 ÷ 500,000 = $3 per unit
Sales – Variable cost – Fixed cost = 0
$4.25X – $3X – $1,000,000 = 0
Break-even point in units = 800,000 units ($1,000,000 ÷ $1.25)
Break-even point in dollars = 800,000 × $4.25 = $3,400,000

(b) New variable cost per unit = (45% × $2,500,000) ÷ 500,000 = $2.25 per unit
$4.25X – $2.25X – ($2,500,000 × 55%) = 0
New break-even point in units = 687,500 units ($1,375,000 ÷ $2)
New break-even point in dollars = 687,500 × $4.25 = $2,921,875

Ex. 181

Henning Co. estimates that variable costs will be 60% of sales and fixed costs will total $2,160,000. The selling price of the product is $10, and 600,000 units will be sold.

Instructions

Using the mathematical equation,
(a) Compute the break-even point in units and dollars.
(b) Compute the margin of safety in dollars and as a ratio.
(c) Compute net income.

Ans: N/A, LO: 5,6,8, Bloom: AP, Difficulty: Medium, Min: 15, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 181 (15–20 min.)

(a) Break-even sales in units

$10X = $6X + $2,160,000
$4X = $2,160,000
X = 540,000 units

Break-even point in dollars

X = .4X + $2,160,000
.4X = $2,160,000
X = $5,400,000

(b) Margin of safety in dollars

$6,000,000 – $5,400,000 = $600,000

Margin of safety ratio

$600,000 ÷ $6,000,000 = 10%

(c) Net Income

Sales	$6,000,000
Variable Costs	(3,600,000)
Fixed Costs	(2,160,000)
Net Income	$ 240,000

Ex. 182

Norton, Inc. has the following information available for September 2013.

Unit selling price of video game consoles	$ 400
Unit variable costs	$ 280
Total fixed costs	$48,000
Units sold	500

Instructions

(a) Prepare a CVP income statement that shows both total and per unit amounts.
(b) Compute Norton's breakeven in units.

Ans: N/A, LO: 5,6, Bloom: AP, Difficulty: Medium, Min: 10, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 182 (10 min.)

(a)

NORTON, INC. COMPANY
CVP Income Statement
For the Month Ended September 30, 2013

	Total	Per Unit
Sales (500 video game consoles)	$200,000	$400
Variable costs	140,000	280
Contribution margin	60,000	$120
Fixed costs	48,000	
Net income	$ 12,000	

Solution 182 (Cont.)

(b) Sales = Variable costs + Fixed costs
$400X = $280X + $48,000
$120X = 48,000
X = 400 units

Ex. 183

In the month of April, Avante Salon gave 2,500 haircuts, shampoos, and permanents at an average price of $40. During the month, fixed costs were $21,000 and variable costs were 70% of sales.

Instructions
(a) Determine the contribution margin in dollars, per unit, and as a ratio.
(b) Using the contribution margin technique, compute the break-even point in dollars and in units.
(c) Compute the margin of safety dollars and as a ratio.

Ans: N/A, LO: 5,6,8, Bloom: AP, Difficulty: Medium, Min: 10, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 183 (10 min.)

(a)	Contribution margin (in dollars):	Sales = (2,500 × $40) =	$100,000
		Variable costs = $100,000 × .70 =	70,000
		Contribution margin	$ 30,000
	Variable cost (per unit):	$40 × .70 = $28.	
	Contribution margin (per unit)	$40 – ($40 × 70%) = $12.	
	Contribution margin (ratio):	$12 ÷ $40 = 30%	
(b)	Breakeven sales (in dollars):	$\frac{\$21,000}{30\%} = \$70,000.$	
	Breakeven sales (in units):	$\frac{\$21,000}{\$12} = 1,750 \text{ units.}$	
(c)	Margin of safety (in dollars):	$100,000 – $70,000 = $30,000.	
	Margin of safety (ratio)	$30,000 ÷ $100,000 = 30%	

Ex. 184

Taveras Industries developed the following information for the product it sells:

Sales price	$50 per unit
Variable cost of goods sold	$28 per unit
Fixed cost of goods sold	$650,000
Variable selling expense	10% of sales price
Variable administrative expense	$2.00 per unit
Fixed selling expense	$400,000
Fixed administrative expense	$300,000

For the year ended December 31, 2013, Taveras produced and sold 100,000 units of product.

Instructions

(a) Prepare a CVP income statement using the contribution margin format for Taveras Industries for 2013.

(b) What was the company's break-even point in units in 2013? Use the contribution margin technique.

(c) What was the company's margin of safety in dollars in 2013?

Ans: N/A, LO: 5,6,8, Bloom: AP, Difficulty: Medium, Min: 20, AACSB: Analytic, AICPA BB: Legal/Regulatory Perspective, AICPA FN: Reporting, AICPA PC: Problem Solving, IMA: Reporting

Solution 184 (20–25 min.)

(a)

TAVERAS INDUSTRIES
Income Statement
For the Year Ended December 31, 2013

Sales		$5,000,000
Variable expenses		
Cost of goods sold	$2,800,000	
Administrative	200,000	
Selling expenses	500,000	
Total variable expenses		3,500,000
Contribution margin		1,500,000
Fixed expenses		
Cost of goods sold	650,000	
Selling	400,000	
Administrative	300,000	
Total fixed expenses		1,350,000
Net income		$ 150,000

(b) Break-even point was 90,000 units in 2013.

Variable costs per unit		Contribution margin per unit	
Cost of goods sold	$28	Sales price	$50
Administrative	2	Variable cost	35
Selling	5	Contribution margin	$15
	$35		

$1,600,000 ÷ $15 = 90,000 units to break even.

(c) Margin of safety in dollars was $500,000

Actual sales	$5,000,000
Break-even sales (90,000 × $50)	4,500,000
Margin of safety	$ 500,000

Ex. 185

Gordon Manufacturing earned net income of $100,000 during 2012. The company wants to earn net income of $40,000 more during 2013. The company's fixed costs are expected to be $126,000, and variable costs are expected to be 30% of sales.

Instructions
(a) Determine the required sales to meet the target net income during 2013.
(b) Fill in the dollar amounts for the summary income statement for 2013 below, based on your answer to part (a).

Sales revenue	$
Variable costs	
Contribution margin	
Fixed costs	
Net income	$

Ans: N/A, LO: 5,7, Bloom: AP, Difficulty: Medium, Min: 6, AACSB: Analytic, AICPA BB: Legal/Regulatory Perspective, AICPA FN: Reporting, AICPA PC: Problem Solving, IMA: Reporting

Solution 185 (6–8 min.)

(a) 70%X – $126,000 = $140,000
Required sales = $380,000 ($266,000 ÷ .70)

(b) Sales revenue	$380,000
Variable costs ($380,000 ×.30)	114,000
Contribution margin	266,000
Fixed costs	126,000
Net income	$140,000

Ex. 186

Ferris, Inc. has a unit selling price of $500, variable cost per unit of $300, and fixed costs of $260,000.

Instructions
Compute the break-even point in units and in sales dollars.

Ans: N/A, LO: 6, Bloom: AP, Difficulty: Medium, Min: 5, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 186 (5 min.)

$500X – $300X – $260,000 = 0
Break-even point in units = X = 1,300 units ($260,000 ÷ $200)
Break-even point in dollars = 1,300 units × $500 = $650,000

Ex. 187

Erickson, Inc. makes student book bags that sell for $20 each. For the coming year, management expects fixed costs to be $225,000. Variable costs are $15 per unit.

Instructions
(a) Compute break-even sales in dollars using the mathematical equation.
(b) Compute break-even sales using the contribution margin ratio.
(c) Compute margin of safety ratio assuming actual sales are $1,200,000.
(d) Compute the sales required to earn net income of $150,000, using the mathematical equation.

Ans: N/A, LO: 6,7,8, Bloom: AP, Difficulty: Medium, Min: 19, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 187 (19–24 min.)

(a) Break-even Sales = Variable Costs + Fixed Costs
X = .75X + $225,000
.25X = $225,000
X = $900,000

(b) Contribution Margin per Unit = Unit Selling Price – Unit Variable Cost
CM = $20 – $15 = $5

$$\text{Contribution Margin Ratio} = \frac{\text{Contribution Margin per Unit}}{\text{Unit Selling Price}}$$

CM Ratio = $5 ÷ $20 = 25%

$$\text{Break-even Sales} = \frac{\text{Fixed Costs}}{\text{Contribution Margin Ratio}}$$

= $225,000 ÷ 25% = $900,000

(c)

Sales	$1,200,000
Less: Break-even Sales	900,000
Margin of Safety	$ 300,000

$$\text{Margin of Safety Ratio} = \frac{\text{Margin of Safety}}{\text{Actual Sales}}$$

= $300,000 ÷ $1,200,000 = 25%

(d) Required Sales = Variable Costs + Fixed Costs + Targeted Net Income
X = .75X + $225,000 + $150,000
.25X = $375,000
X = $1,500,000

Ex. 188

Melody Manufacturing produces a hip-hop CD that is sold for $20. The contribution margin ratio is 40%. Fixed expenses total $9,200.

Instructions
(a) Compute the variable cost per unit.
(b) Compute how many CDs Melody Manufacturing will have to sell in order to break even.
(c) Compute how many CDs Melody Manufacturing will have to sell in order to make a target net income of $16,200.

Ans: N/A, LO: 6,7, Bloom: AP, Difficulty: Medium, Min: 7, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 188 (7–10 min.)

(a) Variable cost per unit: $20 × (1 – .40) = $12/unit

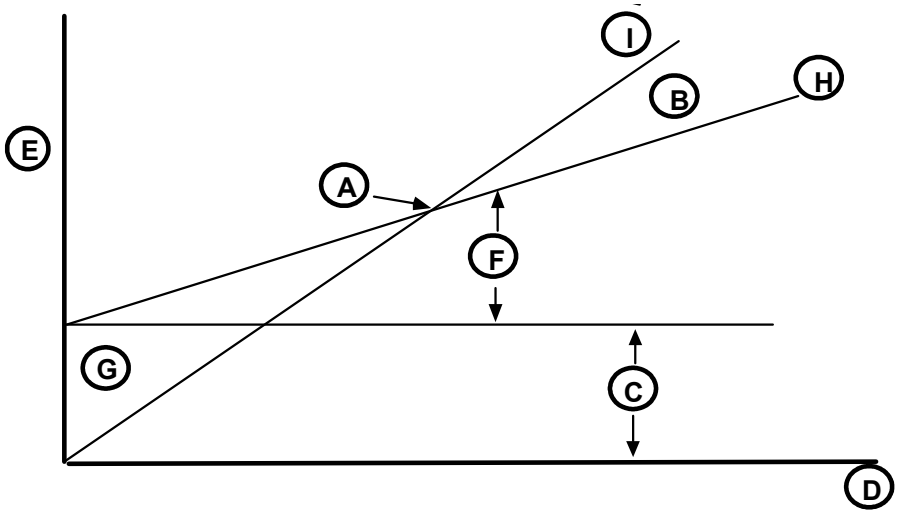
(b) $20X – $12X – $9,200 = 0
X = 1,150 units ($9,200 ÷ $8)

Solution 188 (Cont.)

(c) $20X – $12X – $9,200 = $16,200
X = 3,175 units ($25,400 ÷ $8)

Ex. 189

Usher, Inc. has prepared the following cost-volume-profit graph:



Instructions
For the items listed below, enter to the left of the item, the letter in the graph which best corresponds to the item.

____ 1. Activity base
____ 2. Break-even point
____ 3. Dollars
____ 4. Fixed costs
____ 5. Loss
____ 6. Profit
____ 7. Revenues
____ 8. Total costs
____ 9. Variable costs

Ans: N/A, LO: 6,7, Bloom: C, Difficulty: Medium, Min: 9, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

Solution 189 (9–14 min.)

1. D Activity base
2. A Break-even point
3. E Dollars
4. C Fixed costs
5. G Loss
6. B Profit
7. I Revenues
8. H Total costs
9. F Variable costs

Ex. 190

Holder Manufacturing had $125,000 of net income in 2012 when the selling price per unit was $100, the variable costs per unit were $70, and the fixed costs were $475,000. Management expects per unit data and total fixed costs to remain the same in 2013. The president of Holder Manufacturing is under pressure from stockholders to increase net income by $60,000 in 2013.

Instructions

(a) Compute the number of units sold in 2012.
(b) Compute the number of units that would have to be sold in 2013 to reach the stockholders' desired profit level.
(c) Assume that Holder Manufacturing sells the same number of units in 2013 as it did in 2012. What would the selling price have to be in order to reach the stockholders' desired profit level.

Ans: N/A, LO: 6,7, Bloom: AP, Difficulty: Medium, Min: 10, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 190 (10–14 min.)

(a) Sales = Variable cost + Fixed cost + Target net income

$100X = $70X + $475,000 + $125,000

$30X = $600,000

Or X = 20,000 units

$$\text{Units sold in 2012} = \frac{\$475,000 + \$125,000}{\$100 - \$70} = 20,000 \text{ units}$$

$$\text{(b) Units sold in 2012} = \frac{\$475,000 + \$185,000^*}{\$100 - \$70} = 22,000 \text{ units}$$

*$125,000 + $60,000 = $185,000

$$\text{(c)} \quad \frac{\$475,000 + \$185,000}{X - \$70} = 20,000 \text{ units where X = new selling price}$$

$660,000 = 20,000X – $1,400,000

$2,060,000X = 20,000X

X = $103

Ex. 191

Englehart, Inc. reports the following operating results for the month of August: Sales $400,000 (units 5,000); variable costs $280,000; and fixed costs $95,000. Management is considering the following independent courses of action to increase net income.

1. Increase selling price by 10% with no change in total variable costs.
2. Reduce variable costs to 65% of sales.
3. Reduce fixed costs by $15,000.

Instructions

Compute the net income to be earned under each alternative. Which course of action will produce the highest net income?

Ans: N/A, LO: 6,7, Bloom: AP, Difficulty: Medium, Min: 6, AACSB: Analytic, AICPA BB: Legal/Regulatory Perspective, AICPA FN: Reporting, AICPA PC: Problem Solving, IMA: Reporting

Solution 191 (6 min.)

(1) Unit sales price = $400,000 ÷ 5,000 units = $80
Increase selling price to $88, or ($80 × 110%).
Net income = $440,000 – $280,000 – $95,000 = $65,000.

(2) Reduce variable costs to 65% of sales.
Net income = $400,000 – $260,000 – $95,000 = $45,000.

(3) Reduce fixed costs to $80,000, or ($95,000 – $15,000).
Net income = $400,000 – $280,000 – $80,000 = $40,000.

Alternative 1, increasing selling price, will produce the highest net income.

Ex. 192

Kreter, Inc. earned net income of $300,000 last year. This year it wants to earn net income of $450,000. The company's fixed costs are expected to be $300,000, and variable costs are expected to be 70% of sales.

Instructions
(a) Determine the required sales to meet the target net income of $450,000 using the mathematical equation.
(b) Using a CVP income statement format, prove your answer.

Ans: N/A, LO: 7, Bloom: AP, Difficulty: Medium, Min: 8, AACSB: Analytic, AICPA BB: Legal/Regulatory Perspective, AICPA FN: Reporting, AICPA PC: Problem Solving, IMA: Reporting

Solution 192 (8–12 min.)

(a) Sales = Variable Cost + Fixed Cost + Target Net Income

$$X = .70X + \$300,000 + \$450,000$$
$$.30X = \$750,000$$
$$X = \$2,500,000$$

Required Sales are $2,500,000.

(b)

Sales	$2,500,000
Variable costs	1,750,000
Contribution margin	750,000
Fixed costs	300,000
Target net income	$ 450,000

Ex. 193

Cunningham Industries reported actual sales of $2,000,000, and fixed costs of $510,000. The contribution margin ratio is 30%.

Instructions
Compute the margin of safety in dollars and the margin of safety ratio.

Ans: N/A, LO: 8, Bloom: AP, Difficulty: Medium, Min: 7, AACSB: Analytic, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Problem Solving, IMA: Quantitative Methods

Solution 193 (7 min.)

Break-even point in dollars: $510,000 ÷ 30% = $1,700,000
Margin of safety in dollars: $2,000,000 – $1,700,000 = $300,000
Margin of safety ratio: $300,000 ÷ $2,000,000 = 15%

COMPLETION STATEMENTS

194. Knowledge of cost behavior is important in _____ analysis.

Ans: N/A, LO: 1, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: None, AICPA PC: None, IMA: Business Economics

195. A _____ cost remains constant per unit at every level of activity.

Ans: N/A, LO: 1, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

196. Unit fixed costs _____ with the changes in the level of activity.

Ans: N/A, LO: 1, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

197. Total fixed costs are _____ over various levels of activities, whereas total variable costs _____ directly and _____ with changes in the activity level.

Ans: N/A, LO: 1, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

198. An assumption of CVP analysis is that variable and fixed costs have a _____ relationship with an activity base.

Ans: N/A, LO: 1, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

199. The range over which a company expects to operate is referred to as the _____ range.

Ans: N/A, LO: 2, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

200. A cost that has both variable and fixed elements is referred to as a _____ cost.

Ans: N/A, LO: 3, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

201. The amount of revenue remaining after deducting total variable costs is called the _____.

Ans: N/A, LO: 5, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Legal/Regulatory Perspective, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

202. The _____ point is when total revenues equal total costs.

Ans: N/A, LO: 6, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

203. _____ divided by the contribution margin ratio will give the amount of _____ to break even.

Ans: N/A, LO: 6, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

204. The difference between actual or expected sales and break-even sales is called the _____.

Ans: N/A, LO: 8, Bloom: K, Difficulty: Easy, Min: 1, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

Answers to Completion Statements

194. cost-volume-profit (CVP)
195. variable
196. vary inversely
197. constant, vary, proportionately
198. linear
199. relevant
200. mixed
201. contribution margin
202. break-even
203. Fixed costs, sales (in dollars)
204. margin of safety

MATCHING

205. Match the items in the two columns below by entering the appropriate code letter in the space provided.

A. Activity index
B. Variable costs
C. Fixed costs
D. High-low method
E. Relevant range
F. Mixed costs
G. Break-even point
H. Contribution margin
I. Margin of safety
J. Contribution margin ratio

____ 1. The amount of revenue remaining after deducting variable costs.

____ 2. Costs that contain both a variable and a fixed element.

____ 3. The percentage of sales dollars available to cover fixed costs and produce income.

____ 4. Identifies the activity which causes changes in the behavior of costs.

____ 5. The difference between actual or expected sales and sales at the break-even point.

____ 6. Costs that vary in total directly and proportionately with changes in the activity level.

____ 7. The level of activity at which total revenues equal total costs.

____ 8. The range over which the company expects to operate during the year.

____ 9. Costs that remain the same in total regardless of changes in the activity level.

____ 10. A method that uses the total costs incurred at the high and low levels of activity.

Ans: N/A, LO: 1, Bloom: K, Difficulty: Easy, Min: 5, AACSB: None, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: None, IMA: Business Economics

Answers to Matching

1. H
2. F
3. J
4. A
5. I
6. B
7. G
8. E
9. C
10. D

SHORT-ANSWER ESSAY QUESTIONS

S-A E 206

A cost-volume-profit graph is frequently used in business meetings because it presents a picture of cost relationships within a company. Briefly describe the type of information and data that you would need in order to prepare a CVP graph. After a CVP graph is prepared, what are the major points that could be made from the graph that would be of interest to management?

Ans: N/A, LO: 4, Bloom: S, Difficulty: Easy, Min: 5, AACSB: Communications, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Communications, IMA: Business Economics

Solution 206

To begin constructing a CVP graph, information is needed concerning the maximum estimated level of sales units and the unit sales price. This is necessary to create the axes and also to plot the total revenue line from the origin. In addition, the costs must be broken down into fixed and variable components in order to plot both the fixed cost line and the total cost line.

Using a CVP graph, management can readily identify the break-even point and can see how much profit or loss would result from varying levels of sales. The graph also makes it easy to portray the effects of any changes such as costs or selling prices.

S-A E 207

A CVP income statement is frequently prepared for internal use by management. Describe the features of the CVP income statement that make it more useful for management decision-making than the traditional income statement that is prepared for external users.

Ans: N/A, LO: 5, Bloom: S, Difficulty: Easy, Min: 5, AACSB: Communications, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Communications, IMA: Business Economics

Solution 207

Several features of the CVP income statement make it more useful for internal decision-making. The CVP income statement classifies costs as either fixed or variable, rather than by function. Being able to identify the behavior of costs in this manner can aid management in controlling those costs.

Also, the CVP income statement shows the contribution margin, rather than a gross profit. This helps management establish the extent to which their sales are able to cover their fixed costs, and to analyze the impact on net income of changes in sales or costs.

S-A E 208

(a) Matt Sampson asks your help in understanding the term "activity index." Explain the meaning and importance of this term for Matt.
(b) State the two ways that variable costs may be defined.

Ans: N/A, LO: 1, Bloom: S, Difficulty: Easy, Min: 5, AACSB: Communications, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Communications, IMA: Business Economics

Solution 208

(a) The activity index identifies the activity that causes changes in the behavior of costs. Once the index is determined, it is possible to classify the behavior of costs in response to changes in activity levels into three categories: variable, fixed, or mixed.

(b) Variable costs may be defined in total or on a per-unit basis. Variable costs in total vary directly and proportionately with changes in the activity level. Variable costs per unit remain the same at every level of activity.

S-A E 209

How should mixed costs be classified in CVP analysis? What approach is used to effect the appropriate classification?

Ans: N/A, LO: 3, Bloom: S, Difficulty: Easy, Min: 5, AACSB: Communications, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Communications, IMA: Business Economics

Solution 209

For CVP analysis, mixed costs must be classified into their fixed and variable elements. One approach to the classification of mixed costs is the high-low method.

S-A E 210 (Ethics)

Hanson, Inc. requires its marketing managers to submit estimated cost-volume-profit data on all requests for new products, or expansions of a product line.

Nancy Stephens is a new manager. Her calculations show a fixed cost for a new project at $100,000 and a variable cost of $5. Since the selling price is only $15 for the proposed product, 10,000 would need to be sold to break even. That is approximately twice the volume estimate for the first year. She shares her dismay with Patti Patterson, another manager.

Patti strongly advises her to revise her estimates. She points out that several of the costs that had been classified as fixed costs could be considered variable, since they are step costs and mixed costs. When the data has been revised classifying those costs as variable costs, the project appears viable.

Required:
1. Who are the stakeholders in this decision?
2. Is it ethical for Nancy to revise the costs as indicated? Briefly explain.
3. What should Nancy do?

Ans: N/A, LO: 1, Bloom: S, Difficulty: Easy, Min: 5, AACSB: Ethics, AICPA BB: Legal/Regulatory Perspective, AICPA FN: Decision Modeling, AICPA PC: Professional Demeanor, IMA: Decision Analysis

Solution 210

1. The stakeholders include:
   Nancy Stephens
   Hanson, Inc.
   Hanson's customers

2. It is ethical to revise the costs, certainly. The only problem that exists is the failure to account for the fixed cost component of the step and mixed costs. At low volume levels, such as those anticipated for this project, the project is likely to be less profitable than forecast. To the extent that Nancy is submitting misleading figures in order to get her project approved, she is behaving unethically.

3. Nancy should try to make the forecasts as accurate as possible by making a better determination of cost behavior. If that is not possible within the time she has, she should submit both sets of figures, and let the selection committee make its determination.

S-A E 211(Communication)

For two years, Annette Larson has been the manager of the production department of a company manufacturing toys made of plastic-coated cardboard. One of the toys is a paper doll, whose "clothes" are made of acetate, and stay on the doll with static electricity. The company's sales were mainly to large educational institutions until last year, when the dolls were sold for the first time to a large discount retailer. The dolls were sold out immediately, and enough orders were received to keep the department at full capacity for the immediate future.

The fixed costs for the department are $50,000, with $1 per unit variable costs. A paper doll and one set of clothes sell for $3. The maximum volume is 80,000 units. With the increased volume, Ms. Larson is considering two options to improve profitability. One would reduce variable costs to $0.75, and the other would reduce fixed costs to $35,000.

Required:
Given the fact that sales are increasing, make a short (one paragraph) recommendation to Ms. Larson about which option she should choose. Support your recommendation with a calculation showing her how profitability will change with each option.

Ans: N/A, SO: 1, Bloom: S, Difficulty: Easy, Min: 5, AACSB: Communications, AICPA BB: Industry/Sector Perspective, AICPA FN: Measurement, AICPA PC: Communications, IMA: Quantitative Methods

Solution 211

The variable costs should be reduced to $0.75 per unit in order to ensure maximum profitability of the paper doll product line. The calculations are as follows:

Current Profit = ($3 × 80,000) – ($1 × 80,000) – $50,000
= $240,000 – $80,000 – $50,000
= $110,000

Plan #1: Reduce Variable Costs to $0.75

Profit = ($3 × 80,000) – ($0.75 × 80,000) – $50,000
= $240,000 – $60,000 – $50,000
= $130,000

Plan #2: Reduce Fixed Costs to $35,000

Profit = ($3 × 80,000) – ($1 × 80,000) – $35,000
= $240,000 – $80,000 – $35,000
= $125,000