

Chapter 12

Segment Reporting, Decentralization, and the Balanced Scorecard

Solutions to Questions

12-1 In a decentralized organization, decision-making authority isn't confined to a few top executives, but rather is spread throughout the organization with lower-level managers and other employees empowered to make decisions.

12-2 The benefits of decentralization include: (1) by delegating day-to-day problem solving to lower-level managers, top management can concentrate on bigger issues such as overall strategy; (2) empowering lower-level managers to make decisions puts decision-making authority in the hands of those who tend to have the most detailed and up-to-date information about day-to-day operations; (3) by eliminating layers of decision-making and approvals, organizations can respond more quickly to customers and to changes in the operating environment; (4) granting decision-making authority helps train lower-level managers for higher-level positions; and (5) empowering lower-level managers to make decisions can increase their motivation and job satisfaction.

12-3 The manager of a cost center has control over cost, but not revenue or the use of investment funds. A profit center manager has control over both cost and revenue. An investment center manager has control over

cost and revenue and the use of investment funds.

12-4 A segment is any part or activity of an organization about which a manager seeks cost, revenue, or profit data. Examples of segments include departments, operations, sales territories, divisions, and product lines.

12-5 Under the contribution approach, costs are assigned to a segment if and only if the costs are traceable to the segment (i.e., could be avoided if the segment were eliminated). Common costs are not allocated to segments under the contribution approach.

12-6 A traceable cost of a segment is a cost that arises specifically because of the existence of that segment. If the segment were eliminated, the cost would disappear. A common cost, by contrast, is a cost that supports more than one segment, but is not traceable in whole or in part to any one of the segments. If the departments of a company are treated as segments, then examples of the traceable costs of a department would include the salary of the department's supervisor, depreciation of machines used exclusively by the department, and the costs of supplies used by the department. Examples of

common costs would include the salary of the general counsel of the entire company, the lease cost of the headquarters building, corporate image advertising, and periodic depreciation of machines shared by several departments.

12-7 The contribution margin is the difference between sales revenue and variable expenses. The segment margin is the amount remaining after deducting traceable fixed expenses from the contribution margin. The contribution margin is useful as a planning tool for many decisions, particularly those in which fixed costs don't change. The segment margin is useful in assessing the overall profitability of a segment.

12-8 If common costs were allocated to segments, then the costs of segments would be overstated and their margins would be understated. As a consequence, some segments may appear to be unprofitable and managers may be tempted to eliminate them. If a segment were eliminated because of the existence of arbitrarily allocated common costs, the overall profit of the company would decline and the common cost that had been allocated to the segment would be reallocated to the remaining segments—making them appear less profitable.

12-9 There are often limits to how far down an organization a cost can be traced. Therefore, costs that are traceable to a segment may become common as that segment is divided into smaller segment units. For example, the costs of national TV and print advertising might be traceable to a specific product line, but be a common cost of the geographic sales territories in which that product line is sold.

12-10 Margin refers to the ratio of net operating income to total sales. Turnover refers to the ratio of total sales to average operating assets. The product of the two numbers is the ROI.

12-11 Residual income is the net operating income an investment center earns above the company's minimum required rate of return on operating assets.

12-12 If ROI is used to evaluate performance, a manager of an investment center may reject a profitable investment opportunity whose rate of return exceeds the company's required rate of return but whose rate of return is less than the investment center's current ROI. The residual income approach overcomes this problem because any project whose rate of return exceeds the company's minimum required rate of return will result in an increase in residual income.

12-13 A company's balanced scorecard should be derived from and support its strategy. Because different companies have different strategies, their balanced scorecards should be different.

12-14 The balanced scorecard is constructed to support the company's strategy, which is a theory about what actions will further the company's goals. Assuming that the company has financial goals, measures of financial performance must be included in the balanced scorecard as a check on the reality of the theory. If the internal business processes improve, but the financial outcomes do not improve, the theory may be flawed and the strategy should be changed.

Exercise 12-1 (15 minutes)

	<i>Total</i>	<i>Weedban</i>	<i>Greengrow</i>
Sales*	\$300,000	\$90,000	\$210,000
Variable expenses**	<u>183,000</u>	<u>36,000</u>	<u>147,000</u>
Contribution margin.....	117,000	54,000	63,000
Traceable fixed expenses.....	<u>66,000</u>	<u>45,000</u>	<u>21,000</u>
Product line segment margin. .	51,000	<u>\$ 9,000</u>	<u>\$ 42,000</u>
Common fixed expenses not traceable to products.....	<u>33,000</u>		
Net operating income.....	<u>\$ 18,000</u>		

- * Weedban: 15,000 units × \$6.00 per unit = \$90,000.
Greengrow: 28,000 units × \$7.50 per unit = \$210,000.
- ** Weedban: 15,000 units × \$2.40 per unit = \$36,000.
Greengrow: 28,000 units × \$5.25 per unit = \$147,000.

Exercise 12-2 (10 minutes)

1.
$$\begin{aligned}\text{Margin} &= \frac{\text{Net operating income}}{\text{Sales}} \\ &= \frac{\$600,000}{\$7,500,000} = 8\%\end{aligned}$$
2.
$$\begin{aligned}\text{Turnover} &= \frac{\text{Sales}}{\text{Average operating assets}} \\ &= \frac{\$7,500,000}{\$5,000,000} = 1.5\end{aligned}$$
3.
$$\begin{aligned}\text{ROI} &= \text{Margin} \times \text{Turnover} \\ &= 8\% \times 1.5 = 12\%\end{aligned}$$

Exercise 12-3 (10 minutes)

Average operating assets.....	<u>£2,800,000</u>
Net operating income.....	£ 600,000
Minimum required return:	
18% × £2,800,000.....	<u>504,000</u>
Residual income.....	<u>£ 96,000</u>

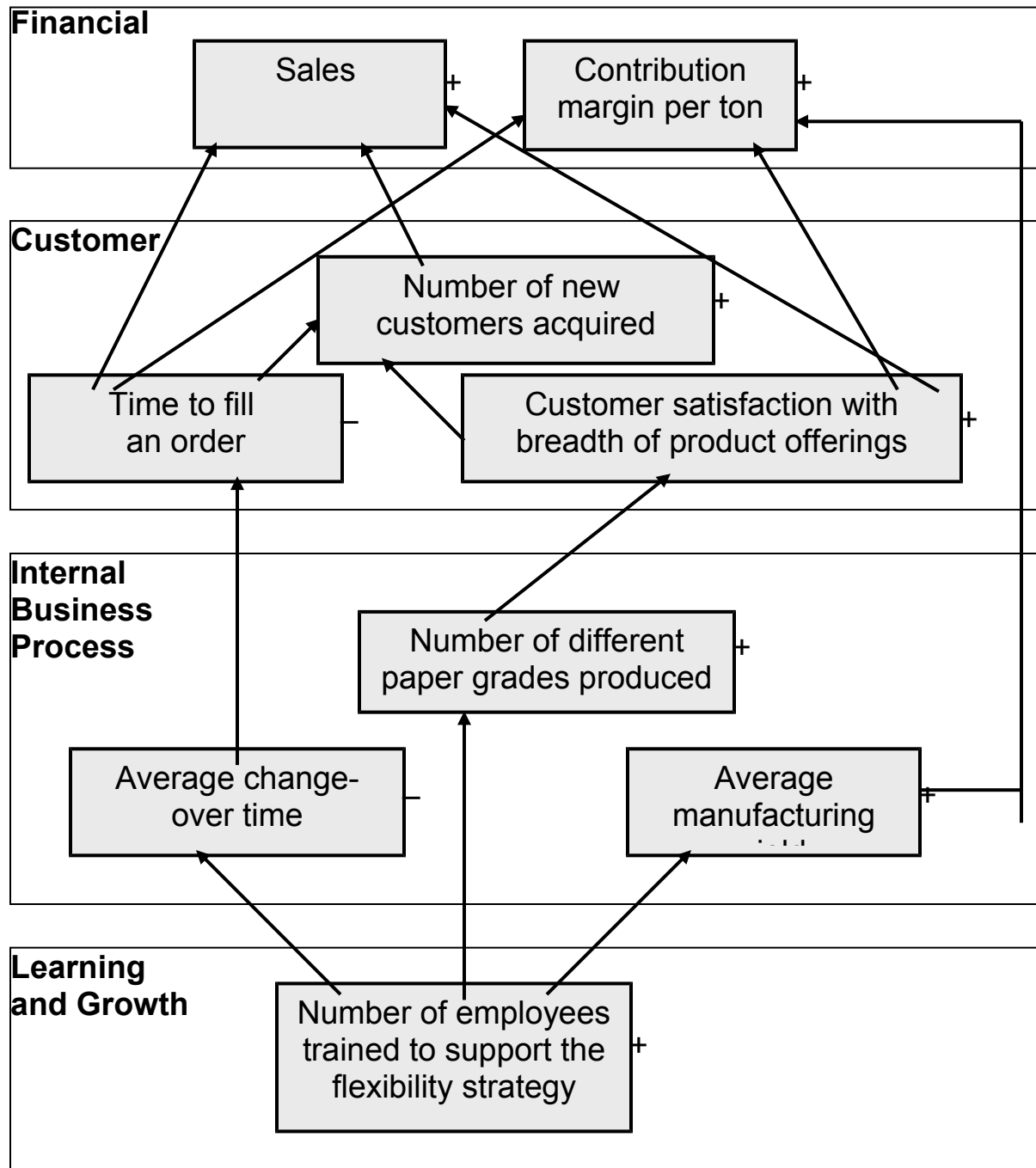
Exercise 12-4 (45 minutes)

1. MPC's previous manufacturing strategy was focused on high-volume production of a limited range of paper grades. The goal of this strategy was to keep the machines running constantly to maximize the number of tons produced. Changeovers were avoided because they lowered equipment utilization. Maximizing tons produced and minimizing changeovers helped spread the high fixed costs of paper manufacturing across more units of output. The new manufacturing strategy is focused on low-volume production of a wide range of products. The goals of this strategy are to increase the number of paper grades manufactured, decrease changeover times, and increase yields across non-standard grades. While MPC realizes that its new strategy will decrease its equipment utilization, it will still strive to optimize the utilization of its high fixed cost resources within the confines of flexible production. In an economist's terms the old strategy focused on economies of scale while the new strategy focuses on economies of scope.
2. Employees focus on improving those measures that are used to evaluate their performance. Therefore, strategically-aligned performance measures will channel employee effort towards improving those aspects of performance that are most important to obtaining strategic objectives. If a company changes its strategy but continues to evaluate employee performance using measures that do not support the new strategy, it will be motivating its employees to make decisions that promote the old strategy, not the new strategy. And if employees make decisions that promote the new strategy, their performance measures will suffer.

Some performance measures that would be appropriate for MPC's old strategy include: equipment utilization percentage, number of tons of paper produced, and cost per ton produced. These performance measures would not support MPC's new strategy because they would discourage increasing the range of paper grades produced, increasing the number of changeovers performed, and decreasing the batch size produced per run.

Exercise 12-4 (continued)

3. Students' answers may differ in some details from this solution.



Exercise 12-4 (continued)

4. The hypotheses underlying the balanced scorecard are indicated by the arrows in the diagram. Reading from the bottom of the balanced scorecard, the hypotheses are:
- If the number of employees trained to support the flexibility strategy increases, then the average changeover time will decrease and the number of different paper grades produced and the average manufacturing yield will increase.
 - If the average changeover time decreases, then the time to fill an order will decrease.
 - If the number of different paper grades produced increases, then the customer satisfaction with breadth of product offerings will increase.
 - If the average manufacturing yield increases, then the contribution margin per ton will increase.
 - If the time to fill an order decreases, then the number of new customers acquired, sales, and the contribution margin per ton will increase.
 - If the customer satisfaction with breadth of product offerings increases, then the number of new customers acquired, sales, and the contribution margin per ton will increase.
 - If the number of new customers acquired increases, then sales will increase.

Each of these hypotheses can be questioned. For example, the time to fill an order is a function of additional factors above and beyond changeover times. Thus, MPC's average changeover time could decrease while its time to fill an order increases if, for example, the shipping department proves to be incapable of efficiently handling greater product diversity, smaller batch sizes, and more frequent shipments. The fact that each of the hypotheses mentioned above can be questioned does not invalidate the balanced scorecard. If the scorecard is used correctly, management will be able to identify which, if any, of the hypotheses are invalid and modify the balanced scorecard accordingly.

Exercise 12-5 (20 minutes)

1. ROI computations:

$$\text{ROI} = \text{Margin} \times \text{Turnover}$$

$$= \frac{\text{Net operating income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Average operating assets}}$$

Osaka Division:

$$\begin{aligned} \text{ROI} &= \frac{¥210,000}{¥3,000,000} \times \frac{¥3,000,000}{¥1,000,000} \\ &= 7\% \times 3 = 21\% \end{aligned}$$

Yokohama Division:

$$\begin{aligned} \text{ROI} &= \frac{¥720,000}{¥9,000,000} \times \frac{¥9,000,000}{¥4,000,000} \\ &= 8\% \times 2.25 = 18\% \end{aligned}$$

	<i>Osaka</i>	<i>Yokohama</i>
2. Average operating assets (a).....	<u>¥1,000,000</u>	<u>¥4,000,000</u>
Net operating income.....	¥ 210,000	¥ 720,000
Minimum required return on average operating assets: 15% × (a).....	<u>150,000</u>	<u>600,000</u>
Residual income.....	<u>¥ 60,000</u>	<u>¥ 120,000</u>

3. No, the Yokohama Division is simply larger than the Osaka Division and for this reason one would expect that it would have a greater amount of residual income. Residual income can't be used to compare the performance of divisions of different sizes. Larger divisions will almost always look better. In fact, in the case above, the Yokohama Division does not appear to be as well managed as the Osaka Division. Note from Part (1) that Yokohama has only an 18% ROI as compared to 21% for Osaka.

Exercise 12-6 (15 minutes)

1. ROI computations:

$$\text{ROI} = \text{Margin} \times \text{Turnover}$$

$$= \frac{\text{Net operating income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Average operating assets}}$$

Queensland Division:

$$\begin{aligned}\text{ROI} &= \frac{\$360,000}{\$4,000,000} \times \frac{\$4,000,000}{\$2,000,000} \\ &= 9\% \times 2 = 18\%\end{aligned}$$

New South Wales Division:

$$\begin{aligned}\text{ROI} &= \frac{\$420,000}{\$7,000,000} \times \frac{\$7,000,000}{\$2,000,000} \\ &= 6\% \times 3.5 = 21\%\end{aligned}$$

2. The manager of the New South Wales Division seems to be doing the better job. Although her margin is three percentage points lower than the margin of the Queensland Division, her turnover is higher (a turnover of 3.5, as compared to a turnover of two for the Queensland Division). The greater turnover more than offsets the lower margin, resulting in a 21% ROI, as compared to an 18% ROI for the other division.

Notice that if you look at margin alone, then the Queensland Division appears to be the stronger division. This fact underscores the importance of looking at turnover as well as at margin in evaluating performance in an investment center.

Exercise 12-7 (15 minutes)

	<i>Division</i>		
	<i>Alpha</i>	<i>Bravo</i>	<i>Charlie</i>
Sales.....	\$4,000,000	\$11,500,000 *	\$3,000,000
Net operating income.....	\$160,000	\$920,000 *	\$210,000 *
Average operating assets....	\$800,000 *	\$4,600,000	\$1,500,000
Margin.....	4%*	8%	7%*
Turnover.....	5*	2.5	2
Return on investment (ROI).	20%	20%*	14%*

Note that Divisions Alpha and Bravo apparently have different strategies to obtain the same 20% return. Division Alpha has a low margin and a high turnover, whereas Division Bravo has just the opposite.

*Given.

Exercise 12-8 (30 minutes)

1. ROI computations:

$$\text{ROI} = \text{Margin} \times \text{Turnover}$$

$$= \frac{\text{Net operating income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Average operating assets}}$$

Division A:

$$\begin{aligned} \text{ROI} &= \frac{\$600,000}{\$12,000,000} \times \frac{\$12,000,000}{\$3,000,000} \\ &= 5\% \times 4 = 20\% \end{aligned}$$

Division B:

$$\begin{aligned} \text{ROI} &= \frac{\$560,000}{\$14,000,000} \times \frac{\$14,000,000}{\$7,000,000} \\ &= 4\% \times 2 = 8\% \end{aligned}$$

Division C:

$$\begin{aligned} \text{ROI} &= \frac{\$800,000}{\$25,000,000} \times \frac{\$25,000,000}{\$5,000,000} \\ &= 3.2\% \times 5 = 16\% \end{aligned}$$

2.	<i>Division A</i>	<i>Division B</i>	<i>Division C</i>
Average operating assets.....	\$3,000,000	\$7,000,000	\$5,000,000
Required rate of return.....	<u>× 14%</u>	<u>× 10%</u>	<u>× 16%</u>
Required operating income.....	<u>\$ 420,000</u>	<u>\$ 700,000</u>	<u>\$ 800,000</u>
Actual operating income.....	\$ 600,000	\$ 560,000	\$ 800,000
Required operating income (above).....	<u>420,000</u>	<u>700,000</u>	<u>800,000</u>
Residual income.....	<u>\$ 180,000</u>	<u>\$(140,000)</u>	<u>\$ 0</u>

Exercise 12-8 (continued)

3. a. and b.

	<i>Division A</i>	<i>Division B</i>	<i>Division C</i>
Return on investment (ROI).....	20%	8%	16%
Therefore, if the division is presented with an investment opportunity yielding 15%, it probably would.....	Reject	Accept	Reject
Minimum required return for computing residual income.....	14%	10%	16%
Therefore, if the division is presented with an investment opportunity yielding 15%, it probably would.....	Accept	Accept	Reject

If performance is being measured by ROI, both Division A and Division C probably would reject the 15% investment opportunity. These divisions' ROIs currently exceed 15%; accepting a new investment with a 15% rate of return would reduce their overall ROIs. Division B probably would accept the 15% investment opportunity because accepting it would increase the division's overall rate of return.

If performance is measured by residual income, both Division A and Division B probably would accept the 15% investment opportunity. The 15% rate of return promised by the new investment is greater than their required rates of return of 14% and 10%, respectively, and would therefore add to the total amount of their residual income. Division C would reject the opportunity because the 15% return on the new investment is less than its 16% required rate of return.

Exercise 12-9 (30 minutes)

1.
$$\text{Margin} = \frac{\text{Net operating income}}{\text{Sales}}$$

$$= \frac{\$70,000}{\$1,400,000} = 5\%$$

$$\text{Turnover} = \frac{\text{Sales}}{\text{Average operating assets}}$$

$$= \frac{\$1,400,000}{\$350,000} = 4$$

$$\text{ROI} = \text{Margin} \times \text{Turnover}$$

$$= 5\% \times 4 = 20\%$$

2.
$$\text{Margin} = \frac{\text{Net operating income}}{\text{Sales}}$$

$$= \frac{\$70,000 + \$18,200}{\$1,400,000 + \$70,000}$$

$$= \frac{\$88,200}{\$1,470,000} = 6\%$$

$$\text{Turnover} = \frac{\text{Sales}}{\text{Average operating assets}}$$

$$= \frac{\$1,400,000 + \$70,000}{\$350,000}$$

$$= \frac{\$1,470,000}{\$350,000} = 4.2$$

$$\text{ROI} = \text{Margin} \times \text{Turnover}$$

$$= 6\% \times 4.2 = 25.2\%$$

Exercise 12-9 (continued)

$$\begin{aligned} 3. \quad \text{Margin} &= \frac{\text{Net operating income}}{\text{Sales}} \\ &= \frac{\$70,000 + \$14,000}{\$1,400,000} \\ &= \frac{\$84,000}{\$1,400,000} = 6\% \end{aligned}$$

$$\begin{aligned} \text{Turnover} &= \frac{\text{Sales}}{\text{Average operating assets}} \\ &= \frac{\$1,400,000}{\$350,000} = 4 \end{aligned}$$

$$\begin{aligned} \text{ROI} &= \text{Margin} \times \text{Turnover} \\ &= 6\% \times 4 = 24\% \end{aligned}$$

$$\begin{aligned} 4. \quad \text{Margin} &= \frac{\text{Net operating income}}{\text{Sales}} \\ &= \frac{\$70,000}{\$1,400,000} = 5\% \end{aligned}$$

$$\begin{aligned} \text{Turnover} &= \frac{\text{Sales}}{\text{Average operating assets}} \\ &= \frac{\$1,400,000}{\$350,000 - \$70,000} \\ &= \frac{\$1,400,000}{\$280,000} = 5 \end{aligned}$$

$$\begin{aligned} \text{ROI} &= \text{Margin} \times \text{Turnover} \\ &= 5\% \times 5 = 25\% \end{aligned}$$

Exercise 12-10 (15 minutes)

1.
$$\text{Margin} = \frac{\text{Net operating income}}{\text{Sales}}$$

$$= \frac{\$150,000}{\$3,000,000} = 5\%$$

$$\text{Turnover} = \frac{\text{Sales}}{\text{Average operating assets}}$$

$$= \frac{\$3,000,000}{\$750,000} = 4$$

$$\text{ROI} = \text{Margin} \times \text{Turnover}$$

$$= 5\% \times 4 = 20\%$$

2.
$$\text{Margin} = \frac{\text{Net operating income}}{\text{Sales}}$$

$$= \frac{\$150,000(1.00 + 2.00)}{\$3,000,000(1.00 + 0.50)}$$

$$= \frac{\$450,000}{\$4,500,000} = 10\%$$

$$\text{Turnover} = \frac{\text{Sales}}{\text{Average operating assets}}$$

$$= \frac{\$3,000,000(1.00 + 0.50)}{\$750,000}$$

$$= \frac{\$4,500,000}{\$750,000} = 6$$

$$\text{ROI} = \text{Margin} \times \text{Turnover}$$

$$= 10\% \times 6 = 60\%$$

Exercise 12-10 (continued)

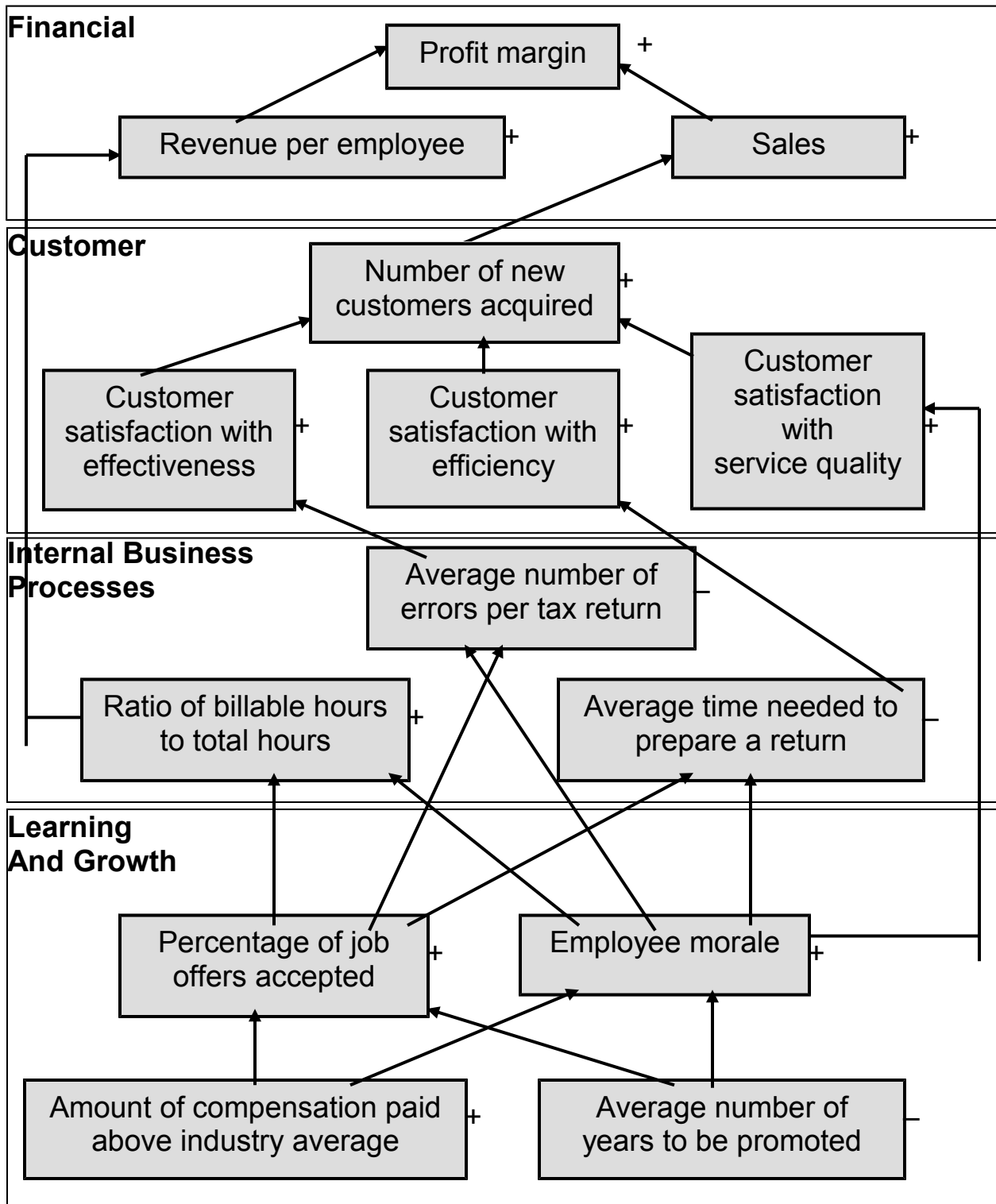
3.
$$\begin{aligned}\text{Margin} &= \frac{\text{Net operating income}}{\text{Sales}} \\ &= \frac{\$150,000 + \$200,000}{\$3,000,000 + \$1,000,000} \\ &= \frac{\$350,000}{\$4,000,000} = 8.75\%\end{aligned}$$

$$\begin{aligned}\text{Turnover} &= \frac{\text{Sales}}{\text{Average operating assets}} \\ &= \frac{\$3,000,000 + \$1,000,000}{\$750,000 + \$250,000} \\ &= \frac{\$4,000,000}{\$1,000,000} = 4\end{aligned}$$

$$\begin{aligned}\text{ROI} &= \text{Margin} \times \text{Turnover} \\ &= 8.75\% \times 4 = 35\%\end{aligned}$$

Exercise 12-11 (45 minutes)

1. Students' answers may differ in some details from this solution.



Exercise 12-11 (continued)

2. The hypotheses underlying the balanced scorecard are indicated by the arrows in the diagram. Reading from the bottom of the balanced scorecard, the hypotheses are:
- If the amount of compensation paid above the industry average increases, then the percentage of job offers accepted and the level of employee morale will increase.
 - If the average number of years to be promoted decreases, then the percentage of job offers accepted and the level of employee morale will increase.
 - If the percentage of job offers accepted increases, then the ratio of billable hours to total hours should increase while the average number of errors per tax return and the average time needed to prepare a return should decrease.
 - If employee morale increases, then the ratio of billable hours to total hours should increase while the average number of errors per tax return and the average time needed to prepare a return should decrease.
 - If employee morale increases, then the customer satisfaction with service quality should increase.
 - If the ratio of billable hours to total hours increases, then the revenue per employee should increase.
 - If the average number of errors per tax return decreases, then the customer satisfaction with effectiveness should increase.
 - If the average time needed to prepare a return decreases, then the customer satisfaction with efficiency should increase.
 - If the customer satisfaction with effectiveness, efficiency and service quality increases, then the number of new customers acquired should increase.
 - If the number of new customers acquired increases, then sales should increase.
 - If revenue per employee and sales increase, then the profit margin should increase.

Exercise 12-11 (continued)

Each of these hypotheses can be questioned. For example, Ariel's customers may define effectiveness as minimizing their tax liability which is not necessarily the same as minimizing the number of errors in a tax return. If some of Ariel's customers became aware that Ariel overlooked legal tax minimizing opportunities, it is likely that the "customer satisfaction with effectiveness" measure would decline. This decline would probably puzzle Ariel because, although the firm prepared what it believed to be error-free returns, it overlooked opportunities to minimize customers' taxes. In this example, Ariel's internal business process measure of the average number of errors per tax return does not fully capture the factors that drive the customer satisfaction. The fact that each of the hypotheses mentioned above can be questioned does not invalidate the balanced scorecard. If the scorecard is used correctly, management will be able to identify which, if any, of the hypotheses are invalid and then modify the balanced scorecard accordingly.

3. The performance measure "total dollar amount of tax refunds generated" would motivate Ariel's employees to aggressively search for tax minimization opportunities for its clients. However, employees may be too aggressive and recommend questionable or illegal tax practices to clients. This undesirable behavior could generate unfavorable publicity and lead to major problems for the company as well as its customers. Overall, it would probably be unwise to use this performance measure in Ariel's scorecard.

However, if Ariel wanted to create a scorecard measure to capture this aspect of its client service responsibilities, it may make sense to focus the performance measure on its training process. Properly trained employees are more likely to recognize viable tax minimization opportunities.

Exercise 12-11 (continued)

4. Each office's individual performance should be based on the scorecard measures only if the measures are controllable by those employed at the branch offices. In other words, it would not make sense to attempt to hold branch office managers responsible for measures such as the percent of job offers accepted or the amount of compensation paid above industry average. Recruiting and compensation decisions are not typically made at the branch offices. On the other hand, it would make sense to measure the branch offices with respect to internal business process, customer, and financial performance. Gathering this type of data would be useful for evaluating the performance of employees at each office.

Exercise 12-12 (15 minutes)

	<i>Company</i>		
	<i>A</i>	<i>B</i>	<i>C</i>
Sales.....	\$9,000,000 *	\$7,000,000 *	\$4,500,000 *
Net operating income.....	\$540,000	\$280,000 *	\$360,000
Average operating assets.....	\$3,000,000 *	\$2,000,000	\$1,800,000 *
Return on investment (ROI).....	18%*	14%*	20%
Minimum required rate of return:			
Percentage.....	16%*	16%	15%*
Dollar amount.....	\$480,000	\$320,000 *	\$270,000
Residual income.....	\$60,000	\$(40,000)	\$90,000 *

*Given.

Exercise 12-13 (20 minutes)

1. $\$75,000 \times 40\%$ CM ratio = $\$30,000$ increased contribution margin in Minneapolis. Because the fixed costs in the office and in the company as a whole will not change, the entire $\$30,000$ would result in increased net operating income for the company.

It is not correct to multiply the $\$75,000$ increase in sales by Minneapolis' 24% segment margin ratio. This approach assumes that the segment's traceable fixed expenses increase in proportion to sales, but if they did, they would not be fixed.

2. a. The segmented income statement follows:

	Segments					
	Total Company		Chicago		Minneapolis	
	Amount	%	Amount	%	Amount	%
Sales.....	\$500,000	100.0	\$200,000	100	\$300,000	100
Variable expenses.....	<u>240,000</u>	<u>48.0</u>	<u>60,000</u>	<u>30</u>	<u>180,000</u>	<u>60</u>
Contribution margin....	260,000	52.0	140,000	70	120,000	40
Traceable fixed expenses.....	<u>126,000</u>	<u>25.2</u>	<u>78,000</u>	<u>39</u>	<u>48,000</u>	<u>16</u>
Office segment margin	134,000	26.8	<u>\$ 62,000</u>	<u>31</u>	<u>\$ 72,000</u>	<u>24</u>
Common fixed expenses not traceable to segments.....	<u>63,000</u>	<u>12.6</u>				
Net operating income..	<u>\$ 71,000</u>	<u>14.2</u>				

- b. The segment margin ratio rises and falls as sales rise and fall due to the presence of fixed costs. The fixed costs are spread over a larger base as sales increase.

In contrast to the segment ratio, the contribution margin ratio is stable so long as there is no change in either the variable expenses or the selling price per unit of service.

Exercise 12-14 (15 minutes)

1. The company should focus its campaign on the Dental market. The computations are:

	<i>Medical</i>	<i>Dental</i>
Increased sales.....	\$40,000	\$35,000
Market CM ratio.....	<u>× 36%</u>	<u>× 48%</u>
Incremental contribution margin.....	\$14,400	\$16,800
Less cost of the campaign.....	<u>5,000</u>	<u>5,000</u>
Increased segment margin and net operating income for the company as a whole.....	<u>\$ 9,400</u>	<u>\$11,800</u>

2. The \$48,000 in traceable fixed expenses in the previous exercise is now partly traceable and partly common. When we segment Minneapolis by market, only \$33,000 remains a traceable fixed expense. This amount represents costs such as advertising and salaries of individuals that arise because of the existence of the Medical and Dental markets. The remaining \$15,000 (\$48,000 – \$33,000) is a common cost when Minneapolis is segmented by market. This amount would include costs such as the salary of the manager of the Minneapolis office that could not be avoided by eliminating either of the two market segments.

Exercise 12-15 (20 minutes)

		<i>Division</i>		
	<i>Total</i>			
	<i>Company</i>	<i>East</i>	<i>Central</i>	<i>West</i>
Sales.....	\$1,000,000	\$250,000	\$400,000	\$350,000
Variable expenses.....	<u>390,000</u>	<u>130,000</u>	<u>120,000</u>	<u>140,000</u>
Contribution margin.....	610,000	120,000	280,000	210,000
Traceable fixed expenses	<u>535,000</u>	<u>160,000</u>	<u>200,000</u>	<u>175,000</u>
Divisional segment margin.....	75,000	<u>\$(40,000)</u>	<u>\$ 80,000</u>	<u>\$ 35,000</u>
Common fixed expenses not traceable to divisions*.....	<u>90,000</u>			
Net operating income (loss).....	<u>\$ (15,000)</u>			

*\$625,000 – \$535,000 = \$90,000.

2. Incremental sales (\$350,000 × 20%).....	\$70,000
Contribution margin ratio (\$210,000 ÷ \$350,000).....	× 60%
Incremental contribution margin.....	\$42,000
Less incremental advertising expense.....	<u>15,000</u>
Incremental net operating income.....	<u>\$27,000</u>

Yes, the advertising program should be initiated.

Exercise 12-16 (20 minutes)

	(b)	(c)	
	Net	Average	
(a)	Operating	Operating	ROI
Sales	Income*	Assets	(b) ÷ (c)
\$2,500,000	\$475,000	\$1,000,000	47.5%
\$2,600,000	\$500,000	\$1,000,000	50.0%
\$2,700,000	\$525,000	\$1,000,000	52.5%
\$2,800,000	\$550,000	\$1,000,000	55.0%
\$2,900,000	\$575,000	\$1,000,000	57.5%
\$3,000,000	\$600,000	\$1,000,000	60.0%

*Sales × Contribution Margin Ratio – Fixed Expenses

2. The ROI increases by 2.5% for each \$100,000 increase in sales. This happens because each \$100,000 increase in sales brings in an additional profit of \$25,000. When this additional profit is divided by the average operating assets of \$1,000,000, the result is an increase in the company's ROI of 2.5%.

Increase in sales.....	\$100,000	(a)
Contribution margin ratio.....	25%	(b)
Increase in contribution margin and net operating income (a) × (b).....	\$25,000	(c)
Average operating assets.....	\$1,000,000	(d)
Increase in return on investment (c) ÷ (d).....	2.5%	

Problem 12-17 (30 minutes)

1.	<i>Present</i>	<i>New Line</i>	<i>Total</i>
(1) Sales.....	\$10,000,000	\$2,000,000	\$12,000,000
(2) Net operating income	\$800,000	\$160,000 *	\$960,000
(3) Operating assets.....	\$4,000,000	\$1,000,000	\$5,000,000
(4) Margin (2) ÷ (1).....	8%	8%	8%
(5) Turnover (1) ÷ (3).....	2.5	2.0	2.4
(6) ROI (4) × (5).....	20.0%	16.0%	19.2%

* Sales.....	\$2,000,000
Variable expenses (60% × \$2,000,000).....	<u>1,200,000</u>
Contribution margin.....	800,000
Fixed expenses.....	<u>640,000</u>
Net operating income.....	<u>\$ 160,000</u>

2. Dell Havasi will be inclined to reject the new product line because accepting it would reduce his division's overall rate of return.
3. The new product line promises an ROI of 16%, whereas the company's overall ROI last year was only 15%. Thus, adding the new line would increase the company's overall ROI.

4. a.	<i>Present</i>	<i>New Line</i>	<i>Total</i>
Operating assets.....	\$4,000,000	\$1,000,000	\$5,000,000
Minimum return required.....	<u>× 12%</u>	<u>× 12%</u>	<u>× 12%</u>
Minimum net operating income.....	<u>\$ 480,000</u>	<u>\$ 120,000</u>	<u>\$ 600,000</u>
Actual net operating income....	\$ 800,000	\$ 160,000	\$ 960,000
Minimum net operating income (above).....	<u>480,000</u>	<u>120,000</u>	<u>600,000</u>
Residual income.....	<u>\$ 320,000</u>	<u>\$ 40,000</u>	<u>\$ 360,000</u>

- b. Under the residual income approach, Dell Havasi would be inclined to accept the new product line because adding the product line would increase the total amount of his division's residual income, as shown above.

Problem 12-18 (30 minutes)

1. Breaking the ROI computation into two separate elements helps the manager to see important relationships that might remain hidden. First, the importance of turnover of assets as a key element to overall profitability is emphasized. Prior to use of the ROI formula, managers tended to allow operating assets to swell to excessive levels. Second, the importance of sales volume in profit computations is stressed and explicitly recognized. Third, breaking the ROI computation into margin and turnover elements stresses the possibility of trading one off for the other in attempts to improve the overall profit picture. That is, a company may shave its margins slightly hoping for a large enough increase in turnover to increase the overall rate of return. Fourth, ratios make it easier to make comparisons between segments of the organization.

2.

	<i>Companies in the Same Industry</i>		
	<i>A</i>	<i>B</i>	<i>C</i>
Sales.....	\$600,000 *	\$500,000 *	\$2,000,000
Net operating income.....	\$84,000 *	\$70,000 *	\$70,000
Average operating assets.....	\$300,000 *	\$1,000,000	\$1,000,000 *
Margin.....	14%	14%	3.5% *
Turnover.....	2.0	0.5	2.0 *
Return on investment (ROI)....	28%	7% *	7%

*Given.

NAA Report No. 35 states (p. 35):

“Introducing sales to measure level of operations helps to disclose specific areas for more intensive investigation. Company B does as well as Company A in terms of profit margin, for both companies earn 14% on sales. But Company B has a much lower turnover of capital than does Company A. Whereas a dollar of investment in Company A supports two dollars in sales each period, a dollar investment in Company B supports only fifty cents in sales each period. This suggests that the analyst should look carefully at Company B’s investment. Is the company keeping an inventory larger than necessary for its sales volume? Are receivables being collected promptly? Or did Company A acquire its fixed assets at a price level which was much lower than that at which Company B purchased its plant?”

Problem 12-18 (continued)

Thus, by including sales specifically in ROI computations the manager is able to discover possible problems, as well as reasons underlying a strong or a weak performance. Looking at Company A compared to Company C, notice that C's turnover is the same as A's, but C's margin on sales is much lower. Why would C have such a low margin? Is it due to inefficiency, is it due to geographical location (requiring higher salaries or transportation charges), is it due to excessive materials costs, or is it due to other factors? ROI computations raise questions such as these, which form the basis for managerial action.

To summarize, in order to bring B's ROI into line with A's, it seems obvious that B's management will have to concentrate its efforts on increasing turnover, either by increasing sales or by reducing assets. It seems unlikely that B can appreciably increase its ROI by improving its margin on sales. On the other hand, C's management should concentrate its efforts on the margin element by trying to pare down its operating expenses.

Problem 12-19 (45 minutes)

The answers below are not the only possible answers. Ingenious people can figure out many different ways of making performance look better even though it really isn't. This is one of the reasons for a *balanced scorecard*. By having a number of different measures that ultimately are linked to overall financial goals, "gaming" the system is more difficult.

1. Speed-to-market can be improved by taking on less ambitious projects. Instead of working on major product innovations that require a great deal of time and effort, R&D may choose to work on small, incremental improvements in existing products. There is also a danger that in the rush to push products out the door, the products will be inadequately tested and developed.
2. Performance measures that are ratios or percentages present special dangers. A ratio can be increased either by increasing the numerator or by decreasing the denominator. Usually, the intention is to increase the numerator in the ratio, but a manager may react by decreasing the denominator instead. In this case (which actually happened), the managers pulled telephones out of the high-crime areas. This eliminated the problem for the managers, but was not what the CEO or the city officials had intended. They wanted the phones fixed, not eliminated.
3. In real life, the production manager simply added several weeks to the delivery cycle time. In other words, instead of promising to deliver an order in four weeks, the manager promised to deliver in six weeks. This increase in delivery cycle time did not, of course, please customers and drove some business away, but it dramatically improved the percentage of orders delivered on time.

Problem 12-19 (continued)

4. As stated above, ratios can be improved by changing either the numerator or the denominator. Managers who are under pressure to increase the revenue per employee may find it easier to eliminate employees than to increase revenues. Of course, eliminating employees may reduce total revenues and total profits, but the revenue per employee will increase as long as the percentage decline in revenues is less than the percentage cut in number of employees. Suppose, for example, that a manager is responsible for business units with a total of 1,000 employees, \$120 million in revenues, and profits of \$2 million. Further suppose that a manager can eliminate one of these business units that has 200 employees, revenues of \$10 million, and profits of \$1.2 million.

	<i>Before eliminating the business unit</i>	<i>After eliminating the business unit</i>
Total revenue.....	\$120,000,000	\$110,000,000
Total employees.....	1,000	800
Revenue per employee.	\$120,000	\$137,500
Total profits.....	\$2,000,000	\$800,000

As these examples illustrate, performance measures should be selected with a great deal of care and managers should avoid placing too much emphasis on any one performance measure.

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Problem 12-20 (20 minutes)

1. Operating assets do not include investments in other companies or in undeveloped land.

	<i>Ending Balances</i>	<i>Beginning Balances</i>
Cash.....	\$ 120,000	\$ 140,000
Accounts receivable.....	530,000	450,000
Inventory.....	380,000	320,000
Plant and equipment (net).....	<u>620,000</u>	<u>680,000</u>
Total operating assets.....	<u>\$1,650,000</u>	<u>\$1,590,000</u>

$$\text{Average operating assets} = \frac{\$1,650,000 + \$1,590,000}{2} = \$1,620,000$$

$$\text{Margin} = \frac{\text{Net operating income}}{\text{Sales}}$$

$$= \frac{\$405,000}{\$4,050,000} = 10\%$$

$$\text{Turnover} = \frac{\text{Sales}}{\text{Average operating assets}}$$

$$= \frac{\$4,050,000}{\$1,620,000} = 2.5$$

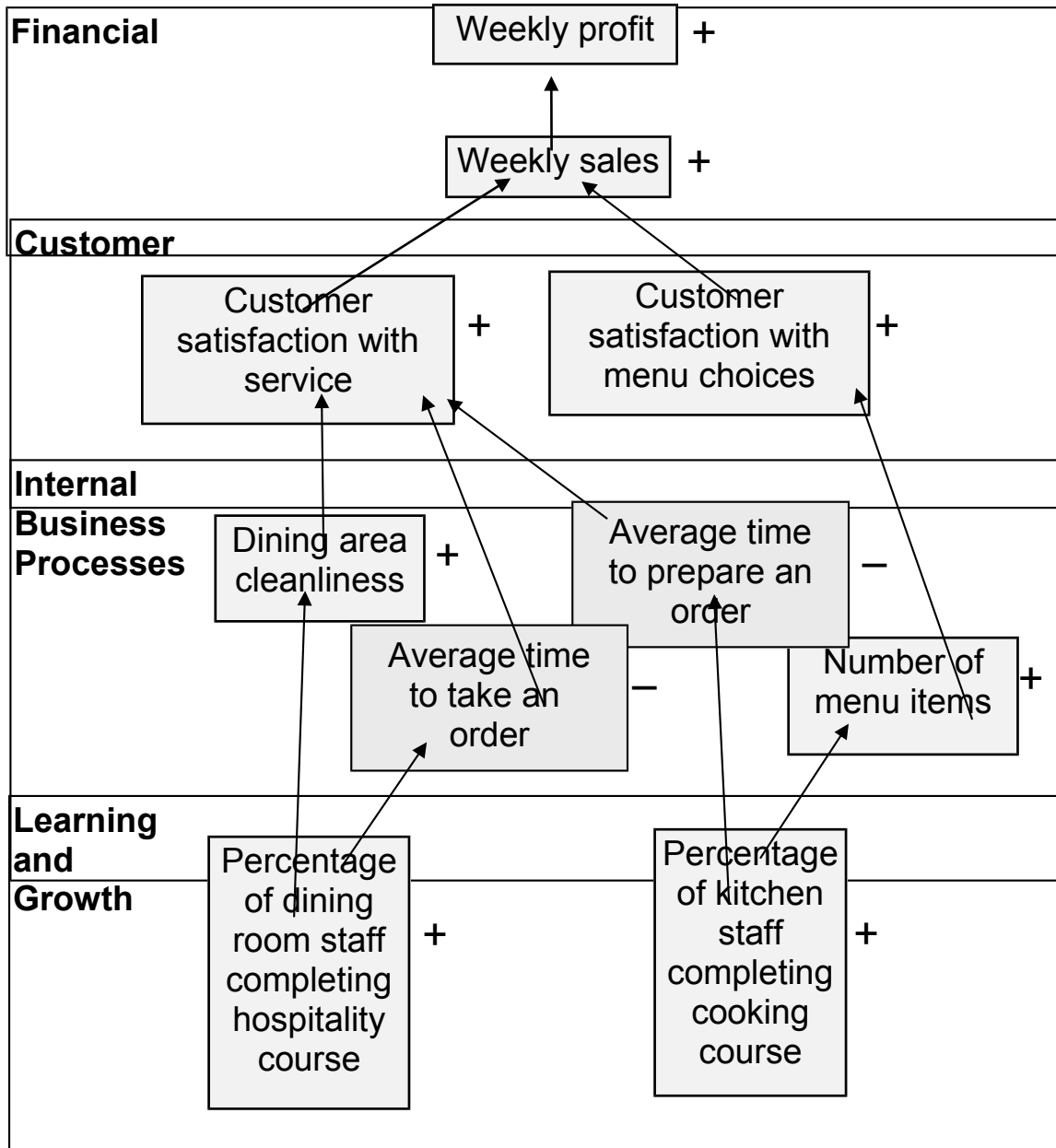
$$\text{ROI} = \text{Margin} \times \text{Turnover}$$

$$= 10\% \times 2.5 = 25\%$$

2. Net operating income.....	\$405,000
Minimum required return (15% × \$1,620,000).....	<u>243,000</u>
Residual income.....	<u>\$162,000</u>

Problem 12-22 (45 minutes)

1. Students' answers may differ in some details from this solution.



Problem 12-22 (continued)

2. The hypotheses underlying the balanced scorecard are indicated by the arrows in the diagram. Reading from the bottom of the balanced scorecard, the hypotheses are:
- o If the percentage of dining room staff that complete the basic hospitality course increases, then the average time to take an order will decrease.
 - o If the percentage of dining room staff that complete the basic hospitality course increases, then dining room cleanliness will improve.
 - o If the percentage of kitchen staff that complete the basic cooking course increases, then the average time to prepare an order will decrease.
 - o If the percentage of kitchen staff that complete the basic cooking course increases, then the number of menu items will increase.
 - o If the dining room cleanliness improves, then customer satisfaction with service will increase.
 - o If the average time to take an order decreases, then customer satisfaction with service will increase.
 - o If the average time to prepare an order decreases, then customer satisfaction with service will increase.
 - o If the number of menu items increases, then customer satisfaction with menu choices will increase.
 - o If customer satisfaction with service increases, weekly sales will increase.
 - o If customer satisfaction with menu choices increases, weekly sales will increase.
 - o If sales increase, weekly profits for the Lodge will increase.

Each of these hypotheses can be questioned. For example, the items added to the menu may not appeal to customers. So even if the number of menu items increases, customer satisfaction with the menu choices may not increase. The fact that each of the hypotheses can be questioned does not, however, invalidate the balanced scorecard. If the scorecard is used correctly, management will be able to identify which, if any, of the hypotheses are incorrect. [See below.]

Problem 12-22 (continued)

3. Management will be able to tell if a hypothesis is false if an improvement in a performance measure at the bottom of an arrow does not, in fact, lead to improvement in the performance measure at the tip of the arrow. For example, if the number of menu items is increased, but customer satisfaction with the menu choices does not increase, management will immediately know that something was wrong with that particular hypothesis.

Problem 12-23 (60 minutes)

1. Segments defined as product lines:

		<i>Product Line</i>		
	<i>Glass Division</i>	<i>Flat Glass</i>	<i>Auto Glass</i>	<i>Specialty Glass</i>
Sales.....	R600,000	R200,000	R300,000	R100,000
Variable expenses.....	<u>300,000</u>	<u>130,000</u>	<u>120,000</u>	<u>50,000</u>
Contribution margin.....	<u>300,000</u>	<u>70,000</u>	<u>180,000</u>	<u>50,000</u>
Traceable fixed expenses:				
Advertising.....	120,000	30,000	42,000	48,000
Depreciation.....	48,000	10,000	24,000	14,000
Administration.....	<u>42,000</u>	<u>14,000</u>	<u>21,000</u>	<u>7,000</u>
Total.....	<u>210,000</u>	<u>54,000</u>	<u>87,000</u>	<u>69,000</u>
Product line segment margin.....	90,000	<u>R 16,000</u>	<u>R 93,000</u>	<u>R (19,000)</u>
Common fixed expenses not traceable to product lines:				
Administration.....	<u>60,000</u>			
Divisional segment margin.	<u>R 30,000</u>			

Problem 12-23 (continued)

2. Segments defined as markets for Specialty Glass:

		<i>Sales Market</i>	
	<i>Specialty Glass</i>	<i>Domestic</i>	<i>Foreign</i>
Sales.....	R100,000	R60,000	R 40,000
Variable expenses.....	<u>50,000</u>	<u>30,000</u>	<u>20,000</u>
Contribution margin.....	50,000	30,000	20,000
Traceable fixed expenses:			
Advertising.....	<u>48,000</u>	<u>18,000</u>	<u>30,000</u>
Market segment margin.....	<u>2,000</u>	<u>R12,000</u>	<u>R(10,000)</u>
Common fixed expenses not traceable to sales markets:			
Depreciation.....	14,000		
Administration.....	<u>7,000</u>		
Total.....	<u>21,000</u>		
Product line segment margin.....	<u>R (19,000)</u>		

3.	<i>Flat Glass</i>	<i>Auto Glass</i>
Increased sales.....	R40,000	R30,000
Contribution margin ratio:		
Flat glass (R70,000/R200,000).....	<u>× 35%</u>	
Auto glass (R180,000/R300,000).....		<u>× 60%</u>
Incremental contribution margin.....	R14,000	R18,000
Less cost of the promotional campaign.....	<u>8,000</u>	<u>8,000</u>
Increased net operating income.....	<u>R 6,000</u>	<u>R10,000</u>

Based on these data, the campaign should be directed toward Auto Glass. Note that the analysis uses the contribution margin ratio rather than the segment margin ratio.

Problem 12-24 (60 minutes)

1.

	<i>Total Compan y</i>	<i>Sales Territory</i>	
		<i>Northern</i>	<i>Southern</i>
Sales.....	\$750,000	\$300,000	\$450,000
Variable expenses.....	<u>336,000</u>	<u>156,000</u>	<u>180,000</u>
Contribution margin.....	414,000	144,000	270,000
Traceable fixed expenses.....	<u>228,000</u>	<u>120,000</u>	<u>108,000</u>
Sales territory segment margin.....	186,000	<u>\$ 24,000</u>	<u>\$162,000</u>
Common fixed expenses not traceable to sales territories (\$378,000 – \$228,000 = \$150,000).....	<u>150,000</u>		
Net operating income.....	<u>\$ 36,000</u>		

	<i>Northern Territory</i>	<i>Product Line</i>	
		<i>Paks</i>	<i>Tibs</i>
Sales.....	\$300,000	\$50,000	\$250,000
Variable expenses.....	<u>156,000</u>	<u>11,000</u>	<u>145,000</u>
Contribution margin.....	144,000	39,000	105,000
Traceable fixed expenses.....	<u>70,000</u>	<u>30,000</u>	<u>40,000</u>
Product line segment margin.....	74,000	<u>\$ 9,000</u>	<u>\$ 65,000</u>
Common fixed expenses not traceable to product lines (\$120,000 – \$70,000 = \$50,000).....	<u>50,000</u>		
Sales territory segment margin.....	<u>\$ 24,000</u>		

Problem 12-24 (continued)

	<i>Total Compan y</i>	<i>Sales Territory</i>	
		<i>Northern</i>	<i>Southern</i>
Sales.....	100.0%	100%	100%
Variable expenses.....	<u>44.8%</u>	<u>52%</u>	<u>40%</u>
Contribution margin.....	55.2%	48%	60%
Traceable fixed expenses.....	<u>30.4%</u>	<u>40%</u>	<u>24%</u>
Sales territory segment margin.....	24.8%	<u>8%</u>	<u>36%</u>
Common fixed expenses not traceable to sales territories (\$378,000 – \$228,000 = \$150,000).....	<u>20.0%</u>		
Net operating income.....	<u>4.8%</u>		

	<i>Northern Territory</i>	<i>Product Line</i>	
		<i>Paks</i>	<i>Tibs</i>
Sales.....	100.0%	100%	100%
Variable expenses.....	<u>52.0%</u>	<u>22%</u>	<u>58%</u>
Contribution margin.....	48.0%	78%	42%
Traceable fixed expenses.....	<u>23.3%</u>	<u>60%</u>	<u>16%</u>
Product line segment margin.....	24.7%	<u>18%</u>	<u>26%</u>
Common fixed expenses not traceable to product lines (\$120,000 – \$70,000 = \$50,000).....	<u>16.7%</u>		
Sales territory segment margin.....	<u>8.0%</u>		

Problem 12-24 (continued)

2. Two insights should be brought to the attention of management. First, compared to the Southern territory, the Northern territory has a low contribution margin ratio. Second, the Northern territory has high traceable fixed expenses. Overall, compared to the Southern territory, the Northern territory is very weak.
3. Again, two insights should be brought to the attention of management. First, the Northern territory has a poor sales mix. Note that the territory sells very little of the Paks product, which has a high contribution margin ratio. This poor sales mix accounts for the low overall contribution margin ratio in the Northern territory mentioned in part (2) above. Second, the traceable fixed expenses of the Paks product seem very high in relation to sales. These high fixed expenses may simply mean that the Paks product is highly leveraged; if so, then an increase in sales of this product line would greatly enhance profits in the Northern territory and in the company as a whole.

Problem 12-25 (60 minutes)

1.

	<i>Total Compan y</i>	<i>Cook- book</i>	<i>Travel Guide</i>	<i>Handy Speller</i>
Sales.....	<u>\$300,000</u>	<u>\$90,000</u>	<u>\$150,000</u>	<u>\$60,000</u>
Variable expenses:				
Printing cost.....	102,000	27,000	63,000	12,000
Sales commissions.....	<u>30,000</u>	<u>9,000</u>	<u>15,000</u>	<u>6,000</u>
Total variable expenses.....	<u>132,000</u>	<u>36,000</u>	<u>78,000</u>	<u>18,000</u>
Contribution margin.....	<u>168,000</u>	<u>54,000</u>	<u>72,000</u>	<u>42,000</u>
Traceable fixed expenses:				
Advertising.....	36,000	13,500	19,500	3,000
Salaries.....	33,000	18,000	9,000	6,000
Equipment depreciation*	9,000	2,700	4,500	1,800
Warehouse rent**	<u>12,000</u>	<u>1,800</u>	<u>6,000</u>	<u>4,200</u>
Total traceable fixed expenses	<u>90,000</u>	<u>36,000</u>	<u>39,000</u>	<u>15,000</u>
Product line segment margin...	<u>78,000</u>	<u>\$18,000</u>	<u>\$ 33,000</u>	<u>\$27,000</u>
Common fixed expenses:				
General sales.....	18,000			
General administration.....	42,000			
Depreciation—office facilities.....	<u>3,000</u>			
Total common fixed expenses.	<u>63,000</u>			
Net operating income.....	<u>\$ 15,000</u>			

* \$9,000 × 30%, 50%, and 20%, respectively.

** \$48,000 square feet × \$3 per square foot = \$144,000; \$144,000 ÷ 12 months = \$12,000 per month. \$12,000 ÷ 48,000 square feet = \$0.25 per square foot per month.
\$0.25 per square foot × 7,200 square feet = \$1,800; \$0.25 per square foot × 24,000 square feet = \$6,000; and \$0.25 per square foot × 16,800 square feet = \$4,200.

Problem 12-25 (continued)

2. a. No, the cookbook line should not be eliminated. The cookbook is covering all of its own costs and is generating an \$18,000 segment margin toward covering the company's common costs and toward profits. (Note: Problems relating to the elimination of a product line are covered in more depth in the next chapter.)

b.

	<i>Cook- book</i>	<i>Travel Guide</i>	<i>Handy Speller</i>
Contribution margin (a).....	\$54,000	\$72,000	\$42,000
Sales (b).....	\$90,000	\$150,000	\$60,000
Contribution margin ratio (a) ÷ (b) ..	60%	48%	70%

It is probably unwise to focus all available resources on promoting the travel guide. The company is already spending more on the promotion of this product than on the other two products combined. Furthermore, the travel guide has the lowest contribution margin ratio of the three products. Therefore, a dollar of sales of the travel guide generates less profit than a dollar of sales of either of the two other products. Nevertheless, we cannot say for sure which product should be emphasized in this situation without more information. The problem states that there is ample demand for all three products, which suggests that there is no idle capacity. If the equipment is being fully utilized, increasing the production of any one product would require cutting back production of the other products. In the next chapter we will discuss how to choose the most profitable product when a production constraint forces such a trade-off among products.

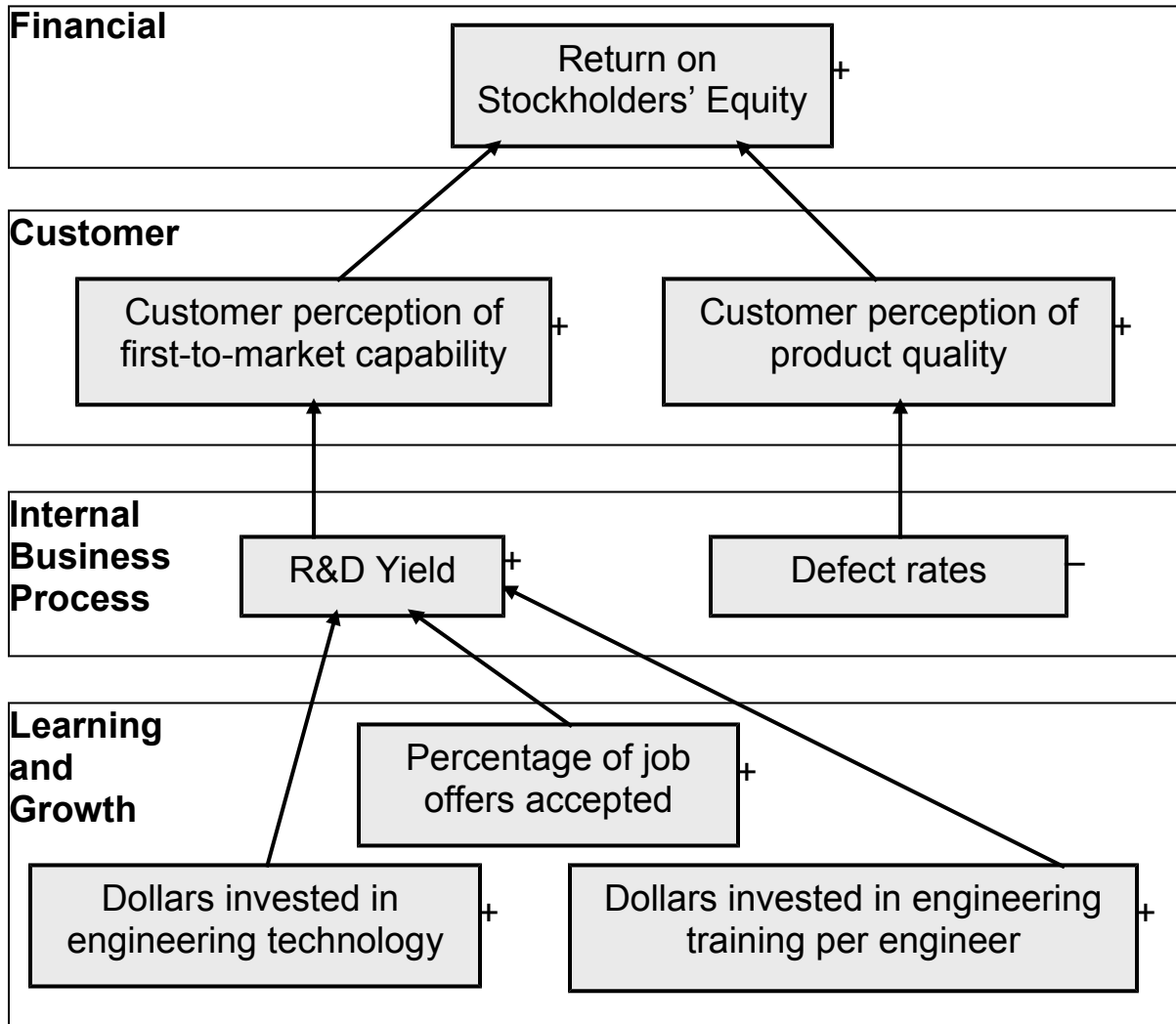
Problem 12-26 (90 minutes)

1. Both companies view training as important; both companies need to leverage technology to succeed in the marketplace; and both companies are concerned with minimizing defects. There are numerous differences between the two companies. For example, Applied Pharmaceuticals is a product-focused company and Destination Resorts International (DRI) is a service-focused company. Applied Pharmaceuticals' training resources are focused on their engineers because they hold the key to the success of the organization. DRI's training resources are focused on their front-line employees because they hold the key to the success of their organization. Applied Pharmaceuticals' technology investments are focused on supporting the innovation that is inherent in the product development side of the business. DRI's technology investments are focused on supporting the day-to-day execution that is inherent in the customer interface side of the business. Applied Pharmaceuticals defines a defect from an internal manufacturing standpoint, while DRI defines a defect from an external customer interaction standpoint.

Problem 12-26 (continued)

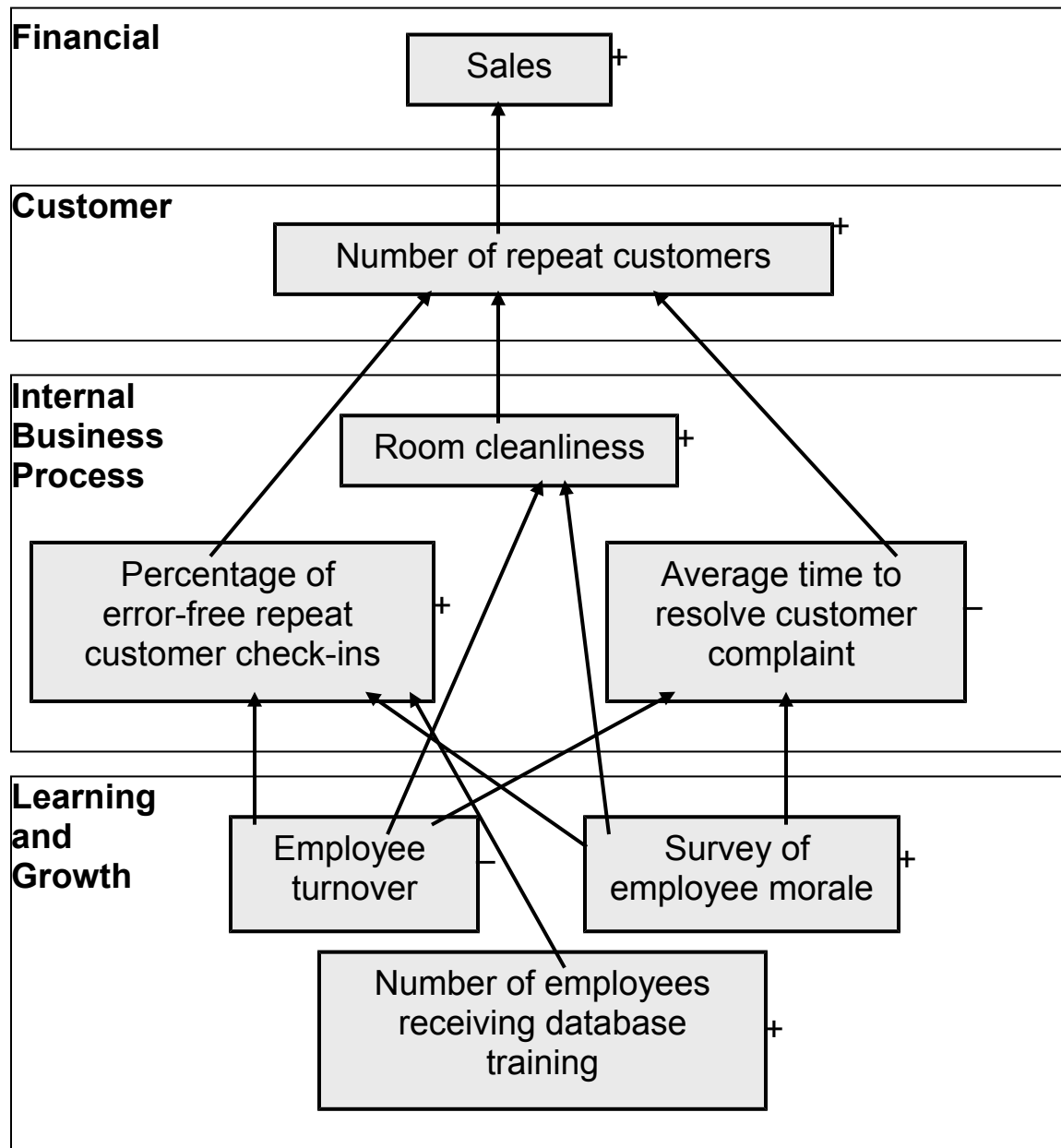
2. Students' answers may differ in some details from this solution.

Applied Pharmaceuticals



Problem 12-26 (continued)

Destination Resorts International



Problem 12-26 (continued)

3. The hypotheses underlying the balanced scorecards are indicated by the arrows in each diagram. Reading from the bottom of each balanced scorecard, the hypotheses are:

Applied Pharmaceuticals

- If the dollars invested in engineering technology increase, then the R&D yield will increase.
- If the percentage of job offers accepted increases, then the R&D yield will increase.
- If the dollars invested in engineering training per engineer increase, then the R&D yield will increase.
- If the R&D yield increases, then customer perception of first-to-market capability will increase.
- If the defects per million opportunities decrease, then the customer perception of product quality will increase.
- If the customer perception of first-to-market capability increases, then the return on stockholders' equity will increase.
- If the customer perception of product quality increases, then the return on stockholders' equity will increase.

Destination Resort International

- If the employee turnover decreases, then the percentage of error-free repeat customer check-ins and room cleanliness will increase and the average time to resolve customer complaints will decrease.
- If the number of employees receiving database training increases, then the percentage of error-free repeat customer check-ins will increase.
- If employee morale increases, then the percentage of error-free repeat customer check-ins and room cleanliness will increase and the average time to resolve customer complaints will decrease.
- If the percentage of error-free repeat customer check-ins increases, then the number of repeat customers will increase.
- If the room cleanliness increases, then the number of repeat customers will increase.
- If the average time to resolve customer complaints decreases, then the number of repeat customers will increase.
- If the number of repeat customers increases, then sales will increase.

Problem 12-26 (continued)

Each of these hypotheses is questionable to some degree. For example, in the case of Applied Pharmaceuticals, R&D yield is not the sole driver of the customers' perception of first-to-market capability. More specifically, if Applied Pharmaceuticals experimented with nine possible drug compounds in year one and three of those compounds proved to be successful in the marketplace it would result in an R&D yield of 33%. If in year two, it experimented with four possible drug compounds and two of those compounds proved to be successful in the marketplace it would result in an R&D yield of 50%. While the R&D yield has increased from year one to year two, it is quite possible that the customer's perception of first-to-market capability would decrease. The fact that each of the hypotheses mentioned above can be questioned does not invalidate the balanced scorecard. If the scorecard is used correctly, management will be able to identify which, if any, of the hypotheses are invalid and the balanced scorecard can then be appropriately modified.

Problem 12-27 (60 minutes)

1. The disadvantages or weaknesses of the company's version of a segmented income statement are as follows:
 - a. The company should include a column showing the combined results of the three regions taken together.
 - b. The regional expenses should be segregated into variable and fixed categories to permit the computation of both a contribution margin and a regional segment margin.
 - c. The corporate expenses are probably common to the regions and should not be arbitrarily allocated.
2. Corporate advertising expenses have been allocated on the basis of sales dollars; the general administrative expenses have been allocated evenly among the three regions. Such allocations can be misleading to management because they seem to imply that these expenses are caused by the segments to which they have been allocated. The segment margin—which only includes costs that are actually caused by the segments—should be used to measure the performance of a segment. The “net operating income” or “net loss” after allocating common expenses should *not* be used to judge the performance of a segment.

Problem 12-27 (continued)

3.	<i>Total</i>	<i>West</i>	<i>Central</i>	<i>East</i>
Sales.....	<u>\$2,000,000</u>	<u>\$450,000</u>	<u>\$800,000</u>	<u>\$750,000</u>
Variable expenses:				
Cost of goods sold.....	819,400	162,900	280,000	376,500
Shipping expense.....	<u>77,600</u>	<u>17,100</u>	<u>32,000</u>	<u>28,500</u>
Total variable expenses.....	<u>897,000</u>	<u>180,000</u>	<u>312,000</u>	<u>405,000</u>
Contribution margin.....	<u>1,103,000</u>	<u>270,000</u>	<u>488,000</u>	<u>345,000</u>
Traceable fixed expenses:				
Advertising.....	518,000	108,000	200,000	210,000
Salaries.....	313,000	90,000	88,000	135,000
Utilities.....	40,500	13,500	12,000	15,000
Depreciation.....	<u>85,000</u>	<u>27,000</u>	<u>28,000</u>	<u>30,000</u>
Total traceable fixed expenses.....	<u>956,500</u>	<u>238,500</u>	<u>328,000</u>	<u>390,000</u>
Regional segment margin.....	<u>146,500</u>	<u>\$31,500</u>	<u>\$160,000</u>	<u>\$(45,000)</u>
Common fixed expenses not traceable to the regions:				
Advertising (general)	80,000			
General administrative expenses.....	<u>150,000</u>			
Total common fixed expenses	<u>230,000</u>			
Net loss.....	<u>\$ (83,500)</u>			

Problem 12-27 (continued)

	<i>Total</i>	<i>West</i>	<i>Central</i>	<i>East</i>
Sales.....	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>
Variable expenses:				
Cost of goods sold.....	41.0%	36.2%	35.0%	50.2%
Shipping expense.....	<u>3.9%</u>	<u>3.8%</u>	<u>4.0%</u>	<u>3.8%</u>
Total variable expenses.....	<u>44.9%</u>	<u>40.0%</u>	<u>39.0%</u>	<u>54.0%</u>
Contribution margin.....	<u>55.1%</u>	<u>60.0%</u>	<u>61.0%</u>	<u>46.0%</u>
Traceable fixed expenses:				
Advertising.....	25.9%	24.0%	25.0%	28.0%
Salaries.....	15.6%	20.0%	11.0%	18.0%
Utilities.....	2.0%	3.0%	1.5%	2.0%
Depreciation.....	<u>4.3%</u>	<u>6.0%</u>	<u>3.5%</u>	<u>4.0%</u>
Total traceable fixed expenses	<u>47.8%</u>	<u>53.0%</u>	<u>41.0%</u>	<u>52.0%</u>
Regional segment margin.....	<u>7.3%</u>	<u>7.0%</u>	<u>20.0%</u>	<u>(6.0%)</u>
Common fixed expenses not traceable to the regions:				
Advertising (general)	4.0%			
General administrative expenses.....	<u>7.5%</u>			
Total common fixed expenses.	<u>11.5%</u>			
Net loss.....	<u>(4.2%)</u>			

Note: Percentage figures may not total down due to rounding.

Problem 12-27 (continued)

4. The following points should be brought to the attention of management:
- a. Sales in the West are much lower than in the other two regions. This is not due to lack of salespeople—salaries in the West are about the same as in the Central Region, which has the highest sales of the three regions.
 - b. The West is spending about half as much for advertising as the Central Region. Perhaps this is the reason for the West's lower sales.
 - c. The East apparently is selling a large amount of low-margin items. Note that it has a contribution margin ratio of only 46%, compared to 60% or more for the other two regions.
 - d. The East appears to be overstaffed. Its salaries are about 50% greater than in either of the other two regions.
 - e. The East is not covering its own traceable costs. Attention should be given to improving the sales mix and reducing expenses in this region.
 - f. Apparently, the salespeople in all three regions are on a salary basis. Perhaps a change to a commission basis would encourage the sales staff to be more aggressive and improve sales throughout the company.

Case 12-28 (90 minutes)

1. See the segmented statement on the second following page.
Supporting computations for the statement are given below:

Sales:

Membership dues (20,000 × \$100).....	\$2,000,000
Assigned to Magazine Subscriptions Division (20,000 × \$20).....	<u>400,000</u>
Assigned to Membership Division.....	<u>\$1,600,000</u>
Non-member magazine subscriptions (2,500 × \$30) ..	<u>\$ 75,000</u>
 Reports and texts (28,000 × \$25).....	 <u>\$ 700,000</u>
Continuing education courses:	
One-day (2,400 × \$75).....	\$ 180,000
Two-day (1,760 × \$125).....	<u>220,000</u>
Total revenue.....	<u>\$ 400,000</u>

Salary and personnel costs:

	<i>Salaries</i>	<i>Personnel Costs (25% of Salaries)</i>
Membership Division.....	\$210,000	\$ 52,500
Magazine Subscriptions Division...	150,000	37,500
Books and Reports Division.....	300,000	75,000
Continuing Education Division.....	<u>180,000</u>	<u>45,000</u>
Total assigned to divisions.....	840,000	210,000
Corporate staff.....	<u>80,000</u>	<u>20,000</u>
Total.....	<u>\$920,000</u>	<u>\$230,000</u>

Case 12-28 (continued)

Some may argue that, except for the \$50,000 in rental cost directly attributed to the Books and Reports Division, occupancy costs are common costs that should not be allocated. The correct treatment of the occupancy costs depends on whether they could be avoided in part by eliminating a division. In the solution below, we have assumed they could be avoided.

Occupancy costs (\$230,000 allocated + \$50,000 direct to the Books and

Reports Division = \$280,000):

Allocated to:

Membership Division ($\$230,000 \times 0.2$).....		\$ 46,000
Magazine Subscriptions Division ($\$230,000 \times 0.2$).....		46,000
Books and Reports Division ($\$230,000 \times 0.3 + \$50,000$).....		119,000
Continuing Education Division ($\$230,000 \times 0.2$).....		46,000
Corporate staff ($\$230,000 \times 0.1$).....		<u>23,000</u>
Total occupancy costs.....		<u>\$280,000</u>
Printing and paper costs.....		\$320,000
Assigned to:		
Magazine Subscriptions Division ($22,500 \times \$7$).....	\$157,500	
Books and Reports Division ($28,000 \times \$4$).....	<u>112,000</u>	<u>269,500</u>
Remainder—Continuing Education Division.....		<u>\$ 50,500</u>
Postage and shipping costs.....		\$176,000
Assigned to:		
Magazine Subscriptions Division ($22,500 \times \$4$).....	\$ 90,000	
Books and Reports Division ($28,000 \times \$2$).....	<u>56,000</u>	<u>146,000</u>
Remainder—corporate staff.....		<u>\$ 30,000</u>

Case 12-28 (continued)

		<i>Division</i>			
	<i>Association Total</i>	<i>Membership</i>	<i>Magazine Subscriptions</i>	<i>Books & Reports</i>	<i>Continuing Education</i>
Sales:					
Membership dues.....	\$2,000,000	\$1,600,000	\$400,000		
Non-member magazine subscriptions.....	75,000		75,000		
Advertising.....	100,000		100,000		
Reports and texts.....	700,000			\$700,000	
Continuing education courses.....	400,000				\$400,000
Total revenues.....	<u>3,275,000</u>	<u>1,600,000</u>	<u>575,000</u>	<u>700,000</u>	<u>400,000</u>
Expenses traceable to segments:					
Salaries.....	840,000	210,000	150,000	300,000	180,000
Personnel costs.....	210,000	52,500	37,500	75,000	45,000
Occupancy costs.....	257,000	46,000	46,000	119,000	46,000
Reimbursement of member costs to local chapters.....	600,000	600,000			
Other membership services.....	500,000	500,000			
Printing and paper.....	320,000		157,500	112,000	50,500
Postage and shipping.....	146,000		90,000	56,000	
Instructors' fees.....	80,000				80,000
Total traceable expenses.....	<u>2,953,000</u>	<u>1,408,500</u>	<u>481,000</u>	<u>662,000</u>	<u>401,500</u>
Division segment margin.....	<u>322,000</u>	<u>\$ 191,500</u>	<u>\$ 94,000</u>	<u>\$ 38,000</u>	<u>\$ (1,500)</u>

[The statement is continued on the next page.]

Case 12-28 (continued)

[Continuation of the segmented income statement.]

	<i>Association</i>	<i>Division</i>			
	<i>Total</i>	<i>Membership</i>	<i>Magazine</i> <i>Subscriptions</i>	<i>Books &</i> <i>Reports</i>	<i>Continuing</i> <i>Education</i>
Division segment margin.....	<u>322,000</u>	<u>\$ 191,500</u>	<u>\$ 94,000</u>	<u>\$ 38,000</u>	<u>\$ (1,500)</u>
Common expenses not traceable to divisions:					
Salaries—corporate staff.....	80,000				
Personnel costs.....	20,000				
Occupancy costs.....	23,000				
Postage and shipping.....	30,000				
General and administrative.....	<u>38,000</u>				
Total common expenses.....	<u>191,000</u>				
Excess of revenues over expenses....	<u>\$ 131,000</u>				

Case 12-28 (continued)

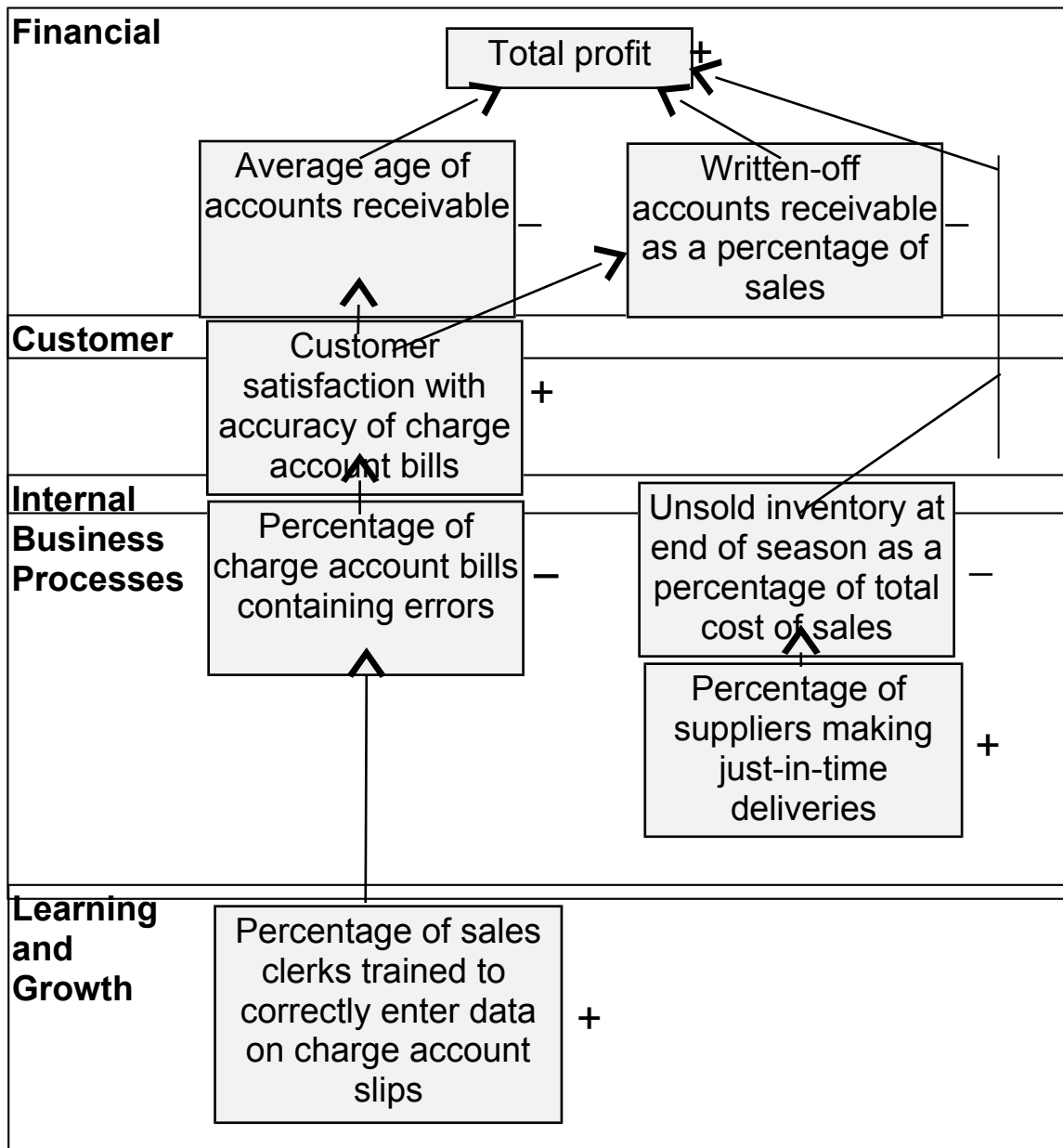
2. While we do not favor the allocation of common costs to segments, the most common reason given for this practice is that segment managers need to be aware of the fact that common costs do exist and that they must be covered.

Arguments against allocation of all costs:

- Allocation bases will need to be chosen arbitrarily because no cause-and-effect relationship exists between common costs and the segments to which they are allocated.
- Management may be misled into eliminating a profitable segment that appears to be unprofitable because of allocated common costs.
- Segment managers usually have little control over common costs. They should not be held accountable for costs over which they have no control.
- Allocations of common costs undermine the credibility of performance reports. Segment managers may resent such allocations and ignore the entire performance report as arbitrary and unfair.

Case 12-29 (60 minutes)

1. Student answers may differ concerning which category—learning and growth, internal business processes, customers, or financial—a particular performance measure belongs to.



Case 12-29 (continued)

A number of the performance measures suggested by managers have not been included in the above balanced scorecard. The excluded performance measures may have an impact on total profit, but they are not linked in any obvious way with the two key problems that have been identified by management—accounts receivables and unsold inventory. If every performance measure that potentially impacts profit is included in a company's balanced scorecard, it would become unwieldy and focus would be lost.

2. The results of operations can be exploited for information about the company's strategy. Each link in the balanced scorecard should be regarded as a hypothesis of the form "If ..., then ...". For example, the balanced scorecard on the previous page contains the hypothesis "If customers express greater satisfaction with the accuracy of their charge account bills, then the average age of accounts receivable will improve." If customers in fact do express greater satisfaction with the accuracy of their charge account bills, but the average age of accounts receivable does not improve, this would have to be considered evidence that is inconsistent with the hypothesis. Management should try to figure out why the average age of receivables has not improved. (See the answer below for possible explanations.) The answer may suggest a shift in strategy.

In general, the most important results are those that provide evidence inconsistent with the hypotheses embedded in the balanced scorecard. Such evidence suggests that the company's strategy needs to be reexamined.

Case 12-29 (continued)

3. a. This evidence is inconsistent with two of the hypotheses underlying the balanced scorecard. The first of these hypotheses is “If customers express greater satisfaction with the accuracy of their charge account bills, then the average age of accounts receivable will improve.” The second of these hypotheses is “If customers express greater satisfaction with the accuracy of their charge account bills, then there will be improvement in bad debts.” There are a number of possible explanations. Two possibilities are that the company’s collection efforts are ineffective and that the company’s credit reviews are not working properly. In other words, the problem may not be incorrect charge account bills at all. The problem may be that the procedures for collecting overdue accounts are not working properly. Or, the problem may be that the procedures for reviewing credit card applications let through too many poor credit risks. If so, this would suggest that efforts should be shifted from reducing charge account billing errors to improving the internal business processes dealing with collections and credit screening. And in that case, the balanced scorecard should be modified.
- b. This evidence is inconsistent with three hypotheses. The first of these is “If the average age of receivables declines, then profits will increase.” The second hypothesis is “If the written-off accounts receivable decrease as a percentage of sales, then profits will increase.” The third hypothesis is “If unsold inventory at the end of the season as a percentage of cost of sales declines, then profits will increase.”

Again, there are a number of possible explanations for the lack of results consistent with the hypotheses. Managers may have decreased the average age of receivables by simply writing off old accounts earlier than was done previously. This would actually decrease reported profits in the short term. Bad debts as a percentage of sales could be decreased by drastically cutting back on extensions of credit to customers—perhaps even canceling some charge accounts. (Bad debts would be zero if there were no credit sales.) This would have the effect of reducing bad debts, but might irritate otherwise loyal credit customers and reduce sales and profits.

Case 12-29 (continued)

The reduction in unsold inventories at the end of the season as a percentage of cost of sales could have occurred for a number of reasons that are not necessarily good for profits. For example, managers may have been too cautious about ordering goods to restock low inventories—creating stockouts and lost sales. Or, managers may have cut prices drastically on excess inventories in order to eliminate them before the end of the season. This may have reduced the willingness of customers to pay the store's normal prices. Or, managers may have gotten rid of excess inventories by selling them to discounters *before* the end of the season.

Research and Application 12-30

1. FedEx succeeds because of its operational excellence customer value proposition. Page 9 of the 10-K describes the company's largest business segment, FedEx Express, by saying "FedEx Express invented express distribution in 1973 and remains the industry leader, providing rapid, reliable, time-definite delivery of packages, documents and freight to more than 220 countries and territories. FedEx Express offers time-certain delivery within one to three business days, serving markets that generate more than 90% of the world's gross domestic product through door-to-door, customs-cleared service with a money- back guarantee. FedEx Express's unmatched air route authorities and extensive transportation infrastructure, combined with leading-edge information technologies, make it world's largest express transportation company." The combination of global scale coupled with one to three day delivery capability testifies to the company's extraordinary operational excellence.

Page 4 of the 10-K describes FedEx's efforts to integrate its business segments so that customers have a single point of contact with the company for all of their air, ground, or freight transportation needs. This is undoubtedly an important aspect of FedEx's strategy.

2. FedEx's four main business segments are, FedEx Express, FedEx Ground, FedEx Freight, and FedEx Kinko's. Examples of traceable fixed costs for the FedEx Express segment include the costs of operating the primary sorting facility in Memphis, Tennessee, the costs of operating regional hubs in Newark, Oakland, and Fort Worth, and the costs of owning 557 airplanes (see page 22 of the 10-K). Examples of traceable fixed costs for the FedEx Ground segment include the costs of owning 19,700 trailers (see page 14 of the 10-K), the costs of operating 515 facilities and 28 hubs throughout the U.S. and Canada (see page 14 of the 10-K), and the compensation paid to the President and Chief Executive Officer of FedEx Ground, Daniel J. Sullivan (see page 29 of the 10-K).

Research and Application 12-30 (continued)

Examples of traceable fixed costs for the FedEx Freight segment include the costs of operating 321 service centers, the costs of owning 39,500 vehicles, and the service center manager salaries. Examples of traceable fixed costs for the FedEx Kinko's segment include the utility costs to operate the 1,290 FedEx Kinko's Office and Print Centers, the salaries paid to the Office and Print Center managers, and the rental costs incurred to operate the Office and Print Centers.

Examples of common costs include all of the FedEx sponsorships mentioned on page 19 of the 10-K. For example, the cost of hosting college football's FedEx Orange Bowl is common to the four business segments. Other common costs include the salary paid to the company's CEO Frederick W. Smith, and the fee paid to the company's auditor, Ernst & Young.

3. Page 24 of the 10-K lists all of the sorting facilities for the FedEx Express segment. These sorting facilities are examples of cost centers. Each of the retail FedEx Kinko's Office and Print Centers is a profit center. The four main business segments—FedEx Express, FedEx Ground, FedEx Freight, and FedEx Kinko's—are examples of investment centers.
4. The salary paid to Gary M. Kusin, the President and Chief Executive Officer for FedEx Kinko's is traceable to the FedEx Kinko's business segment, but it is common to each of the FedEx Kinko's retail locations. The cost of operating a FedEx Express regional hub in Newark is traceable to that hub, but the costs are common to the flights that arrive and depart from Newark. The cost of maintaining the company's website (www.fedex.com) is traceable to the company's Information Technology Department but it is common to the four business segments.

Research and Application 12-30 (continued)

5. The margin, turnover, and ROI for all four segments are summarized in the below table (dollar figures are in millions):

	<i>FedEx Express</i>	<i>FedEx Ground</i>	<i>FedEx Freight</i>	<i>FedEx Kinko's</i>
Sales.....	\$19,485	\$4,680	\$3,217	\$2,066
Operating income.....	\$1,414	\$604	\$354	\$100
Segment assets: 2005.....	\$13,130	\$2,776	\$2,047	\$2,987
Segment assets: 2004.....	\$12,443	\$2,248	\$1,924	\$2,903
Average operating assets [Segment assets: 2005 + Segment assets: 2004]/2.....	\$12,787	\$2,512	\$1,986	\$2,945
Margin [Operating income ÷ Sales].....	7.3%	12.9%	11.0%	4.8%
Turnover [Sales ÷ Average operating assets].....	1.52	1.86	1.62	0.70
ROI [Margin × Turnover].....	11.1%	24.0%	17.8%	3.4%

6. Assuming a 15% required rate of return, the residual income for all four segments would be computed as follows (dollar figures are in millions):

	<i>FedEx Express</i>	<i>FedEx Ground</i>	<i>FedEx Freight</i>	<i>FedEx Kinko's</i>
Average operating assets.....	\$12,787	\$2,512	\$1,986	\$2,945
Operating income.....	\$1,414	\$604	\$354	\$100
Minimum required return [15% × Average operating assets].	<u>1,918</u>	<u>377</u>	<u>298</u>	<u>442</u>
Residual income.....	<u>\$ (504)</u>	<u>\$227</u>	<u>\$ 56</u>	<u>\$(342)</u>

7. A \$20,000,000 investment that increases operating income by \$4,000,000 provides an ROI of 20%. Because the FedEx Express segment is currently earning an ROI of 11.1% (as calculated above), its managers would pursue the investment opportunity because it would increase their overall ROI. The FedEx Ground segment is currently earning an ROI of 24% (as calculated above); therefore, its managers would pass on the investment opportunity because it would lower their

overall ROI.

Research and Application 12-30 (continued)

If the managers are evaluated using residual income, the managers of both segments would pursue the investment opportunity because it would increase their overall residual incomes. Using residual income instead of ROI aligns the incentives of segment managers with the overall goals of the company. The increase in residual income for both segments is shown below (dollar figures are in millions):

	<i>FedEx Express</i>	<i>FedEx Ground</i>
Residual income before investment (from requirement 6).....	<u><u>\$(504)</u></u>	<u><u>\$227</u></u>
Operating income from the investment.....	\$ 4	\$ 4
Required return on investment in operating assets (\$20,000,000 × 15% = \$3,000,000).....	<u>3</u>	<u>3</u>
Residual income provided by investment opportunity.....	<u><u>\$ 1</u></u>	<u><u>\$ 1</u></u>
Residual income after the investment.....	<u><u>\$(503)</u></u>	<u><u>\$228</u></u>

Research and Application 12-31

1. Nordstrom succeeds first and foremost because of its customer intimacy customer value proposition. The company's Personal Book system is the clearest indication of its customer intimacy value proposition. Page 17 of the annual report says "With Personal Book, our salespeople are able to set and manage their customer follow-ups, organize and track customer preferences and easily reference customer purchases and contact information. The result is that our salespeople are able to tailor our service to the needs of each customer. We are able to stay connected with our customers and invite them back in for the new trends, merchandise, sales and events that interest them." The Personal Book system is the latest innovation from a company that has prospered because of its attentiveness to individual customer needs.

Offering fashionable, high-quality merchandise is also important to Nordstrom. However, the company has historically differentiated itself from competitors such as Dillard's, Federated, and Neiman Marcus by hiring top-notch salespeople and motivating them to provide superior individualized customer service. Page 14 of the annual report says "On the selling floor, our goal has been to create an environment that's fair and positive, while at the same time, providing our people with the tools they need to run their own businesses within our four walls. By giving each individual the ability and freedom to excel, we enhance our company's ability to do the same." Providing this extraordinary level of employee autonomy is another major driving force behind Nordstrom's customer intimacy value proposition.

2. These measures do not comprise a balanced scorecard because all of the measures, except one (inventory turns) are financial measures. The measures shown in the annual report may be satisfactory for external investors who are primarily interested in financial results; however, they would not constitute a balanced scorecard for internal management purposes. First, the scorecard does not include enough measures related to the non-financial leading indicators that drive financial results. In other words, the customer, internal business process, and learning and growth perspectives are largely non-existent in the scorecard included in the annual report. Second, there are no linkages between the measures shown in the scorecard. This is understandable because all of the measures except one are financial measures. Nonetheless, to qualify as a genuine balanced scorecard, the scorecard shown in the

annual

Research and Application 12-31 (continued)

report would need to include measures from various non-financial perspectives (such as the customer, internal business process, and learning and growth perspectives) and those measures would need to be related to one another on a cause-and-effect basis.

3. Students will probably choose their measures from among those shown in the scorecard included in Nordstrom's annual report: (1) sales per square foot; (2) same-store sales percentage change; (3) gross profit as a percentage of sales; (4) SG&A expense as a percentage of sales; (5) earnings before income taxes as a percentage of sales; and (6) cash flow from operations. All of these measures, except SG&A expense as a percentage of sales, should increase over time.

The most important part of this question is for students to see that these six measures provide feedback on different facets of financial performance. The "same-store sales percentage change" focuses on revenue management. The "gross profit as a percentage of sales," "SG&A expense as a percentage of sales," and "earnings before income taxes as a percentage of sales" are all margin-oriented measures that incorporate expense management into the evaluative scheme. The "sales per square foot" incorporates constraint management into the scorecard. Finally, "cash flow from operations" looks at cash flow management.

4. The annual report does not explicitly mention customer-focused performance measures. However, it contains numerous statements that refer to performance attributes that would be important to customers. For example, page 14 says "our merchants are doing a better job of reacting quickly to feedback from the sales floor by leveraging our new perpetual inventory system. As a result, we're selling more of the right merchandise in the right store at the right time. This improved merchandise flow brings more fresh and compelling goods to the floor, resulting in fewer markdowns." This quote alludes to two important aspects of the customers' shopping experience. First, the survey-based measure "customer perception of merchandise fashion appeal" assesses if customers perceive Nordstrom's product offerings as fresh and compelling. Second, the survey-based measure "customer perception of merchandise availability" assesses if customers perceive that Nordstrom has the right kind of merchandise available at the right

time. Poor

Research and Application 12-31 (continued)

performance on this measure could be caused by excessive markdowns, which would indicate that Nordstrom does not have enough fresh and compelling merchandise available for sale, or excessive stockouts, which would indicate that Nordstrom is running out of items that customers would like to have purchased.

As already mentioned, the annual report also discusses the company's Personal Book system. The purpose of this technology is to enable superior individualized customer service. The survey-based measure "customer perception of tailored service quality" assesses if customers believe that their individual preferences are understood and being met. Finally, page 15 of the annual report says "we've been taking a look at the different ways our customers choose to shop with us, whether by phone, online, or in our stores. We want to create a seamless shopping experience, sending our customers a clear and consistent message with the merchandise we offer, across all channels." The survey-based measure "customer perception of channel integration" assesses if customers perceive a seamless shopping experience. All four of these measures should increase over time.

5. The annual report explicitly mentions one internal business process measure, inventory turns. If Nordstrom is selling "more of the right merchandise in the right store at the right time," then inventory turnover should increase. The annual report does not explicitly mention any other internal process measures; however, it contains statements that point to various internal business process measures. For example, as previously mentioned, the Personal Book is a new tool that Nordstrom implemented to better serve and retain individual customers. For the Personal Book to work optimally, each Nordstrom salesperson should use the technology to help develop long-term relationships with their customers, to generate more follow-up visits from them, and to sell more merchandise to them. The measure "number of follow-up visits from customers" would provide feedback regarding the effectiveness of this technology. This measure should go up over time.

The annual report also mentions that Nordstrom is always striving to improve its ability to respond to fashion trends. The measure "order cycle time" could be used to measure the amount of time that elapses from when Nordstrom spots a new trend and places an order with a

Research and Application 12-31 (continued)

supplier for a new SKU (Stock Keeping Unit) to when the merchandise becomes available for sale to end consumers. The same type of time-based measure could be used to assess how efficiently Nordstrom replenishes its existing SKUs. These time-based measures should go down over time.

The annual report emphasizes the importance of providing superior customer service. The measure “number of customer complaints” could be used to provide feedback regarding customer dissatisfaction with Nordstrom’s sales process. This measure should go down over time.

The annual report says that Nordstrom strives to provide its customers with compelling merchandise. If customers return merchandise for a refund, it provides clear evidence that they did not find the merchandise to be very compelling or satisfying. Accordingly, the “dollar value of merchandise returns” is an internal business process measure that should decline over time.

6. The annual report does not explicitly mention any learning and growth measures; however, students can suggest some measures based on an elementary understanding of the business. The salespersons are critically important to Nordstrom because they manage the face-to-face customer interactions. Therefore, it would make sense for students to propose numerous measures related to the salesforce. For example, the measure “percentage of excellent job candidates hired” would assess Nordstrom’s ability to hire highly qualified job candidates. The measure “hours of training per employee” would assess Nordstrom’s investment in enabling its salesforce to succeed. The qualitative measure “employee morale” would measure how satisfied employees are with their jobs. In a highly autonomous environment such as Nordstrom, intrinsic motivation and high employee morale are critical drivers of success. Finally, the measure “employee retention” would assess how effective Nordstrom is at retaining its employees.

Research and Application 12-31 (continued)

7. Here are eight “if-then” hypothesis statements based on the measures mentioned above:

- If the level of employee morale increases, then the rate of employee retention should increase.
- If the rate of employee retention increases, then the number of follow-up visits from customers should increase.
- If the number of follow-up visits from customers increases, then the customer perception of tailored service quality should increase.
- If the customer perception of tailored service quality increases, then the same store sales percentage change should increase.
- If the order cycle time for new SKUs decreases, then the customer perception of merchandise fashion appeal should increase.
- If the customer perception of merchandise fashion appeal increases, then the gross margin as a percentage of sales should increase.
- If the inventory turnover increases, then the sales per square foot should increase.
- If the customer perception of channel integration increases, then the earnings before income taxes as a percentage of sales should increase.

Appendix 12A

Transfer Pricing

Exercise 12A-1 (20 minutes)

1. The lowest acceptable transfer price from the perspective of the selling division is given by the following formula:

$$\text{Transfer price}^3 = \text{Variable cost per unit} + \frac{\text{Total contribution margin on lost sales}}{\text{Number of units transferred}}$$

There is no idle capacity, so each of the 40,000 units transferred from Division X to Division Y reduces sales to outsiders by one unit. The contribution margin per unit on outside sales is \$20 (= \$90 – \$70).

$$\begin{aligned}\text{Transfer price}^3 &= (\$70 - \$3) + \frac{\$20 \times 40,000}{40,000} \\ &= \$67 + \$20 = \$87\end{aligned}$$

The buying division, Division Y, can buy a similar unit from an outside supplier for \$86. Therefore, Division Y would be unwilling to pay more than \$86 per unit.

$$\text{Transfer price} \leq \text{Cost of buying from outside supplier} = \$86$$

The requirements of the two divisions are incompatible and no transfer will take place.

Exercise 12A-1 (continued)

2. In this case, Division X has enough idle capacity to satisfy Division Y's demand. Therefore, there are no lost sales and the lowest acceptable price as far as the selling division is concerned is the variable cost of \$60 per unit.

$$\text{Transfer price}^3 = \$60 + \frac{\$0}{40,000} = \$60$$

The buying division, Division Y, can buy a similar unit from an outside supplier for \$74. Therefore, Division Y would be unwilling to pay more than \$74 per unit.

$$\text{Transfer price} \leq \text{Cost of buying from outside supplier} = \$74$$

In this case, the requirements of the two divisions are compatible and a transfer hopefully will take place at a transfer price within the range:

$$\$60 \leq \text{Transfer price} \leq \$74$$

Exercise 12A-2 (30 minutes)

1. a. The lowest acceptable transfer price from the perspective of the selling division is given by the following formula:

$$\text{Transfer price}^3 = \text{Variable cost per unit} + \frac{\text{Total contribution margin on lost sales}}{\text{Number of units transferred}}$$

Because there is enough idle capacity to fill the entire order from the Hi-Fi Division, no outside sales are lost. And because the variable cost per unit is \$42, the lowest acceptable transfer price as far as the selling division is concerned is also \$42.

$$\text{Transfer price}^3 = \$42 + \frac{\$0}{5,000} = \$42$$

- b. The Hi-Fi division can buy a similar speaker from an outside supplier for \$57. Therefore, the Hi-Fi Division would be unwilling to pay more than \$57 per speaker.

$$\text{Transfer price} \leq \text{Cost of buying from outside supplier} = \$57$$

- c. Combining the requirements of both the selling division and the buying division, the acceptable range of transfer prices in this situation is:

$$\$42 \leq \text{Transfer price} \leq \$57$$

Assuming that the managers understand their own businesses and that they are cooperative, they should be able to agree on a transfer price within this range and the transfer should take place.

- d. From the standpoint of the entire company, the transfer should take place. The cost of the speakers transferred is only \$42 and the company saves the \$57 cost of the speakers purchased from the outside supplier.

Exercise 12A-2 (continued)

2. a. Each of the 5,000 units transferred to the Hi-Fi Division must displace a sale to an outsider at a price of \$60. Therefore, the selling division would demand a transfer price of at least \$60. This can also be computed using the formula for the lowest acceptable transfer price as follows:

$$\begin{aligned}\text{Transfer price}^3 &= \$42 + \frac{(\$60 - \$42) \times 5,000}{5,000} \\ &= \$42 + (\$60 - \$42) = \$60\end{aligned}$$

- b. As before, the Hi-Fi Division would be unwilling to pay more than \$57 per speaker.
- c. The requirements of the selling and buying divisions in this instance are incompatible. The selling division must have a price of at least \$60 whereas the buying division will not pay more than \$57. An agreement to transfer the speakers is extremely unlikely.
- d. From the standpoint of the entire company, the transfer should not take place. By transferring a speaker internally, the company gives up revenue of \$60 and saves \$57, for a loss of \$3.

Exercise 12A-3 (20 minutes)

1.

	<i>Division A</i>	<i>Division B</i>	<i>Total Company</i>
Sales.....	<u>\$2,500,000</u> ¹	<u>\$1,200,000</u> ²	<u>\$3,200,000</u> ³
Expenses:			
Added by the division..	1,800,000	400,000	2,200,000
Transfer price paid.....	<u> </u>	<u>500,000</u>	<u> </u>
Total expenses.....	<u>1,800,000</u>	<u>900,000</u>	<u>2,200,000</u>
Net operating income....	<u>\$ 700,000</u>	<u>\$ 300,000</u>	<u>\$1,000,000</u>

¹20,000 units × \$125 per unit = \$2,500,000.²4,000 units × \$300 per unit = \$1,200,000.³Division A outside sales

(16,000 units × \$125 per unit)..... \$2,000,000

Division B outside sales

(4,000 units × \$300 per unit)..... 1,200,000Total outside sales..... \$3,200,000

Note that the \$500,000 in intracompany sales have been eliminated.

2. Division A should transfer the 1,000 additional circuit boards to Division B. Note that Division B's processing adds \$175 to each unit's selling price (B's \$300 selling price, less A's \$125 selling price = \$175 increase), but it adds only \$100 in cost. Therefore, each board transferred to Division B ultimately yields \$75 more in contribution margin (\$175 – \$100 = \$75) to the company than can be obtained from selling to outside customers. Thus, the company as a whole will be better off if Division A transfers the 1,000 additional boards to Division B.

Problem 12A-4 (60 minutes)

1. From the standpoint of the selling division, Alpha Division:

$$\text{Transfer price} = \text{Variable cost per unit} + \frac{\text{Total contribution margin on lost sales}}{\text{Number of units transferred}}$$
$$\text{Transfer price} = (\$18 - \$2) + \frac{(\$30 - \$18) \times 5,000}{5,000} = \$16 + \$12 = \$28$$

But, from the standpoint of the buying division, Beta Division:

$$\text{Transfer price} \leq \text{Cost of buying from outside supplier} = \$27$$

Beta Division won't pay more than \$27 and Alpha Division will not accept less than \$28, so no deal is possible. There will be no transfer.

2. a. From the standpoint of the selling division, Alpha Division:

$$\text{Transfer price} = \text{Variable cost per unit} + \frac{\text{Total contribution margin on lost sales}}{\text{Number of units transferred}}$$
$$\text{Transfer price} = (\$65 - \$5) + \frac{(\$90 - \$65) \times 30,000}{30,000} = \$60 + \$25 = \$85$$

From the standpoint of the buying division, Beta Division:

$$\text{Transfer price} \leq \text{Cost of buying from outside supplier} = \$89$$

In this instance, an agreement is possible within the range:

$$\$85 \leq \text{Transfer price} \leq \$89$$

Even though both managers would be better off with *any* transfer price within this range, they may disagree about the exact amount of the transfer price. It would not be surprising to hear the buying division arguing strenuously for \$85 while the selling division argues just as strongly for \$89.

Problem 12A-4 (continued)

b. The loss in potential profits to the company as a whole will be:

Beta Division's outside purchase price.....	\$89
Alpha Division's variable cost on the internal transfer...	<u>85</u>
Potential added contribution margin lost to the company as a whole.....	\$ 4
Number of units.....	<u>× 30,000</u>
Potential added contribution margin and company profits forgone.....	<u>\$120,000</u>

Another way to derive the same answer is to look at the loss in potential profits for each division and then total the losses for the impact on the company as a whole. The loss in potential profits in Alpha Division will be:

Suggested selling price per unit.....	\$88
Alpha Division's variable cost on the internal transfer...	<u>85</u>
Potential added contribution margin per unit.....	\$ 3
Number of units.....	<u>× 30,000</u>
Potential added contribution margin and divisional profits forgone.....	<u>\$90,000</u>

The loss in potential profits in Beta Division will be:

Outside purchase price per unit.....	\$89
Suggested price per unit inside.....	<u>88</u>
Potential cost avoided per unit.....	\$ 1
Number of units.....	<u>× 30,000</u>
Potential added contribution margin and divisional profits forgone.....	<u>\$30,000</u>

The total of these two amounts equals the \$120,000 loss in potential profits for the company as a whole.

3. a. From the standpoint of the selling division, Alpha Division:

$$\text{Transfer price}^3 = \text{Variable cost per unit} + \frac{\text{Total contribution margin on lost sales}}{\text{Number of units transferred}}$$

$$\text{Transfer price}^3 = \$40 + \frac{\$0}{20,000} = \$40$$

Problem 12A-4 (continued)

From the standpoint of the buying division, Beta Division:

Transfer price £ Cost of buying from outside supplier

Transfer price £ $\$75 - (0.08 \times \$75) = \$69$

In this case, an agreement is possible within the range:

\$40 £ Transfer price £ \$69

If the managers understand what they are doing and are reasonably cooperative, they should be able to come to an agreement with a transfer price within this range.

- b. Alpha Division's ROI should increase. The division has idle capacity, so selling 20,000 units a year to Beta Division should cause no increase in the division's operating assets. Therefore, Alpha Division's turnover should increase. The division's margin should also increase, because its contribution margin will increase by \$400,000 as a result of the new sales, with no offsetting increase in fixed costs:

Selling price.....	\$60
Variable costs.....	<u>40</u>
Contribution margin.....	\$20
Number of units.....	<u>× 20,000</u>
Added contribution margin.....	<u>\$400,000</u>

Thus, with both the margin and the turnover increasing, the division's ROI would also increase.

4. From the standpoint of the selling division, Alpha Division:

$$\text{Transfer price}^3 = \text{Variable cost per unit} + \frac{\text{Total contribution margin on lost sales}}{\text{Number of units transferred}}$$
$$\text{Transfer price}^3 = \$21 + \frac{(\$50 - \$26) \times 45,000}{120,000} = \$21 + \$9 = \$30$$

Problem 12A-5 (60 minutes)

1. The lowest acceptable transfer price from the perspective of the selling division is given by the following formula:

$$\text{Transfer price} \geq \text{Variable cost per unit} + \frac{\text{Total contribution margin on lost sales}}{\text{Number of units transferred}}$$

The Pulp Division has no idle capacity, so transfers from the Pulp Division to the Carton Division would cut directly into normal sales of pulp to outsiders. The costs are the same whether the pulp is transferred internally or sold to outsiders, so the only relevant cost is the lost revenue of \$70 per ton from the pulp that could be sold to outsiders. This is confirmed below:

$$\text{Transfer price} \geq \$42 + \frac{(\$70 - \$42) \times 5,000}{5,000} = \$42 + (\$70 - \$42) = \$70$$

Therefore, the Pulp Division will refuse to transfer at a price less than \$70 a ton.

The Carton Division can buy pulp from an outside supplier for \$70 a ton, less a 10% quantity discount of \$7, or \$63 a ton. Therefore, the Division would be unwilling to pay more than \$63 per ton.

$$\text{Transfer price} \leq \text{Cost of buying from outside supplier} = \$63$$

The requirements of the two divisions are incompatible. The Carton Division won't pay more than \$63 and the Pulp Division will not accept less than \$70. Thus, there can be no mutually agreeable transfer price and no transfer will take place.

2. The price being paid to the outside supplier, net of the quantity discount, is only \$63. If the Pulp Division meets this price, then profits in the Pulp Division and in the company as a whole will drop by \$35,000 per year:

Lost revenue per ton.....	\$70
Outside supplier's price.....	\$63
Loss in contribution margin per ton.....	\$7
Number of tons per year.....	<u>× 5,000</u>
Total loss in profits.....	<u>\$35,000</u>

Problem 12A-5 (continued)

Profits in the Carton Division will remain unchanged because it will be paying the same price internally as it is now paying externally.

3. The Pulp Division has idle capacity, so transfers from the Pulp Division to the Carton Division do not cut into normal sales of pulp to outsiders. In this case, the minimum price as far as the Carton Division is concerned is the variable cost per ton of \$42. This is confirmed in the following calculation:

$$\text{Transfer price}^3 = \$42 + \frac{\$0}{5,000} = \$42$$

The Carton Division can buy pulp from an outside supplier for \$63 a ton and would be unwilling to pay more than that for pulp in an internal transfer. If the managers understand their own businesses and are cooperative, they should agree to a transfer and should settle on a transfer price within the range:

$$\$42 \leq \text{Transfer price} \leq \$63$$

4. Yes, \$59 is a bona fide outside price. Even though \$59 is less than the Pulp Division's \$60 "full cost" per unit, it is within the range given in Part 3 and therefore will provide some contribution to the Pulp Division.

If the Pulp Division does not meet the \$59 price, it will lose \$85,000 in potential profits:

Price per ton.....	\$59
Variable costs.....	<u>42</u>
Contribution margin per ton.....	<u>\$17</u>

$$5,000 \text{ tons} \times \$17 \text{ per ton} = \$85,000 \text{ potential increased profits}$$

This \$85,000 in potential profits applies to the Pulp Division and to the company as a whole.

5. No, the Carton Division should probably be free to go outside and get the best price it can. Even though this would result in lower profits for the company as a whole, the buying division should probably not be forced to buy inside if better prices are available outside.

Problem 12A-5 (continued)

6. The Pulp Division will have an increase in profits:

Selling price.....	\$70
Variable costs.....	<u>42</u>
Contribution margin per ton.....	<u>\$28</u>

5,000 tons × \$28 per ton = \$140,000 increased profits

The Carton Division will have a decrease in profits:

Inside purchase price.....	\$70
Outside purchase price.....	<u>59</u>
Increased cost per ton.....	<u>\$11</u>

5,000 tons × \$11 per ton = \$55,000 decreased profits

The company as a whole will have an increase in profits:

Increased contribution margin in the Pulp Division.....	\$28
Decreased contribution margin in the Carton Division.....	<u>11</u>
Increased contribution margin per ton.....	<u>\$17</u>

5,000 tons × \$17 per ton = \$85,000 increased profits

So long as the selling division has idle capacity, profits in the company as a whole will increase if internal transfers are made. However, there is a question of *fairness* as to how these profits should be split between the selling and buying divisions. The inflexibility of management in this situation damages the profits of the Carton Division and greatly enhances the profits of the Pulp Division.

Problem 12A-6 (45 minutes)

1. The Quark Division will probably reject the \$340 price because it is below the division's variable cost of \$350 per set. This variable cost includes the \$140 transfer price from the Cabinet Division, which in turn includes \$30 per unit in fixed costs. Nevertheless, from the perspective of the Quark Division, the entire \$140 transfer price from the Cabinet Division is a variable cost. Thus, it will reject the offered \$340 price.
2. If both the Cabinet Division and the Quark Division have idle capacity, then from the perspective of the entire company the \$340 offer should be accepted. By rejecting the \$340 price, the company will lose \$60 in potential contribution margin per set:

Price offered per set.....		\$340
Less variable costs per set:		
Cabinet Division.....	\$ 70	
Quark Division.....	<u>210</u>	<u>280</u>
Potential contribution margin per set.....		<u>\$ 60</u>

3. If the Cabinet Division is operating at capacity, any cabinets transferred to the Quark Division to fill the overseas order will have to be diverted from outside customers. Whether a cabinet is sold to outside customers or is transferred to the Quark Division, its production cost is the same. However, if a set is diverted from outside sales, the Cabinet Division (and the entire company) loses the \$140 in revenue. As a consequence, as shown below, there would be a net loss of \$10 on each TV set sold for \$340.

Price offered per set.....		\$340
Less:		
Lost revenue from sales of cabinets to outsiders..	\$140	
Variable cost of Quark Division.....	<u>210</u>	<u>350</u>
Net loss per TV.....		<u>(\$ 10)</u>

Problem 12A-6 (continued)

4. When the selling division has no idle capacity, as in part (3), market price works very well as a transfer price. The cost to the company of a transfer when there is no idle capacity is the lost revenue from sales to outsiders. If the market price is used as the transfer price, the buying division will view the market price of the transferred item as its cost—which is appropriate because that is the cost to the company. As a consequence, the manager of the buying division should be motivated to make decisions that are in the best interests of the company.

When the selling division has idle capacity, the cost to the company of the transfer is just the variable cost of producing the item. If the market price is used as the transfer price, the manager of the buying division will view that as his/her cost rather than the real cost to the company, which is just variable cost. Hence, the manager will have the wrong cost information for making decisions as we observed in parts (1) and (2) above.

Case 12A-7 (60 minutes)

1. The Electrical Division is presently operating at capacity; therefore, any sales of X52 electrical fitting to the Brake Division will require that the Electrical Division give up an equal number of sales to outside customers. Using the transfer pricing formula, we get a minimum transfer price of:

$$\text{Transfer price}^3 = \text{Variable cost per unit} + \frac{\text{Total contribution margin on lost sales}}{\text{Number of units transferred}}$$

$$\text{Transfer price}^3 = \$4.25 + (\$7.50 - \$4.25)$$

$$\text{Transfer price}^3 = \$4.25 + \$3.25$$

$$\text{Transfer price}^3 = \$7.50$$

Thus, the Electrical Division should not supply the fitting to the Brake Division for \$5 each. The Electrical Division must give up revenues of \$7.50 on each fitting that it sells internally. Because management performance in the Electrical Division is measured by ROI, selling the fittings to the Brake Division for \$5 would adversely affect these performance measurements.

2. The key is to realize that the \$8 in fixed overhead and administrative costs contained in the Brake Division's \$49.50 "cost" per brake unit is not relevant. There is no indication that winning this contract would actually affect any of the fixed costs. If these costs would be incurred regardless of whether or not the Brake Division gets the airplane brake contract, they should be ignored when determining the effects of the contract on the company's profits. Another key is that the variable cost of the Electrical Division is not relevant either. Whether the fittings are used in the brake units or sold to outsiders, the production costs of the fittings would be the same. The only difference between the two alternatives is the revenue on outside sales that is given up when the fittings are transferred within the company.

Case 12A-7 (continued)

Selling price of the brake units.....		\$50.00
Less:		
The cost of the fittings used in the brakes (i.e. the lost revenue from sale of fittings to outsiders).....	\$ 7.50	
Variable costs of the Brake Division excluding the fitting (\$22.50 + \$14.00).....	<u>36.50</u>	<u>44.00</u>
Net positive effect on the company's profit.....		<u>\$ 6.00</u>

Therefore, the company as a whole would be better off by \$6.00 for each brake unit that is sold to the airplane manufacturer.

3. As shown in part (1) above, the Electrical Division would insist on a transfer price of at least \$7.50 for the fitting. Would the Brake Division make any money at this price? Again, the fixed costs are not relevant in this decision because they would not be affected. Once this is realized, it is evident that the Brake Division would be ahead by \$6.00 per brake unit if it accepts the \$7.50 transfer price.

Selling price of the brake units.....		\$50.00
Less:		
Purchased parts (from outside vendors).....	\$22.50	
Electrical fitting X52 (assumed transfer price).....	7.50	
Other variable costs.....	<u>14.00</u>	<u>44.00</u>
Brake Division contribution margin.....		<u>\$ 6.00</u>

In fact, because there is a positive contribution margin of \$6, any transfer price within the range of \$7.50 to \$13.50 ($= \$7.50 + \6.00) will improve the profits of both divisions. So yes, the managers should be able to agree on a transfer price.

4. It is in the best interests of the company and of the divisions to come to an agreement concerning the transfer price. As demonstrated in part (3) above, any transfer price within the range \$7.50 to \$13.50 would improve the profits of both divisions. What happens if the two managers do not come to an agreement?

Case 12A-7 (continued)

In this case, top management knows that there should be a transfer and could step in and force a transfer at some price within the acceptable range. However, such an action, if done on a frequent basis, would undermine the autonomy of the managers and turn decentralization into a sham.

Our advice to top management would be to ask the two managers to meet to discuss the transfer pricing decision. Top management should not dictate a course of action or what is to happen in the meeting, but should carefully observe what happens in the meeting. If there is no agreement, it is important to know why. There are at least three possible reasons. First, the managers may have better information than the top managers and refuse to transfer for very good reasons. Second, the managers may be uncooperative and unwilling to deal with each other even if it results in lower profits for the company and for themselves. Third, the managers may not be able to correctly analyze the situation and may not understand what is actually in their own best interests. For example, the manager of the Brake Division may believe that the fixed overhead and administrative cost of \$8 per brake unit really does have to be covered in order to avoid a loss.

If the refusal to come to an agreement is the result of uncooperative attitudes or an inability to correctly analyze the situation, top management can take some positive steps that are completely consistent with decentralization. If the problem is uncooperative attitudes, there are many training companies that would be happy to put on a short course in team building for the company. If the problem is that the managers are unable to correctly analyze the alternatives, they can be sent to executive training courses that emphasize economics and managerial accounting.

Appendix 12B

Service Department Charges

Exercise 12B-1 (20 minutes)

1.	<i>Long-Run Average Number of Employees</i>	<i>Percentage</i>		
Cutting Department.....	180	30%		
Milling Department.....	120	20%		
Assembly Department...	<u>300</u>	<u>50%</u>		
Total.....	<u>600</u>	<u>100%</u>		
			<i>Cutting</i>	<i>Milling</i>
Variable cost charges:				<i>Assembly</i>
\$80 per employee × 150 employees	\$ 12,000			
\$80 per employee × 80 employees..		\$ 6,400		
\$80 per employee × 270 employees				\$ 21,600
Fixed cost charges:				
30% × \$400,000.....	120,000			
20% × \$400,000.....		80,000		
50% × \$400,000.....				<u>200,000</u>
Total charges.....	<u>\$132,000</u>	<u>\$86,400</u>		<u>\$221,600</u>

2. Part of the total actual cost should not be charged to the operating departments as shown below:

	<i>Variable Cost</i>	<i>Fixed Cost</i>	<i>Total</i>
Total actual costs incurred.....	\$41,000	\$408,000	\$449,000
Total charges.....	<u>\$40,000</u>	<u>\$400,000</u>	<u>\$440,000</u>
Spending variance.....	<u>\$ 1,000</u>	<u>\$ 8,000</u>	<u>\$ 9,000</u>

The overall spending variance of \$9,000 represents costs incurred in excess of the budgeted variable cost of \$80 per employee and the

budgeted fixed cost of \$400,000. This \$9,000 in uncharged costs is the responsibility of the Medical Services Department.

Exercise 12B-2 (15 minutes)

1. and 2.

	<i>Northern Plant</i>	<i>Southern Plant</i>	<i>Total</i>
Variable cost charges:			
\$0.25 per ton × 130,000 tons.....	\$ 32,500		
\$0.25 per ton × 50,000 tons.....		\$ 12,500	\$ 45,000
Fixed cost charges:			
70% × \$300,000.....	210,000		
30% × \$300,000.....		90,000	300,000
Total charges.....	<u>\$242,500</u>	<u>\$102,500</u>	<u>\$345,000</u>

3. Part of the \$364,000 in total cost will not be charged to the plants, as follows:

	<i>Variable Cost</i>	<i>Fixed Cost</i>	<i>Total</i>
Total actual cost incurred.....	\$54,000	\$310,000	\$364,000
Total charges (above).....	<u>45,000</u>	<u>300,000</u>	<u>345,000</u>
Spending variance.....	<u>\$ 9,000</u>	<u>\$ 10,000</u>	<u>\$ 19,000</u>

The overall spending variance of \$19,000 represents costs incurred in excess of the budgeted \$0.25 per ton variable cost and budgeted \$300,000 in fixed costs. This \$19,000 in uncharged cost is the responsibility of the Transport Services Department.

Exercise 12B-3 (20 minutes)

1.

	<i>Restaurants</i>			
	<i>Rick's Harborside</i>	<i>Imperial Garden</i>	<i>Ginger Wok</i>	<i>Total</i>
Percentage of 2009 sales.....	32%	50%	18%	100%
Allocation of 2009 fixed administrative expenses (based on the above percentages).....	\$640,000	\$1,000,000	\$360,000	\$2,000,000
2. 2009 allocation (above).....	\$640,000	\$1,000,000	\$360,000	\$2,000,000
2008 allocation.....	<u>800,000</u>	<u>750,000</u>	<u>450,000</u>	<u>2,000,000</u>
Increase (decrease) in allocation.....	<u>\$(160,000)</u>	<u>\$ 250,000</u>	<u>\$(90,000)</u>	<u>\$ 0</u>

The manager of the Imperial Garden undoubtedly will be upset about the increased allocation of fixed administrative expense. Such an increased allocation may be viewed as a penalty for an outstanding performance.

3. Sales dollars is not ordinarily a good base for allocating fixed costs. The departments with the greatest sales will be allocated the greatest amount of cost and the costs allocated to a department will be affected by the sales in *other* departments. In our illustration above, the sales in two restaurants remained static and the sales in the third increased. As a result, less cost was allocated to the restaurants with static sales and more cost was allocated to the one restaurant that showed improvement during the period.

Problem 12B-4 (30 minutes)

1.

	<i>Forming Department</i>	<i>Assembly Department</i>	<i>Total</i>
Variable costs:			
\$0.40 per machine-hour × 190,000 machine-hours.....	\$ 76,000		
\$0.40 per machine-hour × 70,000 machine-hours.....		\$28,000	\$104,000
Fixed costs:			
70% × \$150,000.....	105,000		
30% × \$150,000.....		<u>45,000</u>	<u>150,000</u>
Total cost charged.....	<u>\$181,000</u>	<u>\$73,000</u>	<u>\$254,000</u>

2. Any difference between the budgeted and actual variable cost per machine-hour or between the budgeted and actual total fixed cost would not be charged to the other departments. The amount not charged would be:

	<i>Variable Cost</i>	<i>Fixed Cost</i>	<i>Total</i>
Actual cost incurred during the year...	\$110,000	\$153,000	\$263,000
Cost charged (above).....	<u>104,000</u>	<u>150,000</u>	<u>254,000</u>
Cost not charged (spending variance)	<u>\$ 6,000</u>	<u>\$ 3,000</u>	<u>\$ 9,000</u>

The costs not charged are spending variances of the Maintenance Department and are the responsibility of the Maintenance Department's manager.

Problem 12B-5 (45 minutes)

1.	<i>Auto Division</i>	<i>Truck Division</i>
Variable costs:		
\$3 per meal × 20,000 meals....	\$60,000	
\$3 per meal × 20,000 meals....		\$60,000
Fixed costs:		
65% × \$40,000.....	26,000	
35% × \$40,000.....		<u>14,000</u>
Total cost charged.....	<u>\$86,000</u>	<u>\$74,000</u>

The variable costs are charged using the budgeted rate per meal and the actual meals served. The fixed costs are charged in predetermined, lump-sum amounts, based on budgeted fixed costs and peak-load capacity. Any difference between budgeted and actual costs is not charged to the operating divisions, but rather is treated as a spending variance of the cafeteria:

	<i>Variable</i>	<i>Fixed</i>
Total actual cost for the month.....	\$128,000	\$42,000
Total cost charged above.....	<u>120,000</u>	<u>40,000</u>
Spending variance—not allocated.....	<u>\$ 8,000</u>	<u>\$ 2,000</u>

2. Actual variable cost.....	\$128,000
Actual fixed cost.....	<u>42,000</u>
Total actual cost.....	<u>\$170,000</u>

One-half of the total cost, or \$85,000, would be allocated to each division, because the same number of meals was served in the two divisions during the month.

Problem 12B-5 (continued)

3. This method has two major problems. First, allocating the total actual cost of the service department to the operating departments essentially allocates the spending variances to the operating departments. This forces the inefficiencies of the service department onto the operating departments. Second, allocating the fixed costs of the service department according to the actual level of activity in each operating department results in the allocation to one operating department being affected by the actual activity in the other operating departments. For example, if the activity in one operating department falls, the fixed charges to the other operating departments will increase.
4. Managers may understate their peak-period needs to reduce their charges for fixed service department costs. Top management can control such ploys by careful follow-up, with rewards being given to those managers who estimate accurately, and severe penalties assessed against those managers who understate their departments' needs. For example, departments that exceed their estimated peak-period maintenance requirements may be forced to hire outside maintenance contractors, at market rates, to do their maintenance work during peak periods.

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