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Chapter 2
Cost Behavior and Cost Estimation
Summary of Questions by Objectives and Bloom's Taxonomy

CHAPTER LEARNING OBJECTIVES

1. Identify basic cost behavior patterns and explain how changes in activity level affect total cost and unit cost. (Unit 2.1)

The two basic cost behavior patterns are variable and fixed. Costs that are a combination of these two basic patterns are referred to as mixed. The following table shows how these costs change with changes in activity.

	As Activity Increases		As Activity Decreases	
Cost Behavior	Total Cost	Cost per Unit	Total Cost	Cost per Unit
Variable	Increases	Remains constant	Decreases	Remains constant
Fixed	Remains constant	Decreases	Remains constant	Increases
Mixed	Increases	Decreases	Decreases	Increases

2. Estimate a cost equation from a set of cost data and predict future total cost from that equation. (Unit 2.2)

Total cost can be expressed in the form $y = mx + b$, where y is the total cost, m is the variable cost per unit, x is the number of units, and b is the total fixed cost. Given a set of costs and activity levels, you can estimate a cost equation using one of the following methods: scattergraph, high-low, or regression.

3. Prepare a contribution format income statement. (Unit 2.3)

A contribution format income statement is an income statement that categorizes expenses by their behavior. It follows the structure:

Sales revenue – Variable expenses = Contribution margin
Contribution margin – Fixed expenses = Operating income

Besides showing total sales revenue and expenses, the contribution format statement should also show per unit amounts for sales revenue, variable expenses, and contribution margin.

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Chapter 2 – Cost Behavior and Cost Estimation

TRUE-FALSE STATEMENTS

1. A variable cost is one that varies in proportion to a business activity.
Ans: True, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

2. With a variable cost, as the level of activity decreases, the total cost remains the same.
Ans: False – With a variable cost, as the level of activity decreases, the total cost decreases by the same proportion, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

3. A fixed cost is a cost that does **not** change in total with the activity level.
Ans: True, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

4. With a fixed cost, the cost per unit varies proportionately with changes in the level of activity.
Ans: False – With a fixed cost, the cost per unit varies inversely with changes in the level of activity, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

5. Discretionary fixed costs are fixed costs that **cannot** be changed over the short run.
Ans: False – Discretionary fixed costs are fixed costs that can be changed over the short run, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

6. An example of a committed fixed cost is when a company signs a 10-year lease on an office building.
Ans: True, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

7. A committed fixed cost is one that **cannot** be changed over the short run.
Ans: True, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

8. Companies should reduce fixed costs whenever possible during times of falling profits.
Ans: False – Companies should be careful about reducing their discretionary fixed costs during times of falling profits. For example, reducing advertising is likely to reduce sales further, exacerbating the problem of falling profits, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

9. Step costs are fixed over only a small range of activity.
Ans: True, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

10. All costs are either fixed or variable. That is, a cost **cannot** have a fixed and a variable component.
Ans: False – Some costs have both a fixed and a variable component. These costs are referred to as a mixed cost, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

11. Since a mixed cost has both a fixed and a variable component, both the total cost and the unit cost will vary with changes in the level of activity.
Ans: True, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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12. An example of a step cost is the electric bill you receive for heating your apartment.
Ans: False – Your natural gas bill would be an example of a mixed cost. The base charge would be fixed and the additional charge per cubic foot of gas would be variable, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

13. Once you know how a particular cost behaves, estimating the total cost is relatively simple.
Ans: True, LO: 2, Bloom: K, Unit: 2-2, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: Decision Making, IMA: Reporting

14. Three methods used for estimating the fixed and variable portions of a cost include: cost-cover graphs, the high-low method and regression analysis.
Ans: False – Three methods used for estimating the fixed and variable portions of a cost include scattergraphs, the high-low method and regression analysis, LO: 2, Bloom: K, Unit: 2-2, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

15. A scattergraph is simply a graph that shows total costs in relation to volume, or activity level.
Ans: True, LO: 2, Bloom: K, Unit: 2-2, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

16. The high-low method of estimating the fixed and variable components of a mixed cost is a precise approach that uses a statistical technique.
Ans: False – The high-low method is a "quick and dirty" method. It does not use a statistical technique, LO: 2, Bloom: C, Unit: 2-2, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

17. Unlike the scattergraph, the high-low method requires only two data points – the lowest point of activity and the highest point of activity.
Ans: True, LO: 2, Bloom: K, Unit: 2-2, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

18. To estimate the unit variable cost using the high-low method, identify the highest and lowest level of activity and compute the slope of the line.
Ans: True, LO: 2, Bloom: K, Unit: 2-2, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

19. Regression is a more precise method of estimating the fixed and variable components of a mixed cost than the high-low method or a scattergraph.
Ans: True, LO: 2, Bloom: K, Unit: 2-2, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

20. Like the high-low method of estimating the fixed and variable components of a mixed cost, regression analysis uses a statistical technique that identifies the line of best fit.
Ans: False – The high-low method is not a statistical technique, LO: 2, Bloom: C, Unit: 2-2, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

21. Cost behaviors and estimates are valid only within what is referred to as a precision range.
Ans: False – Cost behaviors and estimates are valid only within a relevant range, LO: 2, Bloom: K, Unit: 2-2, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

22. The relevant range is the normal level of operating activity.
Ans: True, LO: 2, Bloom: K, Unit: 2-2, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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23. Operating income = Sales revenue – Variable cost per unit – Total fixed costs.
Ans: False – Operating income = Sales revenue – Total variable costs – Total fixed costs, LO: 3, Bloom: K, Unit: 2-3, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

24. A basic tool for making business decisions is the contribution margin.
Ans: True, LO: 3, Bloom: K, Unit: 2-3, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

25. The contribution margin is the difference between sales and fixed costs.
Ans: False – The contribution margin is the difference between sales and variable costs, LO: 3, Bloom: K, Unit: 2-3, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

26. Contribution margin is the amount of revenue that remains to cover fixed costs and provide a profit.
Ans: True, LO: 3, Bloom: K, Unit: 2-3, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

27. Contribution margin = Sales revenue – Total variable costs.
Ans: True, LO: 3, Bloom: K, Unit: 2-3, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

28. Unlike the contribution margin in dollars, the contribution margin ratio **cannot** be used to determine the increase in profits from a given dollar increase in sales revenue.
Ans: False – The contribution margin ratio can be used to determine the increase in profits from a given dollar increase in sales revenue, because the ratio represents the portion of every sales dollar that is available to cover fixed costs and go towards profit., LO: 3, Bloom: C, Unit: 2-3, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

29. The contribution margin income statement allows managers to easily assess the impact of sales volume on operating income.
Ans: True, LO: 3, Bloom: C, Unit: 2-3, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

30. The contribution format income statement presents costs by behavior.
Ans: True, LO: 3, Bloom: C, Unit: 2-3, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

31. When production and sales are equal, a drawback of the contribution format income statement is that is does **not** produce the same operating income as the traditional functional income statement format.
Ans: False – The contribution format income statement arrives at the same operating income as in the traditional functional income statement when production equals sales, LO: 3, Bloom: AP, Unit: 2-3, Difficulty: Moderate, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

32. A contribution format income statement just rearranges the individual cost components and produces the same operating income as the traditional functional income statement.
Ans: True, LO: 3, Bloom: C, Unit: 2-3, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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Answers to True-False Statements

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

MULTIPLE-CHOICE QUESTIONS

33. GAAP-based income statements categorize expenses based on
    A. business function.
    B. cost behavior.
    C. dollar amount.
    D. contribution margin.

Ans: A, LO: 3, Bloom: K, Unit: 2-3, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

34. GAAP-based income statements categorize expenses based on
    a. product, contribution, selling, or administrative.
    b. product, selling, or administrative.
    c. contribution, product, administrative.
    d. variable costs and fixed costs.

Ans: B, LO: 3, Bloom: K, Unit: 2-3, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

35. If the activity level increases, what happens to the total variable cost?
    a. It remains the same.
    b. It decreases.
    c. It increases.
    d. It depends on how much the activity level increases.

Ans: C, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

36. If the activity level decreases, what happens to the total variable cost?
    a. It decreases.
    b. It increases.
    c. It remains the same.
    d. It depends on how much the activity level increases.

Ans: A, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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37. If the activity level increases, what happens to the total fixed cost?
    a. It decreases.
    b. It increases.
    c. It remains the same.
    d. It depends on how much the activity level increases.

Ans: C, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

38. If the activity level decreases, what happens to the total fixed cost?
    a. It remains the same.
    b. It decreases.
    c. It increases.
    d. It depends on how much the activity level increases.

Ans: A, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

39. If the activity level increases, what happens to the unit fixed cost?
    a. It decreases.
    b. It increases.
    c. It remains the same.
    d. It depends on how much the activity level increases.

Ans: A, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

40. If the activity level decreases, what happens to the unit fixed cost?
    a. It decreases.
    b. It increases.
    c. It remains the same.
    d. It depends on how much the activity level increases.

Ans: B, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

41. If activity level increases, what happens to the unit variable cost?
    a. It remains the same.
    b. It decreases.
    c. It increases.
    d. It depends on how much the activity level increases.

Ans: A, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

42. If activity level decreases, what happens to the unit variable cost?
    a. It remains the same.
    b. It decreases.
    c. It increases.
    d. It depends on how much the activity level increases.

Ans: A, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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43. Which of the following is an example of a variable cost for a bicycle manufacturer?
    a. Rent
    b. Insurance
    c. Tires
    d. Depreciation

Ans: C, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

44. When managers talk about cost behavior, they are referring to
    a. where a cost is reported on the income statement.
    b. the way in which total costs change in response to changes in the level of activity.
    c. the method used to determine whether a cost is accrued or expensed.
    d. the way cost is reported within inventory on the balance sheet.

Ans: B, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

45. When a manager talks about cost behavior, she is referring to
    a. the way in which total costs change in response to changes in the level of activity.
    b. the method used to determine whether a cost is accrued or expensed.
    c. the classification of product or period costs.
    d. the way in which costs are allocated.

Ans: A, LO: 1, Bloom: C Unit: 2-1, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

46. Four common cost behavior patterns that serve as the foundation for cost-volume-profit analysis are
    a. variable cost, fixed cost, selling cost, and administrative cost.
    b. variable cost, fixed cost, mixed cost, and step cost.
    c. variable cost, fixed cost, period cost, and other cost.
    d. selling cost, administrative cost, cost of goods sold, and depreciation.

Ans: B, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

47. Assume you are planning a spring break ski trip to Colorado. You are preparing a budget of your costs. You are staying at a lodge that has a special where the lodge charges you $2 for each ski lift ride. You believe you will ride the ski lift 40 times during the week, so you budget $80. The ski lift cost is an example of a
    a. fixed cost.
    b. variable cost.
    c. mixed cost.
    d. step cost.

Ans: B, LO: 1, Bloom: AP, Unit: 2-1, Difficulty: Moderate, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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48. Assume you are planning a spring break ski trip to Colorado. You are preparing a budget of your costs. You are staying at a lodge that has a special where the lodge charges you $80 per week for the ski lift regardless of how many times you ride. You believe you will ride the ski lift 40 times during the week. The ski lift cost is an example of a
    a. fixed cost.
    b. variable cost.
    c. mixed cost.
    d. step cost.

Ans: A, LO: 1, Bloom: AP, Unit: 2-1, Difficulty: Moderate, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

49. Assume you are planning a spring break ski trip to Colorado. You are preparing a budget of your costs. You are staying at a lodge that has a special where the lodge charges you $25 for the first 30 ski lift rides and an additional charge of $5 for each ride in excess of 30. You believe you will ride the ski lift 40 times during the week, so you budget $75. The ski lift cost is an example of a
    a. fixed cost.
    b. variable cost.
    c. mixed cost.
    d. step cost.

Ans: C, LO: 1, Bloom: AP, Unit: 2-1, Difficulty: Moderate, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

50. Assume you are planning a spring break ski trip to Colorado. You plan to stay at a lodge that has a special where the lodge charges you a flat fee of $25 for each package of ten ski lift rides.. You believe you will ride the ski lift 40 times during the week, so you budget $100. The ski lift charge is an example of a
    a. fixed cost.
    b. variable cost.
    c. mixed cost.
    d. step cost.

Ans: D, LO: 1, Bloom: AP, Unit: 2-1, Difficulty: Moderate, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

51. Any cost that varies in proportion to a business activity is a
    a. fixed cost.
    b. variable cost.
    c. mixed cost.
    d. step cost.

Ans: B, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min:1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

52. An example of a variable cost for a cell phone manufacturer is
    a. units sold.
    b. the total costs of all cell phone produced.
    c. minutes talked.
    d. touch screens used in production.

Ans: D, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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53. As the level of activity increases, the total variable cost
    a. increases proportionally.
    b. changes inversely.
    c. changes conversely.
    d. remains the same.

Ans: A, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min:1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

54. A characteristic of a variable cost is that the
    a. total cost varies in proportion to changes in the level of activity.
    b. cost per unit increases as activity increases.
    c. total cost varies indirectly with the level of activity.
    d. the total cost remains constant, regardless of the level of activity.

Ans: A, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

55. A 10 percent increase in sales volume will result in a
    a. 10 percent decrease in total variable cost.
    b. 10 percent decrease in unit variable cost.
    c. 10 percent increase in total variable cost.
    d. 10 percent increase in unit variable cost.

Ans: C, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting AICPA PC: None, IMA: Reporting

56. A 10 percent increase in sales volume will result in
    a. a 10 percent decrease in per unit fixed cost.
    b. a 10 percent increase in total fixed cost.
    c. a 10 percent increase in per unit fixed cost.
    d. no change in total fixed cost.

Ans: D, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

57. A 10 percent decrease in sales volume will result in a
    a. 10 percent decrease in total variable cost.
    b. 10 percent decrease in per unit variable cost.
    c. 10 percent increase in total variable cost.
    d. 10 percent increase in per unit variable cost.

Ans: A, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: Decision Making, IMA: Cost Management

58. In contrast to a variable cost,
    a. the total amount of a fixed cost does not change with activity level.
    b. the total amount of a fixed cost increases as activity increases.
    c. the per unit amount of a fixed cost does not change with activity level.
    d. the per unit amount of a fixed cost increases as activity increases.

Ans: A, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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59. Which of the following is a characteristic of a fixed cost?
    a. The total cost remains constant, regardless of changes in the level of activity.
    b. The cost per unit varies proportionately with changes in the level of activity.
    c. The total cost varies when activity changes during the period.
    d. The unit and total costs remain constant.

Ans: A, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

60. You and two friends decide to rent an apartment off campus. You have found an apartment for $750 per month. You and your two friends will share the rent equally. This is an example of a
    a. fixed cost.
    b. variable cost.
    c. mixed cost.
    d. step cost.

Ans: A, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 2, Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

61. You are living on campus and are considering moving off campus. You have found a two-bedroom apartment for $1,200 per month, but you cannot afford that much rent. You are considering inviting up to three of your friends to become your roommates. The relationship between the number of roommates, the total cost, and the cost per person is:

Number of Roommates	Total Cost	Cost per Person
1	$1,200	$1,200
2	1,200	600
3	1,200	400
4	1,200	300

    This is an example of a
    a. fixed cost.
    b. variable cost.
    c. mixed cost.
    d. step cost.

Ans: A, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 2, Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

62. You are considering moving off campus. You have found a one-bedroom apartment very near campus that is clean and safe. However, you do not want to live alone. A one-bedroom apartment is roomy enough to have one or two roommates. The manager discourages having more than one individual in an apartment and so charges rent per person. The relationship between the number of roommates, the total cost, and the cost per person is:

Number of Roommates	Total Cost	Cost per Person
1	$ 600	$600
2	1,200	600
3	1,800	600

    This is an example of a
    a. fixed cost.
    b. variable cost.
    c. mixed cost.
    d. step cost.

Ans: B, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 3, Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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63. A discretionary fixed cost
    a. remains the same per unit regardless of the level of activity.
    b. increases as the level of activity increases.
    c. can be changed in the short run.
    d. can be changed over the long run.

Ans: C, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min:1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

64. An example of a committed fixed cost for a clothing manufacturer is
    a. an annual contract for television advertising costs.
    b. a 10-year lease on an office building.
    c. yards of fabric used.
    d. thread used.

Ans: B, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

65. An example of a discretionary fixed cost for a clothing manufacturer is
    a. an annual contract for television advertising cost.
    b. a 10-year lease on an office building.
    c. yards of fabrics used.
    d. thread used.

Ans: A, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

66. Suppose your cell phone company offers a plan under which you can buy time in blocks of 100 minutes. Every 100-minute block costs $15. If you use 101 minutes you will pay $30. This is an example of a
    a. variable cost
    b. mixed cost.
    c. fixed cost.
    d. step cost.

Ans: D, LO: 1, Bloom: AP, Unit: 2-1, Difficulty: Moderate, Min: 2, Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

67. Suppose your cell phone company offers a plan under which you buy time per minute. A one-minute call costs you $0.10. If you talk 100 minutes it costs you $10. This is an example of a
    a. variable cost
    b. mixed cost.
    c. fixed cost.
    d. step cost.

Ans: A, LO: 1, Bloom: AP, Unit: 2-1, Difficulty: Moderate, Min: 2, Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

68. Suppose your cell phone company offers a plan under which you pay $15 for a 100-minute block. For each minute over 100 minutes you have to pay $0.10 per minute. This is an example of a
    a. variable cost
    b. mixed cost.
    c. fixed cost.
    d. step cost.

Ans: B, LO: 1, Bloom: AP, Unit: 2-1, Difficulty: Moderate, Min: 2, Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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69. Which of the following is a true statement relating to step costs?
    a. Step costs remain constant over only a small range of activity.
    b. Step costs do not contain a fixed component.
    c. Step costs are also referred to as fixed costs.
    d. Step costs do not vary proportionately over a small range of activity.

Ans: A, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

70. Step costs are fixed over only a small range of activity. Once that level of activity has been exceeded, total cost
    a. increases because the excess costs become variable.
    b. increases and remains constant over another small range of activity.
    c. remains the same regardless of activity.
    d. decreases and remains constant over another small range of activity.

Ans: B, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

71. Some costs have both a fixed and a variable component. These costs are referred to as
    a. discretionary costs.
    b. committed costs.
    c. mixed costs.
    d. step costs.

Ans: C, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min:1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

72. Since a mixed cost has both a fixed and a variable component,
    a. neither total cost nor unit cost will vary with changes in the level of activity.
    b. total cost will vary with changes in the level of activity, but unit cost will not.
    c. unit cost will vary with changes in the level of activity, but total cost will not.
    d. both the total cost and the unit cost will vary with changes in the level of activity.

Ans: D, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

73. Suppose you are charged a $10 per month base charge for your electrical service. You are also charged an additional $0.08 for every kwh of electricity you use. The cost is an example of a
    a. variable cost.
    b. fixed cost.
    c. mixed cost.
    d. step cost.

Ans: C, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 1, Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

74. Suppose you are charged a $10 per month base charge for your electrical service. You are also charged an additional $0.08 for every kwh of electricity you use. Which one of the following statements is **not** true?
    a. The $10 base charge is a fixed cost.
    b. The $0.08 charge per kwh is a variable cost.
    c. The total cost is an example of a step cost.
    d. The total cost is an example of a mixed cost.

Ans: C, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 2, Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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75. The formula, Electricity cost = $10 + ($0.08 × kwh used) is the formula for a
    a. mixed cost.
    b. fixed cost.
    c. step cost.
    d. variable cost.

Ans: A, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 2, Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

76. Mounce Corporation leases a color copier for a monthly fee of $75 plus a charge of $0.02 per copy. Mounce's copy cost is classified as a
    a. variable cost.
    b. fixed cost.
    c. step variable cost.
    d. mixed cost.

Ans: D, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 2, Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

77. Mike Mounts has a membership at the Marigold Men's Fitness Club. The membership costs $30 per month regardless of how many times the facility is used. The membership cost is classified as a
    a. variable cost.
    b. fixed cost.
    c. step variable cost.
    d. mixed cost.

Ans: B, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 2, Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

78. Which of the following is **not** an example of a variable cost for a manufacturer of bicycles?
    a. Number of tires
    b. Gallons of paint
    c. Wages for factory workers
    d. President of the company's salary

Ans: D, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 2, Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

79. Which of the following is **not** an example of a fixed cost for manufacturer of bicycles?
    a. Rent on factory warehouse
    b. Insurance on factory equipment
    c. Number of tires
    d. Advertising costs

Ans: C, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 2, Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

80. An example of a committed fixed cost is
    a. advertising.
    b. lease on warehouse space.
    c. sales commissions.
    d. number of bolts used.

Ans: B, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 2, Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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81. An example of a discretionary fixed cost is
    a. research and development costs.
    b. lease on warehouse space.
    c. sales commissions.
    d. number of bolts used.

Ans: A, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 2, Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

82. International Imports is a merchandising firm. Last year, the company reported sales of $674,500 and cost of goods sold of $404,700. The company's total variable selling and administrative expense was $60,705, and fixed selling and administrative expense was $53,960. The total variable costs for the firm are
    a. $60,705.
    b. $114,665.
    c. $404,700.
    d. $465,405.

Ans: D, LO: 1, Bloom: AP, Unit: 2-1, Difficulty: Moderate, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting, Solution: Cost of Goods Sold + Variable Selling and Administrative Expense = $404,700 + $60,705 = $465,405

83. International Imports is a merchandising firm. Last year, the company reported sales of $674,500 and cost of goods sold of $404,700. The company's total variable selling and administrative expense was $60,705, and fixed selling and administrative expense was $53,960. The total fixed costs for the firm are
    a. $458,660.
    b. $404,700.
    c. $60,705.
    d. $53,960.

Ans: D, LO: 1, Bloom: AP, Unit: 2-1, Difficulty: Moderate, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting, Solution: Only the fixed selling and administrative expense is a fixed cost.

84. Georgiana operates a nail salon. She is trying to plan her costs for the next month and is uncertain of how to estimate those costs. Help her estimate next month's costs given the following information she collected, based on number of customers per month.

	Number of Customers			
	1,300	1,800	1,500	1,200
Nail supplies	$4,030	$5,580	$4,650	$3,720
Equipment Rental	2,200	2,200	2,200	2,200
Electricity	274	364	310	256
Total	$6,504	$8,144	$7,160	$6,176

If Georgiana estimates 1,400 customers next month, what is the estimated cost for nail supplies?
    a. $4,030
    b. $4,340
    c. $4,650
    d. $3,720

Ans: B, LO: 1, Bloom: AP, Unit: 2-1, Difficulty: Moderate, Min: 3, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting
Solution: ($5,580 – $3,720) ÷ (1,800 – 1,200) = $1,860 ÷ 600 = $3.10 variable cost per customer
Per Georgiana's estimate: $3.10 × 1,400 = $4,340

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85. Jenny's Cutting Station offers a new concept in haircuts; low cost and very quick. Set in a local mall, Jenny's offers 15-minute haircuts with a shampoo for harried shoppers who do not have time for lengthy appointments. To ensure that the clients are in and out quickly, Jenny schedules her 5 employees based on expected client traffic. Each of the employees is paid $1,200 per month, with part of their pay coming from client tips. Jenny pays rent and overhead costs of $2,000 per month for the facility. Because of the quick nature of the service, Jenny doesn't have time to clean combs in between clients, so she uses a new comb for each customer, at a cost of $0.55 each. She also provides shampoo and conditioner for each client at a cost of $0.95 per client. The average price for a haircut is $12. Jenny pays herself $5,000 per month. What are Jenny's fixed costs for the month?
    a. $9,200
    b. $13,000
    c. $11,000
    d. $8,000

Ans: B, LO: 1, Bloom: AP, Unit: 2-1, Difficulty: Moderate, Min: 3, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting, Solution: ($1,200 × 5) + $2,000 + $5,000 = $13,000

86. Total cost is a combination of fixed and variable costs. The algebraic equation, where T = total costs, v = variable costs, x = units produced, and f = fixed costs, for total cost is
    a. T = v(x) + f.
    b. T = v + f.
    c. T = v(x) – f.
    d. T = f(x) + v.

Ans: A, LO: 2, Bloom: AP, Unit: 2-2, Difficulty: Moderate, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

87. Which of the following is **not** a method of estimating costs?
    a. Scattergraphs
    b. Bar charts
    c. The high-low method
    d. Regression analysis

Ans: B, LO: 2, Bloom: K, Unit: 2-2, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

88. Which of the following is a method of estimating costs?
    a. Break-even analysis
    b. Bar charts
    c. Financial analysis
    d. The high low method

Ans: D, LO: 2, Bloom: K, Unit: 2-2, Difficulty: Easy, Min:1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

89. Which of the following is the simplest method for estimating the fixed and variable components of a mixed cost?
    a. Regression analysis
    b. Scattergraphs
    c. The high-low method
    d. Break-even analysis

Ans: B, LO: 2, Bloom: K, Unit: 2-2, Difficulty: Easy, Min:1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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90. A scattergraph is a simple graph that shows
    a. total costs in relation to volume.
    b. the fixed portion of a total cost.
    c. the variable portion of a total cost.
    d. the point where revenue equals total costs.

Ans: A, LO: 2, Bloom: C, Unit: 2-2, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

91. On a scattergraph, once the individual points have been plotted,
    a. enter the information into a statistical calculator to calculate the total cost.
    b. count the points and divide by variable cost per unit.
    c. draw a line through the points to estimate the cost relationship.
    d. multiply the high point by the variable cost per unit to calculate the total cost.

Ans: C, LO: 2, Bloom: C, Unit: 2-2, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

92. On a scattergraph, you must "fit" a line to the plotted points. Once the line is drawn,
    a. calculate the fixed and variable costs using basic algebra.
    b. use a statistical technique to identify the fixed and variable costs.
    c. choose more than one point to calculate the fixed and variable costs.
    d. use regression analysis to calculate the fixed and variable components of the total cost.

Ans: A, LO: 2, Bloom: C, Unit: 2-2, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

93. Assume a scattergraph shows $500 at no activity and $2,500 at an activity level of 1,000 units. The variable cost per unit is
    a. $2.00.
    b. $1.40.
    c. $2.50.
    d. $5.00.

Ans: A, LO: 2, Bloom: AP, Unit: 2-2, Difficulty: Moderate, Min: 3, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting
Solution: ($2,500 – $500) ÷ (1,000 – 0) = $2.00

94. Assume a scattergraph shows $100 at no activity and $1,500 at an activity level of 1,000 units. The variable cost per unit is
    a. $2.00.
    b. $1.40.
    c. $2.50.
    d. $5.00.

Ans: B, LO: 2, Bloom: AP, Unit: 2-2, Difficulty: Moderate, Min: 3, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting
Solution: ($1,500 – $100) ÷ (1,000 – 0) = $1.40

95. A limitation of using the scattergraph method to estimate the cost components of total cost is the
    a. scattergraph method is complex and costly to use.
    b. scattergraph method requires the use of statistical software.
    c. scattergraph method is not an accepted method for many companies.
    d. choice of the line used to estimate the cost components is subjective.

Ans: D, LO: 2, Bloom: C, Unit: 2-2, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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96. The high-low method differs from the scattergraph in that the high-low method
    a. is simple to prepare and interpret whereas the scattergraph requires the use of statistical methods.
    b. is less costly than the scattergraph method.
    c. uses a statistical technique to estimate the cost components.
    d. requires only two data points – the lowest point of activity and the highest point of activity.

Ans: D, LO: 2, Bloom: C, Unit: 2-2, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

97. Which of the following is **not** a step in estimating total cost using the high-low method?
    a. Identify the highest and lowest levels of activity.
    b. Visually "fit" a line to the plotted points.
    c. Compute the variable cost per unit.
    d. Calculate the fixed cost using either the high point or the low point.

Ans: B, LO: 2, Bloom: K, Unit: 2-2, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

98. Determine the fixed cost given the following information:
    Highest level of activity – 880 units at a total cost of $4,800
    Lowest level of activity – 240 units at a total cost of $1,600
    a. $229
    b. $400
    c. $2,600
    d. $3,200

Ans: B, LO: 2, Bloom: AP, Unit: 2-2, Difficulty: Moderate, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting
Solution: ($4,800 – $1,600) ÷ (880 – 240) = $5 VC; $4,800 − (880 × $5) = $400 fixed cost

99. Determine the fixed cost given the following information:
    Lowest level of activity – 200 units at a total cost of $600
    Highest level of activity – 800 units at a total cost of $1,800
    a. $200
    b. $360
    c. $480
    d. $600

Ans: A, LO: 2, Bloom: AP, Unit: 2-2, Difficulty: Moderate, Min:2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting
Solution: ($1,800 – $600) ÷ (800 – 200) = $2 VC; $1,800 − (800 × $2) = $200 FC

100. A limitation of the high-low method is that
    a. it is costly to use because it uses a statistical technique to estimate the cost components.
    b. it is complex to calculate.
    c. it can only be used if the levels of activity cover a wide range.
    d. because it is based on only two extreme points, the high and low activity levels, the cost equation may not be truly representative of the cost relationship.

Ans: D, LO: 2, Bloom: C, Unit: 2-2, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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101. An advantage of using regression analysis over the high-low and scattergraph methods is that regression analysis
   a. is less costly to implement than high-low or scattergraph methods.
   b. is a more precise approach than the high-low or scattergraph methods.
   c. uses fewer data points.
   d. determines the breakeven point.

Ans: B, LO: 2, Bloom: K, Unit: 2-2, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

102. A statistical technique that identifies the line of best fit for the points plotted in a scattergraph is called
   a. regression analysis.
   b. break-even analysis.
   c. high-low method.
   d. ERP.

Ans: A, LO: 2, Bloom: K, Unit: 2-2, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

103. Cost behaviors and estimates are valid only within the normal level of operating activity. This range is referred to as the
   a. normal range.
   b. activity range.
   c. relevant range.
   d. cost range.

Ans: C, LO: 2, Bloom: K, Unit: 2-2, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

104. Children's World Toy Shop is an online toy store specializing in hand-made stuffed animals. Children's World sold 4,000 Donny the Dragon stuffed toys during April and 6,000 during May. Shipping costs for the two months were $12,000 and $16,800 respectively. Using these two months' data, the shipping cost function is best estimated as
   a. ($2 × number of toys sold) + $70,000
   b. ($2.40 × number of toys sold) + $2,400
   c. ($3 × number of toys sold) + $2,880
   d. ($0.50 × number of toys sold) + $10,000

Ans: B, LO: 2, Bloom: AP, Unit: 2-2, Difficulty: Moderate, Min: 3, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting,
Solution: Variable cost per unit = ($16,800 – 12,000) ÷ (6,000 – 4,000) = $2.40; Total fixed costs = (6,000 × $2.40) – $16,800 = $2,400

105. Chocolate Delight sells chocolate-dipped fruit to local restaurants. Chocolate Delight delivered 30,000 chocolate dipped strawberries to customers in May and 24,000 in June. Delivery costs for the two months were $1,500 and $1,200, respectively. Using these two months' data, the delivery cost function is best estimated as
   a. ($2.00 × number of strawberries) + $800
   b. ($0.02 × number of strawberries) + $900
   c. ($0.05 × number of strawberries) + $0
   d. ($0.05 × number of strawberries) + $600

Ans: C, LO: 2, Bloom: AP, Unit: 2-2, Difficulty: Moderate, Min: 3, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting,
Solution: ($1,500 – $1,200) ÷ (30,000 – 24,000) = $0.05; ($.05 × 30,000) – $1,500 = $0

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106. Georgiana operates a nail salon. She is trying to plan her costs for the next month and is uncertain as to how to estimate those costs. Help her estimate next month's costs given the following information she collected, based on number of customers per month.

	Number of Customers			
	1,300	1,800	1,500	1,200
Nail supplies	$4,030	$5,580	$4,650	$3,720
Equipment rental	2,200	2,200	2,200	2,200
Electricity	274	364	310	256
Total	$6,504	$8,144	$7,160	$6,176

Georgiana wants to know what her total costs would be if she estimates 1,450 customers next month.

a. $2,240
b. $6,832
c. $6,996
d. $4,756

Ans: C, LO: 2, Bloom: AP, Unit: 2-2, Difficulty: Moderate, Min: 3, AACSB: AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting,
Solution: ($8,144 – $6,176) ÷ (1,800 – 1,200) = $1,968 ÷ 600 = $3.28 variable cost per customer;
$8,144 = ($3.28 × 1,800) + FC = $8,144 - $5,904 = $2,240; Total costs = ($3.28 × 1,450) + $2,240 = $6,996

107. Georgiana operates a nail salon. She is trying to plan her costs for the next month and is uncertain as to how to estimate those costs. Help her estimate next month's costs given the following information she collected, based on number of customers per month.

	Number of Customers			
	1,300	1,800	1,500	1,200
Nail supplies	$4,030	$5,580	4,650	3,720
Equipment Rental	2,200	2,200	2,200	2,200
Electricity	274	364	310	256
Total	$6,504	$8,144	$7,160	$6,176

If Georgiana believes next month is going to be busier than the last few months and she expects 1,850 customers (relevant range is 1,000 to 2,000 customers per month), what is the expected cost for electricity?

a. $390
b. $378
c. $410
d. $373

Ans: D, LO: 2, Bloom: AP, Unit: 2-2, Difficulty: Moderate, Min: 3, AACSB: AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting,
Solution: ($364 –$256) ÷ (1,800 – 1,200) = $0.18 variable cost per customer. $364 = ($0.18 × 1,800) + FC, Fixed Cost = $40; Total cost = ($0.18 × 1,850) + $40 = $373

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108. Dana owns her own real estate agency. She has been working hard to increase her client base. She offers the most comprehensive advertising campaign in the city and it has been paying off by the steady increase in the number of listings over the last several months. However, Dana is concerned that her extensive cost for advertising is eating into her profits. It is difficult to determine how much she spends on advertising for each listing because some of her advertising sources are fixed amounts each month and others are more variable in nature. She would like to analyze the following information to determine how her advertising costs behave based on the number of listings.

Month	Number of Listings	Advertising Cost
March	22	$15,280
April	26	17,640
May	35	23,145
June	42	27,205
July	48	30,565
August	51	32,485
September	50	31,835
October	56	36,020
November	54	34,920

Using the high-low method, what is Dana's variable cost per listing for advertising?

a. $610
b. $593
c. $612
d. $598

Ans: A, LO: 2, Bloom: AP, Unit: 2-2, Difficulty: Moderate, Min: 3, AACSB: AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting,
Solution: ($36,020 – $15,280) ÷ (56 – 22) = $610 variable cost per listing

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109. Dana owns her own real estate agency. She has been working hard to increase her client base. She offers the most comprehensive advertising campaign in the city and it has been paying off by the steady increase in the number of listings over the last several months. However, Dana is concerned that her extensive cost for advertising is eating into her profits. It is difficult to determine how much she spends on advertising for each listing because some of her advertising sources are fixed amounts each month and others are more variable in nature. She would like to analyze the following information to determine how her advertising costs behave based on the number of listings.

Month	Number of Listings	Advertising Cost
March	22	$15,280
April	26	17,640
May	35	23,145
June	42	27,205
July	48	30,565
August	51	32,485
September	50	31,835
October	56	36,020
November	54	34,920

Using the high-low method, what is the fixed cost of advertising each month?

a. $2,360
b. $2,074
c. $2,900
d. $1,860

Ans: D, LO: 2, Bloom: AP, Unit: 2-2, Difficulty: Moderate, Min: 3, AACSB: AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting,
Solution: ($36,020 – $15,280) ÷ (56 – 22) = $610 variable cost per listing; $36,020 = ($610 × 56) + FC; Fixed Cost = $36,020 – $34,160 = $1,860

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110. Dana owns her own real estate agency. She has been working hard to increase her client base. She offers the most comprehensive advertising campaign in the city and it has been paying off by the steady increase in the number of listings over the last several months. However, Dana is concerned that her extensive cost for advertising is eating into her profits. It is difficult to determine how much she spends on advertising for each listing because some of her advertising sources are fixed amounts each month and others are more variable in nature. She would like to analyze the following information to determine how her advertising costs behave based on the number of listings.

Month	Number of Listings	Advertising Cost
March	22	$15,280
April	26	17,640
May	35	23,145
June	42	27,205
July	48	30,565
August	51	32,485
September	50	31,835
October	56	36,020
November	54	34,920

If Dana believes she will have 52 listings in December, what is her expected cost for advertising?

a. $34,310
b. $33,378
c. $33,580
d. $35,470

Ans: C, LO: 2, Bloom: AP, Unit: 2-2, Difficulty: Moderate, Min: 3, AACSB: AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting,
Solution: ($36,020 – $15,280) ÷ (56 – 22) = $610 variable cost per listing; $36,020 = ($610 × 56) + FC, Fixed Cost = $36,020 – $34,160; Fixed Cost = $1,860, Expected advertising cost = ($610 × 52) + $1,860 = $33,580

111. If an organization wants to make a profit, it must generate more sales revenue than the total costs it incurs. This relation can be expressed using which of the following profit equations?

a. Operating income = [(Sales price per unit – Variable cost per unit) × # units sold] – Fixed cost
b. Operating income = [Sales price per unit – Fixed cost per unit) × # units produced] – Variable cost
c. Operating income = Sales revenue – Total variable costs – Discretionary costs
d. Operating income = Sales revenue – Committed costs – Fixed costs

Ans: A, LO: 3, Bloom: K, Unit: 2-3, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

112. If an organization wants to make a profit, it must generate more sales revenue than the total costs it incurs. Which of the following is **not** a correct expression of the profit equation?

a. Operating income = Sales revenue – Total variable costs – Total fixed costs
b. Operating income = Sales revenue – Discretionary costs – Fixed costs
c. Operating income = [(Sales price per unit – Variable cost per unit) × # units sold] – Fixed cost
d. Operating income = [Contribution margin per unit × # units sold] – Fixed costs

Ans: B, LO: 3, Bloom: C, Unit: 2-3, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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113. If an organization wants to make a profit, it must generate more sales revenue than the total costs it incurs. This relation can be expressed using which of the following profit equations?
   a. Operating income = [Sales price per unit – Fixed cost per unit) × # units produced] – Variable cost
   b. Operating income = [Contribution margin per unit × # units sold] – Fixed costs
   c. Operating income = Sales revenue – Total variable costs – Committed costs
   d. Operating income = Sales revenue – Product costs – Discretionary costs

Ans: B, LO: 3, Bloom: C, Unit: 2-3, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

114. There is an important relationship between contribution margin and profit. Which of the following statements is **not** true?
   a. As the number of units sold increases, total contribution margin increases, but fixed costs remain the same.
   b. As the number of units sold rises, profit increases by the additional contribution margin per unit.
   c. As the number of units sold increases, total contribution margin and fixed costs increase.
   d. As the number of units sold decreases, total contribution margin decreases, but fixed costs remain the same.

Ans: C, LO: 3, Bloom: AN, Unit: 2-3, Difficulty: Moderate, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

115. There is an important relation between contribution margin and profit. Which of the following statements is **not** true?
   a. As the number of units sold rises, profit increases by the variable cost per unit.
   b. As the number of units sold increases, total contribution margin increases, but fixed costs remain the same.
   c. As the number of units sold rises, profit increases by the additional contribution margin per unit.
   d. As the number of units sold decreases, total contribution margin decreases, but fixed costs remain the same.

Ans: A, LO: 3, Bloom: AN, Unit: 2-3, Difficulty: Moderate, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

116. There is an important relation between contribution margin and profit. Which of the following statements is **not** true?
   a. As the number of units sold increases, total contribution margin increases, but fixed costs remain the same.
   b. As the number of units sold rises, profit increases by the additional contribution margin per unit.
   c. As the number of units sold decreases, total contribution margin decreases, but fixed costs remain the same.
   d. As the number of units sold falls, profit increases by the additional contribution margin per unit.

Ans: D, LO: 3, Bloom: AN, Unit: 2-3, Difficulty: Moderate, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

117. The formula for the contribution margin ratio is
   a. contribution margin divided by sales.
   b. contribution margin divided by net income.
   c. contribution margin divided by gross profit.
   d. contribution margin divided by (sales less variable costs).

Ans: A, LO: 3, Bloom: K, Unit: 2-3, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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118. The contribution margin ratio can be used to
    a. determine the increase in profits from a given dollar increase in sales revenue.
    b. determine the impact of fixed costs on contribution margin.
    c. estimate the behavior of fixed cost.
    d. determine an increase in fixed costs due to an increase in sales volume.

Ans: A, LO: 3, Bloom: K, Unit: 2-3, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

119. Pam's Puppy Parlor is a pet grooming parlor and boutique. Pam sells personalized puppy blankets at $20 each. Her contribution margin is $5. If Pam has an additional $100 in blanket sales, how much will her profit increase?
    a. $5
    b. $25
    c. $50
    d. $100

Ans: B, LO: 3, Bloom: AP, Unit: 2-3, Difficulty: Moderate, Min: 3, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting,
Solution: $100 ÷ $20 = 5 additional units × $5 unit contribution margin = $25

120. Pam's Puppy Parlor is a pet grooming parlor and boutique. Pam sells personalized puppy blankets at $20 each. Her contribution margin is $5. If Pam has an additional $80 in blanket sales, how much additional contribution margin will this produce?
    a. $4
    b. $20
    c. $80
    d. $100

Ans: B, LO: 3, Bloom: AP, Unit: 2-3, Difficulty: Moderate, Min: 3, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting,
Solution: $80 ÷ $20 = 4 additional units x $5 contribution margin = $20

121. If selling price is $100 per unit, variable cost is $70 per unit, and fixed cost is $200, calculate the contribution margin ratio.
    a. 14%
    b. 30%
    c. 200%
    d. 50%

Ans: B, LO: 3, Bloom: AP, Unit: 2-3, Difficulty: Moderate, Min: 3, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting,
Solution: ($100 −$70) ÷ $100 = 30%

122. A traditional GAAP income statement does **not** help managers predict the financial results of their decisions. Which of the following is a reason for this shortcoming?
    a. The GAAP statement is based on cost function rather than cost behavior.
    b. The GAAP statement is based on classification rather than function.
    c. The GAAP statement is based on cost behavior rather than cost function.
    d. The GAAP statement is based on function rather than classification.

Ans: A, Unit 2-3, LO: 3, Bloom: C, Unit: 2-3, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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123. A traditional GAAP income statement does **not** help managers predict the financial results of their decisions because the format of the statement is based on cost function rather than cost behavior. Which of the following is not classified as a cost function?
   a. Product
   b. Sales
   c. Administration
   d. Variable

Ans: D, LO: 3, Bloom: C, Unit: 2-3, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

124. A traditional GAAP income statement does **not** help managers predict the financial results of their decisions because the format of the statement is based on cost function rather than cost behavior. Which of the following is not classified as a cost behavior?
   a. Product
   b. Fixed
   c. Variable
   d. Fixed and Variable

Ans: A, LO: 3, Bloom: C, Unit: 2-3, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

125. A contribution format income statement classifies costs by
   a. behavior.
   b. function.
   c. constraints.
   d. product.

Ans: A, LO: 3, Bloom: K, Unit: 2-3, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

126. A contribution format income statement allows a manager to
   a. assess the impact of product costs on net profit.
   b. assess the impact of sales volume on gross margin.
   c. assess the impact of sales volume on operating income.
   d. assess the impact of profit margin on product costs.

Ans: C, LO: 3, Bloom: K, Unit: 2-3, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

127. A contribution margin format income statement
   a. is based on cost function rather than on cost behavior.
   b. allows managers to assess the impact of sales volume on operating income.
   c. is acceptable for GAAP reporting.
   d. classifies costs as committed or discretionary.

Ans: B, LO: 3, Bloom: C, Unit: 2-3, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

128. The formula for a contribution format income statement is
   a. Sales revenue – Step costs = Contribution margin – Fixed costs = Operating income.
   b. Sales revenue – Cost of goods sold – Discretionary costs = Operating income.
   c. Sales revenue – Discretionary costs = Gross profit – Committed costs = Operating income.
   d. Sales revenue – Variable costs = Contribution margin – Fixed costs = Operating income.

Ans: D, LO: 3, Bloom: K, Unit: 2-3, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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129. Assume sales of $10,000, variable costs of $7,000, and fixed costs of $2,000. Calculate contribution margin and operating income.
    a. Contribution margin = $3,000; Operating income = $1,000
    b. Contribution margin = $5,000; Operating income =$1,000
    c. Contribution margin = $8,000; Operating income = $1,000
    d. Contribution margin = $6,000; Operating income = $1,000

Ans: A, LO: 3, Bloom: AP, Unit: 2-3, Difficulty: Moderate, Min: 3, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting,
Solution: $10,000 – $7,000 = $3,000 contribution margin; $10,000 – $7,000 – $2,000 = $1,000 operating income

130. A contribution margin format income statement presents all costs by
    a. behavior rather than by function.
    b. function rather than behavior.
    c. cost classification rather than behavior.
    d. category rather than behavior.

Ans: A, LO: 3, Bloom: K, Unit: 2-3, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

131. The contribution margin is calculated as
    a. sales revenue less cost of goods sold.
    b. sales revenue less discretionary costs.
    c. sales revenue less committed costs.
    d. sales revenue less total variable costs.

Ans: D, LO: 3, Bloom: K, Unit: 2-3, Difficulty: Easy, Min: 1, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

132. A company's sales and production levels are the same. The amount of income presented on a contribution margin format income statement
    a. will always be greater than that shown on a traditional GAAP income statement.
    b. will always be less than that shown on a traditional GAAP income statement.
    c. will always be the same as that shown on a traditional GAAP income statement.
    d. will not differ from that shown on a traditional GAAP income statement regardless of the level of production and sales.

Ans: C, LO: 3, Bloom: C, Unit: 2-3, Difficulty: Easy, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

133. Mounce's Market operates with a 20% contribution margin. If Mounce's sales decrease by $10,000, operating income will decrease by
    a. $200.
    b. $250.
    c. $2,000.
    d. $2,500.

Ans: C, LO: 3, Bloom: AP, Unit: 2-3, Difficulty: Moderate, Min: 3, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting, Solution: 20% × $10,000 = $2,000

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134. Jenny's Cutting Station offers a new concept in haircuts; low cost and very quick. Set in a local mall, Jenny's offers 15-minute haircuts for harried shoppers who do not have time for lengthy appointments. To ensure that the clients are in and out quickly, she schedules her 5 employees based on expected client traffic. Each of the employees is paid $1,200 per month, with part of their pay coming from client tips. Jenny pays rent and overhead costs of $2,000 per month on the facility. Because of the quick nature of the service, Jenny doesn't have time to clean combs in between clients, so she uses a new comb for each customer, at a cost of $0.55 each. She also provides shampoo and conditioner for each client at a cost of $0.95 per client. The average price for a haircut is $12. Jenny pays herself $5,000 per month. What is Jenny's contribution margin per haircut?
    a. $11.45
    b. $10.50
    c. $11.05
    d. $10.20

Ans: B, LO: 3, Bloom: AP, Unit: 2-3, Difficulty: Moderate, Min: 3, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting,
Solution: $12.00 – ($0.95 + $0.55) = $10.50

135. Jenny's Cutting Station is a new concept in haircuts; low cost and very quick. Set in a local mall, Jenny's offers 15-minute haircuts for harried shoppers who do not have time for lengthy appointments. To ensure that the clients are in and out quickly, she schedules her 5 employees based on expected client traffic. Each of the employees is paid $1,200 per month, with part of their pay coming from client tips. Jenny pays rent and overhead costs of $2,000 per month. Because of the quick nature of the service, Jenny doesn't have time to clean combs in between clients, so she uses a new comb for each customer, at a cost of $0.55 each. She also provides shampoo and conditioner for each client at a cost of $0.95 per client. The average price for a haircut is $12. Jenny pays herself $5,000 per month. What is Jenny's contribution margin ratio?
    a. 12.5%
    b. 83.5%
    c. 87.5%
    d. 8.3%

Ans: C, LO: 3, Bloom: AP, Unit: 2-3, Difficulty: Moderate, Min: 4, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting,
Solution: $12.00 – ($0.95 + $0.55) = $10.50; $10.50 ÷ $12.00 = 87.5%

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136. Jenny's Cutting Station offers a new concept in haircuts; low cost and very quick. Set in a local mall, Jenny's offers 15-minute haircuts for harried shoppers who do not have time for lengthy appointments. To ensure that the clients are in and out quickly, she schedules her 5 employees based on expected client traffic. Each of the employees is paid $1,200 per month, with part of their pay coming from client tips. Jenny pays rent and overhead costs of $2,000 per month. Because of the quick nature of the service, Jenny doesn't have time to clean combs in between clients, so she uses a new comb for each customer, at a cost of $0.55 each. She also provides shampoo and conditioner for each client at a cost of $0.95 per client. The average price for a haircut is $12. Jenny pays herself $5,000 per month. Calculate Jenny's net operating income assuming 1,400 haircuts this month.
    a. $1,700
    b. $3,800
    c. $6,500
    d. $2,900

Ans: A, LO: 3, Bloom: AP, Unit: 2-3, Difficulty: Moderate, Min: 3-4, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting, Solution: ($12.00 – ($0.95 + $0.55) × 1,400) = $14,700; $14,700 – ((5 × $1,200) + $2,000 + $13,000 = $1,700

137. International Imports is a merchandising firm. Last year they reported sales of $674,500 and cost of goods sold of $404,700. The company's total variable selling and administrative expense was $60,705, and fixed selling and administrative expense was $53,960. The total contribution margin for the firm is
    a. $209,095.
    b. $613,795.
    c. $559,835.
    d. $215,840.

Ans: A, LO: 3, Bloom: AP, Unit: 2-3, Difficulty: Moderate, Min: 3, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting,
Solution: $674,500 – $404,700 – $60,705 = $209,095

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Answers to Multiple Choice Questions

Item	Ans	Item	Ans	Item	Ans	Item	Ans	Item	Ans
33.	A	55.	C	77.	B	99.	A	121.	B
34.	B	56.	D	78.	D	100.	D	122.	A
35.	C	57.	A	79.	C	101.	B	123.	D
36.	A	58.	A	80.	B	102.	A	124.	A
37.	C	59.	A	81.	A	103.	C	125.	A
38.	A	60.	A	82.	D	104.	B	126.	C
39.	A	61.	A	83.	D	105.	C	127.	B
40.	B	62.	B	84.	B	106.	C	128.	D
41.	A	63.	C	85.	B	107.	D	129.	A
42.	A	64.	B	86.	A	108.	A	130.	A
43.	C	65.	A	87.	B	109.	D	131.	D
44.	B	66.	D	88.	D	110.	C	132.	C
45.	A	67.	A	89.	B	111.	A	133.	C
46.	B	68.	B	90.	A	112.	B	134.	B
47.	B	69.	A	91.	C	113.	B	135.	C
48.	A	70.	B	92.	A	114.	C	136.	A
49.	C	71.	C	93.	A	115.	A	137.	A
50.	D	72.	D	94.	B	116.	D		
51.	B	73.	C	95.	D	117.	A		
52.	D	74.	C	96.	D	118.	A		
53.	A	75.	A	97.	B	119.	B		
54.	A	76.	D	98.	B	120.	B		

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MATCHING

140. Match the following terms to the appropriate statement by placing the letter to the left of each statement.

a. Committed fixed cost	g. Mixed cost
b. Contribution format income statement	h. Regression analysis
c. Contribution margin	i. Relevant range
d. Contribution margin ratio	j. Scattergraph
e. Discretionary fixed cost	k. Step cost
f. High-low method	l. Variable cost ratio

____ 1. A statistical technique that identifies the line of best for the points plotted in a scattergraph.
____ 2. The difference between sales and variable costs.
____ 3. Fixed costs that cannot be changed over the short run.
____ 4. The ratio of the contribution margin to sales.
____ 5. One minus the contribution margin ratio.
____ 6. A report that allows easy assessment of the impact of sales volume on operating income.
____ 7. The normal level of operating activity.
____ 8. Fixed costs that can be changed over the short run.
____ 9. A cost that has both a fixed and variable component.
____ 10. A cost that is fixed over only a small range of activity.
____ 11. A graph that shows total costs in relation to volume, or activity level.
____ 12. A method of estimating the fixed and variable cost components of a mixed cost that requires using only two data points, the lowest point of activity and the highest point of activity.

Solution:

1. H – Regression analysis
2. C – Contribution margin
3. A – Committed fixed cost
4. D – Contribution margin ratio
5. L – Variable cost ratio
6. B – Contribution margin income statement
7. I – Relevant range
8. E – Discretionary fixed cost
9. G – mixed cost
10. K – step cost
11. J – Scattergraph
12. F – High-low method

Ans: N/A, LO: 1,2,3, Bloom: K, Unit 2-1,2-2,2-3, Difficulty: Easy, Min: 5-6, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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BRIEF EXERCISES

141. Indicate which of the following costs are classified as mixed or step costs.

		Mixed	Step
a.	Electrical charge for the month		
b.	Factory overhead		
c.	Wages of quality control employee who gets paid a bonus for every 10 defects found		
d.	Charges for an employee development seminar where the cost includes a speaker fee and cost of supplies for each attendee		
e.	Phone plan where you purchase 10-minute increments of time		

Solution:

		Mixed	Step
a.	Electrical charge for the month	X	
b.	Factory overhead	X	
c.	Wages of quality control employee who gets paid a bonus for every 10 defects found		X
d.	Charges for an employee development seminar where the cost includes a speaker fee and cost of supplies for each attendee	X	
e.	Phone plan where you purchase 10-minute increments of time		X

Ans: N/A, LO: 1, Bloom: AP, Unit: 2-1, Difficulty: Moderate, Min: 3-4, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

142. Indicate which of the following costs are classified as mixed, step, or variable costs.

		Mixed	Step	Variable
a.	Phone plan where you are charged for each minute used			
b.	Factory overhead			
c.	Plan that pays $5 for every 100 soda cans recycled			
d.	Charges for gasoline purchased for your car			
e.	A phone plan where the user purchases 10-minute increments of time			

Solution:

		Mixed	Step	Variable
a.	Phone plan where you are charged for each minute used			X
b.	Factory overhead	X		
c.	Plan that pays $5 for every 100 soda cans recycled		X	
d.	Charges for gasoline purchased for your car			X
e.	A phone plan where the user purchases 10-minute increments of time		X	

Ans: N/A, LO: 1, Bloom: AP, Unit: 2-1, Difficulty: Moderate, Min: 3-4, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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143. Complete the following table, identifying the following as fixed, variable or mixed cost.

	Activity level			Cost Behavior
	5,000 Units	6,000 units	7,000 units	F, V, M
Cost A	$15,000	$16,000	$17,000	
Cost B	5,000	6,000	7,000	
Cost C	15,000	15,000	15,000	
Cost D	10,000	12,000	14,000	
Cost E	1,200	1,300	1,400	

Solution:

	Activity level			Cost Behavior
	5,000 Units	6,000 units	7,000 units	F, V, M
Cost A	$15,000	$16,000	$17,000	M
Cost B	5,000	6,000	7,000	V
Cost C	15,000	15,000	15,000	F
Cost D	10,000	12,000	14,000	V
Cost E	1,200	1,300	1,400	M

Ans: N/A, LO: 1, Bloom: AP, Unit: 2-1, Difficulty: Moderate, Min: 4-5, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

144. King Comics is a wholesaler of popular comic books. The company's records indicate the following financial results:

	Current Year	Previous Year
Units Sold	50,000	40,000
Sales revenue	$250,000	$200,000
Cost of goods sold	175,500	140,000
Gross margin	74,500	60,000
Operating expenses	23,500	20,000
Net operating income	$ 51,000	$ 40,000

Using the high-low method, what is the company's estimated variable and fixed components of operating expenses?

Solution:
($23,500 – $20,000) ÷ (50,000 – 40,000) = $0.35 variable cost per unit;
$23,500 = ($0.35 × 50,000) + FC;
Fixed Cost = $23,500 – 17,500 = $6,000

Ans: N/A, LO: 2, Bloom: AP, Unit: 2-2, Difficulty: Moderate, Min: 3, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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145. Vest Construction Company's cost of renting a crane for the last four months is as follows:

Month	Hours of Operation	Rental Cost
January	35	$1,200
February	42	1,350
March	45	1,400
April	40	1,290

Using the high-low method, what is the company's estimated variable and fixed components of operating expenses?

Solution:
($1,400 – $1,200) ÷ (45 – 35) = $20 variable cost per hour;
$1,400 = ($20 × 45) + FC;
Fixed Cost = $1,400 – $900 = $500

Ans: N/A, LO: 2, Bloom: AP, Unit: 2-2, Difficulty: Moderate, Min: 3, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

146. Data concerning Engel Company's activity for the first three months are shown below.

Month	Machine Hours	Repair Cost
January	4,000	$3,100
February	4,800	3,500
March	3,600	2,900

Using the high-low method of analysis, determine the estimated variable cost per machine hour and the total fixed cost.

Solution:
($3,500 – $2,900) ÷ (4,800 – 3,600) = $0.50 variable cost per machine hour;
$3,500 = ($0.50 × 4,800) + FC;
Fixed Cost = $3,500 − $2,400 = $1,100

Ans: N/A, LO: 2, Bloom: AP, Unit: 2-2, Difficulty: Moderate, Min: 2-3, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

147. Assume a selling price of $20 per unit, variable cost per unit of $12, and total fixed cost of $500. If 200 units are sold, calculate the contribution margin and the operating income.

Solution:

Sales (200 × $20)	$4,000
Variable costs (200 × $12)	2,400
Contribution margin	**1,600**
Fixed costs	500
Operating income	**$1,100**

Ans: N/A, LO: 3, Bloom: AP, Unit: 2-3, Difficulty: Moderate, Min: 3, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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148. Assume a selling price of $20 per unit, variable cost per unit of $12, and total fixed cost of $500. If 200 units are sold, calculate the contribution margin ratio.

Solution:

Sales (200 × $20)	$4,000
Variable costs (200 × $12)	2,400
Contribution margin	$1,600

Contribution margin ratio = $1,600 ÷ $4,000 = 40%

Ans: N/A, LO: 3, Bloom: AP, Unit: 2-3, Difficulty: Moderate, Min: 2, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

149. Suppose Kathy Lentz Company sells hand tatted lace for $25 per yard. Her materials cost $4 per yard and labor costs her $10 per yard. She also estimates her fixed cost to be $50 per month. If she sells 2,000 yards of lace during the month, what is her contribution margin ratio?

Solution:
$25 – ($4 + $10) = $11 contribution margin
$11 ÷ $25 = 44% contribution margin ratio

Ans: N/A, LO: 3, Bloom: AP, Unit: 2-3, Difficulty: Moderate, Min: 2-3, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

150. Restate the following income statement for a retail company in contribution margin format.

Sales ($20 per unit)		$14,000
Less cost of goods sold ($14 per unit)		9,800
Gross margin		4,200
Less Operating costs:		
Salaries	$2,100	
Advertising	200	
Rent	1,000	
Delivery charges ($0.20 per unit)	140	3,440
Operating Income		$ 760

Solution:

Sales ($20 per unit)		$14,000
Less variable costs		
Cost of goods sold ($14 per unit)		9,800
Delivery charges ($0.20 per unit)		140
Contribution margin		4,060
Less fixed costs		
Salaries	$2,100	
Advertising	200	
Rent	1,000	3,300
Operating Income		$ 760

Ans: N/A, LO: 3, Bloom: AN, Unit: 2-3, Difficulty: Moderate, Min: 7-8, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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EXERCISES

151. Pangle Health Food Store sells a variety of herbal supplements and natural skin care items. Pangle purchases the items from leading manufacturers. Identify each of the following costs incurred by Pangle in terms of its cost behavior – variable, fixed, mixed, or step.

    a. Dried fruits for making "All-natural trail mix"
    b. Annual salary for salesclerk
    c. Weight loss supplements packaged in bottles of 100 pills per bottle
    d. Shipping charges for vitamin tablets (billed in 100-pound increments)
    e. Telephone charges (base rate plus usage)
    f. Advertising (annual contract with newspaper for one ad per week)
    g. Salary for Cindi Pangle (president of company)
    h. Sales bonus on body lotions of $1 per 100 sales
    i. Sales bonus on body power of $0.10 per item sold
    j. Straight line depreciation on store fixtures

Solution:

a. Variable
b. Fixed
c. Variable
d. Step
e. Mixed
f. Fixed
g. Fixed
h. Step
i. Variable
j. Fixed

Ans: N/A, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 3-4, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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152. Curtis Unique Toys has an on-line business where it sells a variety of hand-made toys. The company purchases the items from local wood workers and artisans and ships them all over the world. Identify each of the following costs incurred by Curtis in terms of its cost behavior – variable, fixed, mixed, or step.

    a. Replacement wheels for toy wagons
    b. Wages for salesclerks who are paid for the number of orders they ship
    c. Webmaster fee which bills Curtis a base fee plus a small charge for every update made
    d. Shipping charges for bulk shipments (billed in 100-pound increments)
    e. Telephone charges (base rate plus usage)
    f. Rental for warehouse space
    g. Salary for Curtis (president of company)
    h. Sales bonuses to on-line order clerks of $1 for each clearance item sold
    i. Straight line depreciation on store fixtures
    j. Boxes for shipping toys

Solution:

a. Variable
b. Variable
c. Mixed
d. Step
e. Mixed
f. Fixed
g. Fixed
h. Variable
i. Fixed
j. Variable

Ans: N/A, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 3-4, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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153. Identify each of the following costs in terms of its cost behavior – variable, fixed, mixed, or step.

a. The cost of ice cream at Baskin-Robbins
b. Electricity costs at Starbucks (base rate plus usage)
c. Sales manager who is paid a base salary plus a commission on sales over a specified amount
d. Depreciation on factory equipment
e. The cost of fabric in making children's pajamas at Carter's
f. The cost of paint in manufacturing garden art
g. Wages of day care workers, assuming a ratio of one worker for every 15 children
h. Store managers salaries at Wal-Mart
i. Telephone plan with a base rate plus a specified amount per minute
j. Shipping charges based on 100-pound increments

Solution:

a. Variable
b. Mixed
c. Mixed
d. Fixed
e. Variable
f. Variable
g. Step
h. Fixed
i. Mixed
j. Step

Ans: N/A, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 3-4, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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154. Gabbard and Fink CPA firm leases tax software from BGG Tax Software Company to prepare federal and state income tax returns. The lease agreement calls for a base charge of $5,000 per year plus $100 per year for each state for which returns are prepared. In addition, Gabbard and Fink are charged $2 ($1 for federal and $1 for state) for each tax return prepared. All of their clients have federal and state returns prepared, with 60 percent in Arkansas and 40 percent in Oklahoma.

Required:

a. What is the firm's total annual cost for the software if a total 2,500 returns are prepared?
b. What is the firm's cost per unit at a level of 2,500 returns?
c. What is the firm's cost per return if 2,000 are prepared?
d. Besides software lease cost, list five other costs that Gabbard and Fink must consider when the company set the selling price to be charged to the clients.

Solution:
a. $5,000 + ($100 × 2) + ($2 × 2,500) = $10,200
b. $10,200 ÷ 2,500 = $4.08
c. $5,000 + ($100 × 2) + ($2 × 2,000) = $9,200 ÷ 2,000 = $4.60
d. Answers will vary. Possible answers include: Salary for Gabbard and Fink, equipment such as computer, telephone, supplies such as paper, toner, envelopes, employee salaries, postage, training for preparers, or rent on office space.

Ans: N/A, LO: 1, Bloom: AP, Unit: 2-1, Difficulty: Moderate, Min: 5-7, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

155. FastPrint Company leases a machine that stuffs, seals, and stamps envelopes in one process. FastPrint's lease agreement calls for a base charge of $4,000 per year plus $0.25 for every envelope over 1,000 the machine processes per month.

Required:

a. What is the firm's total annual cost for the lease if a total of 2,500 envelopes are processed each month?
b. What is the firm's total processing cost per envelope at a level of 2,500 envelopes processed each month?
c. What is the firm's processing cost per envelope if only 1,500 envelopes are processed each month?

Solution:
a. (($2,500 – $1,000) × 12) = $18,000; $4,000 + ($0.25 × 18,000) = $8,500
b. $8,500 ÷ (2,500 × 12) = $0.28
c. $4,000 + ($0.25 × 6,000) = $5,500 ÷ 18,000 = $0.31

Ans: N/A, LO: 1, Bloom: AP, Unit: 2-1, Difficulty: Moderate, Min: 6-7, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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156. Welk's Weekend Spa charges $75 for a two-hour all-natural facial treatment. It pays a $500 annual charge plus $10 per hour for a facial massage machine used during the treatment.

Required:

a. What is Welk's total annual cost for the facial machine if 30 facials are sold? If 40 are sold? If 50 are sold?
b. What is the company's cost per facial for the machine if 30 facials are sold? If 40 are sold? If 50 are sold?
c. Why does the machine's cost per facial differ at the three levels of activity?

Solution:

a. $500 + ($10 × 2 × 30) = $1,100
   $500 + ($10 × 2 × 40) = $1,300
   $500 + ($10 × 2 × 50) = $1,500
b. $1,100 ÷ 30 = $36.67
   $1,300 ÷ 40 = $32.50
   $1,500 ÷ 50 = $30.00
c. The cost varies because the cost contains some fixed and some variable costs. The variable portion of the cost remains the same per facial as the number of facials performed changes. However, as more facials are sold, the fixed cost per facial decreases.

Ans: N/A, LO: 1, Bloom: AP, Unit: 2-1, Difficulty: Moderate, Min: 5-6, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

157. Feel Good Massage offers customized sports massages. Feel Good charges $75 for a one-hour massage session that includes a ten-minute session in a therapeutic spa. The spa is leased at a cost of $3,000 per year plus $10 per use. Feel Good pays the massage therapists $20 per session.

Required:

a. What is Feel Good's total annual cost of massages if 60 massages are sold? If 70 are sold? If 80 are sold?
b. What is the company's total cost per massage if 60 massages are sold? If 70 are sold? If 80 are sold?
c. Should Feel Good consider raising the price charged for the sports massage? Why?

Solution:

a. $3,000 + ($10 + $20) × 60)) = $4,800
   $3,000 + ($10 + $20) × 70)) = $5,100
   $3,000 + ($10 + $20) × 80)) = $5,400
b. $4,800 ÷ 60 = $80
   $5,100 ÷ 70 = $72.86
   $5,400 ÷ 80 = $67.50
c. Yes. The current price charged of $75 is not sufficient to cover fixed and variable costs unless the company performs more than 70 massages.

Ans: N/A, LO: 1, Bloom: AP, Unit: 2-1, Difficulty: Moderate, Min: 7-8, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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158. Upton, Inc. has collected the following information on its copying costs for the month.

	Number of Copies	Total Copying Costs
Week 1	700	$290
Week 2	575	260
Week 3	280	150
Week 4	200	100

Required:

a. Using the high-low-method, compute the variable cost per copy.
b. Compute the total fixed cost per month.
c. Represent the copy cost function in equation form.
d. What is the expected cost if 800 copies are made?

Solution:
a. ($290 – $100) – (700 – 200) = $0.38
b. $290 – (700 × $.38) = $24
c. Y = $0.38x + $24
d. (800 × $0.38) + $24 = $328

Ans: N/A, LO: 2, Bloom: AP, Unit: 2-2, Difficulty: Moderate, Min: 3-4, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

159. Restate the following income statement for a merchandising company in contribution format.

Sales ($10 per unit)		$5,000
Less cost of goods sold ($6 per unit)		3,000
Gross margin		2,000
Less operating expenses		
Commissions ($0.60 per unit)	$300	
Salaries	800	1,100
Operating Income		$ 900

Solution:

Sales ($10 per unit)	$5,000
Less variable costs ($3,000 + $300)	3,300
Contribution margin	1,700
Less fixed costs	
Salaries	800
Operating Income	$ 900

Ans: N/A, LO: 3, Bloom: AN, Unit: 2-3, Difficulty: Moderate, Min: 5-6, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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160. Restate the following income statement for a merchandising company in contribution format.

Sales ($20 per unit)		$20,000
Less cost of goods sold ($6 per unit)		6,000
Gross margin		14,000
Less operating expenses		
Shipping charges ($2 per unit)	$2,000	
Salaries	3,000	
Utilities	4,000	9,000
Operating Income		$ 5,000

Solution:

Sales ($20 per unit)		$20,000
Less variable costs ($6,000 + $2,000)		8,000
Contribution margin		12,000
Less fixed costs		
Salaries	$3,000	
Utilities	4,000	7,000
Operating Income		$ 5,000

Ans: N/A, LO: 3, Bloom: AN, Unit: 2-3, Difficulty: Moderate, Min: 6-7, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

161. Complete each of the following contribution format income statements by supplying the missing amounts.

	Blue Co.	Red, Inc.
Sales revenue	**?**	$45,000
Variable costs	21,000	**?**
Contribution margin	9,000	25,000
Fixed costs	**?**	12,000
Operating income	2,500	**?**
Income taxes	**?**	4,000
Operating income	$1,750	**?**

Solution:

	Blue Co.	Red, Inc.
Sales revenue	**$30,000**	$45,000
Variable costs	21,000	**20,000**
Contribution margin	9,000	25,000
Fixed costs	**6,500**	12,000
Operating income	2,500	**13,000**
Income taxes	**750**	4,000
Operating income	$1,750	**$9,000**

Ans: N/A, LO: 3, Bloom: AN, Unit: 2-3, Difficulty: Moderate, Min: 4-5, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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162. Complete each of the following contribution format income statements by supplying the missing numbers.

	Blue Co.	Red, Inc.
Sales revenue	**?**	$60,000
Variable costs	9,000	**?**
Contribution margin	**?**	40,000
Fixed costs	12,000	**?**
Operating income	**?**	**?**
Income taxes	1,600	4,000
Operating income	$4,800	$16,000

Solution:

	Blue Co.	Red, Inc.
Sales revenue	**$27,400**	$60,000
Variable costs	9,000	**20,000**
Contribution margin	**18,400**	40,000
Fixed costs	12,000	**20,000**
Operating income	**6,400**	**20,000**
Income taxes	1,600	4,000
Operating income	$ 4,800	$16,000

Ans: N/A, LO: 3, Bloom: AN, Unit: 2-3, Difficulty: Moderate, Min: 4-5, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

163. Assume University Athletic Booster Club sells T-shirts for $20 and anticipates selling 5,000 shirts during football season. The club purchases the shirts from a local dealer for $14.50. Budgeted fixed costs of $18,000 are made up of $2,000 of selling expense and the remainder is $16,000 administrative expense. The selling expenses include a sales commission of $0.05 per shirt. All other selling costs are fixed. Prepare an income statement in the contribution margin format.

University Athletic Booster Club Income Statement	
Sales ($20 × 5,000)	$100,000
Variable costs [($14.50 + $.05) × 5,000]	72,750
Contribution margin	27,250
Fixed cost [$18,000 – (.05 × 5,000)]	17,750
Operating income	$ 9,500

Ans: N/A, LO: 3, Bloom: AP, Unit: 2-3, Difficulty: Moderate, Min: 6-7, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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164. MousePad Computer Company, in addition to its retail sales, conducts night classes in computer technology. MousePad has provided you the following information:

Number of students	120
Revenue per student	$450
Student-related variable costs	$100 per student
Salary for three instructors	$1,800 each
Administrative costs	$30 per student
Factory fixed costs	$15,000 per year

Required*:*

Construct a contribution margin format income statement.

Solution:

Revenue ($450 × 120)		$54,000
Variable costs		
Student related costs ($100 × 120)	$12,000	
Administrative costs ($30 × 120)	3,600	15,600
Contribution margin		38,400
Fixed costs		
Instructor salaries ($1,800 × 3)	5,400	
Factory fixed costs	15,000	20,400
Operating income		$18,000

Ans: N/A, LO: 3, Bloom: AP, Unit: 2-3, Difficulty: Moderate, Min: 6-7, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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165. Nancy's Nursery provides and maintains live plants in office buildings. The company's 120 customers are charged $90 per month for this service, which includes weekly watering visits. The variable cost to service a customer's location is $22 per month. The company incurs $2,000 each month to maintain its equipment and service vans and $3,000 each month in salaries. Nancy pays a CPA firm $5 per customer for accounting services.

Required:

a. Prepare Nancy's contribution format income statement for the month.
b. What is the expected monthly operating income if 10 customers are added?

Solution:

a.

Revenue ($90 × 120)	$10,800
Variable costs ($22 + $5) × 120))	3,240
Contribution margin	7,560
Fixed costs	5,000
Operating income	$ 2,560

b.

Revenue ($90 × (120 + 10))	$11,700
Variable costs (($22 + $5) × (120 + 10))	3,510
Contribution margin	8,190
Fixed costs	5,000
Operating income	$ 3,190

Ans: N/A, LO: 3, Bloom: AP, Unit: 2-3, Difficulty: Moderate, Min: 8-10, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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PROBLEMS

166. The Melina Corporation has gathered the following data on its copy machine costs for the first eight months of the year.

Month	Number of Copies	Total Copy Cost
January	60,000	$ 7,400
February	50,000	6,500
March	70,000	7,000
April	90,000	9,200
May	80,000	7,600
June	100,000	8,500
July	120,000	10,000
August	110,000	9,800

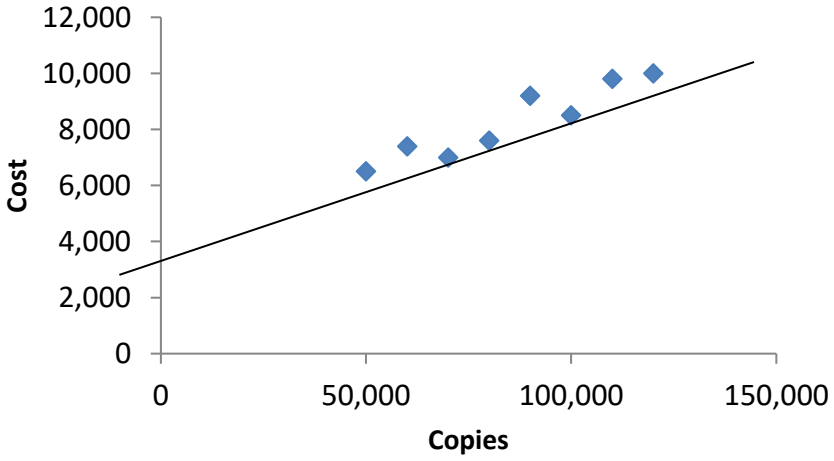
Required:

Use 5 decimals on 'per unit' amounts.

a. Prepare a scattergraph of the cost information and then choose a line that you believe best represents the cost function. Represent your line with a cost equation of the form, $y = mx + b$. Show your calculations.
b. Using the high-low method, what is the variable cost per copy?
c. Using the high-low method, what is the fixed cost per month?
d. Using the high-low method, represent the cost function in the form, $y = mx + b$.
e. Using your cost equation from part (d), provide your best estimate of the copy costs for September if 68,000 copies will be made. Why does your estimate differ from the $7,000 cost incurred in March, when 70,000 copies were made rather than 68,000?

Solution:

a.



The line intersects the y-axis at $3,500, representing total fixed costs. The line passes through the point (80,000, $7,600), so the slope can be calculated as follows:

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($7,600 − $3,500) ÷ (80,000 – 0) = $0.05125 per copy

The equation of the line is: y = $.05125 per copy + $3,500

b. Variable cost = ($10,000 − $6,500) ÷ (120,000 – 50,000) = $0.05 per copy
c. Fixed cost = $10,000 – ($.05 × 120,000) = $4,000
d. y = $0.05x + $4,000
e. September cost = ($0.05 x 68,000) + $4,000 = $7,400. The equation is just an approximation of the relationship between cost and copies. Since the March cost was not one of the points used to construct the line, it is not surprising that the two figures aren't equal.

LO: 2, Bloom: AP, AN, Unit: 2-2, Difficulty: Moderate, Min: 10-12, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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Bailey Jones owns a catering company that stages banquets and parties for both individuals and companies. The business is seasonal, with heavy demand during the summer months and year-end holidays and light demand at other times. Bailey has gathered the following cost information from the past year:

Month	Labor Hours	Overhead Costs
January	2,500	$ 57,000
February	2,800	59,000
March	3,000	60,000
April	4,200	64,000
May	4,500	67,000
June	5,500	71,000
July	6,500	74,000
August	7,500	77,000
September	7,000	75,000
October	4,500	68,000
November	3,100	62,000
December	6,500	73,000
Total	57,600	$807,000

Required:

a. Using the high-low method, compute the overhead cost per labor hour and the fixed overhead cost per month.
b. Bailey has booked 2,800 labor hours for the coming month. How much overhead should he expect to incur?
c. If Bailey books one more catering job for the month, requiring 200 labor hours, how much additional overhead should he expect to incur?
d. Bailey recently attended a meeting of the local Chamber of Commerce, at which he heard an accounting professor discuss regression analysis and its business applications. After the meeting, Bailey enlisted the professor's assistance in preparing a regression analysis of the overhead data he collected. This analysis yielded an estimated fixed cost of $48,000 per month and a variable cost of $4 per labor hour. Why do these estimates differ from your high-low estimates, calculated in part (a)?

Solution:

a. Variable cost = ($77,000 − $57,000) ÷ (7,500 – 2,500) = $4.00 per labor hour
   Fixed cost = $77,000 – ($4.00 × 7,500) = $47,000
b. Total cost = ($4.00 × 2,800) + $47,000 = $58,200
c. Additional overhead = $4.00 × 200 = $800
d. In regression analysis, the cost equation is calculated using all of the data points. In the high-low method, only two points are used to determine the cost equation. In either case, they are both estimates.

LO: 2, Bloom: AP, AN, Unit: 2-2, Difficulty: Moderate, Min: 5-6, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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167. Yarlan Gravity Grips produces spike sets for track shoes. CEO Brittany Yarlan has gathered the following information about the company's sales volume and marketing cost for the past six months.

	Sales Volume	Total Marketing Costs
January	550,700	$82,770
February	390,500	74,525
March	561,000	83,050
April	543,000	82,330
May	546,600	82,480
June	553,900	82,960

Required:

a. Using the high-low method, compute the variable marketing cost per spike set.
b. Compute the total fixed marketing cost.
c. Represent the marketing cost function in equation form.
d. Examine the data and identify the potential outlier.
e. Recalculate the marketing cost function, removing the potential outlier.
f. Which of the two cost functions you calculated would be appropriate to use in estimating future marketing costs? Why?

Solution:

a. Variable cost = ($83,050 − $74,525) ÷ (561,000 – 390,500) = $0.05 per spike set sold
b. Fixed cost = $83,050 – ($.05 × 561,000) = $55,000
c. Marketing cost = $.05(sets sold) + $55,000
d. February sales volume and costs are much lower than the others.
e. Variable cost = ($83,050 − $82,330) ÷ (561,000 – 543,000) = $0.04 per spike set sold
   Fixed cost = $83,050 – ($.04 × 561,000) = $60,610
   Marketing cost = ($.04 × sets sold) + $60,610
f. The second equation is better because the endpoints used to estimate the line are more consistent with the normal sales volumes and costs.

LO: 2, Bloom: AP, AN, Unit: 2-2, Difficulty: Moderate, Min: 8, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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168. Stegman, Ltd., provides nationwide passenger train service on 21,000 miles of routes. Selected operating data for fiscal 2021 are shown below.

Month	Fuel Expense (000s)	Passengers (000s)	Passenger Miles (000s)	Train Miles (000s)
October 2020	$20,075	2,145	450,857	3,098
November 2020	22,037	2,154	451,448	3,091
December 2020	22,435	2,180	373,533	3,141
January 2021	23,613	2,151	377,438	3,178
February 2021	21,931	2,136	461,088	2,825
March 2021	26,204	2,174	458,762	3,175
April 2021	24,698	2,207	470,311	3,096
May 2021	24,832	2,296	492,429	3,197
June 2021	23,239	2,291	540,655	3,076
July 2021	24,481	2,414	578,133	3,191
August 2021	25,459	2,430	563,986	3,315
September 2021	25,021	2,148	448,263	3,066

Required:

a. The above data provide three possible activity measures that could influence fuel expense. Use the high-low method to develop a cost formula for fuel expense for each of the three measures.
b. Do any of the cost formulas you developed in (a) appear to be a poor choice for estimating future train operations expense? Why?
c. Which formula do you think will make the most accurate predictions? Why?

Solution:

a. **Passengers:**
Variable cost = ($25,459 − $21,931 ÷ (2,430 – 2,136) = $12.00 per passenger
Fixed cost = $25,459 – ($12 × 2,430) = ($3,701)
Fuel expense = $12 (passenger) – $3,701
Passenger miles:
Variable cost = ($24,481 − $22,435) ÷ (578,133 – 373,533) = $0.01 per passenger mile
Fixed cost = $24,481 – ($.01 × 578,133) = $18,699.67
Fuel expense = ($.01 × passenger mile) + $18,699.67
Train Miles:
Variable cost = ($25,459 – $21,931) ÷ (3,315 – 2,825) = $7.20 per train mile
Fixed cost = $25,459 – ($7.20 × 3,315) = $1,591
Fuel expense = ($7.20 × train mile) + $1,591

b. The formula based on passengers doesn't make sense as the fixed cost is negative, which doesn't help managers understand any causal relationship between the number of passengers and fuel expense.

c. Logically, train miles would seem to have the most predictive ability since the miles a train travels and fuel costs should be directly related. While passenger miles would likely provide information related to the fuel expended due to weight (more passengers, greater weight), it is unlikely that one more passenger mile will have a strong impact on fuel expenses.

LO: 2, Bloom: E, Unit: 2-2, Difficulty: Difficult, Min: 12-15, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

Managerial Accounting 4th edition Davis Test Bank

169. Mega Bright Window Cleaners' monthly income statement at several levels of activity is as follows:

Windows washed	2,000	4,000	6,000
Sales revenue	$3,000	$6,000	$9,000
Cost of goods sold	1,200	2,400	3,600
Gross profit	1,800	3,600	5,400
Operating expenses			
Advertising expense	500	500	500
Salaries and wages expense	700	900	1,100
Insurance expense	200	200	200
Postage expense	500	1,000	1,500
Total operating expenses	1,900	2,600	3,300
Operating income	$ (100)	$1,000	$2,100

Required:

a. Identify each expense as fixed, variable, or mixed.
b. Prepare a contribution margin income statement based on a volume of 5,000 windows.

Solution:

a. Cost of goods sold – variable
Advertising – fixed
Salaries and Wages – mixed
Insurance – fixed
Postage – variable

b. Sales price = $3,000 ÷ 2,000 windows = $1.50 per window
Cost of goods sold = $1,200 ÷ 2,000 windows = $0.60 per window
Variable salaries = ($1,100 – $700) ÷ (6,000 – 2,000) = $0.10 per window
Postage = $500 ÷ 2,000 windows = $0.25 per window
Fixed salaries = $1,100 – (.1 × 6,000) = $500

	5,000 Windows		Per Unit
Sales revenue		$7,500	$1.50
Less variable costs:			
Cost of goods sold	$3,000		0.60
Salaries	500		0.10
Postage	1,250		0.25
Total variable costs		4,750	0.95
Contribution margin		2,750	$0.55
Less fixed costs:			
Advertising	500		
Salaries	500		
Insurance	200		
Total fixed costs		1,200	
Operating Income		$1,550	

LO: 1,3, Bloom: AP, Unit: 2-1,2-3, Difficulty: Moderate, Min: 12-15, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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170. J Bryson, Ltd. is a local coat retailer. The store's accountant prepared the following income statement for the month ended January 31.

Sales revenue		$750,000
Cost of goods sold		300,000
Gross margin		450,000
Less operating expenses		
Selling expense	$23,560	
Administrative expense	49,500	73,060
Operating income		$376,940

Bryson sells its coats for $250 each. Selling expenses consist of fixed costs plus a commission of $6.50 per coat. Administrative expenses consist of fixed costs plus a variable component equal to 6% of sales.

Required:

a. Prepare a contribution format income statement for January.
b. Using the format $y = mx + b$, develop a cost formula for the operating expenses.
c. If 2,700 coats are sold next month, what is the expected total contribution margin?

Solution:

a. Coats sold = $750,000 ÷ $250 = 3,000 units
Variable selling = $6.50 × 3,000 = $19,500
Variable administrative = 6% × $750,000 = $45,000
Fixed selling = $23,560 – $19,500 = $4,060
Fixed administrative = $49,500 – $45,000 = $4,500

			Per Unit
Sales revenue		$750,000	$250.00
Less variable costs:			
Cost of goods sold	$300,000		100.00
Selling	19,500		6.50
Administrative	45,000		15.00
Total variable costs		364,500	121.50
Contribution margin		385,500	$128.50
Less fixed costs:			
Selling	4,060		
Administrative	4,500		
Total fixed costs		8,560	
Operating Income		$376,940	

b. Operating expenses = $121.50X + 8,560
c. $128.50 × 2,700 = $346,950

LO: 2,3, Bloom: AP, Unit: 2-2,2-3, Difficulty: Moderate, Min: 12-15, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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171. Hartland Horticulture provides and maintains live plants in office buildings. The company's 850 customers are charged $30 per month for this service, which includes weekly watering visits. The variable cost to service a customer's location is $18 per month. The company incurs $2,000 each month to maintain its fleet of four service vans and $3,000 each month in salaries. Hartland pays a bookkeeping service $2 per customer each month to handle all invoicing and accounting functions.

Required:

a. Prepare Hartland's contribution format income statement for the month.
b. What is the expected monthly operating income if 150 customers are added?
c. Mr. Hartland is exploring options to reduce the **annual** bookkeeping costs.
Option 1: Renegotiate the current contract with the bookkeeping service to pay a flat fee of $10,200 per year plus $1 per customer per month.
Option 2: Hire a part-time bookkeeper for $18,000 per year to handle the invoicing and simple accounting. Harland will need to pay $5,000 per year to have taxes and year-end financial statements prepared.
Compare the current bookkeeping cost with the two options at customer levels of 850, 1,000, and 1,100.
d. In addition to the bookkeeping costs incurred, what should Mr. Hartland consider before he makes a change in bookkeeping services?

Solution:

a.

			Per Unit
Sales revenue		$25,500	$30
Less variable costs:			
Service	$15,300		18
Bookkeeping	1,700		2
Total variable costs		17,000	20
Contribution margin		8,500	$10
Less fixed costs:			
Vans	2,000		
Salaries	3,000		
Total fixed costs		5,000	
Operating income		$ 3,500	

b. $3,500 + (150 × $10) = $5,000

c.

	850	1,000	1,100
Current cost: $2 × customers × 12 months	$20,400	$24,000	$26,400
Option 1: $10,200 + ($1 × customers × 12 months)	20,400	22,200	23,400
Option 2: $18,000 + $5,000	23,000	23,000	23,000

d. Mr. Hartland needs to evaluate what he thinks future demand for his services will be. If he thinks he will have more customers, then he should consider switching to option 1 or 2 before prices increase. He also needs to think about the stability of his customer base. If he services fewer than 850 customers, options 1 and 2 will be more expensive than the current arrangement.

LO: 3, Bloom: E, Unit: 2-3, Difficulty: Difficult, Min: 14-16, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

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SHORT ANSWER

172. To calculate the unit cost of the Neoprene stocking foot waders he sells, Gary Guinn added up all his costs and divided by the number of waders he sold during the year. He then used this unit cost to estimate total costs for the coming year. Explain why Gary's method is not useful in predicting total costs for the coming year.

Solution:
Gary did not consider what portion of his total cost is fixed versus variable. Gary should analyze his total cost to estimate the variable cost per unit and total fixed cost and then apply these amounts to his estimated sales for the coming year.

Ans: N/A, LO: 1, Bloom: AN, Unit: 2-1, Difficulty: Moderate, Min: 3, AACSB: Communication, AICPA FN: Reporting, AICPA PC: Communication, IMA: Reporting

173. What is a mixed cost? What happens to a mixed cost as the level of activity changes?

Solution:
A mixed cost is a cost that contains both a fixed and a variable component. Both the total cost and the unit cost will vary with changes in level of activity. Total cost will increase as the level of activity increases. Unit cost will decrease as activity increases since the fixed component is being spread among a larger number of units.

Ans: N/A, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 2-3, AACSB: Communication, AICPA FN: Reporting, AICPA PC: Communication, IMA: Reporting

174. Express the relationship between total cost (TC), variable cost per unit (VC), sales volume (X), and fixed cost (FC) in equation form.

Solution:
$TC = (VC \times X) + FC$

Ans: N/A, LO: 1, Bloom: K, Unit: 2-1, Difficulty: Easy, Min: 2, AACSB: Communication, AICPA FN: Reporting, AICPA PC: Communication, IMA: Reporting

175. When managers talk about cost behavior, they are referring to the way in which total costs change in response to changes of the level of activity. List the four common cost behavior patterns that serve as the foundation for cost-volume-profit analysis and give an example of each.

Solution:
Variable cost – direct material
Fixed cost – rent on an apartment
Mixed cost – phone plan with a base charge and an amount charged for minutes used
Step cost – phone plan where you buy airtime in blocks of 500 minutes

Ans: N/A, LO: 1, Bloom: C, Unit: 1-1, Difficulty: Easy, Min: 4-5, AACSB: Communication, AICPA FN: Reporting, AICPA PC: Communication, IMA: Reporting

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176. Assume sales revenue of $50,000, variable costs of $22,000, and fixed costs of $25,000. Prepare a contribution format income statement.

Solution:

Revenue	$50,000
Variable costs	22,000
Contribution margin	28,000
Fixed costs	25,000
Operating income	$ 3,000

Ans: N/A, LO: 3, Bloom: AP, Unit: 2-3, Difficulty: Moderate, Min: 3-4, AACSB: Analytic, AICPA FN: Reporting, AICPA PC: None, IMA: Reporting

ESSAY

177. Walker Boat Company produces bass boats. The following comments were found in the "Management's Discussion and Analysis" section of the annual report.

"Bass boat production includes a significant amount of robotic manufacturing costs, a portion of which do not vary with production rates."

As industry practice, Walker spreads its robotic costs over the estimated number of boats that are expected to be produced for each type of bass boat. At the end of the previous year, the number of boats produced was 2,400 while the expected number of boats to be produced in the current year is 2,700.

Required:

a. What effect would the change in level of boats produced have on the total robotic costs?
b. What effect would the change in level of boats produced have on the unit costs of the boats?

Solution:

a. Robotic costs are classified as fixed costs since the cost does not change with the level of activity. Therefore, if the level of activity increases from 2,400 to 2,700 boats, the total robotic costs will remain the same. There will be no effect on the total robotic costs.
b. Although robotic costs remain the same in total, they change inversely with the level of activity per unit costs. Therefore, the more boats that are produced the less robotic cost will be allocated to each unit.

Ans: N/A, LO: 1, Bloom: AN, Unit: 2-1, Difficulty: Moderate, Min: 4, AACSB: Communication, AICPA FN: Reporting, AICPA PC: Communication, IMA: Reporting

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178. Fixed costs are those costs that do not change as the level of activity increases or decreases. However, fixed costs may be classified as discretionary or committed.

Required:

a. Explain the differences in these classifications and give an example of each.
b. Discuss why managers should consider the impact of these costs in the decision-making process in times of falling profits.

Solution:

a. Discretionary fixed costs can be changed over the short run while committed fixed costs cannot. For example, an advertising contract with the local newspaper may easily be reduced or canceled while a 10-year lease on a building may have severe consequences if the contract is broken.
b. Managers should be cautious about reducing their discretionary fixed costs during times of falling profits since doing so may reduce sales even further. Managers, in their strategic planning (long-range planning) should consider the impact of committed fixed cost and what consequences will arise if revenues fall since these costs generally cannot be changed over the short run.

Ans: N/A, LO: 1, Bloom: AN, Unit: 2-1, Difficulty: Moderate, Min: 4-5, AACSB: Communication, AICPA FN: Reporting, AICPA PC: Communication, IMA: Reporting

179. Three popular methods of identifying variable and fixed components of a cost are the scattergraph method, the high-low method and regression analysis. Compare and contrast these three methods.

Solution:

All three methods are used to estimate the fixed and variable components of mixed costs. These methods can be used for estimating total costs at various levels of activity. Scattergraphs are the simplest method. The scattergraph shows total costs in relation to volume. The data needed to create the scattergraph can be gathered from weekly or monthly reports. Once you have plotted the individual points, draw a line through them to estimate the cost relationship. The high-low method is similar to the scattergraph, but unlike the scattergraph, the high-low method requires only two data points–the lowest point of activity and the highest point of activity. Regression analysis is a more precise approach to separating a mixed cost. It is a statistical technique that identifies the line of best fit for the points plotted in the scattergraph. Spreadsheet software makes regression analysis easy.

Ans: N/A, LO: 2, Bloom: C, Unit: 2-2, Difficulty: Easy, Min: 7-9, AACSB: Communication, AICPA FN: Reporting, AICPA PC: Communication, IMA: Reporting

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180. There are four common cost behavior patterns that serve as the foundation for cost-volume-profit analysis.

Required:

a. Explain the term cost behavior.
b. List the four common cost behavior patterns that serve as the foundation for cost-volume-profit analysis and give an example of each type of cost classified by behavior.
c. Explain the relationship between level of activity and each of the four types of cost behavior.

Solution:
a. Cost behavior refers to the how total costs change in response to changes in the level of activity.
b. Variable cost – direct material
Fixed cost – rent on factory building
Mixed cost – utility charge with a base rate and per unit of activity charge
Step cost – shipping charge based on 100-pound increments
c. A variable cost changes in total as activity changes but remains the same per unit. A fixed cost remains the same in total as activity changes within the relevant range, while the per unit cost has an inverse relationship to activity. As the level of activity increases, the fixed cost per unit decreases. A mixed cost has both a fixed and variable component. The total cost and the unit cost will vary with changes in the level of activity. Step costs are fixed over only a small range of activity. Once the level of activity has been exceeded, total cost increases and remains constant over another small range of activity.

Ans: N/A, LO: 1, Bloom: C, Unit: 2-1, Difficulty: Easy, Min: 8-10, AACSB: Communication, AICPA FN: Reporting, AICPA PC: Communication, IMA: Reporting

181. You have been hired by University Bike Shop as the controller. The CEO has been using a traditional GAAP income statement for internal decision making. However, the CEO has just completed an MBA program where she covered the contribution format income statement. She has asked you to explain the contribution format income statement to the other managers of the company with emphasis on the differences between the two income statements and how the contribution format income statement can help all the managers.

Solution:
The traditional GAAP income statement organizes costs by function whereas the contribution margin income statement organizes costs by cost behavior. The GAAP income statement classifies costs as product costs and selling costs and administrative costs, while the contribution format income statement classifies costs by their behavior (variable and fixed). The contribution format income statement highlights the contribution margin (sales less variable costs) and the traditional income statement focuses on gross margin (sales less product costs). Gross margin represents the amount available to cover non-product costs (selling and administrative) and to contribute to profit, while contribution margin represents the amount available to cover fixed costs and profit.

The GAAP income statement does not help managers predict the financial results of their decisions. The contribution format income statement allows managers to easily access the impact of sales volume on operating income because the costs are separated by behavior.

Ans: N/A, LO: 3, Bloom: C, Unit: 2-3, Difficulty: Easy, Min: 8, AACSB: Communication, AICPA FN: Reporting, AICPA PC: Communication, IMA: Reporting

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