Catalog

Chapter 10: Standard Costing, Operational Performance Measures, and the BSC ........1
Chapter 11: Flexible Budgeting and the Management of FO and Support Activity Costs ... 5
Chapter 12: Responsibility Accounting, QC, and Environmental Cost Management ...... 9
Chapter 13: Investment Centers and Transfer Pricing ............................................ 12
Chapter 14: Decision Making: Relevant Costs and Benefits .................................. 17
Chapter 16: Capital Expenditure Decisions ............................................................ 23
Chapter 17: Absorption, Variable, and Throughput Costing ............................... 27
Chapter 18: Allocation of Support Activity Costs and Joint Costs ...................... 31

Chapter 10: Standard Costing, Operational Performance Measures, and the BSC

MULTIPLE CHOICE QUESTIONS
1. Most companies base the calculation of the materials price variance on the:
   A. number of units purchased.
   B. number of units spoiled.
   C. number of units that should have been used.
   D. number of units actually used.
   E. number of units to be purchased during the next accounting period.

2. Which of the following correctly lists all the information needed to calculate a labor rate variance?
   A. Standard labor rate and actual hours worked.
   B. Actual hours worked and actual units produced.
   C. Standard labor rate, actual labor rate, and actual units produced.
   D. Actual labor rate and actual hours worked.
   E. Actual labor rate, standard labor rate, and actual hours worked.

3. Vancouver, Inc., recently completed 45,000 units of a product that was expected to consume four pounds of direct material per finished unit. The standard price of the direct material was $8 per pound. If the firm purchased and consumed 186,000 pounds in manufacturing (cost = $1,534,500), the direct-materials quantity variance would be figured as:
   A. $48,000F.
   B. $48,000U.
   C. $49,500F.
   D. $49,500U.
   E. none of the above.

Use the following to answer questions 4-5:

The following data relate to product no. 89 of Des Moines Corporation:

Direct material standard: 3 square feet at $2.50 per square foot
Direct material purchases: 30,000 square feet at $2.60 per square foot
Direct material consumed: 29,200 square feet
Manufacturing activity, product no. 89: 9,600 units completed
4. The direct-material quantity variance is:
   A. $1,000F.
   B. $1,000U.
   C. $1,040F.
   D. $1,040U.
   E. $2,000F.

5. The direct-material price variance is:
   A. $2,880U.
   B. $2,920F.
   C. $2,920U.
   D. $3,000F.
   E. $3,000U.

Use the following to answer questions 6-7:

The following data relate to product no. 33 of La Quinta Corporation:
   - Direct labor standard: 5 hours at $14 per hour
   - Direct labor used in production: 45,000 hours at a cost of $639,000
   - Manufacturing activity, product no. 33: 8,900 units completed

6. The direct-labor rate variance is:
   A. $8,900F.
   B. $8,900U.
   C. $9,000F.
   D. $9,000U.
   E. None of the above.

7. The direct-labor efficiency variance is:
   A. $7,100F.
   B. $7,100U.
   C. $7,000F.
   D. $7,000U.
   E. None of the above.
8. Lucky Corporation's purchasing manager obtained a special price on an aluminum alloy from a new supplier, resulting in a direct-material price variance of $9,500F. The alloy produced more waste than normal, as evidenced by a direct-material quantity variance of $2,000U, and was also difficult to use. This slowed worker efficiency, generating a $2,500U labor efficiency variance. To help remedy the situation, the production manager used senior line employees, which gave rise to a $900U labor rate variance. If overall product quality did not suffer, what variance amount is best used in judging the appropriateness of the purchasing manager's decision to acquire substandard material?
   A. $4,100F.
   B. $5,000F.
   C. $7,000F.
   D. $7,500F.
   E. $9,500F.

9. The manufacturing cycle efficiency for PQR Company when the processing time is six hours and inspection, waiting, and move time are one hour each is:
   A. 0.67.
   B. 0.75.
   C. 0.78.
   D. 0.88.
   E. an amount other than those shown above.

10. Which of the following journal entries definitely contains an error?
    A. Raw-Material Inventory 200,000
        Direct-Material Price Variance 5,000
        Accounts Payable 205,000
    B. Raw-Material Inventory 38,000
        Direct-Material Price Variance 2,000
        Accounts Payable 36,000
    C. Raw-Material Inventory 156,000
        Direct-Material Price Variance 8,000
        Work-in-Process Inventory 148,000
    D. Work-in-Process Inventory 67,000
        Direct-Material Quantity Variance 3,000
        Raw-Material Inventory 70,000
    E. Work-in-Process Inventory 79,000
        Direct-Material Quantity Variance 4,000
        Raw-Material Inventory 75,000
EXERCISE

1. Volmer Company has set the following standards for one unit of product:

   Direct material
   Quantity: 4.7 pounds per unit
   Price per pound: $9 per pound

   Direct labor
   Quantity: 3 hours per unit
   Rate per hour: $21 per hour

Actual costs incurred in the production of 2,000 units were as follows:

   Direct material: $89,280 ($9.30 per pound)
   Direct labor: $118,900 ($20.50 per hour)

All materials purchased were consumed during the period.
Required:
   Calculate the direct-material price and quantity variances and the direct-labor rate and efficiency variances. Indicate whether each variance is favorable or unfavorable.

2. Hermosa Enterprises recently experienced a fire, forcing the company to use incomplete information to analyze operations. Consider the following data and assume that all materials purchased during the period were used in production:

   Direct materials:
   Standard price per pound: $9
   Actual price per pound: $8
   Price variance: $20,000F
   Total of direct-material variances: $2,000F

   Direct labor:
   Actual hours worked: 40,000
   Actual rate per hour: $15
   Efficiency variance: $28,000F
   Total of direct-labor variances: $12,000U

Hermosa completed 12,000 units.
Required:
   Determine the following: (1) actual materials used, (2) materials quantity variance, (3) labor rate variance, (4) standard labor rate per hour, and (5) standard labor time per finished unit.
3. Howell Company has established the following standards:
   Direct materials: 2.0 pounds at $4.10
   Direct labor: 1.5 hours at $7 per hour

Additional information was extracted from the accounting records:
   Actual production: 32,000 completed units
   Direct materials purchased: 70,000 pounds at $3.82, or $267,400
   Direct materials consumed: 65,000 pounds
   Actual labor incurred: 51,000 hours at $6.30, or $321,300
   Direct-labor rate variance: $37,200 favorable
   Direct labor efficiency variance: $22,500 unfavorable

Required:
Prepare journal entries to record the:
A. purchase of direct materials.
B. usage of direct materials.

Chapter 11: Flexible Budgeting and the Management of FO and Support Activity Costs

MULTIPLE CHOICE QUESTIONS
1. Main Street Merchandising anticipated selling 24,000 units of a major product and paying sales commissions of $5 per unit. Actual sales and sales commissions totaled 23,600 units and $120,360, respectively. If the company used a static budget for performance evaluations, Main Street would report a cost variance of:
   A. $360U.
   B. $360F.
   C. $2,360U.
   D. $2,360F.
   E. some other amount not listed above.

2. Young Corporation has a high probability of operating at 40,000 activity hours during the upcoming period, and lower probabilities of operating at 30,000 hours and 50,000 hours. The company's flexible budget revealed the following:

<table>
<thead>
<tr>
<th>Hours</th>
<th>Variable costs</th>
<th>Fixed costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>30,000</td>
<td>$135,000</td>
<td>720,000</td>
</tr>
<tr>
<td>40,000</td>
<td>$180,000</td>
<td>720,000</td>
</tr>
<tr>
<td>50,000</td>
<td>$225,000</td>
<td>720,000</td>
</tr>
</tbody>
</table>

Young's flexible-budget formula, where Y is defined as total cost and AH represents activity hours, is:
   A. Y = $22.50AH.
   B. Y = $180,000 + $18AH.
   C. Y = $4.50AH + $720,000.
   D. Y = $4.50AH + $24AH.
   E. Y = $945,000.
3. Martin Company, which applies overhead to production on the basis of machine hours, reported the following data for the period just ended:

- Actual units produced: 9,000
- Actual variable overhead incurred: $54,400
- Actual machine hours worked: 16,000
- Standard variable overhead cost per machine hour: $3.50

If it takes two hours to manufacture a completed unit, the company's variable-overhead efficiency variance is:
A. $1,600 favorable.
B. $7,000 favorable.
C. $1,600 unfavorable.
D. $7,000 unfavorable.
E. some other amount not listed above.

4. Arling Company, which applies overhead to production on the basis of machine hours, reported the following data for the period just ended:

- Actual units produced: 12,000
- Actual fixed overhead incurred: $730,000
- Actual machine hours worked: 60,000
- Budgeted fixed overhead: $720,000
- Planned level of machine-hour activity: 50,000

If it takes four hours to manufacture a completed unit, the company's standard fixed overhead rate per machine hour would be:
A. $12.00.
B. $14.40.
C. $14.60.
D. $15.00.
E. some other amount not listed above.

Use the following to answer questions 6-7:
Benson Company, which uses a standard cost system, budgeted $600,000 of fixed overhead when 40,000 machine hours were anticipated. Other data for the period were:

- Actual units produced: 10,000
- Standard production time per unit: 3.9 machine hours
- Fixed overhead incurred: $620,000
- Actual machine hours worked: 42,000
5. Benson's fixed-overhead budget variance is:
   A. $10,000 favorable.
   B. $15,000 favorable.
   C. $20,000 favorable.
   D. $15,000 unfavorable.
   E. $20,000 unfavorable.

6. Benson's fixed-overhead volume variance is:
   A. $10,000 favorable.
   B. $15,000 favorable.
   C. $20,000 favorable.
   D. $15,000 unfavorable.
   E. $20,000 unfavorable.

7. Luke, Inc., has a standard variable overhead rate of $5 per machine hour, with each completed unit expected to take three machine hours to produce. A review of the company's accounting records found the following:
   
   Actual production: 19,500 units
   Variable-overhead efficiency variance: $9,000U
   Variable-overhead spending variance: $21,000F

   What was Luke's actual variable overhead during the period?
   A. $262,500.
   B. $280,500.
   C. $304,500.
   D. $322,500.
   E. Some other amount.

Use the following to answer questions 9-10:

Master Products has the following information for the year just ended:

<table>
<thead>
<tr>
<th></th>
<th>Budget</th>
<th>ACTUAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales in units</td>
<td>15,000</td>
<td>14,000</td>
</tr>
<tr>
<td>Sales</td>
<td>$150,000</td>
<td>$147,000</td>
</tr>
<tr>
<td>Less: Variable expenses</td>
<td>90,000</td>
<td>82,600</td>
</tr>
<tr>
<td>Contribution margin</td>
<td>$60,000</td>
<td>$64,400</td>
</tr>
<tr>
<td>Less: Fixed expenses</td>
<td>35,000</td>
<td>40,000</td>
</tr>
<tr>
<td>Operating income</td>
<td>$25,000</td>
<td>$24,400</td>
</tr>
</tbody>
</table>
8. The company's sales-volume variance is:
   A. $3,000 unfavorable.
   B. $4,000 unfavorable.
   C. $10,000 unfavorable.
   D. $4,400 favorable.
   E. $10,000 favorable.

9. The company's sales-price variance is:
   A. $3,000 unfavorable.
   B. $7,000 unfavorable.
   C. $7,500 unfavorable.
   D. $7,000 favorable.
   E. $7,500 favorable.

**EXERCISE**
(Flexible Budgets and Performance Evaluation)

1. Hempstead Corporation plans to manufacture 8,000 units over the next month at the following costs: direct materials, $480,000; direct labor, $60,000; variable manufacturing overhead, $150,000; and fixed manufacturing overhead, $300,000. The last amount, which includes $24,000 of straight-line depreciation, resulted in a total budget of $990,000.

   Shortly after the conclusion of the month, Hempstead reported the following costs:

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct materials used</td>
<td>$490,500</td>
</tr>
<tr>
<td>Direct labor</td>
<td>$69,600</td>
</tr>
<tr>
<td>Variable manufacturing overhead</td>
<td>$132,000</td>
</tr>
<tr>
<td>Depreciation</td>
<td>$24,000</td>
</tr>
<tr>
<td>Other fixed manufacturing overhead</td>
<td>$272,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$988,100</strong></td>
</tr>
</tbody>
</table>

   Howard Krueger and his crews turned out 7,200 units—a remarkable feat given that the firm's manufacturing plant was closed for several days because of blizzards and impassable roads. Krueger was especially pleased with the fact that total actual costs were less than budget. He was thus very surprised when Hempstead's general manager expressed unhappiness about the plant's financial performance.

   Required:
   A. Prepare a performance report that fairly compares budgeted and actual costs for the period just ended—namely, the report that the general manager likely used when assessing performance.
   B. Should Krueger be praised for "having met the budget" or is the general manager's unhappiness justified? Explain, citing any apparent problems for the firm.
(BASIC VARIANCE ANALYSIS)

2. The following information relates to Joplin Company for the period just ended:

- Standard variable overhead rate per hour: $1
- Standard fixed overhead rate per hour: $2
- Planned monthly activity: 40,000 machine hours
- Actual production completed: 82,000 units
- Standard machine processing time: Two units per hour
- Actual variable overhead: $37,000
- Actual total overhead: $121,000
- Actual machine hours worked: 40,500

All of the company's overhead is variable or fixed in nature.

Required:
A. Calculate the spending and efficiency variances for variable overhead.
B. Calculate the budget and volume variances for fixed overhead.

Chapter 12: Responsibility Accounting, QC, and Environmental Cost Management

MULTIPLE CHOICE QUESTIONS

Use the following to answer questions 1-2

Management of Child Kare, an operator of day-care facilities, wants the firm's profit to be subdivided by center. The firm's accountant has provided the following data:

<table>
<thead>
<tr>
<th>Center</th>
<th>Actual Revenue</th>
<th>Budgeted Revenue</th>
<th>Actual Direct Costs</th>
<th>Budgeted Direct Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Downtown</td>
<td>$340,200</td>
<td>$320,000</td>
<td>$300,000</td>
<td>$300,000</td>
</tr>
<tr>
<td>SF Valley</td>
<td>534,600</td>
<td>560,000</td>
<td>440,000</td>
<td>510,000</td>
</tr>
<tr>
<td>Pomona</td>
<td>226,800</td>
<td>240,000</td>
<td>250,000</td>
<td>225,000</td>
</tr>
<tr>
<td>Ventura</td>
<td>518,400</td>
<td>480,000</td>
<td>490,000</td>
<td>465,000</td>
</tr>
<tr>
<td>Totals</td>
<td>$1,620,000</td>
<td>$1,600,000</td>
<td>$1,480,000</td>
<td>$1,500,000</td>
</tr>
</tbody>
</table>

Child Kare's advertising, which is handled by the home office, is not reflected in the preceding figures and amounted to $60,000.

1. If advertising expense were allocated to centers based on actual center profitability, how much advertising would be allocated to SF Valley?
   A. $18,000.
   B. $19,800.
   C. $20,400.
   D. $21,000.
   E. $40,543.
2. Assume that management used the allocation base that is most influenced by advertising effort and consistent with sound managerial accounting practices. How much advertising would be allocated to SF Valley?
   A. $18,000.
   B. $19,800.
   C. $21,000.
   D. $30,000.
   E. None of the above.

3. Sands Corporation operates two stores: J and K. The following information relates to store J:

   Sales revenue $1,300,000
   Variable operating expenses 600,000
   Fixed expenses:
   - Traceable to J and controllable by J 275,000
   - Traceable to J and controllable by others 80,000

   J's segment contribution margin is:
   A. $345,000.
   B. $425,000.
   C. $620,000.
   D. $700,000.
   E. $745,000.

4. The costs that follow appeared on Omaha's quality cost report:

   Warranty costs $15,000
   Raw-materials inspection 10,000
   Quality training 31,000
   Customer complaints 5,500
   Rework of defective units 12,800

   The sum of Omaha's appraisal and internal failure costs is:
   A. $10,000.
   B. $12,800.
   C. $22,800.
   D. $68,800.
   E. some other amount.
EXERCISE

1. County Cable Services Inc., is organized in three segments: Metro, Suburban, and Outlying. Data for the company and for these segments follow.

<table>
<thead>
<tr>
<th>Services</th>
<th>Inc.</th>
<th>Metro</th>
<th>Suburban</th>
<th>Outlying</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service revenue</td>
<td>$500</td>
<td>$400</td>
<td>$200</td>
<td></td>
</tr>
<tr>
<td>Less: Variable costs</td>
<td>225</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Segment contribution margin</td>
<td></td>
<td>$200</td>
<td>$160</td>
<td>$75</td>
</tr>
<tr>
<td>Less: Controllable fixed costs</td>
<td>200</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controllable profit margin</td>
<td>$440</td>
<td>$200</td>
<td>$160</td>
<td>$75</td>
</tr>
<tr>
<td>Less: Noncontrollable fixed costs</td>
<td></td>
<td>$100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Segment profit margin</td>
<td>$180</td>
<td>$85</td>
<td>$100</td>
<td>$30</td>
</tr>
<tr>
<td>Less: Common fixed costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income before taxes</td>
<td>$180</td>
<td>$85</td>
<td>$100</td>
<td>$30</td>
</tr>
<tr>
<td>Less: Income tax expense</td>
<td>75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net income</td>
<td>$55</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Variable costs as a percentage of service revenue are: Metro, 20%; Suburban, 18.75%; and Outlying, 25%.

Required:
A. Complete the segmented income statement for County Cable.
B. Evaluate the three segment managers for consideration of a pay raise. Base the managers’ performance on an appropriate measure, and rank their performance with respect to absolute dollars and as a percentage of service revenue. What causes any difference in rankings between the two approaches?
2. Los Angeles Technologies (LAT) produces two synthesizers that are popular in the music/entertainment industry: A678 and B443. The company is very concerned about quality and has provided the following information about A678:

<table>
<thead>
<tr>
<th>Cost Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warranty repair costs</td>
<td>$100,000</td>
</tr>
<tr>
<td>Reliability engineering</td>
<td>$340,000</td>
</tr>
<tr>
<td>Rework at LAT’s manufacturing plant</td>
<td>$80,000</td>
</tr>
<tr>
<td>Manufacturing inspection</td>
<td>$30,000</td>
</tr>
<tr>
<td>Transportation costs to customer sites to fix problems</td>
<td>$20,000</td>
</tr>
<tr>
<td>Quality training for employees</td>
<td>$60,000</td>
</tr>
</tbody>
</table>

Quality cost reports revealed the following about B443:

<table>
<thead>
<tr>
<th>Cost Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevention costs</td>
<td>80.3%</td>
</tr>
<tr>
<td>Appraisal costs</td>
<td>3.9%</td>
</tr>
<tr>
<td>Internal failure costs</td>
<td>9.1%</td>
</tr>
<tr>
<td>External failure costs</td>
<td>6.7%</td>
</tr>
<tr>
<td>Total quality costs</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Finally, the company's accounting department reported that the percentage of sales revenues consumed by quality costs is lower for B443 than for A678.

Required
A. Classify the costs that relate to A678 as prevention, appraisal, internal failure, or external failure.
B. Using your answer in requirement "A," compute prevention, appraisal, internal failure, and external failure costs as a percentage of A678's total quality costs.
C. Comment on your findings, noting whether the company is "investing" its quality expenditures differently for the two synthesizers.

**Chapter 13: Investment Centers and Transfer Pricing**

**MULTIPLE CHOICE QUESTIONS**

1. Webster Company had sales revenue and operating expenses of $5,000,000 and $4,200,000, respectively, for the year just ended. If invested capital amounted to $6,000,000, the firm's ROI was:
   A. 13.33%.
   B. 83.33%.
   C. 120.00%.
   D. 750.00%.
   E. some other figure.
2. The information that follows relates to Katz Corporation:

Sales margin: 7.5%
Capital turnover: 2
Invested capital: $20,000,000

On the basis of this information, the company's sales revenue is:
A. $1,500,000.
B. $3,000,000.
C. $10,000,000.
D. $40,000,000.
E. some other amount.

3. The following information relates to the Ajax Division of Rider Enterprises:

Income for the period just ended: $1,800,000
Invested capital: $9,000,000

If the firm has an imputed interest rate of 12%, Ajax's residual income would be:
A. $216,000.
B. $720,000.
C. $864,000.
D. $936,000.
E. some other amount.

4. For the period just ended, United Corporation's Delta Division reported profit of $31.9 million and invested capital of $220 million. Assuming an imputed interest rate of 12%, which of the following choices correctly denotes Delta's return on investment (ROI) and residual income?

<table>
<thead>
<tr>
<th>Return on Investment</th>
<th>Residual Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. 12.0%</td>
<td>$(5.5) million</td>
</tr>
<tr>
<td>B. 12.0%</td>
<td>$5.5 million</td>
</tr>
<tr>
<td>C. 14.5%</td>
<td>$(5.5) million</td>
</tr>
<tr>
<td>D. 14.5%</td>
<td>$5.5 million</td>
</tr>
<tr>
<td>E. 14.5%</td>
<td>$26.4 million</td>
</tr>
</tbody>
</table>
5. Utah Corporation has an after-tax operating income of $2,600,000 and a 10% weighted-average cost of capital. Assets total $8,000,000 and current liabilities total $400,000. On the basis of this information, Utah’s economic value added is:
   A. $1,400,000.
   B. $1,800,000.
   C. $1,840,000.
   D. $1,980,000.
   E. some other amount.

Use the following to answer questions 7-9:

Laissez Faire has two divisions: the Cologne Division and the Bottle Division. The Bottle Division produces containers that can be used by the Cologne Division. The Bottle Division’s variable manufacturing cost is $2, shipping cost is $0.10, and the external sales price is $3. No shipping costs are incurred on sales to the Cologne Division, and the Cologne Division can purchase similar containers in the external market for $2.60.

6. The Bottle Division has sufficient capacity to meet all external market demands in addition to meeting the demands of the Cologne Division. Using the general rule, the transfer price from the Bottle Division to the Cologne Division would be:
   A. $2.00.
   B. $2.10.
   C. $2.60.
   D. $2.90.
   E. $3.00.

7. Assume the Bottle Division has no excess capacity and could sell everything it produced externally. Using the general rule, the transfer price from the Bottle Division to the Cologne Division would be:
   A. $2.00.
   B. $2.10.
   C. $2.60.
   D. $2.90.
   E. $3.00.

8. The maximum amount the Cologne Division would be willing to pay for each bottle transferred would be:
   A. $2.00.
   B. $2.10.
   C. $2.60.
   D. $2.90.
   E. $3.00.
9. The Pro Division of Custom Industries is in need of a particular service. The service can be obtained from another division of Custom at "cost," with cost defined as the summation of variable cost (S9) and fixed cost (S3). Alternatively, Pro can secure the service from a source external to Custom for $10. Which of the following statements is true?
   A. Pro will compare $10 vs. $3 in deciding where to acquire the service.
   B. Pro will compare $10 vs. $9 in deciding where to acquire the service.
   C. Pro will compare $10 vs. $12 in deciding where to acquire the service.
   D. From Custom's perspective, the proper decision is reached by comparing $10 vs. $9.
   E. Both "C" and "D" are true.

**EXERCISE**

1. The following data pertain to Orange Corporation:

<table>
<thead>
<tr>
<th>Income</th>
<th>Sales revenue</th>
<th>Average invested capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>$ 5,000,000</td>
<td>20,000,000</td>
<td>40,000,000</td>
</tr>
</tbody>
</table>

Required: Calculate Orange Corporation's sales margin, capital turnover, and return on investment.

2. Jasper Corporation is organized in three separate divisions. The three divisional managers are evaluated at year-end, and bonuses are awarded based on ROI. Last year, the overall company produced a 12% return on its investment.

Managers of Jasper's Iowa Division recently studied an investment opportunity that would assist in the division's future growth. Relevant data follow.

<table>
<thead>
<tr>
<th>Iowa Division</th>
<th>Investment Opportunity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td>$12,800,000</td>
</tr>
<tr>
<td>Invested capital</td>
<td>80,000,000</td>
</tr>
<tr>
<td>Income</td>
<td>$4,200,000</td>
</tr>
<tr>
<td>Invested capital</td>
<td>30,000,000</td>
</tr>
</tbody>
</table>

Required:

A. Compute the current ROI of the Iowa Division and the division's ROI if the investment opportunity is pursued.

B. What is the likely reaction of divisional management toward the acquisition? Why?

C. What is the likely reaction of Jasper's corporate management toward the investment? Why?

D. Assume that Jasper uses residual income to evaluate performance and desires an 11% minimum return on invested capital. Compute the current residual income of the Iowa Division and the division's residual income if the investment is made. Will divisional management likely change its attitude toward the acquisition? Why?
3. Deborah Lewis, general manager of the Northwest Division of Berkshire Enterprises, has significant authority over pricing decisions as well as programs that involve cost reduction/control. The data that follow relate to upcoming divisional operations:

- Average invested capital: $15,000,000
- Annual fixed costs: $3,900,000
- Variable cost per unit: $80
- Number of units expected to be sold: 120,000

Required:
A. Top management will promote Deborah if she can earn a 14% return on investment for the year. What unit selling price should she establish to earn her promotion?  
B. Independent of part "A," assume the unit selling price is $132 and that Berkshire has a 16% imputed interest charge. Top management will promote Deborah to corporate headquarters if her division can generate $200,000 of residual income. If Deborah desires to move to corporate, what must the division do to the amount of annual fixed costs incurred? Show your calculations.

4. Press Corporation is a multi-divisional company, and its managers have been delegated full profit responsibility and complete autonomy to accept or reject transfers from other divisions. Division A produces 1,000 units of a subassembly that has a ready market. One subassembly is currently used by Division B for each final product manufactured, the latter of which is sold to outsiders for $1,400. Division A charges Division B the $900 market price for the subassembly. Variable costs are $600 and $550 for Divisions A and B, respectively.

The manager of Division B feels that A should transfer the subassembly at a lower price because B is currently unable to make a profit.

Required:
A. Calculate the contribution margins (total dollars and per unit) of Division A and B, as well as the company as a whole, if transfers are made at market price.  
B. Assume that Division A can sell all of its production in the open market. From the company's perspective, should Division A transfer goods to Division B? If so, at what price?  
C. Assume that conditions have changed and A can sell only 500 units in the market at $800 per unit. From the company's perspective, should A transfer all 1,000 units to B or sell 500 in the market and transfer the remainder? Show calculations to support your answer.
Chapter 14: Decision Making: Relevant Costs and Benefits

MULTIPLE CHOICE QUESTIONS

1. Elegant, Inc., has $125,000 of inventory that suffered minor smoke damage from a fire in the warehouse. The company can sell the goods "as is" for $45,000; alternatively, the goods can be cleaned and shipped to the firm's outlet center at a cost of $23,000. There the goods could be sold for $80,000. What alternative is more desirable and what is the relevant cost for that alternative?
   A. Sell "as is," $125,000.
   B. Clean and ship to outlet center, $23,000.
   C. Clean and ship to outlet center, $103,000.
   D. Clean and ship to outlet center, $148,000.
   E. Neither alternative is desirable, as both produce a loss for the firm.

2. Sound, Inc., reported the following results from the sale of 24,000 units of IT-54:

   Sales $528,000
   Variable manufacturing costs $288,000
   Fixed manufacturing costs $120,000
   Variable selling costs $52,800
   Fixed administrative costs $35,200

   Rhythm Company has offered to purchase 3,000 IT-54s at $16 each. Sound has available capacity, and the president is in favor of accepting the order. She feels it would be profitable because no variable selling costs will be incurred. The plant manager is opposed because the "full cost" of production is $17. Which of the following correctly notes the change in income if the special order is accepted?
   A. $3,000 decrease.
   B. $3,000 increase.
   C. $12,000 decrease.
   D. $12,000 increase.
   E. None of the above.
3. Torrey Pines is studying whether to outsource its Human Resources (H/R) activities. Salaried professionals who earn $390,000 would be terminated; in contrast, administrative assistants who earn $120,000 would be transferred elsewhere in the organization. Miscellaneous departmental overhead (e.g., supplies, copy charges, long distance) is expected to decrease by $30,000, and $25,000 of corporate overhead, previously allocated to Human Resources, would be picked up by other departments. If Torrey Pines can secure needed H/R services locally for $410,000, how much would the company benefit by outsourcing?

A. $10,000.
B. $35,000.
C. $130,000.
D. $155,000.
E. None, as it would be cheaper to keep the department open.

4. The Shoe Department at the Baton Rouge Department Store is being considered for closure. The following information relates to shoe activity:

<table>
<thead>
<tr>
<th></th>
<th>Cassette Players</th>
<th>Compact Disc Players</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Units</td>
<td>10,000</td>
<td>3,700</td>
<td>13,700</td>
</tr>
<tr>
<td>Sales</td>
<td>$240,000</td>
<td>$740,000</td>
<td>$980,000</td>
</tr>
<tr>
<td>Less: Cost of goods sold</td>
<td>180,000</td>
<td>481,000</td>
<td>661,000</td>
</tr>
<tr>
<td>Gross margin</td>
<td>$ 60,000</td>
<td>$259,000</td>
<td>$319,000</td>
</tr>
<tr>
<td>Less: Selling expenses</td>
<td>60,000</td>
<td>134,000</td>
<td>194,000</td>
</tr>
<tr>
<td>Operating income</td>
<td>$ -</td>
<td>$125,000</td>
<td>$125,000</td>
</tr>
</tbody>
</table>

If 70% of the fixed operating costs are avoidable, should the Shoe Department be closed?
A. Yes, Baton Rouge would be better off by $23,000.
B. Yes, Baton Rouge would be better off by $50,000.
C. No, Baton Rouge would be worse off by $13,000.
D. No, Baton Rouge would be worse off by $40,000.
E. None of the above.

Use the following to answer questions 6-7:

HiTech manufactures two products: cassette players and compact disc players. The results of operations for 20x1 follow.
Fixed manufacturing costs included in cost of goods sold amount to $3 per unit for the cassette players and $20 per unit for the compact disc players. Variable selling expenses are $4 per unit for the cassette players and $20 per unit for the compact disc players; remaining selling amounts are fixed.

5. HiTech wants to drop the line of cassette players. If the line is dropped, company-wide fixed manufacturing costs would fall by 10% because there is no alternative use of the facilities. What would be the impact on operating income if the cassette players are discontinued?
   A. $0.
   B. $10,400 increase.
   C. $20,000 increase.
   D. $39,600 decrease.
   E. None of the above.

6. Disregard the information in the previous question. If HiTech eliminates the line of cassette players and uses the available capacity to produce and sell an additional 1,500 compact disc players, what would be the impact on operating income?
   A. $28,000 increase
   B. $45,000 increase
   C. $55,000 increase
   D. $85,000 increase
   E. None of the above.

7. Lido manufactures A and B from a joint process (cost = $80,000). Five thousand pounds of A can be sold at split-off for $20 per pound or processed further at an additional cost of $20,000 and then sold for $25. Ten thousand pounds of B can be sold at split-off for $15 per pound or processed further at an additional cost of $20,000 and later sold for $16. If Lido decides to process B beyond the split-off point, operating income will:
   A. increase by $10,000.
   B. increase by $20,000.
   C. decrease by $10,000.
   D. decrease by $20,000.
   E. decrease by $58,000.

8. Adams Enterprises, which produces various goods, has limited processing hours at its manufacturing plant. The following data apply to product no. 775:

   Sales price per unit: $8.00
   Variable cost per unit: $6.50
   Process time per unit: 2 hours
Management is now studying whether to devote the firm's limited hours to product no. 775 or to other products. What key dollar amount should management focus on when determining no. 775's "value" to the firm and deciding the best course of action to follow?

A. $0.75.
B. $1.50.
C. $4.00.
D. $6.50.
E. $8.00.

Use the following to answer questions 10-11:

Johnson Company makes two products: Carpet Kleen and Floor Deodorizer. Operating information from the previous year follows.

<table>
<thead>
<tr>
<th></th>
<th>Carpet Kleen</th>
<th>Floor Deodorizer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Units produced and sold</td>
<td>5,000</td>
<td>4,000</td>
</tr>
<tr>
<td>Machine hours used</td>
<td>5,000</td>
<td>2,000</td>
</tr>
<tr>
<td>Sales price per unit</td>
<td>$7</td>
<td>$10</td>
</tr>
<tr>
<td>Variable cost per unit</td>
<td>$4</td>
<td>$8</td>
</tr>
</tbody>
</table>

Fixed costs of $20,000 per year are presently allocated equally between both products. If the product mix were to change, total fixed costs would remain the same.

9. The contribution margin per machine hour for Floor Deodorizer is:
   A. $0.25.
   B. $2.00.
   C. $4.00.
   D. $5.00.
   E. $20.00.

10. Assuming there is unlimited demand for both products and Johnson has 10,000 machine hours available, how many units of each product should be produced and sold?

<table>
<thead>
<tr>
<th></th>
<th>Carpet Kleen</th>
<th>Floor Deodorizer</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. 0 units</td>
<td>0 units</td>
<td></td>
</tr>
<tr>
<td>B. 0 units</td>
<td>20,000 units</td>
<td></td>
</tr>
<tr>
<td>C. 5,000 units</td>
<td>10,000 units</td>
<td></td>
</tr>
<tr>
<td>D. 8,000 units</td>
<td>4,000 units</td>
<td></td>
</tr>
<tr>
<td>E. 10,000 units</td>
<td>0 units</td>
<td></td>
</tr>
</tbody>
</table>
EXERCISE

1. Attleboro Company recently discontinued the manufacture of product J15. The standard costs for this product were:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct material</td>
<td>$ 50</td>
</tr>
<tr>
<td>Direct labor</td>
<td>20</td>
</tr>
<tr>
<td>Variable overhead</td>
<td>14</td>
</tr>
<tr>
<td>Fixed overhead</td>
<td>35</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$119</strong></td>
</tr>
</tbody>
</table>

There are 800 units of this product in finished-goods inventory. The units are technologically obsolete, and the following alternatives are being considered:

I. Dispose of as scrap. The proceeds from the sale will equal the cost of transportation to the disposal site.
II. Sell to an exporter for sale in a developing country. The sales price to the exporter would be $12 per unit.
III. Remanufacture the products to convert them into model J16, a model that normally sells for $200. The additional cost to convert the J15 units would be $45; the standard cost to manufacture J16 is $125. Presently, there is sufficient capacity to manufacture product J16 directly or to do the necessary conversion work on J15.

Required:
A. Determine the current carrying value of the J15 inventory.
B. Determine the net benefit to Attleboro of each alternative.

2. St. Joseph Hospital has been hit with a number of complaints about its food service from patients, employees, and cafeteria customers. These complaints, coupled with a very tight local labor market, have prompted the organization to contact Nationwide Institutional Food Service (NIFS) about the possibility of an outsourcing arrangement.

The hospital's business office has provided the following information for food service for the year just ended: food costs, $890,000; labor, $85,000; variable overhead, $35,000; allocated fixed hospital overhead, $60,000; and cafeteria food sales, $80,000.

Conversations with NIFS personnel revealed the following information:
- NIFS will charge St. Joseph Hospital $14 per day for each patient served. Note: This figure has been "marked up" by NIFS to reflect the firm's cost of operating the hospital cafeteria.
- St. Joseph's 250-bed facility operates throughout the year and typically has an average occupancy rate of 70%.
- Labor is the primary driver for variable overhead. If an outsourcing agreement is reached,
hospital labor costs will drop by 90%. NIFS plans to use St. Joseph facilities for meal preparation.

- Cafeteria food sales are expected to increase by 15% because NIFS will offer an improved menu selection.

Required:
A. What is meant by the term "outsourcing"?
B. Should St. Joseph outsource its food-service operation to NIFS?
C. What factors, other than dollars, should St. Joseph consider before making the final decision?

3. "It's close to a $30,000 loser and we ought to devote our efforts elsewhere," noted Laura Rigby, after reviewing financial reports of her company's attempt to offer a reduced-price daycare service to employees. The daycare's financial figures for the year just ended follow:

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues</td>
<td>$85,000</td>
</tr>
<tr>
<td>Variable costs</td>
<td>30,000</td>
</tr>
<tr>
<td>Traceable fixed costs</td>
<td>68,000</td>
</tr>
<tr>
<td>Allocated corporate overhead</td>
<td>15,000</td>
</tr>
</tbody>
</table>

If the daycare service/center is closed, 70% of the traceable fixed cost will be avoided. In addition, the company will incur one-time closure costs of $5,900.

Required:
A. Show calculations that support Laura Rigby's belief that the daycare center lost almost $30,000.
B. Should the center be closed? Show calculations to support your answer.
C. What problem might the company experience if the center is closed?
# Chapter 16: Capital Expenditure Decisions

Instructions: The following tables are provided for use with all questions that require future- and present-value calculations.

## Future Value of $1

<table>
<thead>
<tr>
<th>Periods</th>
<th>4%</th>
<th>6%</th>
<th>8%</th>
<th>10%</th>
<th>12%</th>
<th>14%</th>
<th>16%</th>
<th>18%</th>
<th>20%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.040</td>
<td>1.060</td>
<td>1.080</td>
<td>1.100</td>
<td>1.120</td>
<td>1.140</td>
<td>1.160</td>
<td>1.180</td>
<td>1.200</td>
</tr>
<tr>
<td>2</td>
<td>1.082</td>
<td>1.124</td>
<td>1.166</td>
<td>1.210</td>
<td>1.254</td>
<td>1.300</td>
<td>1.346</td>
<td>1.393</td>
<td>1.440</td>
</tr>
<tr>
<td>3</td>
<td>1.125</td>
<td>1.191</td>
<td>1.260</td>
<td>1.331</td>
<td>1.405</td>
<td>1.482</td>
<td>1.561</td>
<td>1.643</td>
<td>1.728</td>
</tr>
<tr>
<td>4</td>
<td>1.170</td>
<td>1.263</td>
<td>1.361</td>
<td>1.464</td>
<td>1.574</td>
<td>1.689</td>
<td>1.811</td>
<td>1.939</td>
<td>2.074</td>
</tr>
<tr>
<td>5</td>
<td>1.217</td>
<td>1.338</td>
<td>1.469</td>
<td>1.611</td>
<td>1.762</td>
<td>1.925</td>
<td>2.101</td>
<td>2.288</td>
<td>2.488</td>
</tr>
<tr>
<td>6</td>
<td>1.265</td>
<td>1.419</td>
<td>1.587</td>
<td>1.772</td>
<td>1.974</td>
<td>2.195</td>
<td>2.437</td>
<td>2.700</td>
<td>2.986</td>
</tr>
<tr>
<td>7</td>
<td>1.316</td>
<td>1.504</td>
<td>1.714</td>
<td>1.949</td>
<td>2.211</td>
<td>2.502</td>
<td>2.827</td>
<td>3.186</td>
<td>3.583</td>
</tr>
<tr>
<td>8</td>
<td>1.369</td>
<td>1.594</td>
<td>1.851</td>
<td>2.144</td>
<td>2.476</td>
<td>2.853</td>
<td>3.279</td>
<td>3.759</td>
<td>4.300</td>
</tr>
<tr>
<td>9</td>
<td>1.423</td>
<td>1.690</td>
<td>1.999</td>
<td>2.359</td>
<td>2.773</td>
<td>3.252</td>
<td>3.803</td>
<td>4.436</td>
<td>5.160</td>
</tr>
</tbody>
</table>

## Future Value of a Series of $1 Cash Flows

<table>
<thead>
<tr>
<th>Periods</th>
<th>4%</th>
<th>6%</th>
<th>8%</th>
<th>10%</th>
<th>12%</th>
<th>14%</th>
<th>16%</th>
<th>18%</th>
<th>20%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>2</td>
<td>2.040</td>
<td>2.060</td>
<td>2.080</td>
<td>2.100</td>
<td>2.120</td>
<td>2.140</td>
<td>2.160</td>
<td>2.180</td>
<td>2.220</td>
</tr>
</tbody>
</table>

## Present Value of $1

<table>
<thead>
<tr>
<th>Periods</th>
<th>4%</th>
<th>6%</th>
<th>8%</th>
<th>10%</th>
<th>12%</th>
<th>14%</th>
<th>16%</th>
<th>18%</th>
<th>20%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.962</td>
<td>.943</td>
<td>.926</td>
<td>.909</td>
<td>.893</td>
<td>.877</td>
<td>.862</td>
<td>.847</td>
<td>.833</td>
</tr>
<tr>
<td>2</td>
<td>.925</td>
<td>.890</td>
<td>.857</td>
<td>.826</td>
<td>.797</td>
<td>.769</td>
<td>.743</td>
<td>.718</td>
<td>.694</td>
</tr>
<tr>
<td>3</td>
<td>.889</td>
<td>.840</td>
<td>.794</td>
<td>.751</td>
<td>.712</td>
<td>.675</td>
<td>.641</td>
<td>.609</td>
<td>.579</td>
</tr>
<tr>
<td>4</td>
<td>.855</td>
<td>.792</td>
<td>.735</td>
<td>.683</td>
<td>.636</td>
<td>.592</td>
<td>.552</td>
<td>.516</td>
<td>.482</td>
</tr>
<tr>
<td>5</td>
<td>.822</td>
<td>.747</td>
<td>.681</td>
<td>.621</td>
<td>.567</td>
<td>.519</td>
<td>.476</td>
<td>.437</td>
<td>.402</td>
</tr>
<tr>
<td>6</td>
<td>.790</td>
<td>.705</td>
<td>.630</td>
<td>.564</td>
<td>.507</td>
<td>.456</td>
<td>.410</td>
<td>.370</td>
<td>.335</td>
</tr>
<tr>
<td>7</td>
<td>.760</td>
<td>.665</td>
<td>.583</td>
<td>.513</td>
<td>.452</td>
<td>.400</td>
<td>.354</td>
<td>.314</td>
<td>.279</td>
</tr>
<tr>
<td>8</td>
<td>.731</td>
<td>.622</td>
<td>.540</td>
<td>.467</td>
<td>.404</td>
<td>.351</td>
<td>.305</td>
<td>.266</td>
<td>.233</td>
</tr>
<tr>
<td>9</td>
<td>.703</td>
<td>.592</td>
<td>.500</td>
<td>.424</td>
<td>.361</td>
<td>.308</td>
<td>.263</td>
<td>.225</td>
<td>.194</td>
</tr>
<tr>
<td>10</td>
<td>.676</td>
<td>.558</td>
<td>.463</td>
<td>.386</td>
<td>.322</td>
<td>.270</td>
<td>.227</td>
<td>.191</td>
<td>.162</td>
</tr>
</tbody>
</table>

## Present Value of a Series of $1 Cash Flows

<table>
<thead>
<tr>
<th>Periods</th>
<th>4%</th>
<th>6%</th>
<th>8%</th>
<th>10%</th>
<th>12%</th>
<th>14%</th>
<th>16%</th>
<th>18%</th>
<th>20%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.962</td>
<td>.943</td>
<td>.926</td>
<td>.909</td>
<td>.893</td>
<td>.877</td>
<td>.862</td>
<td>.847</td>
<td>.833</td>
</tr>
<tr>
<td>2</td>
<td>1.886</td>
<td>1.833</td>
<td>1.783</td>
<td>1.736</td>
<td>1.690</td>
<td>1.647</td>
<td>1.605</td>
<td>1.566</td>
<td>1.528</td>
</tr>
<tr>
<td>3</td>
<td>2.775</td>
<td>2.673</td>
<td>2.577</td>
<td>2.487</td>
<td>2.402</td>
<td>2.322</td>
<td>2.246</td>
<td>2.174</td>
<td>2.106</td>
</tr>
<tr>
<td>4</td>
<td>3.630</td>
<td>3.465</td>
<td>3.312</td>
<td>3.170</td>
<td>3.037</td>
<td>2.914</td>
<td>2.798</td>
<td>2.690</td>
<td>2.589</td>
</tr>
</tbody>
</table>
MULTIPLE CHOICE QUESTIONS

1. Page Company is contemplating the acquisition of a machine that costs $50,000 and promises to reduce annual cash operating costs by $11,000 over each of the next six years. Which of the following is a proper way to evaluate this investment if the company desires a 12% return on all investments?
   A. $50,000 vs. $11,000 x 6.
   B. $50,000 vs. $66,000 x 0.507.
   C. $50,000 vs. $66,000 x 4.111.
   D. $50,000 vs. $11,000 x 4.111.
   E. $50,000 x 0.893 vs. $11,000 x 4.111.

2. A new asset is expected to provide service over the next four years. It will cost $500,000, generate annual cash inflows of $150,000, and require cash operating expenses of $30,000 each year. In addition, a $10,000 overhaul will be needed in year 3. If the company requires a 10% rate of return, the net present value of this machine would be:
   A. $(127,110), and the machine meets the company's rate-of-return requirement.
   B. $(127,110), and the machine does not meet the company's rate-of-return requirement.
   C. $(129,600), and the machine does not meet the company's rate-of-return requirement.
   D. $(151,700), and the machine meets the company's rate-of-return requirement.
   E. some other amount.

Use the following to answer questions 3-5:

The mayor of Smalltown is considering the purchase of a new computer system for the city's tax department. The system costs $75,000 and has an expected life of five years. The mayor estimates the following savings will result if the system is purchased:

<table>
<thead>
<tr>
<th>YEAR</th>
<th>SAVINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$20,000</td>
</tr>
<tr>
<td>2</td>
<td>25,000</td>
</tr>
<tr>
<td>3</td>
<td>30,000</td>
</tr>
<tr>
<td>4</td>
<td>15,000</td>
</tr>
<tr>
<td>5</td>
<td>12,000</td>
</tr>
</tbody>
</table>

3. If Smalltown uses a 10% discount rate for capital-budgeting decisions, the net present value of the computer system would be:
   A. $489.  
   B. $4,057.  
   C. $11,658.  
   D. $63,342.  
   E. $79,057.
4. What can be said about the computer system's internal rate of return if the net present value at 12% is positive?
   A. The internal rate of return is greater than 12%.
   B. The internal rate of return is between 10% and 12%.
   C. The internal rate of return is less than 10%.
   D. The internal rate of return must be less than 5%.
   E. There is insufficient information to make any judgment about the internal rate of return.

5. A salesperson from a different computer company claims that his machine, which costs $85,000 and has an estimated service life of four years, will generate annual savings for the city of $32,000. If the discount rate is 10%, the net present value of this system would be:
   A. $16,440.
   B. $23,175.
   C. $63,512.
   D. $101,440.
   E. some other amount.

6. Jester plans to generate $650,000 of sales revenue if a capital project is implemented. Assuming a 30% tax rate, the sales revenue should be reflected in the analysis by a:
   A. $195,000 inflow.
   B. $195,000 outflow.
   C. $455,000 inflow.
   D. $455,000 outflow.
   E. $650,000 inflow.

7. Ralston Company received $7,000 cash from the sale of a machine that had an $11,000 book value. If the company is subject to a 30% income tax rate, the net cash flow to use in a discounted-cash-flow analysis would be:
   A. $2,100.
   B. $4,900.
   C. $5,800.
   D. $7,000.
   E. $8,200.

8. A machine is expected to produce annual savings in cash operating costs of $400,000 for the next six years. If the firm has a 10% hurdle rate and is subject to a 30% income tax rate, the correct discounted net cash flow would be:
   A. $522,600.
   B. $947,520.
   C. $1,219,400.
   D. $1,742,000.
   E. some other amount.
9. St. Andrews ranks investments by using the profitability index (PI). The following data relate to Project X and Project Y:

<table>
<thead>
<tr>
<th></th>
<th>Project X</th>
<th>Project Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial investment</td>
<td>$400,000</td>
<td>$1,300,000</td>
</tr>
<tr>
<td>Present value of inflows</td>
<td>600,000</td>
<td>1,800,000</td>
</tr>
</tbody>
</table>

Which project would be more attractive as judged by its ranking, and why?
A. Project X because the PI is 1.50.
B. Project Y because the PI is 1.38.
C. Project X because the PI is 0.67.
D. Project Y because the PI is 0.72.
E. Both projects would be equally attractive in terms of ranking, as indicated by a positive PI.

10. Mulligan Corporation, which is subject to a 30% income tax rate, is considering a $150,000 asset that will result in the following over its seven-year life:

Total revenue: $1,190,000
Total operating expenses (excluding depreciation): $770,000
Total depreciation: $150,000

The accounting rate of return on the initial investment is:
A. 16%.
B. 18%.
C. 26%.
D. 28%.
E. some other figure.

**EXERCISE**

1. Mark Industries is currently purchasing part no. 76 from an outside supplier for $80 per unit. Because of supplier reliability problems, the company is considering producing the part internally in a currently idle manufacturing plant. Annual volume over the next six years is expected to total 300,000 units at variable manufacturing costs of $75 per unit.

Mark must acquire $80,000 of new equipment if it reopens the plant. The equipment has a six-year service life and a $14,000 salvage value, and will be depreciated by the straight-line method. Repairs and maintenance are expected to average $5,200 per year in years 4-6, and the equipment will be sold at the end of its life.
Required:
Rounding to the nearest dollar, use the net-present-value method (total-cost approach) and a 12% hurdle rate to determine whether Mark should make or buy part no. 76. Ignore income taxes.

2. Worrell Industries is currently purchasing part no. 456 from an outside supplier for $90 per unit. Because of supplier reliability problems, the company is considering producing the part internally in a currently idle manufacturing plant. Annual volume over the next five years is expected to total 400,000 units at variable manufacturing costs of $88 per unit.

Worrell must acquire $200,000 of new equipment if it reopens the plant. The equipment has a five-year service life and a $20,000 salvage value, and will be depreciated by the straight-line method. (Note: Worrell ignores salvage values in depreciation calculations.) Normal equipment maintenance is expected to total $12,000 in year 4, and the equipment will be sold at the end of its life.

Required:
Rounding to the nearest dollar, use the net-present-value method (total-cost approach) and a 12% hurdle rate to determine whether Worrell should make or buy part no. 456. The company is subject to a 30% income tax rate.

3. Xenox Corporation is considering the acquisition of a new machine that is expected to produce annual savings in cash operating costs of $20,000 before income taxes. The machine costs $80,000, has a useful life of five years, and no salvage value. Xenox uses straight-line depreciation on all assets, is subject to a 30% income tax rate, and has an after-tax hurdle rate of 12%.

Required:
A. Compute the machine's payback period.
B. Compute the machine's accounting rate of return on the initial investment.
C. Compute the machine's net present value.

Chapter 17: Absorption, Variable, and Throughput Costing
MULTIPLE CHOICE QUESTIONS
1. Lone Star has computed the following unit costs for the year just ended:

<table>
<thead>
<tr>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct material used</td>
<td>$12</td>
</tr>
<tr>
<td>Direct labor</td>
<td>18</td>
</tr>
<tr>
<td>Variable manufacturing overhead</td>
<td>25</td>
</tr>
<tr>
<td>Fixed manufacturing overhead</td>
<td>29</td>
</tr>
<tr>
<td>Variable selling and administrative cost</td>
<td>10</td>
</tr>
<tr>
<td>Fixed selling and administrative cost</td>
<td>17</td>
</tr>
</tbody>
</table>

   Under variable costing, each unit of the company's inventory would be carried at:

   A. $35.
   B. $55.
   C. $65.
   D. $84.
   E. some other amount.
2. Gerber Corporation has computed the following unit costs for the year just ended:

- Direct material used: $15
- Direct labor: 23
- Variable manufacturing overhead: 20
- Fixed manufacturing overhead: 30
- Variable selling and administrative cost: 12
- Fixed selling and administrative cost: 19

Under absorption costing, each unit of the company's inventory would be carried at:

A. $58.
B. $88.
C. $100.
D. $119.
E. some other amount.

3. McAfee, which began business at the start of the current year, had the following data:

- Planned and actual production: 40,000 units
- Sales: 37,000 units at $15 per unit
- Production costs:
  - Variable: $4 per unit
  - Fixed: $260,000
- Selling and administrative costs:
  - Variable: $1 per unit
  - Fixed: $32,000

The amount of contribution margin the company would disclose on an absorption-costing income statement is:

A. $0.
B. $147,000.
C. $166,500.
D. $370,000.
E. none of the above.

Use the following to answer questions 4-5:

Franz began business at the start of this year and had the following costs: variable manufacturing cost per unit, $9; fixed manufacturing costs, $60,000; variable selling and administrative costs per unit, $2; and fixed selling and administrative costs, $220,000. The company sells its units for $45 each. Additional data follow:

- Planned production in units: 10,000
- Actual production in units: 10,000
- Number of units sold: 8,500

There were no variances.

4. The net income (loss) under absorption costing is:

A. $(7,500).
B. $9,000.
C. $15,000.
D. $18,000.
E. some other amount.

5. The net income (loss) under variable costing is:

A. $(7,500).
B. $9,000.
C. $15,000.
D. $18,000.
E. some other amount.
6. Monex reported $65,000 of net income for the year by using absorption costing. The company had no beginning inventory, planned and actual production of 20,000 units, and sales of 18,000 units. Standard variable manufacturing costs were $20 per unit, and total budgeted fixed manufacturing overhead was $100,000. If there were no variances, net income under variable costing would be:
   A. $15,000.
   B. $55,000.
   C. $65,000.
   D. $75,000.
   E. $115,000.

7. Canyon reported $106,000 of net income for the year by using variable costing. The company had no beginning inventory, planned and actual production of 50,000 units, and sales of 47,000 units. Standard variable manufacturing costs were $15 per unit, and total budgeted fixed manufacturing overhead was $150,000. If there were no variances, net income under absorption costing would be:
   A. $52,000.
   B. $97,000.
   C. $106,000.
   D. $115,000.
   E. $160,000.

**EXERCISE**

(Miscellaneous Calculations: Variable and Absorption Costing)

1. Information taken from Jersey Corporation's May accounting records follows.

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct materials used</td>
<td>$150,000</td>
</tr>
<tr>
<td>Direct labor</td>
<td>60,000</td>
</tr>
<tr>
<td>Variable manufacturing overhead</td>
<td>30,000</td>
</tr>
<tr>
<td>Fixed manufacturing overhead</td>
<td>80,000</td>
</tr>
<tr>
<td>Variable selling and administrative costs</td>
<td>51,000</td>
</tr>
<tr>
<td>Fixed selling and administrative costs</td>
<td>20,000</td>
</tr>
<tr>
<td>Sales revenues</td>
<td>575,000</td>
</tr>
</tbody>
</table>

Required:
A. Assuming the use of variable costing, compute the inventoriable costs for the month.
B. Compute the month's inventoriable costs by using absorption costing.
C. Assume that anticipated and actual production totaled 20,000 units, and that 17,000 units were sold during May. Determine the amount of fixed manufacturing overhead and fixed selling and administrative costs that would be expensed for the month under (1) variable costing and (2) absorption costing.
D. Assume the same data as in requirement "C." Compute the contribution margin that would be reported on a variable-costing income statement.
2. The following data relate to Venture Company, a new corporation, during a period when the firm produced and sold 100,000 units and 90,000 units, respectively:

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct materials used</td>
<td>$400,000</td>
</tr>
<tr>
<td>Direct labor</td>
<td>200,000</td>
</tr>
<tr>
<td>Fixed manufacturing overhead</td>
<td>250,000</td>
</tr>
<tr>
<td>Variable manufacturing overhead</td>
<td>120,000</td>
</tr>
<tr>
<td>Fixed selling and administrative expenses</td>
<td>300,000</td>
</tr>
<tr>
<td>Variable selling and administrative expenses</td>
<td>45,000</td>
</tr>
</tbody>
</table>

The company met its original planned production target of 100,000 units. There were no variances during the period, and the firm's selling price is $15 per unit.

**Required:**
A. What is the cost of Venture's end-of-period finished-goods inventory under the variable-costing method?
B. Calculate the company's variable-costing net income.
C. Calculate the company's absorption-costing net income.

**Conversion of Absorption-Cost Data to Variable-Cost Data; Working Backwards**
3. Hawthorne, Inc., began business at the start of the current year and maintains its accounting records on an absorption-cost basis. The following selected information appeared on the company's income statement and end-of-year balance sheet:

**Income-statement data:**
- Sales revenues (35,000 units x $22) $770,000
- Gross margin                           210,000
- Total sales and administrative expenses 160,000

**Balance-sheet data:**
- Ending finished-goods inventory (12,000 units) 192,000

Hawthorne achieved its planned production level for the year. The company's fixed manufacturing overhead totaled $141,000, and the firm paid a 10% commission based on gross sales dollars to its sales force.

**Required:**
A. How many units did Hawthorne plan to produce during the year.
B. How much fixed manufacturing overhead did the company apply to each unit manufactured?
C. Compute Hawthorne's cost of goods sold.
D. How much variable cost did the company attach to each unit manufactured?
E. Assuming the use of variable costing, compute (1) the cost of ending finished-goods inventory, (2) the contribution margin for the year, and (3) net income.
4. Southfork Company has per-unit fixed and variable manufacturing costs of $40 and $15, respectively. Variable selling and administrative costs are $9 per unit. Assume that during the past two years, Southfork reported the following income, sales, and production information:

20x1: Variable-costing income, $110,000; sales, 6,000 units; production, 6,000 units
20x2: Variable-costing income, $94,000; sales, 7,500 units; production, 7,100 units

Required:
A. From a product-costing perspective, what is the basic difference between absorption costing and variable costing?
B. Compute Southfork's absorption-costing income in 20x1.
C. Compute Southfork's absorption-costing income in 20x2.

Chapter 18: Allocation of Support Activity Costs and Joint Costs

MULTIPLE CHOICE QUESTIONS
1. Peterson Company has two service departments (Cafeteria and Human Resources) and two production departments (Machining and Assembly). The number of employees in each department follows.

<table>
<thead>
<tr>
<th>Department</th>
<th>Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cafeteria</td>
<td>40</td>
</tr>
<tr>
<td>Human resources</td>
<td>60</td>
</tr>
<tr>
<td>Machining</td>
<td>200</td>
</tr>
<tr>
<td>Assembly</td>
<td>300</td>
</tr>
</tbody>
</table>

Peterson uses the direct method of cost allocation and allocates cost on the basis of employees. If Human Resources cost amounts to $1,800,000, how much of the department's cost would be allocated to Machining?
A. $600,000.
B. $720,000.
C. $900,000.
D. $1,200,000.
E. Some other amount.

2. Anniston, Inc., has two service departments (Human Resources and Building Maintenance) and two production departments (Machining and Assembly). The company allocates Building Maintenance cost on the basis of square footage and Human Resources cost on the basis of employees, and believes that Building Maintenance provides more service than Human Resources. The square footage and employees in each department follow.

<table>
<thead>
<tr>
<th>Department</th>
<th>Square Footage</th>
<th>Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human resources</td>
<td>4,000</td>
<td>10</td>
</tr>
<tr>
<td>Building maintenance</td>
<td>10,000</td>
<td>15</td>
</tr>
<tr>
<td>Machining</td>
<td>15,000</td>
<td>40</td>
</tr>
<tr>
<td>Assembly</td>
<td>21,000</td>
<td>60</td>
</tr>
</tbody>
</table>

Assuming use of the step-down method, which of the following choices correctly denotes the number of square feet and employees over which the Building Maintenance cost and Human Resources cost would be allocated (i.e., spread)?

<table>
<thead>
<tr>
<th>Building Maintenance</th>
<th>Human Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. 36,000</td>
<td>100</td>
</tr>
<tr>
<td>B. 40,000</td>
<td>100</td>
</tr>
<tr>
<td>C. 46,000</td>
<td>110</td>
</tr>
<tr>
<td>D. 50,000</td>
<td>110</td>
</tr>
<tr>
<td>E. Some other combination of figures not listed above.</td>
<td></td>
</tr>
</tbody>
</table>
3. Saunders Company has two service departments (Cafeteria and Human Resources) and two production departments (Machining and Assembly). The number of employees in each department follows:

<table>
<thead>
<tr>
<th>Department</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cafeteria</td>
<td>20</td>
</tr>
<tr>
<td>Human resources</td>
<td>30</td>
</tr>
<tr>
<td>Machining</td>
<td>100</td>
</tr>
<tr>
<td>Assembly</td>
<td>150</td>
</tr>
</tbody>
</table>

Saunders uses the step-down method of cost allocation and allocates cost on the basis of employees. Human Resources cost amounts to $1,200,000, and the department provides more service to the firm than Cafeteria. How much Human Resources cost would be allocated to Machining?

A. $0.
B. $428,572.
C. $444,444.
D. $480,000.
E. Some other amount.

Use the following to answer questions 4-6:
The Dexter Manufacturing Company has two production departments (Assembly and Finishing) and two service departments (Human Resources and Janitorial). The projected usage of the two service departments is as follows:

<table>
<thead>
<tr>
<th>Use of Human Resources</th>
<th>Use of Janitorial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human resources</td>
<td>---</td>
</tr>
<tr>
<td>Janitorial</td>
<td>5%</td>
</tr>
<tr>
<td>Assembly</td>
<td>10%</td>
</tr>
<tr>
<td>Finishing</td>
<td>60% 40%</td>
</tr>
</tbody>
</table>

The budgeted costs in the service departments are: Human Resources, $90,000 and Janitorial, $50,000.

4. Using the direct method, the amount of Janitorial Department cost allocated to the Finishing Department is:

A. $21,053.
B. $24,843.
C. $25,000.
D. $28,947.
E. $34,157.

5. Using the step-down method and assuming the Human Resources Department is allocated first, the amount of Human Resources cost allocated to the Assembly Department is:

A. $21,053.
B. $28,947.
C. $54,000.
D. $60,000.
E. $78,842.

6. Using the step-down method and assuming the Human Resources Department is allocated first, the amount of total service department cost allocated to the Finishing Department is:

A. $58,947.
B. $61,158.
C. $74,000.
D. $78,842.
E. $81,053.
7. Oakland Corporation allocates administrative costs on the basis of staff hours. Short-run monthly usage and anticipated long-run monthly usage of staff hours for Operating Departments 1 and 2 follow.

<table>
<thead>
<tr>
<th></th>
<th>Dept. 1</th>
<th>Dept. 2</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-run usage (hours)</td>
<td>40,000</td>
<td>60,000</td>
<td>100,000</td>
</tr>
<tr>
<td>Long-run usage (hours)</td>
<td>45,000</td>
<td>55,000</td>
<td>100,000</td>
</tr>
</tbody>
</table>

Variable and fixed administrative costs total $200,000 and $500,000, respectively. If Oakland uses dual-cost accounting procedures, the total amount of administrative cost to allocate to Department 1 would be:
A. $280,000.
B. $290,000.
C. $305,000.
D. $315,000.
E. some other amount.

Use the following to answer questions 8-10:
Rocky Mountain Company produces two products (X and Y) from a joint process. Each product may be sold at the split-off point or processed further. Additional processing requires no special facilities, and production costs of further processing are entirely variable and traceable to the products involved. Joint manufacturing costs for the year were $60,000. Sales values and costs were as follows:

<table>
<thead>
<tr>
<th></th>
<th>Units Made</th>
<th>Sales Value at Split-off</th>
<th>Sales Value if Processed Further</th>
<th>Separable Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>9,000</td>
<td>$40,000</td>
<td>$78,000</td>
<td>$10,500</td>
</tr>
<tr>
<td>Y</td>
<td>6,000</td>
<td>80,000</td>
<td>90,000</td>
<td>7,500</td>
</tr>
</tbody>
</table>

8. If the joint production costs are allocated based on the physical-units method, the amount of joint cost assigned to product X would be:
A. $20,000.
B. $24,000.
C. $30,000.
D. $36,000.
E. $40,000.

9. If the joint production costs are allocated based on the relative-sales-value method, the amount of joint cost assigned to product X would be:
A. $20,000.
B. $27,000.
C. $33,000.
D. $40,000.
E. some other amount.

10. If the joint production costs are allocated based on the net-realizable-value method, the amount of joint cost assigned to product Y would be:
A. $20,000.
B. $27,000.
C. $33,000.
D. $40,000.
E. some other amount.
EXERCISE

(Direct and Step-Down Methods of Service Department Cost Allocation)

1. Beckers Corporation is developing departmental overhead rates based on direct labor hours for its two production departments, Molding and Assembly. The Molding Department worked 20,000 hours during the period just ended, and the Assembly Department worked 40,000 hours. The overhead costs incurred by Molding and Assembly were $151,250 and $440,750, respectively. The following schedule reflects the use of Repair and Power's output by the various departments:

Two service departments, Repair and Power, directly support the two production departments. These service departments have costs of $90,000 and $250,000, respectively. The following schedule reflects the use of Repair and Power's output by the various departments:

<table>
<thead>
<tr>
<th>Department</th>
<th>Repair (repair hours)</th>
<th>Power (kilowatt hours)</th>
<th>Molding</th>
<th>Assembly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repair</td>
<td>500</td>
<td>120,000</td>
<td>500</td>
<td>420,000</td>
</tr>
<tr>
<td>Power</td>
<td>500</td>
<td>420,000</td>
<td>4,000</td>
<td>60,000</td>
</tr>
</tbody>
</table>

Required:
A. Allocate the company's service department costs to production departments by using the direct method.
B. Calculate the overhead application rates of the production departments. Hint: Consider both directly traceable and allocated overhead when deriving your answer.
C. Allocate the company's service department costs to production departments by using the step-down method. Begin with the Power Department, and round calculations to the nearest dollar.

(Joint-Cost Allocations)

2. Suppose that one hog yields 300 pounds of ham, 200 pounds of chops, and 100 pounds of miscellaneous items. The sales value of ham is $1.20 per pound; chops, $1.50 per pound; and miscellaneous items, $0.90 per pound. The hog costs $580, and processing costs are $20.

Required:
A. Determine the proper allocation of joint costs to the three products by using the physical-units method.
B. Repeat part "B" by using the relative-sales-value method.

(Net-Realizable-Value Method, Gross Margin Calculation)

3. Thomas Company, a new firm, manufactures two products, Q and R, in a common process. The joint costs amount to $30,000 per batch of finished goods. Each batch results in 10,000 liters of output, of which 70% are Q and 30% are R. The two products are processed beyond the split-off point, with Thomas incurring the following separable costs: Q, $0.50 per liter; R, $1.00 per liter. After the additional processing, the selling price of Q is $6.50 per liter, and the selling price of R is $12.00 per liter.

Required:
A. Determine the proper allocation of joint costs if the company uses the net-realizable-value method.
B. Assume that Thomas sold all of its production of Q during the current accounting period. Compute Q's sales revenue, cost of goods sold, and gross margin.
C. Is the firm's cost-of-goods-sold figure influenced by the choice of a joint-cost allocation method? Briefly explain.