Chapter 2—Cost Behaviour

MULTIPLE CHOICE

1. What does cost behaviour analysis focus on?
   a. how costs react to changes in profit
   b. how costs change over time
   c. how costs react to changes in activity level
   d. how costs act in the long term

   ANS: C PTS: 1 DIF: Moderate REF: p. 46
   OBJ: 2-1 NAT: AACSB Reflective MSC: Remember

2. Which activity driver explains changes in costs as the number of units produced changes?
   a. non-unit-level drivers
   b. activity-based cost drivers
   c. unit-level drivers
   d. batch-level drivers

   ANS: C PTS: 1 DIF: Easy REF: p. 46
   OBJ: 2-1 NAT: AACSB Reflective MSC: Remember

3. Which activity driver explains changes in costs as factors other than changes in units produced?
   a. functional-based cost drivers
   b. non-unit-based cost drivers
   c. unit-based cost drivers
   d. variable-based cost drivers

   ANS: B PTS: 1 DIF: Easy REF: p. 46
   OBJ: 2-1 NAT: AACSB Reflective MSC: Remember

4. In a traditional cost management system, what is the only type of driver that cost behaviour is assumed to be driven by?
   a. unit-based cost drivers
   b. non-unit-level cost drivers
   c. activity-based cost drivers
   d. variable-based cost drivers

   ANS: A PTS: 1 DIF: Moderate REF: p. 46
   OBJ: 2-1 NAT: AACSB Reflective MSC: Remember

5. Which of the following would be an example of a unit-based cost driver?
   a. engineering orders
   b. direct labour hours
   c. inspection hours
   d. material moves

   ANS: B PTS: 1 DIF: Moderate REF: p. 46
   OBJ: 2-1 NAT: AACSB Reflective MSC: Higher Order

6. What is a supervisor's salary of $2,000 per month an example of?
   a. fixed cost
   b. variable cost
   c. step cost
   d. mixed cost

   ANS: A PTS: 1 DIF: Moderate REF: p. 46
   OBJ: 2-1 NAT: AACSB Analytic MSC: Higher Order

7. Which statement best describes how fixed and variable costs behave per unit and in total?
   a. Both costs are constant when considered on a per-unit basis.
   b. Both costs are constant when considered on a total basis.
   c. Fixed costs are constant in total and variable costs are constant per unit.
   d. Variable costs are constant in total and fixed costs are constant per unit.

   ANS: C PTS: 1 DIF: Difficult REF: p. 46-48
   OBJ: 2-1 NAT: AACSB Reflective MSC: Remember

8. Which statement best describes cost behaviour?
   a. In the long run, all costs are fixed.
   b. Variable costs decrease in total in relation to the activity driver.
   c. Total fixed costs increase or decrease inversely in relation to the activity driver.
   d. Unit variable cost remains the same in relation to the activity.

   ANS: D PTS: 1 DIF: Difficult REF: p. 46-49
   OBJ: 2-1 NAT: AACSB Reflective MSC: Higher Order

9. When the volume of activity increases within the relevant range, how does the fixed cost per unit respond?
   a. It decreases.
   b. It decreases at first, then increases.
   c. It increases at first, then decreases.
   d. It increases.

   ANS: A PTS: 1 DIF: Moderate REF: p. 47
   OBJ: 2-1 NAT: AACSB Analytic MSC: Remember

10. Fixed cost per unit is $9 when 20,000 units are produced and $6 when 30,000 units are produced. What is the total fixed cost when nothing is produced?
    a. $15
    b. $120,000
    c. $180,000
    d. $270,000

    ANS: C
    SUPPORTING CALCULATIONS:
    $\$9 \times 20{,}000 = \underline{\$180{,}000}$

    PTS: 1 DIF: Moderate REF: p. 47 OBJ: 2-1
    NAT: AACSB Analytic MSC: Higher Order

11. What is the term for the range of activity within which a linear cost function is valid?
    a. normal range
    b. relevant range
    c. activity range
    d. fixed range

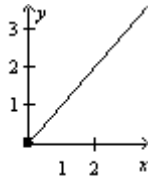
    ANS: B PTS: 1 DIF: Moderate REF: p. 47
    OBJ: 2-1 NAT: AACSB Reflective MSC: Remember

12. When are costs valid for analysis?
    a. When costs reach a level above the relevant range, they are considered appropriate for analysis.
    b. When linear estimates of an economist's curvilinear cost function are within the relevant range, they are valid for analysis.
    c. When costs reach a level below the relevant range, they are considered appropriate for analysis.
    d. When the nonlinear relevant range is ignored only those costs outside this range may be considered for analysis.

    ANS: B PTS: 1 DIF: Difficult REF: p. 47
    OBJ: 2-1 NAT: AACSB Reflective MSC: Higher Order

13. Assuming costs are represented on the vertical axis and volume of activity on the horizontal axis, which of the following costs would be represented by a line that is parallel to the horizontal axis?
    a. total direct material costs
    b. a consultant paid $75 per hour with a maximum fee of $1,200
    c. employees who are paid $10 per hour and guaranteed a minimum weekly wage of $200
    d. rent on exhibit space at a convention

    ANS: D PTS: 1 DIF: Difficult REF: p. 48
    OBJ: 2-1 NAT: AACSB Analytic MSC: Higher Order



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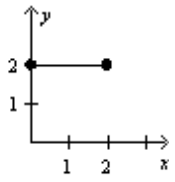

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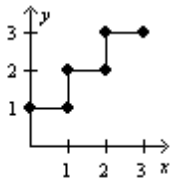

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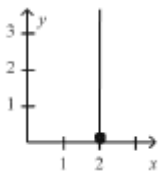


IV

14. Refer to the figure. Which graph represents fixed costs?
    a. I
    b. II
    c. III
    d. IV

    ANS: B PTS: 1 DIF: Easy REF: p. 48
    OBJ: 2-1 NAT: AACSB Analytic MSC: Higher Order

15. As the volume of activity increases within the relevant range, how does the variable cost per unit respond?
    a. It decreases.
    b. It decreases at first, then increases.
    c. It remains the same.
    d. It increases.

    ANS: C PTS: 1 DIF: Moderate REF: p. 48
    OBJ: 2-1 NAT: AACSB Analytic MSC: Remember

16. A manufacturing company pays an assembly line worker $10 per hour. What is the proper classification of this labour cost?
    a. fixed cost
    b. semi-variable cost
    c. variable cost
    d. mixed cost

    ANS: C PTS: 1 DIF: Moderate REF: p. 48
    OBJ: 2-1 NAT: AACSB Analytic MSC: Higher Order

17. The direct material cost is $10,000 when 2,000 units are produced. What is the direct material cost for 2,500 units produced?
    a. $8,000
    b. $10,000
    c. $12,500
    d. $15,000

    ANS: C
    SUPPORTING CALCULATIONS:
    $10,000/2,000 × 2,500 = $12,500

    PTS: 1 DIF: Moderate REF: p. 48 OBJ: 2-1
    NAT: AACSB Analytic MSC: Higher Order

18. Holly Corporation has the following costs for 1,000 units:

	Total Cost	**Cost per Unit**
Direct materials	$ 1,500	$ 1.50
Direct labour	7,500	7.50
Depreciation on building	30,000	30.00

    What is the total amount of direct materials for 100 units?
    a. $1.50
    b. $3.00
    c. $150.00
    d. $225.00

    ANS: C
    SUPPORTING CALCULATIONS:
    100 × $1.50 = $150

    PTS: 1 DIF: Moderate REF: p. 48 OBJ: 2-1
    NAT: AACSB Analytic MSC: Higher Order

19. Which of the following costs is a variable cost?
    a. supervisors' salaries
    b. research and development
    c. materials used in production
    d. rent

    ANS: C PTS: 1 DIF: Moderate REF: p. 48
    OBJ: 2-1 NAT: AACSB Reflective MSC: Remember

20. What are direct materials an example of?
    a. fixed cost
    b. variable cost
    c. step cost
    d. mixed cost

    ANS: B PTS: 1 DIF: Easy REF: p. 48
    OBJ: 2-1 NAT: AACSB Reflective MSC: Remember

21. What does a steep slope in the variable cost line indicate?
    a. a low variable cost per unit
    b. a high influence of activity on total variable costs
    c. a low influence of activity on total variable costs
    d. a large amount of fixed costs

    ANS: B PTS: 1 DIF: Difficult REF: p. 49
    OBJ: 2-1 NAT: AACSB Analytic MSC: Higher Order

22. When is the linearity assumption most likely to be a close approximation for an underlying nonlinear cost function?
    a. within a relevant range of activity
    b. over the long run
    c. for short-run periods
    d. at lower levels of activity only

    ANS: A PTS: 1 DIF: Moderate REF: p. 49
    OBJ: 2-1 NAT: AACSB Reflective MSC: Higher Order

23. What do mixed costs, by definition, contain?
    a. product and period costs
    b. fixed and variable costs
    c. direct and indirect costs
    d. controllable and non-controllable costs

    ANS: B PTS: 1 DIF: Easy REF: p. 51
    OBJ: 2-1 NAT: AACSB Reflective MSC: Remember

24. Assuming costs are represented on the vertical axis and volume of activity on the horizontal axis, which of the following costs would be represented by a line that starts at the origin and reaches a maximum value beyond which the line is parallel to the horizontal axis?
    a. total direct material costs
    b. a consultant paid $100 per hour with a maximum fee of $2,000
    c. employees who are paid $15 per hour and guaranteed a minimum weekly wage of $300
    d. rent on exhibit space at a convention

    ANS: B PTS: 1 DIF: Difficult REF: p. 51
    OBJ: 2-1 NAT: AACSB Analytic MSC: Higher Order

25. Adams Corporation rents a truck for a flat fee plus an additional charge per mile. What type of cost is the rent?
    a. fixed cost
    b. mixed cost
    c. variable cost
    d. step cost

    ANS: B PTS: 1 DIF: Moderate REF: p. 51
    OBJ: 2-1 NAT: AACSB Analytic MSC: Higher Order

26. If production volume increases from 8,000 to 10,000 units, how will the costs respond?
    a. Total costs will increase by 20 percent.
    b. Total costs will increase by 25 percent.
    c. Total variable costs will increase by 25 percent.
    d. Mixed and variable costs will increase by 25 percent.

    ANS: C PTS: 1 DIF: Difficult REF: p. 51
    OBJ: 2-1 NAT: AACSB Analytic MSC: Higher Order

27. Boss Company currently leases a delivery van from Check Enterprises for a fee of $250 per month plus $0.40 per mile. Management is evaluating the desirability of switching to a modern, fuel-efficient van, which can be leased from David, Inc., for a fee of $600 per month plus $0.05 per mile. All operating costs and fuel are included in the rental fees. Which delivery van would it be economically preferable to lease?
    a. David, Inc. is economically preferable to a lease from Check Enterprises regardless of the monthly use.
    b. Check Enterprises is economically preferable below 1,000 miles per month.
    c. Check Enterprises is economically preferable to a lease from David, Inc., regardless of the monthly use.
    d. Check Enterprises is economically preferable above 1,000 miles per month.

    ANS: B PTS: 1 DIF: Difficult REF: p. 51
    OBJ: 2-1 NAT: AACSB Analytic MSC: Higher Order

28. What is an equipment lease that specifies a payment of $5,000 per month plus $8 per machine hour used an example of?
    a. a fixed cost
    b. a variable cost
    c. a step cost
    d. a mixed cost

    ANS: D PTS: 1 DIF: Moderate REF: p. 51
    OBJ: 2-1 NAT: AACSB Analytic MSC: Higher Order

    ALF Systems undertakes its own machine maintenance. The depreciation on the equipment is $20,000 per year and an operating cost is $2 per machine hour. Last year 275,000 machine hours were used to produce 100,000 units.

29. Refer to the figure. What is the cost equation for the total machine maintenance cost?
    a. Y = $275,000 + $2 MHR
    b. Y = $20,000 + $275,000 MHR
    c. Y = $20,000 + $2 MHR
    d. Y = $275,000 + 100,000 MHR

    ANS: C
    Y = $20,000 + 2 MHR

    PTS: 1 DIF: Moderate REF: p. 51 OBJ: 2-1
    NAT: AACSB Analytic MSC: Higher Order

30. Refer to the figure. What was the total variable machine maintenance cost last year?
    a. $220,000
    b. $240,000
    c. $275,000
    d. $550,000

    ANS: D
    TVC = $2 (275,000) = $550,000

    PTS: 1 DIF: Moderate REF: p. 51 OBJ: 2-1
    NAT: AACSB Analytic MSC: Higher Order

31. Refer to the figure. What was the total machine maintenance cost for last year?
    a. $20,000
    b. $420,000
    c. $550,000
    d. $570,000

    ANS: D
    Y = $20,000 + $2 (275,000) = $570,000

    PTS: 1 DIF: Moderate REF: p. 51 OBJ: 2-1
    NAT: AACSB Analytic MSC: Higher Order

32. Refer to the figure. What is the total maintenance cost per unit produced?
    a. $0.55
    b. $4.20
    c. $5.50
    d. $5.70

    ANS: D
    Y = $20,000 + $2(275,000)/100,000 = $5.70 per unit

    PTS: 1 DIF: Moderate REF: p. 51 OBJ: 2-1
    NAT: AACSB Analytic MSC: Higher Order

33. Refer to the figure. If 300,000 machine hours had been worked last year, what would be the total machine maintenance cost?
    a. $220,000
    b. $420,000
    c. $600,000
    d. $620,000

    ANS: D
    Y = $20,000 + $2(300,000) = $620,000

    PTS: 1 DIF: Moderate REF: p. 51 OBJ: 2-1
    NAT: AACSB Analytic MSC: Higher Order

34. When a firm acquires the resources needed to perform an activity, what is it obtaining?
    a. practical capacity
    b. resource usage
    c. activity capacity
    d. unused capacity

    ANS: C PTS: 1 DIF: Moderate REF: p. 52
    OBJ: 2-2 NAT: AACSB Reflective MSC: Remember

35. Which of the following is an example of improved managerial control and decision making under the activity-based resource usage model?
    a. knowing the best way to use excess activity capacity in the system
    b. maximizing individual unit performance
    c. increasing the allocation of costs
    d. focusing on managing costs rather than activities

    ANS: A PTS: 1 DIF: Difficult REF: p. 52
    OBJ: 2-2 NAT: AACSB Reflective MSC: Remember

36. What is the term for the efficient level of activity performance?
    a. activity capacity
    b. practical capacity
    c. unused capacity
    d. acquired capacity

    ANS: B PTS: 1 DIF: Easy REF: p. 53
    OBJ: 2-2 NAT: AACSB Reflective MSC: Remember

37. If all the activity capacity acquired is not used, what is this an example of?
    a. practical capacity
    b. activity capacity
    c. unused capacity
    d. ideal capacity

    ANS: C PTS: 1 DIF: Easy REF: p. 53
    OBJ: 2-2 NAT: AACSB Reflective MSC: Remember

38. What is not a characteristic of flexible resources?
    a. They are supplied as needed.
    b. They are acquired from outside sources and do not require a long-term commitment.
    c. They have no unused capacity.
    d. They are supplied in advance of usage.

    ANS: D PTS: 1 DIF: Easy REF: p. 53
    OBJ: 2-2 NAT: AACSB Reflective MSC: Remember

39. What is characteristic of committed resources?
    a. They are supplied as needed.
    b. They are acquired from outside sources and do not require a long-term commitment.
    c. They may exceed the demand for their usage.
    d. They are free to purchase as much or as little as is needed.

    ANS: C PTS: 1 DIF: Easy REF: p. 53
    OBJ: 2-2 NAT: AACSB Reflective MSC: Remember

40. Which of the following is an example of a committed fixed expense?
    a. depreciation on a factory building
    b. supervisor's salary
    c. direct labour
    d. insurance on a building

    ANS: A PTS: 1 DIF: Moderate REF: p. 53
    OBJ: 2-2 NAT: AACSB Reflective MSC: Higher Order

41. What type of expense results when organizations acquire many multi-period service capacities by paying cash up front or by entering into an explicit contract that requires periodic cash payments?
    a. managed fixed expenses
    b. committed fixed expenses
    c. discretionary fixed expenses
    d. period expenses

    ANS: B PTS: 1 DIF: Moderate REF: p. 53
    OBJ: 2-2 NAT: AACSB Reflective MSC: Remember

42. What is acquired from outside sources, where the terms of acquisition do NOT require any long-term commitment for any given amount of the resource?
    a. flexible resources
    b. committed resources
    c. discretionary fixed expenses
    d. committed fixed expenses

    ANS: A PTS: 1 DIF: Moderate REF: p. 53
    OBJ: 2-2 NAT: AACSB Reflective MSC: Remember

43. What type of incurred cost provides long-term activity capacity, usually as the result of strategic planning?
    a. discretionary fixed expenses
    b. committed fixed expenses
    c. mixed costs
    d. step-variable costs

    ANS: B PTS: 1 DIF: Moderate REF: p. 53
    OBJ: 2-2 NAT: AACSB Reflective MSC: Remember

44. Which of the following is an example of a discretionary fixed expense?
    a. direct labour
    b. depreciation on a factory building
    c. insurance on a building
    d. property taxes on a factory building

ANS: C PTS: 1 DIF: Moderate REF: p. 53
OBJ: 2-2 NAT: AACSB Reflective MSC: Higher Order

45. What type of cost is incurred for the acquisition of short-run activity capacity, usually as the result of yearly planning?
    a. discretionary fixed expenses
    b. committed fixed expenses
    c. mixed costs
    d. step-variable costs

ANS: A PTS: 1 DIF: Moderate REF: p. 53
OBJ: 2-2 NAT: AACSB Reflective MSC: Remember

46. A hospital requires one nurse for each eight patients. What type of cost is this an example of?
    a. a fixed cost
    b. a variable cost
    c. a step cost
    d. a mixed cost

ANS: C PTS: 1 DIF: Moderate REF: p. 55
OBJ: 2-2 NAT: AACSB Analytic MSC: Higher Order

47. Which of the following is an example of a step-fixed cost?
    a. cost of disposable surgical scissors, which are purchased in increments of 100
    b. cost of soaking solution to clean jewellery (each jar can soak 50 rings before losing effectiveness)
    c. cost of tuition at $300 per credit hour up to 15 credit hours (hours taken in excess of 15 hours are free)
    d. cost of disposable gowns used by patients in a hospital

ANS: A PTS: 1 DIF: Difficult REF: p. 55
OBJ: 2-2 NAT: AACSB Analytic MSC: Higher Order

48. What are salaries paid to shift supervisors an example of?
    a. step-variable cost
    b. step-fixed cost
    c. variable cost
    d. mixed cost

ANS: B PTS: 1 DIF: Moderate REF: p. 55
OBJ: 2-2 NAT: AACSB Analytic MSC: Remember

A company usually processes 20,000 orders at a total cost of $300,000. During the year, only 16,000 orders were processed.

49. Refer to the figure. What is the cost of unused activity?
    a. $30
    b. $60,000
    c. $240,000
    d. $300,000

    ANS: B
    SUPPORTING CALCULATIONS:
    ($300,000/20,000) × 4,000 = $60,000

    PTS: 1 DIF: Moderate REF: p. 56 OBJ: 2-2
    NAT: AACSB Analytic MSC: Higher Order

50. Refer to the figure. What is the cost of resource usage?
    a. $30
    b. $60,000
    c. $240,000
    d. $300,000

    ANS: C
    SUPPORTING CALCULATIONS:
    ($300,000/20,000) × $16,000 = $240,000

    PTS: 1 DIF: Moderate REF: p. 56 OBJ: 2-2
    NAT: AACSB Analytic MSC: Higher Order

    Mork Company has four process engineers that are each able to process 1,500 design changes. Last year 5,250 design changes were produced by the four engineers. Each engineer is paid $60,000 per year.

51. Refer to the figure. What is the activity rate per change order?
    a. $4 per change order
    b. $10 per change order
    c. $15 per change order
    d. $40 per change order

    ANS: D
    activity rate = (4 × 60,000)/(4 × 1,500) = $40 per change order

    PTS: 1 DIF: Moderate REF: p. 56 OBJ: 2-2
    NAT: AACSB Analytic MSC: Higher Order

52. Refer to the figure. What is the unused capacity?
    a. 750 change orders
    b. 1,375 change orders
    c. 2,000 change orders
    d. 4,000 change orders

    ANS: A
    Total capacity availability – actual activity = unused capacity
    (4 × 1,500) – 5,250 = 750 change orders

    PTS: 1 DIF: Moderate REF: p. 56 OBJ: 2-2
    NAT: AACSB Analytic MSC: Higher Order

53. Refer to the figure. What is the unused capacity in dollars?
    a. $15,000
    b. $30,000
    c. $60,000
    d. $240,000

    ANS: B
    unused capacity × activity rate = unused capacity in dollars
    750 × $40 = $30,000

    PTS: 1 DIF: Moderate REF: p. 56 OBJ: 2-2
    NAT: AACSB Analytic MSC: Higher Order

54. Which of the following is NOT a method of determining cost behaviour?
    a. industrial engineering method
    b. account analysis method
    c. statistical and quantitative methods
    d. confidence interval model

    ANS: D PTS: 1 DIF: Moderate REF: p. 57
    OBJ: 2-3 NAT: AACSB Reflective MSC: Remember

55. Which cost behaviour method may use time and motion studies to determine the activities and amounts for cost behaviour analysis?
    a. account analysis method
    b. industrial engineering method
    c. regression analysis
    d. high-low method

    ANS: B PTS: 1 DIF: Moderate REF: p. 57
    OBJ: 2-3 NAT: AACSB Analytic MSC: Remember

56. Which of the following decision-making tools would NOT be useful in determining the slope and intercept of a mixed cost?
    a. linear programming
    b. least-squares method
    c. high-low method
    d. scattergraphs

    ANS: A PTS: 1 DIF: Moderate REF: p. 57
    OBJ: 2-3 NAT: AACSB Analytic MSC: Remember

57. In the formula Y = F + VX, what does VX refer to?
    a. the total variable costs
    b. the intercept
    c. the dependent variable
    d. the independent variable

    ANS: A PTS: 1 DIF: Easy REF: p. 57
    OBJ: 2-3 NAT: AACSB Analytic MSC: Remember

58. In the formula Y = F + VX, what does V refer to?
    a. the slope
    b. the intercept
    c. the dependent variable
    d. the total variable costs

    ANS: A PTS: 1 DIF: Easy REF: p. 57
    OBJ: 2-3 NAT: AACSB Analytic MSC: Remember

59. In the formula Y = F + VX, what does Y refer to?
    a. the slope
    b. the intercept
    c. the dependent variable
    d. the independent variable

    ANS: C PTS: 1 DIF: Easy REF: p. 57
    OBJ: 2-3 NAT: AACSB Analytic MSC: Remember

60. In the formula Y = F + VX, what does X refer to?
    a. the slope
    b. the intercept
    c. the dependent variable
    d. the independent variable

    ANS: D PTS: 1 DIF: Easy REF: p. 57
    OBJ: 2-3 NAT: AACSB Analytic MSC: Remember

61. In the formula Y = F + VX, what does F refer to?
    a. the slope
    b. the intercept
    c. the dependent variable
    d. the independent variable

    ANS: B PTS: 1 DIF: Easy REF: p. 57
    OBJ: 2-3 NAT: AACSB Analytic MSC: Remember

62. If at a given volume total costs and fixed costs are known, how are the variable costs per unit computed?
    a. (Total costs – Fixed costs)/Unit volume
    b. (Total costs/Unit volume) – Fixed costs
    c. (Total costs × Unit volume) – (Fixed costs/Unit volume)
    d. Total costs – (Fixed costs/Unit volume)

    ANS: A PTS: 1 DIF: Easy REF: p. 57
    OBJ: 2-3 NAT: AACSB Analytic MSC: Higher Order

63. How are total costs computed?
    a. Fixed costs + (Variable costs per unit × Unit volume)
    b. (Fixed costs per unit × Unit volume) + Variable costs
    c. Fixed costs per unit + (Variable costs per unit × Unit volume)
    d. (Fixed costs per unit × Unit volume) + Variable costs per unit

    ANS: A PTS: 1 DIF: Easy REF: p. 57
    OBJ: 2-3 NAT: AACSB Analytic MSC: Higher Order

64. English Corporation analyzed the relationship between total factory overhead and changes in direct labour hours. It found the following:

Y = $6,000 + $6X

What is the Y in the equation an estimate of?
a. total variable costs
b. total direct labour hours
c. total factory overhead
d. total fixed costs

ANS: C PTS: 1 DIF: Easy REF: p. 57
OBJ: 2-3 NAT: AACSB Analytic MSC: Remember

65. Assume the following information:

Volume	**Total Cost**
80 units	$1,200
88 units	$1,300
96 units	$1,400

What is the variable cost per unit?
a. $12.50
b. $13.75
c. $14.78
d. $15.00

ANS: A
SUPPORTING CALCULATIONS:
($1,400 – $1,300)/(96 – 88) = $12.50

PTS: 1 DIF: Moderate REF: p. 59 OBJ: 2-3
NAT: AACSB Analytic MSC: Higher Order

66. The following cost functions were developed for manufacturing overhead costs:

Manufacturing Overhead Cost	**Cost Function**
Electricity	$200 + $20 per direct labour hour
Maintenance	$400 + $30 per direct labour hour
Supervisors' salaries	$20,000 per month
Indirect materials	$16 per direct labour hour

If June production is expected to be 2,000 units requiring 3,000 direct labour hours, what would be the estimated manufacturing overhead costs?

a. $20,733
b. $152,600
c. $198,000
d. $218,600

ANS: D
SUPPORTING CALCULATIONS:

Electricity [$200 + ($20 × 3,000)]	$ 60,200
Maintenance [$400 + ($30 × 3,000)]	90,400
Supervisors' salaries	20,000
Indirect materials ($16 × 3,000)	48,000
Overhead	$218,600

PTS: 1 DIF: Moderate REF: p. 59 OBJ: 2-3
NAT: AACSB Analytic MSC: Higher Order

67. Which of the following is NOT an advantage of the method of least squares over the high-low method?
a. A statistical method is used to mathematically derive the cost function.
b. Only two points are used to develop the cost function.
c. The squared differences between actual observations and the line (cost function) are minimized.
d. All the observations have an effect on the cost function.

ANS: B PTS: 1 DIF: Difficult REF: p. 57
OBJ: 2-3 NAT: AACSB Reflective MSC: Remember

68. Which of the following is NOT a weakness of the high-low method?
a. Only two observations are used to develop the cost function.
b. The high and low activity levels may not be representative.
c. The method does not detect if the cost behaviour is nonlinear.
d. The method is relatively complex and difficult to apply.

ANS: D PTS: 1 DIF: Difficult REF: p. 57
OBJ: 2-3 NAT: AACSB Reflective MSC: Remember

69. Under what circumstances might the high-low method give unsatisfactory results?
a. if the data points all fall on a line
b. if volume of activity is heavy
c. if volume of activity is light
d. if the points are unrepresentative

ANS: D PTS: 1 DIF: Moderate REF: p. 57
OBJ: 2-3 NAT: AACSB Reflective MSC: Remember

70. What is characteristic of the scatterplot method of cost estimation?
    a. The scatterplot method is influenced by extreme observations.
    b. The scatterplot method requires the use of judgment.
    c. The scatterplot method uses the least-squares method.
    d. The scatterplot method is superior to other methods in its ability to distinguish between discretionary and committed fixed costs.

    ANS: B PTS: 1 DIF: Difficult REF: p. 58
    OBJ: 2-3 NAT: AACSB Analytic MSC: Remember

71. Which of the following is an advantage of using the scatterplot method over the high-low method to estimate costs?
    a. It is a statistical method to determine the "best fit."
    b. A cost analyst can review the data visually and eliminate outliers.
    c. The cost formula relies on the objective judgment of the analyst.
    d. The cost formula can be determined simply by looking at two points of data.

    ANS: B PTS: 1 DIF: Difficult REF: p. 58
    OBJ: 2-3 NAT: AACSB Reflective MSC: Remember

    The following information is available for electricity costs for the last six months of the year:

Month	Production Volume	Electricity Costs
July	1,400	$2,200
August	2,800	5,400
September	3,200	5,700
October	1,750	3,900
November	1,200	2,400
December	2,100	4,050

72. Refer to the figure. Using the high-low method, what is the estimated variable cost per unit of production?
    a. $1.26
    b. $1.53
    c. $1.65
    d. $1.75

    ANS: C
    SUPPORTING CALCULATIONS:
    ($5,700 – $2,400)/(3,200 – 1,200) = $1.65

    PTS: 1 DIF: Difficult REF: p. 59 OBJ: 2-3
    NAT: AACSB Analytic MSC: Higher Order

73. Refer to the figure. What are the fixed costs?
    a. $100
    b. $200
    c. $420
    d. $5,400

    ANS: C
    $2,400 = FC + $1.65(1,200)
    FC = $2,400 – $1,980 = $420

    PTS: 1 DIF: Difficult REF: p. 59 OBJ: 2-3
    NAT: AACSB Analytic MSC: Higher Order

74. The following information was available about supplies cost for the second quarter of the year:

Month	Production Volume	Supplies Cost
April	700	$3,185
May	1,600	7,100
June	600	2,700

Using the high-low method, what is the estimate of supplies cost at 1,000 units of production?
a. $2,700
b. $4,460
c. $4,900
d. $7,100

ANS: B
SUPPORTING CALCULATIONS:
Variable cost = ($7,100 – $2,700)/(1,600 – 600) = $4.40
Fixed cost = $7,100 – (1,600 × $4.40) = $60
Total cost = $60 + $4.40X = $60 + ($4.40 × 1,000) = $4,460

PTS: 1 DIF: Difficult REF: p. 59 OBJ: 2-3
NAT: AACSB Analytic MSC: Higher Order

75. Baker Enterprises developed a cost function for manufacturing overhead costs of Y = $8,000 + $1.60X. What are the estimated manufacturing overhead costs at 10,000 units of production?
a. $16,000
b. $17,600
c. $24,000
d. $26,000

ANS: C
SUPPORTING CALCULATIONS:
Y = $8,000 + ($1.60 × 10,000) = $24,000

PTS: 1 DIF: Moderate REF: p. 59 OBJ: 2-3
NAT: AACSB Analytic MSC: Higher Order

76. Greene Enterprises has the following information about its truck fleet miles and operating costs:

Year	Miles	Operating Costs
2010	400,000	$256,000
2011	480,000	280,000
2012	560,000	320,000

What is the best estimate of total costs using the high-low method if the expected fleet mileage for 2008 is 500,000 miles?

a. $256,000
b. $288,000
c. $296,000
d. $320,000

ANS: C
SUPPORTING CALCULATIONS:
($320,000 – $256,000)/(560,000 – 400,000) = $0.40 per mile
Fixed costs = $320,000 – (560,000 × $0.40) = $96,000
Total costs = $96,000 + ($0.40 × 500,000) = $296,000

PTS: 1 DIF: Difficult REF: p. 59 OBJ: 2-3
NAT: AACSB Analytic MSC: Higher Order

77. Hook Company wants to develop a cost estimating equation for its monthly cost of electricity. It has the following data:

Month	Cost of Electricity	Direct Labour Hours
January	$ 8,100	750
April	9,000	850
July	10,200	1,000
October	8,700	800

Using the high-low method, which of the following is the best equation?

a. Y = $900 + $8.40X
b. Y = $900 + $12.00X
c. Y = $1,800 + $8.40X
d. Y = $2,400 + $8.40X

ANS: C
SUPPORTING CALCULATIONS:
($10,200 – $8,100)/(1,000 – 750) = $8.40
Fixed costs = $10,200 – (1,000 × $8.40) = $1,800

PTS: 1 DIF: Moderate REF: p. 59 OBJ: 2-3
NAT: AACSB Analytic MSC: Higher Order

78. Kane Corporation found its maintenance cost and sales dollars to be somewhat correlated. Last year's high and low observations were as follows:

Maintenance Cost	Sales
$36,000	$400,000
$42,000	$600,000

What is the fixed portion of the maintenance cost?

a. $12,000
b. $24,000
c. $30,000
d. $42,000

ANS: B
SUPPORTING CALCULATIONS:
($42,000 – $36,000)/($600,000 – $400,000) = 0.03
Fixed costs = $42,000 – (0.03 × $600,000) = $24,000

PTS: 1 DIF: Moderate REF: p. 59 OBJ: 2-3
NAT: AACSB Analytic MSC: Higher Order

Lee Corporation manufactures and sells party items. The following representative direct labour hours and production costs are provided for a four-month period:

Month	Direct Labour Hours	Production Costs
January	3,600	$15,000
February	4,800	17,500
March	6,000	20,000
April	4,800	17,500
Total	19,200	$70,000

Let a = Fixed production costs per month
b = Variable production costs per direct labour hour
n = Number of months
X = Direct labour hours per month
Y = Total monthly production costs
S = Summation

79. Refer to the figure. How can the monthly production cost be expressed?

a. $X = aY + b$
b. $Y = a + bX$
c. $X = a + bY$
d. $Y = b + aX$

ANS: B PTS: 1 DIF: Easy REF: p. 59
OBJ: 2-3 NAT: AACSB Analytic MSC: Higher Order

80. Refer to the figure. Using the high-low method, what is the cost formula for estimating costs?
    a. Total cost = $2.08X
    b. Total cost = $5,000 + 2.08X
    c. Total cost = $7,500 + $2.08X
    d. Total cost = $20,000 + $2.08X

    ANS: C
    ($20,000 – $15,000)/(6,000 – 3,600) = 2.0833
    $20,000 = FC + (6,000 × 2.08)= $7,500

    PTS: 1 DIF: Difficult REF: p. 59 OBJ: 2-3
    NAT: AACSB Analytic MSC: Higher Order

81. Refer to the figure. What would the cost be for 5,000 labour hours?
    a. $16,667
    b. $17,700
    c. $17,900
    d. $30,400

    ANS: C
    Y = $7,500 + 2.08(5,000) = $17,900

    PTS: 1 DIF: Difficult REF: p. 59 OBJ: 2-3
    NAT: AACSB Analytic MSC: Higher Order

The following computer printout estimated overhead costs using regression:

Parameter	*t* for H(0) Estimate	Parameter = 0	Pr > *t*	Std. Error of Parameter
Intercept	100.41	4.81	0.0003	20.88
DLH	14.05	6.78	0.0001	2.07

R Square (R^2)	0.80
Standard Error (S_e)	25.03
Observations	17

Degrees of Freedom	90%	95%	99%	Degrees of Freedom	90%	95%	99%
1	6.314	12.708	63.657	11	1.796	2.201	3.106
2	2.920	4.303	9.925	12	1.782	2.179	3.055
3	2.353	3.182	5.841	13	1.771	2.160	3.055
4	2.132	2.776	4.604	14	1.761	2.145	3.012
5	2.015	2.571	4.032	15	1.753	2.131	2.947
6	1.943	2.447	3.707	16	1.746	2.120	2.921
7	1.895	2.365	3.499	17	1.740	2.110	2.898
8	1.860	2.306	3.355	18	1.734	2.101	2.878
9	1.833	2.262	3.250	19	1.729	2.093	2.861
10	1.812	2.228	3.169	20	1.725	2.086	2.845

During the last accounting period 10,000 DLH were worked.

82. Refer to the figure. What is the model?
    a. Overhead = 100.41 + 14.05 DLH
    b. Overhead = 4.81 + 6.78 DLH
    c. Overhead = 14.05 + 100.41 DLH
    d. DLH = 4.81 + 6.78 Overhead

    ANS: A PTS: 1 DIF: Moderate REF: p. 63
    OBJ: 2-3 NAT: AACSB Analytic MSC: Higher Order

83. Refer to the figure. What does the coefficient of determination in this model indicate?
    a. The slope is 14.05, which is the variable costs.
    b. The intercept is 100.41, which is the fixed costs.
    c. Eighty percent of the variation in overhead variable is explained by DLH.
    d. The slope is 14.05 and it is significant.

    ANS: C PTS: 1 DIF: Moderate REF: p. 65
    OBJ: 2-4 NAT: AACSB Analytic MSC: Higher Order

84. Refer to the figure. What do the hypothesis tests of the cost parameters indicate?
    a. The slope is significantly different from zero.
    b. The intercept is significantly different from zero.
    c. Both the slope and intercept are not significant.
    d. Both the slope and intercept are significant.

    ANS: B PTS: 1 DIF: Moderate REF: p. 65
    OBJ: 2-4 NAT: AACSB Analytic MSC: Remember

85. Refer to the figure. What is the *t*-value for a 90 percent confidence level?
    a. 1.740
    b. 1.753
    c. 2.920
    d. 6.314

    ANS: B
    degrees of freedom = # of observations – # of variables
    15 = 17 – 2
    the *t*-value for 15 degrees of freedom at 90% = 1.753

    PTS: 1 DIF: Difficult REF: p. 65 OBJ: 2-4
    NAT: AACSB Analytic MSC: Higher Order

86. .Refer to the figure. What is the confidence interval for the predicted overhead cost rounded to the nearest whole number for a 90 percent confidence level?
    a. predicted value between 75,600 and 125,600
    b. predicted value between 100,557 and 100,644
    c. predicted value between 100,600 and 175,648
    d. predicted value between 175,648 and 200,000

    ANS: B
    the *t*-value for 15 degrees of freedom at 90% = 1.753
    predicted cost = Y = 100.41 + 14.05(10,000 DLH) = 100,600.41

    confidence interval = predicted cost + (*t*-value × standard error)

    = 100,600.41 + (1.753 × 25.03)
    = 100,600.41 + 43.88
    100,557 – predicted value – 100,644

    PTS: 1 DIF: Difficult REF: p. 65 OBJ: 2-4
    NAT: AACSB Analytic MSC: Higher Order

87. The following computer printout estimated overhead costs using linear regression:

Parameter	Estimate	*t* for H(0) Parameter = 0	Pr > *t*	Std. Error of Parameter
Intercept	100.41	4.81	0.0003	20.88
DLH	14.05	6.78	0.0001	2.07

R Square (R^2)	0.80
Standard Error (S_e)	25.03
Observations	17

Table of Selected Values: *t* Distribution

Degrees of Freedom	90%	95%	99%
15	1.753	2.131	2.947
16	1.746	2.120	2.921
17	1.740	2.110	2.898
18	1.734	2.101	2.878
19	1.729	2.093	2.861

What is the interval around Y if 95 percent confidence is desired?
a. Y ± 20.024
b. Y ± 43.87759
c. Y ± 52.8133
d. Y ± 53.33893

ANS: D
SUPPORTING CALCULATIONS:
2.131 × 25.03 = 53.33893

PTS: 1 DIF: Difficult REF: p. 63 OBJ: 2-3
NAT: AACSB Analytic MSC: Higher Order

88. What is a characteristic of the cost function derived by the least-squares cost estimation method?
    a. It is linear.
    b. It is curvilinear.
    c. It is parabolic.
    d. It is quadratic.

    ANS: A PTS: 1 DIF: Easy REF: p. 64
    OBJ: 2-3 NAT: AACSB Analytic MSC: Remember

89. The following information was taken from a computer printout generated with the least-squares method for use in estimating overhead costs:

Slope	45
Intercept	5,700
Correlation coefficient	.72
Activity variable	Direct labour hours

    What is the cost formula?
    a. Overhead = $5,700 – $45X
    b. Overhead = $5,700 + $45X
    c. Overhead = $5,700 + ($45 × 0.72)
    d. Overhead = $5,700 × 0.72

    ANS: B PTS: 1 DIF: Moderate REF: p. 64
    OBJ: 2-3 NAT: AACSB Analytic MSC: Remember

90. In the method of least squares, what is the deviation?
    a. the difference between the predicted and estimated costs
    b. the difference between the predicted and average costs
    c. the difference between the predicted and budgeted costs
    d. the difference between the predicted and actual costs

    ANS: D PTS: 1 DIF: Moderate REF: p. 64
    OBJ: 2-3 NAT: AACSB Reflective MSC: Remember

    The following information is available for maintenance costs:

Month	**Production Volume**	**Maintenance Costs**
January	75	$250
February	115	310
March	190	400
April	60	240
May	135	355

91. Refer to the figure. Using the method of least squares, what would the variable cost per unit of production be (rounded to two decimal places)?
    a. $1.23
    b. $1.31
    c. $2.70
    d. $3.21

    ANS: B

Month	X	Y	XY	X^2
January	75	$ 250	$18,750	5,625
February	115	310	35,650	13,225
March	190	400	76,000	36,100
April	60	240	14,400	3,600
May	135	355	47,925	18,225
Totals	575	1,555	$192,725	76,775

$$V = \left(\sum XY - \sum X \sum Y / n\right) / \left[\sum X^2 - \left(\sum X\right)^2 / n\right]$$

= [$192,725 – (575 × $1,555/5)]/[76,775 – $(575)^2$/5]
= ($192,725 – $178,825)/(76,775 – 66,125)
= $13,900/10,650
= $1.31

PTS: 1 DIF: Difficult REF: p. 64 OBJ: 2-3
NAT: AACSB Analytic MSC: Higher Order

92. Refer to the figure. Using the method of least squares, what would the fixed portion of maintenance costs be (rounded to dollars)?
    a. $66
    b. $160
    c. $166
    d. $575

    ANS: B

$$F = \left(\sum Y / n - v \sum X / n\right)$$

$$= \left[\$1,555/5 - (\$1.31 \times 575/5)\right]$$

$$= \$311 - \$150.65 = \$160.35 \text{ or } \$160 \text{ (rounded)}$$

PTS: 1 DIF: Difficult REF: p. 64 OBJ: 2-3
NAT: AACSB Analytic MSC: Higher Order

93. Refer to the figure. Using the method of least squares, what would be the maintenance costs at 100 units of production?
    a. $291
    b. $321
    c. $336
    d. $698

    ANS: A
    Y = $160 + $1.31X
    = $160 + ($1.31 × 100)
    = $291

    PTS: 1 DIF: Difficult REF: p. 64 OBJ: 2-3
    NAT: AACSB Analytic MSC: Higher Order

94. The following computer printout estimated overhead costs using regression:

Parameter	Estimate	*t* for H(0) Parameter = 0	Pr > *t*	Std. Error of Parameter
Intercept	100.41	4.81	0.0003	20.88
DLH	14.05	6.78	0.0001	2.07

R Square (R^2)	0.80
Standard Error (S_e)	25.03
Observations	17

    What is the 95 percent confidence interval around the slope estimate?
    a. 9.57 to 18.54
    b. 9.64 to 18.46
    c. 10.67 to 17.45
    d. 11.98 to 16.13

    ANS: B PTS: 1 DIF: Difficult REF: p. 64
    OBJ: 2-4 NAT: AACSB Analytic MSC: Higher Order

95. What is the hypothesis test of cost parameters?
    a. It is not tested by the *t*-statistic.
    b. It indicates whether the parameters are different from zero.
    c. It tells the *t*-value of the significance achieved.
    d. It ensures that the cost function is useable.

    ANS: B PTS: 1 DIF: Easy REF: p. 65
    OBJ: 2-4 NAT: AACSB Reflective MSC: Remember

96. What is the coefficient of determination?
    a. It is a measure of the variability of actual costs around the cost-estimating equation.
    b. It is used to construct probability intervals for cost estimates.
    c. It is a standardized measure of the degree to which two variables move together.
    d. It is a measure of the percentage variation in the dependent variable that is explained by the cost estimating equation.

    ANS: D PTS: 1 DIF: Moderate REF: p. 65
    OBJ: 2-4 NAT: AACSB Reflective MSC: Remember

97. What does a coefficient of determination of 0.91 indicate?
    a. Ninety-one percent of the variables move together in the same direction and have a strong relationship.
    b. The parameter is 91 percent significant.
    c. The model is significant 91 percent of the time.
    d. The independent variable explains 91 percent of the cost.

    ANS: D PTS: 1 DIF: Moderate REF: p. 65
    OBJ: 2-4 NAT: AACSB Analytic MSC: Remember

98. A managerial accountant has determined the following relationships between overhead and several possible bases:

Basis	**Correlation with Total Overhead**
Direct labour hours	0.842
Direct labour dollars	0.279
Machine hours	–0.837
Employee minutes in coffee breaks	–0.243

    What is the best basis for overhead application?
    a. direct labour hours
    b. coffee breaks
    c. direct labour dollars
    d. machine hours

    ANS: A PTS: 1 DIF: Moderate REF: p. 65
    OBJ: 2-4 NAT: AACSB Analytic MSC: Higher Order

99. What is the difference between a correlation equal to –1 and a correlation equal to 0?
    a. A correlation equal to –1 means two alternatives are moving in the same direction, whereas a correlation of 0 means they are moving in opposite directions.
    b. A correlation equal to –1 means two alternatives are moving in the same direction, whereas a correlation of 0 means they are unrelated.
    c. A correlation equal to –1 means two alternatives are moving in opposite directions, whereas a correlation of 0 means they are moving in the same direction.
    d. A correlation equal to –1 means two alternatives are moving in opposite directions, whereas a correlation of 0 means they are unrelated.

    ANS: D PTS: 1 DIF: Difficult REF: p. 65
    OBJ: 2-4 NAT: AACSB Analytic MSC: Remember

100. What is the difference between a correlation equal to –1 and a correlation equal to +1?
    a. A correlation equal to –1 means two alternatives are moving in the same direction, whereas a correlation of +1 means they are moving in opposite directions.
    b. A correlation equal to –1 means two alternatives are moving in the same direction, whereas a correlation of +1 means they are unrelated.
    c. A correlation equal to –1 means two alternatives are moving in opposite directions, whereas a correlation of +1 means they are moving in the same direction.
    d. A correlation equal to –1 means two alternatives are moving in opposite directions, whereas a correlation of +1 means they are unrelated.

    ANS: C PTS: 1 DIF: Difficult REF: p. 65
    OBJ: 2-4 NAT: AACSB Analytic MSC: Remember

101. What is the appropriate range for the coefficient of correlation (r)?
   a. $0 \le r \le 1$
   b. $-\% \le r \le +\%$
   c. $-1 \le r \le 1$
   d. $-1 \le r \le +\%$

ANS: C PTS: 1 DIF: Moderate REF: p. 65
OBJ: 2-3 NAT: AACSB Analytic MSC: Remember

102. What does a correlation coefficient near +1 mean?
   a. Two variables are moving in the opposite direction.
   b. Two variables are moving in the same direction.
   c. Two variables are unrelated.
   d. One variable is not a good predictor of the other.

ANS: B PTS: 1 DIF: Moderate REF: p. 65
OBJ: 2-3 NAT: AACSB Analytic MSC: Remember

103. What does a correlation coefficient near 0 mean?
   a. Two variables are moving in the opposite direction.
   b. Two variables are moving in the same direction.
   c. Two variables are unrelated.
   d. One variable is a good predictor of the other.

ANS: C PTS: 1 DIF: Moderate REF: p. 65
OBJ: 2-3 NAT: AACSB Analytic MSC: Remember

104. What does a correlation coefficient near –1 mean?
   a. Two variables are moving in the opposite direction.
   b. Two variables are moving in the same direction.
   c. Two variables are unrelated.
   d. One variable is not a good predictor of the other.

ANS: A PTS: 1 DIF: Moderate REF: p. 65
OBJ: 2-3 NAT: AACSB Analytic MSC: Remember

105. Which of the following statements is NOT true?
   a. In selecting an independent variable for cost behaviour analysis, it is important to determine the activity that causes the cost being analyzed to occur.
   b. Professional judgment is very important in selecting an activity measure for a particular cost.
   c. A low correlation between two variables proves that one causes the other.
   d. The least-squares cost estimation method can be used to measure the linear function.

ANS: C PTS: 1 DIF: Difficult REF: p. 65
OBJ: 2-4 NAT: AACSB Reflective MSC: Remember

106. What is the confidence interval for the predicted value of Y?
   a. It is constructed by multiplying the *t*-statistic times the standard error.
   b. It is a measure of the likelihood that the prediction interval will not contain the actual cost.
   c. It provides a 95 percent confidence level.
   d. It is constructed by deciding the *t*-statistic times the standard error.

ANS: A PTS: 1 DIF: Easy REF: p. 65
OBJ: 2-4 NAT: AACSB Analytic MSC: Remember

107. What is the method for understanding cost behaviour that generally classifies general ledger entries into fixed, variable, and mixed?
a. account analysis method
b. multiple regression method
c. industrial engineering method
d. learning curve method

ANS: A PTS: 1 DIF: Moderate REF: p. 66
OBJ: 2-5 NAT: AACSB Reflective MSC: Remember

108. Parker Corp. has developed the following information on product costs and inventories for a three-month period:

	January	**February**	**March**
Finished goods inventory, units:			
Beginning	15	20	25
Manufactured	30	45	40
Available	45	65	65
Sold	25	40	50
Ending	20	25	15
Manufacturing costs	$3,000		$5,000
$4,500			

Based on managerial judgment, what is the best predictor of manufacturing costs?
a. beginning inventory
b. units manufactured
c. ending inventory
d. units available

ANS: B PTS: 1 DIF: Moderate REF: p. 67
OBJ: 2-5 NAT: AACSB Analytic MSC: Higher Order

109. If an automobile manufacturer changes from skilled labour to computer-controlled assembly procedures, of what use is the past data?
   a. They are useful in predicting future costs.
   b. They are of little or no value in predicting future costs.
   c. They are representative of future costs.
   d. They should be used without adjustments to predict future costs.

ANS: B PTS: 1 DIF: Moderate REF: p. 67
OBJ: 2-5 NAT: AACSB Analytic MSC: Higher Order

The following computer printout estimated overhead costs using multiple regression:

Parameter	Estimate	*t* for H(0) Parameter = 0	Pr > *t*	Std. Error of Parameter
Intercept	1000	1.96	0.0250	510.204
Setup hours	25	81.96	0.0001	0.305
# of parts	100	9.50	0.0001	10.527

R Square (R^2)	0.94
Standard Error (S_e)	75.00
Observations	160

During the year the company used 1,000 setup hours and 500 parts.

110. Refer to the figure. What are the degrees of freedom for the model?
   a. 157
   b. 158
   c. 159
   d. 160

ANS: A PTS: 1 DIF: Moderate REF: p. 69
OBJ: 2-6 NAT: AACSB Analytic MSC: Higher Order

111. Refer to the figure. Which slope and intercept parameters are not significant at the 0.05 level?
   a. intercept
   b. setup hours
   c. number of parts
   d. standard error

ANS: D PTS: 1 DIF: Difficult REF: p. 69
OBJ: 2-6 NAT: AACSB Analytic MSC: Higher Order

112. Refer to the figure. What model is being measured?
   a. Overhead = 0.98 + 40.98(Setup hours) + 4.865(# of parts)
   b. Overhead = 510 + 0.305(Setup hours) + 10.527(# of parts)
   c. Overhead = 1,000 + 25(Setup hours)
   d. Overhead = 1,000 + 25(Setup hours) + 100(# of parts)

ANS: D PTS: 1 DIF: Difficult REF: p. 69
OBJ: 2-6 NAT: AACSB Analytic MSC: Higher Order

113. Refer to the figure. What is the predicted overhead cost?
a. $2,500
b. $25,000
c. $75,000
d. $76,000

ANS: C
overhead = 25(1,000) and 100 (500) and 1,000= $76,000

PTS: 1 DIF: Difficult REF: p. 69 OBJ: 2-6
NAT: AACSB Analytic MSC: Higher Order

114. Which of the following equations uses multiple regression?
a. Overhead = a + b(MH)
b. DL Costs = a + b(MH)
c. Overhead = a + b(DLH)
d. Overhead = a + b(DLH) + c(MH)

ANS: D PTS: 1 DIF: Easy REF: p. 69
OBJ: 2-6 NAT: AACSB Analytic MSC: Higher Order

115. What is characteristic of the learning curve?
a. The curve decreases at an increasing rate.
b. The learning effect will eventually disappear as the number of units produced increases.
c. Failure to recognize the learning curve effect will cause units produced later in a new production process to receive less cost than they should.
d. The learning curve is linear.

ANS: B PTS: 1 DIF: Difficult REF: p. 70
OBJ: 2-7 NAT: AACSB Analytic MSC: Remember

116. Abboud Company is planning to introduce a new product with an 80 percent incremental unit-time learning curve for production for batches of 1,000 units. The variable labour costs are $30 per unit for the first 1,000-unit batch. Each batch requires 100 hours. There is $10,000 in fixed costs not subject to learning. What is the cumulative total time (labour hours) to produce 2,000 units?
a. 80 hours
b. 100 hours
c. 160 hours
d. 180 hours

ANS: D
SUPPORTING CALCULATIONS:
$(100 \times 0.80) + 100 = \underline{\underline{180}}$ hours

PTS: 1 DIF: Moderate REF: p. 71 OBJ: 2-7
NAT: AACSB Analytic MSC: Higher Order

Abboud Company is planning to introduce a new product with an 80 percent learning rate for production for batches of 1,000 units. The variable labour costs are $30 per unit for the first 1,000-unit batch. Each batch requires 100 hours. There is $10,000 in fixed costs not subject to learning.

117. Refer to the figure. What is the cumulative total time (labour hours) to produce 2,000 units based on the cumulative average-time learning curve?
a. 20 hours
b. 80 hours
c. 100 hours
d. 160 hours

ANS: D
SUPPORTING CALCULATIONS:
$(100 \times 0.80) \times 2 = \underline{\underline{160}}$ hours

PTS: 1 DIF: Moderate REF: p. 71 OBJ: 2-7
NAT: AACSB Analytic MSC: Higher Order

118. Refer to the figure. What is the batch unit time (labour hours) to produce 2,000 units based on the cumulative average time learning curve?
a. 20 hours
b. 60 hours
c. 80 hours
d. 100 hours

ANS: B
SUPPORTING CALCULATIONS:
$(100 \times 0.80) \times 2 = 160$ hours $- 100 = \underline{\underline{60}}$ hours

PTS: 1 DIF: Moderate REF: p. 71 OBJ: 2-7
NAT: AACSB Analytic MSC: Higher Order

119. Refer to the figure. What is the cumulative total time using the incremental unit-time learning curve to produce 2,000 units?
a. 80
b. 90
c. 100
d. 180

ANS: D PTS: 1 DIF: Moderate REF: p. 71
OBJ: 2-7 NAT: AACSB Analytic MSC: Higher Order
NOT: .8 x 100 = 80 + 100 = 180

120. Refer to the figure. What is the cumulative average time per batch using the incremental unit-time learning curve for 2,000 units?
a. 80
b. 90
c. 100
d. 180

ANS: B PTS: 1 DIF: Moderate REF: p. 71
OBJ: 2-7 NAT: AACSB Analytic MSC: Higher Order
NOT: [(.8 x 100) + 100]/2 = 90

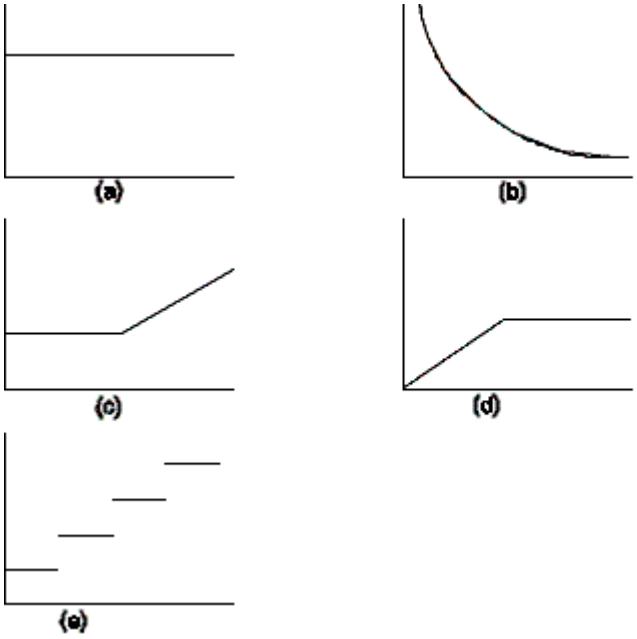
121. What is the term for the learning curve that decreases by a constant percentage each time the cumulative quantity doubles?
    a. cumulative average-time model
    b. cumulative total-time model
    c. incremental unit-time model
    d. decremental average-time model

ANS: C PTS: 1 DIF: Easy REF: p. 71
OBJ: 2-7 NAT: AACSB Reflective MSC: Higher Order

PROBLEM

1. For each of the following situations, draw a graph that best describes the cost behaviour pattern. The vertical axis represents costs, and the horizontal axis represents volume.
    a. Direct materials per unit
    b. Depreciation expense on a building per unit
    c. An employee paid $50 per hour with a guaranteed salary of $1,000 per week
    d. A consultant paid $100 per hour with a maximum fee of $2,000
    e. Salaries of teachers where each teacher can handle a maximum of 15 students

ANS:



PTS: 1 DIF: Moderate OBJ: 2-2 NAT: AACSB Analytic

2. Ross Company has the following information available regarding costs at various levels of monthly production:

Production volume	**7,000**	**10,000**
Direct materials	$ 70,000	$100,000
Direct labour	56,000	80,000
Indirect materials	21,000	30,000
Supervisors' salaries	12,000	12,000
Depreciation on plant and equipment	10,000	10,000
Maintenance	32,000	44,000
Utilities	15,000	21,000
Insurance on plant and equipment	1,600	1,600
Property taxes on plant and equipment	2,000	2,000
Total	$219,600	$300,600

a. Identify each cost as being variable, fixed, or mixed by writing the name of each cost under one of the following headings:

Variable Costs Fixed Costs Mixed Costs

b. Develop an equation for total monthly production costs.
c. Predict total costs for a monthly production volume of 8,000 units.

ANS:

a.

Variable Costs	Fixed Costs	Mixed Costs
Direct materials	Supervisors' salaries	Maintenance
Direct labour	Depreciation	Utilities
Indirect materials	Insurance	
	Property taxes	

b. Variable costs = ($300,600 – $219,600)/($10,000 – $7,000) = $27.00
Fixed costs = $300,600 – ($27.00 × 10,000) = $30,600 per month
Total monthly production costs = $30,600 + $27.00(# of units)

c. Total costs = $30,600 + ($27.00 × 8,000) = $246,600

PTS: 1 DIF: Moderate OBJ: 2-2 NAT: AACSB Analytic

3. The Valley Forge Company cost accountant wants to determine the cost behaviour for overhead. Based on observation and discussion with the plant workers, the following accounts have been identified as the most relevant: supervisor salaries and depreciation are believed to be generally be fixed; indirect labour, utilities, and purchasing are generally believed to be variable; indirect labour primarily is responsible for moving materials; utility cost is primarily caused by the electricity to run machinery; and purchasing costs are driven by the number of purchase orders. These accounts and their balances are given below:

	Indirect Labour	**Utilities**	**Purchasing**	**Supervisory Salaries**	**Depreciation on Plant and Equipment**
July	$ 28,500	$ 24,000	$ 76,400	$ 40,000	$ 13,000
August	31,600	21,200	70,800	46,000	13,000
September	33,600	25,000	75,200	64,000	13,000
October	41,400	25,000	80,400	55,600	13,000
November	40,000	25,000	79,800	50,800	13,000
December	34,000	25,000	79,400	34,000	13,000
Total	$209,100	$145,200	$ 462,000	$ 290,400	$ 78,000

Information on the activities is given below:

	# of Moves	**Machine Hours**	**Purchase Orders**
July	340	5,400	250
August	380	5,200	300
September	400	5,800	450
October	500	6,200	380
November	480	6,000	340
December	420	5,600	200
Total	2,520	34,200	1,920

i. Why did the cost accountant decide that salaries and depreciation were fixed?
ii. Calculate the average account balance for each of the five accounts and calculate the average monthly amount for each of the three drivers.
iii. Calculate the fixed overhead and variable rates for each of the costs. Write an equation for the total overhead cost.
iv. In January, 490 moves; 4,375 machine hours, and 220 purchase orders were expected. What is the amount of overhead predicted?

ANS:
i. Depreciation is fixed. Salaries is fixed because it does not vary with the drivers.

ii.	**Indirect labour**	**Utilities**	**Purchasing**	**Supervisory Salaries**	**Depreciation on Plant and Equipment**
	$78,000	$209,100	$145,200	$ 462,000	$ 290,400
Total # of months	6	6	6	6	6
AVG	$34,850	$ 24,200	$ 77,000	$ 48,400	$ 13,000

	# of moves	**Machine Hours**	**Purchase Orders**
	2,520	34,200	1,920
Total # of months	6	6	6
avg	420	5,700	320

iii. FOH = $48,400 + $13,000 = $61,400

VC = IL $34,850/420 =$82.98
Utilities = $24,200/5,700 = $4.246
Purchasing = $77,000/320 = $240.625
Total OH = $61,400 + $82.98(moves) + $4.246(MHR) + $240.625(PO)

iv. Total OH = $61,400 + $82.98(490) + $4.246(4,375) + $240.625(220) = $173,573.95

PTS: 1 DIF: Moderate OBJ: 2-2 NAT: AACSB Analytic

4. The average unit cost at a monthly volume of 9,000 units is $3, and the average unit cost at a monthly volume of 22,500 units is $2.10.

Develop an equation for total monthly costs.

ANS:

Volume	×	Average Unit Cost	=	Total Costs
9,000		$3.00	=	$27,000
22,500		2.10	=	47,250

Variable cost per unit = ($47,250 – $27,000)/(22,500 – 9,000) = $1.50

Fixed costs per month = $27,000 – ($1.50 × 9,000) = $13,500

Total monthly costs = $13,500 + $1.50(# of units)

PTS: 1 DIF: Moderate OBJ: 2-4 NAT: AACSB Analytic

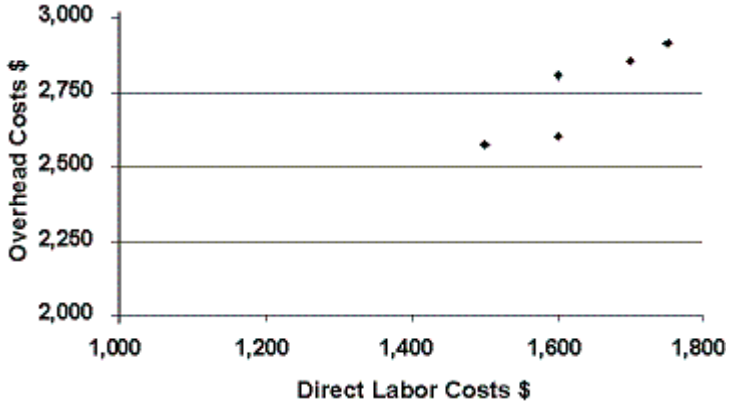
5. The Smith Company has the following cost data pertaining to the production of small desks:

Units Produced	Direct Labour Costs	Overhead Costs
150	$1,600	$2,800
120	1,500	2,570
210	1,750	2,910
190	1,700	2,850
140	1,600	2,600

a. Plot the preceding direct labour costs and overhead costs using the scatterplot method. Overhead costs should be on the vertical axis.
b. Compute the fixed and variable components of the overhead costs using the high-low method.

ANS:

a.



b. b = ($2,910 – $2,570)/(1,750 – 1,500) = 136% of DL Costs
a = $2,910 – ($1,750 × 1.36) = $530
Factory overhead costs = $530 + 1.36(DL Costs)

PTS: 1 DIF: Moderate OBJ: 2-3 NAT: AACSB Analytic

6. The following data were obtained from the books of Thomas Company:

Month	Overhead Costs	Direct Labour Hours
1	$14	3
2	18	5
3	25	7
4	12	4
5	26	8
6	8	2

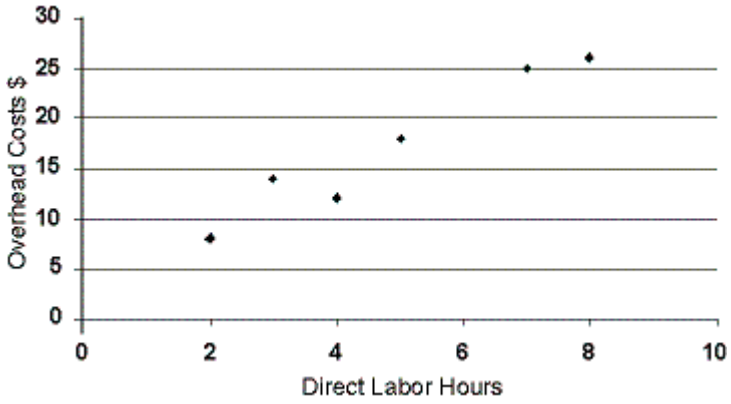
The normal equations are $\Sigma XY = a\Sigma X + b\Sigma X^2$
$\Sigma Y = an + b\Sigma X$

Use a computer or calculator to prepare the following:

a. Plot the data for overhead cost as a function of direct labour hours using the scatterplot method.
b. Compute the fixed and variable components of the overhead costs using the high-low method.
c. Compute the fixed and variable components of the overhead costs using the least-squares method.
d. Discuss the strengths and weaknesses of the three different cost estimation techniques used in parts a, b, and c.

ANS:

a.



b. b = ($26 – $8)/(8 – 2) = $3 per DLH
a = $26 – (8 × $3) = $2
Overhead costs = $2 + $3(DLH)

c.

X	Y	XY	X^2
3	14	42	9
5	18	90	25
7	25	175	49
4	12	48	16
8	26	208	64
2	8	16	4
29	103	579	167

Normal equations:
(1) 579 = 29a + 167b
(2) 103 = 6a + 29b

Multiplying (1) by 6 and (2) by 29, we get:

$$\begin{aligned} 3{,}474 &= 174a + 1{,}002b \\ -2{,}987 &= 174a + 841b \\ 487 &= 161b \end{aligned}$$

$$b = \$3.0248$$

Substituting 3.0248 into the first equation for b, we get:

$$579 = 29a + (167 \times 3.0248)$$
$$a = \$2.5468$$

The least-squares cost estimation equation is

Overhead costs = $\$2.5468 + \$3.0248(DLH)$

d. Scatterplot Method: Scattergraphs help identify representative high and low volumes. They also are useful in determining if costs can be reasonably approximated by a straight line. Scattergraphs are simple to use, but professional judgment is required to draw a representative straight line through the plot of historical data. This method is subjective in nature and probability intervals cannot be developed.

   High-Low Method: This method uses data from two time periods to estimate fixed and variable costs. This is a good method to use when data is limited. It is a subjective method and probability intervals cannot be developed. It is very important that the high and low volumes represent the normal operating conditions of all observations. Again, professional judgment is required to select the appropriate data.

   Least-Squares Method: This method uses all available data. It uses a mathematical criterion, which provides for an objective approach to cost estimation. In addition, this method can provide information on how good the cost estimating equation fits the historical cost data and information needed to construct probability intervals for cost estimates. It also can be used to develop equations that are not linear in nature. This method requires more data points than the high-low or scatterplot methods.

PTS: 1 DIF: Moderate OBJ: 2-3 NAT: AACSB Analytic

7. Machine hours and electricity costs for Wells Industries for the year 2011 are as follows:

Month	Machine Hours	Electricity Costs
January	2,000	$ 9,200
February	2,320	10,500
March	1,520	6,750
April	2,480	11,500
May	3,040	14,125
June	2,640	11,000
July	3,280	12,375
August	2,800	11,375
September	1,600	7,750
October	2,960	13,000
November	3,760	15,500
December	3,360	13,875

a. Using the high-low method, develop an estimate of variable electricity costs per machine hour.
b. Using the high-low method, develop an estimate of fixed electricity costs per month.
c. Using the high-low method, develop a cost function for monthly electricity costs.
d. Estimate electricity costs for a month in which 3,000 machine hours are worked.

ANS:

a. $3.91 [($15,500 – $6,750)/(3,760 – 1,520)]
b. $798.40 [$15,500 – ($3.91 × 3,760)]
c. Y = $798.40 + $3.91X, or
   Electricity costs = $798.40 + ($3.91 × Machine hours)
d. $12,528.40 [$798.40 + ($3.91 × 3,000)]

PTS: 1 DIF: Moderate OBJ: 2-3 NAT: AACSB Analytic

8. Given the following information:

Month	HR Dept Costs	# New Hires	# Terminations
January	$785,000	444	137
February	$569,000	276	250
March	$603,000	219	138
April	$445,000	343	99
May	$463,000	355	75
June	$489,000	298	83
July	$400,000	196	47
August	$423,000	258	92
September	$469,000	307	101
October	$538,000	389	175
November	$667,000	402	23
December	$403,000	361	10

a. Calculate an estimate of HR department costs using the high-low method using number of new hires as the variable parameter.
b. Calculate an estimate of HR department costs using the high-low method using number of terminations as the variable parameter.
c. Which parameter do you feel is a better driver of HR cost?

ANS:
Solution:
a. Variable using New Hires = ($785,000 – 400,000)/(444 – 196) = $1,552.42
b. Variable using Terminations = ($785,000 – 400,000)/(137 – 47) = $4,277.78

a. Fixed using new hires = $785,000 – (444 × $1,552.42) = $95,725.52
b. Fixed using terminations = $785,000 – (137 × $4,277.78) = $198,944.14
c.There is no good way to determine which driver is a better predictor of HR costs in a given period. Using a regression analysis is the best way to determine if your parameters correlate to the prediction of overall cost.

PTS: 1 DIF: Moderate OBJ: 2-3 NAT: AACSB Analytic

9. The plant manager requested information to assist in estimating maintenance costs. The following computer printout was generated using the least-squares method:

Intercept	2,550
Slope	1.85
Correlation coefficient	0.84
Activity variable	Units of production volume

a. Using the information from the computer printout, develop a cost function that can be used to estimate maintenance costs at different volume levels.
b. Estimate maintenance costs if expected production for next month is 10,000 units.

ANS:
a. Total maintenance costs = $2,550 + $1.85X
b. Total maintenance costs = $2,550 + ($1.85 × 10,000) = $21,050

PTS: 1 DIF: Moderate OBJ: 2-3 NAT: AACSB Analytic

10. The following Excel printout provides information to estimate overhead costs using linear regression:

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	6035.987027	1411.05464	4.277642	0.002696	2782.0871	9289.88697
DLH	4.558482698	1.609683731	2.831912	0.022085	0.846543	8.27042244
# setups	771.1028938	54.93418317	14.03685	6.44E-07	644.42436	897.781429
# moves	29.9411124	2.874675342	10.41548	6.26E-06	23.312095	36.5701299

Regression Statistics	
Multiple R	0.996584412
R Square	0.99318049
Adjusted R Square	0.990623174
Standard Error	347.9563597
Observations	12

a. Write the multiple regression model (round to nearest cent).
b. What does the '*t* Stat' measure?
c. What is the estimate of overhead if the department has 1,205 DLH, 55 setups, and 125 moves?

ANS:
a .Overhead = $6,035.99 + $4.56 (DLH) + $771.10 (#setups) + $29.94 (#moves)
b. There is a t Stat for each parameter. These *t* statistics are used to test the hypothesis that the parameters are significantly different from zero. The column labelled "P-value" measures the level of significance achieved for each *t* statistic.
c. Overhead = $6,035.99 + $4.56 (DLH) + $771.10 (#setups) + $29.94 (#moves)
Overhead = $6,035.99 + $4.56(1,205) + $771.10(55) + $29.94(125) = $57,683.79

PTS: 1 DIF: Moderate OBJ: 2-6 NAT: AACSB Analytic

11. Rush Company is trying to find an appropriate allocation base for factory overhead. Presented are five months of data:

Month	Direct Labour Hours	Machine Hours	Factory Overhead
January	10	3	$45
February	20	5	75
March	15	4	70
April	30	5	130
May	25	3	80

$$r = \frac{\Sigma(X-\bar{X})(Y-\bar{Y})}{(\Sigma(X-\bar{X})^2\Sigma(Y-\bar{Y})^2)^{.5}}$$

a. Calculate the correlation coefficient between factory overhead and direct labour hours.
b. Calculate the correlation coefficient between factory overhead and machine hours.
c. Should Rush Company use direct labour hours or machine hours for its allocation base for factory overhead? Why?

ANS:

a.

X	(X – X)	(X – X)^2	Y	(Y – Y)	(Y – Y)^2	(X – X)(Y – Y)
10	–10	100	45	–35	1,225	350
20	0	0	75	–5	25	0
15	–5	25	70	–10	100	50
30	10	100	130	50	2,500	500
25	5	25	80	0	0	0
100		250	400		3,850	900

X = 20 Y = 80

$r = (900)/(250 \times 3{,}850)^{.5} = 0.91736$

b.

X	(X – X)	(X – X)^2	Y	(Y – Y)	(Y – Y)^2	(X – X)(Y – Y)
3	–1	1	45	–35	1,225	35
5	1	1	75	–5	25	–5
4	0	0	70	–10	100	0
5	1	1	130	50	2,500	50
3	–1	1	80	0	0	0
20		4	400		3,850	80

X = 4 Y = 80

$r = (80)/(4 \times 3{,}850)^{.5} = 0.64466$

c. Use direct labour hours because the correlation is 0.91736. The higher correlation indicates that the overhead is more closely related to direct labour hours than machine hours.

PTS: 1 DIF: Difficult OBJ: 2-5 NAT: AACSB Analytic

12. The following computer printout estimated overhead costs using linear regression:

Parameter	Estimate	*t* for H(0) Parameter = 0	Pr > *t*	Std. Error of Parameter
Intercept	75	2.25	0.0250	33.33
Setup hours	13	5.10	0.0001	2.45
# of parts	50	1.65	0.0500	30.30

R Square (R^2)	0.83
Standard Error (S_e)	50.00
Observations	70

a. Write the multiple regression model.
b. What does R Square mean?
c. Provide a 95 percent confidence interval around the number of parts parameter.

ANS:
a. Overhead costs = \$75 + \$13(setup hours) + \$50(# of parts)
b. Eighty-three percent of the variation in overhead costs is explained by setup hours and number of parts.
c. df = 70 – 3 = 67
   t is about 2.00
   \$50 ± 2(30.30) = [\$(10.60), \$110,60]

PTS: 1 DIF: Moderate OBJ: 2-5 NAT: AACSB Analytic

13. The Knapp Company needs to predict the labour cost in producing small Carrot Patch Dolls. The following production information is available:

Year	Dolls Produced	Labour Hours	Labour Dollars
2005	1,150	850	$17,000
2006	1,600	975	23,400
2007	1,100	800	25,600
2008	2,100	1,150	36,800
2009	1,500	950	34,200
2010	1,300	875	35,000

Wage rates have steadily increased since 2005; however, management expects no further increases in 2011.

a. Select the appropriate independent variable for predicting labour cost. Explain the reason for your selection.
b. Develop an equation to predict for 2011 the labour cost of producing Carrot Patch Dolls. Use the high-low method.

ANS:

a. In periods of changing prices, unadjusted cost data should not be used as the dependent variable. Assuming that the technology has not changed, labour hours used in doll production can be substituted for labour dollars in developing the cost-estimating equation:

$Y = a + bX$

Total labour hours = a constant + (b × # of dolls produced)

After solving for total labour hours, the dependent variable can be restated in terms of labour dollars since wage rates in 2011 have not increased over wage rates in 2010, and for 2011:

Total labour dollars/Total labour hours = Labour rate per hour

This labour rate per hour applied to 2011 estimates will give total labour dollars for 2011.

b. Using labour hours:

$b = (1{,}150 - 800)/(\$2{,}100 - 1{,}100)$
$= \underline{0.35}$ variable labour hours per doll

$a = 1{,}150 - (0.35 \times 2{,}100)$
$= \underline{415}$ fixed labour hours per year

Total labour hours = 415 + 0.35 (# of dolls produced)

The wage rate for 2011 is the same as in 2010.

For 2011, $35,000/875 = $40 per labour hour.

Total labour costs = Total labour hours × $40
= 415($40) + 0.35($40)(# of dolls produced)
= $16,600 + $14.00(# of dolls produced)

PTS: 1 DIF: Difficult OBJ: 2-4 NAT: AACSB Analytic

14. Innova, Inc., is beginning the production of a new product. Management believes that 500 labour hours will be required to complete the new unit. A 90 percent cumulative average-time learning curve model for direct labour hours is assumed to be valid. Data on costs are as follows:

Direct materials	$50,000 per unit
Direct labour	$20 per direct labour hour
Variable manufacturing overhead	$30 per direct labour hour

a. Set up a table with columns for cumulative number of units, cumulative average time per unit in hours, and cumulative total time in hours using the cumulative average-time learning curve. Complete the table for 1, 2, 4, and 8 units.
b. Set up a similar table assuming an 80 percent cumulative average-time learning curve.
c. What is the difference in variable cost of producing four units?

ANS:

a.

Units	**90%**	**Total Hrs.**
1	500	500
2	450	900
4	405	1,620
8	364.5	2,916

b.

Units	**80%**	**Total Hrs.**
1	500	500
2	400	800
4	320	1,280
8	256	2,048

c. 0.90 model = $200,000 + 50(1,620) = $281,000/4 = $70,250
0.80 model = $200,000 + 50(1,280) = $264,000/4 = $66,000
The difference is $4,250.

PTS: 1 DIF: Difficult OBJ: 2-7 NAT: AACSB Analytic

15. Innova, Inc., is beginning the production of a new product. Management believes that 500 labour hours will be required to complete the new unit. An 80 percent incremental unit-time learning curve model for direct labour hours is assumed to be valid. Assume the q = –0.3219. Data on costs are as follows:

Direct materials	$50,000 per unit
Direct labour	$20 per direct labour hour
Variable manufacturing overhead	$30 per direct labour hour

a. Set up a table with columns for cumulative number of units showing the cumulative total time in hours using the incremental unit-time learning curve. Complete the table for 1, 2, 3, and 4 units given the individual unit time for the nth unit as 500, 400, 351, and 320 for 1 to 4 units respectively.
b. Set up a similar table assuming a 90 percent with the incremental unit-time learning curve with the individual unit time for the nth unit as 500, 450, 430, 405 for 1 to 4 units respectively.
c. What is the difference in variable cost of producing four units?

ANS:

a.

Units	80%	Total Hrs.
1	500	500
2	400	900
3	351	1,251
4	320	1,571

b.

Units	90%	Total Hrs.
1	500	500
2	450	950
3	430	1,380
4	405	1,785

c. 0.80 model = $200,000 + (50 × 1,571) = $278,550/4 = $69,637.50

0.90 model = $200,000 + (50 × 1,785) = $289,250/4 = $72,312.50

PTS: 1 DIF: Difficult OBJ: 2-7 NAT: AACSB Analytic