Fundamentals of Cost Accounting 7th edition Lanen Solutions Manual

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1
Cost Accounting: Information for Decision Making

Solutions to Review Questions

1-1.

Among the goals of an organization, a central one is to create and increase value. Cost accounting systems are designed to provide information to decision makers in the organization with the information they need to accomplish this goal. Therefore, the designers of the cost accounting system need to understand how value is created in the organization to design systems for their organization.

1-2.

Financial accounting is designed to provide information about the firm to external users. External users include investors, creditors, government authorities, regulators, customers, competitors, suppliers, labor unions, and so on. Cost accounting systems are designed to provide information to internal users (managers).

This difference is important, because it affects the design of the systems. Financial accounting systems are based on standards or rules. This allows the user to compare the results of different firms. Managerial accounting systems do not require rules. Each firm is free to develop managerial accounting systems that best serve the needs of the decision makers (managers).

1-3.

B Providing cost information for financial reporting

A Identifying the best store in a chain

C Determining which plant to use for production

1-4.

The value chain is the set of activities that transforms raw resources into the goods and services end users purchase and consume. The supply chain includes the set of firms and individuals that sells goods and services to the firm. The distribution chain is the set of firms and individuals that buys and distributes goods and services from the firm.

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1-5.

The customers of cost accounting are managers, from plant managers to the CEO.

1-6.

Value-added activities are activities that customers perceive as adding utility to the goods or services they purchase. Nonvalue-added activities do not add value to the goods or services. By classifying costs this way, the cost accounting system can help the manager identify areas (processes) that can be improved, lowering costs and adding value to the organization.

1-7.

Answers will vary, but should include some of the following:

Title	Major Responsibilities and Major Duties
Chief financial officer (CFO)	• Manages entire finance and accounting function
Treasurer	• Manages liquid assets • Conducts business with banks and other financial institutions • Oversees public issues of stock and debt
Controller	• Plans and designs information and incentive systems
Internal auditor.....	• Ensures compliance with laws, regulations, and company policies and procedures • Provides consulting and auditing services within the firm
Cost accountant.....	• Records, measures, estimates, and analyzes costs • Works with financial and operational manager to provide relevant information for decisions

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1-8.

The four questions of the critical thinking framework are:

1. What are the relevant questions (what decisions do I need to make)?
2. What are the data relevant to the analysis and where do I find them?
3. What are the appropriate tools for analyzing data?
4. How can I effectively and persuasively communicate the results of my analysis?

1-9.

No. Sarbanes-Oxley is a law and violations of it are legal issues. Codes of ethics are necessary to help accountants and managers identify situations that might develop into ethical conflicts, understand what they could do in these situations, and to learn what to do when they believe that an ethical violation has occurred.

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Solutions to Critical Analysis and Discussion Questions

1-10.

The role of cost accountants is to help manage the organization. Part of that role is to report results. Another part is to design systems that assist other managers in making decisions to improve performance. This role requires that accountants understand how value is created in their organizations. Identifying and reporting how the decisions managers make affect value creation lead to better decisions.

1-11.

Yes, you should be interested in the efficiency of your customers. The consumer (the customer of the retailers) is interested in receiving the most value. If one of the links in the supply chain is inefficient, the customer may choose to buy from a different retailer (who might use a different wholesaler).

1-12.

Costs that you could ask to be reimbursed might include the fuel, a share of the maintenance costs, “wear and tear,” or depreciation, and insurance. To avoid disagreements, it would be necessary to negotiate an agreement (even if only informally) between you and your friend considering all factors. For example, you might agree that she should pay for the gas and any other supplies (e.g., oil) needed on the trip.

If you are going along, you might change the agreement so that you split these costs. Alternatively, you might say that because you are going anyway, she can ride along for nothing.

1-13.

Cost accounting provides important information to those who determine strategy. If the cost accounting system provides inaccurate information, the organization may end up with an unintended strategy, because managers are making decisions based on faulty information.

1-14.

Executive performance evaluation systems are designed for a specific company’s needs. The systems should be flexible to adapt to the circumstances that exist in that company. A common set of accounting principles would tend to reduce flexibility and usefulness of these systems. If all parties know the accounting basis used by the system, the exact rules can be designed in whatever manner the parties deem appropriate.

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1-15.

Although not-for-profit organizations are not seeking to make a profit, they must remain financially viable to accomplish their missions. Cost accounting information can help managers of not-for-profit organizations by highlighting the costs of various activities, identifying sources of revenue, and measuring performance of managers. In terms of organizational survival, cost accounting information can be just as (or more) important for a not-for-profit as for a for-profit firm.

1-16.

Both Goodyear and Pep Boys needs to determine the cost of tire to determine cost of goods sold on the income statement and inventory amounts on the balance sheet. Perhaps the biggest difference is that for a retailer, such as Pep Boys, the cost of a tire is what was paid to the supplier (Goodyear) for the tire. For Goodyear, the problem is not quite as simple. Goodyear does not buy a tire. It buys materials (rubber, for example) and labor and combines them in a manufacturing plant. These resources cost money and Goodyear needs to determine what resources went into the tires.

A second, though perhaps less important, difference is that Goodyear may have some tires that have been started in the production process but have not been completed when the fiscal year ends. As a result, Goodyear also needs to determine the value of this incomplete work, the work in process.

1-17.

The cost accounting issues for Hostess Brands are the same as for The AM Bakery in the sense that managers at Hostess Brands want the same kind of information as Adam: what are the costs of products, who is performing the best, and so on.

The cost accounting issues are different in the size and complexity of the operations at Hostess compared to The AM Bakery.

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1-18.

In decision making, managers or supervisors may wish to take actions that they believe will increase the firm's value that are difficult to justify given available information. Often, these situations arise when managers are using their intuition and their experience to identify new business opportunities and cannot point to data that support their views. For example, a marketing manager might view investment in a new advertising campaign as necessary for remaining competitive even though it appears to increase costs. Not having expertise in this area, the controller cannot verify the information the marketing manager is using.

In a few cases, however, a marketing manager may wish to pursue a project because of personal reasons (for example, the manager was a champion of the product), and hopes to have an economic analysis to justify additional advertising support. In these situations, care must be taken to ascertain the economic merits of the plan, and, if the plan cannot be justified on economic grounds, the manager must make the case for the project on another basis.

The final responsibility for the decision rests with the manager. Therefore, plans that cannot be justified on a cost analysis basis may still be adopted at the discretion of operating management. The controller should be clear that the project is justified on a basis other than (easily measured) costs.

The controller is charged with the responsibility of making certain that plans are executed in an optimal and efficient manner. In some cases, this may be viewed as placing restrictions on management actions. Under these circumstances the marketing manager may view the accounting function as placing too great a constraint on marketing while the controller may view the marketing manager as attempting to circumvent the rules.

Whatever the organization's approach to decision making within the firm, the rules should be written in a way that leave, in most cases, the decision with the operating manager or, less commonly, with the controller. As we discuss later in the book, the idea of delegating authority to other managers is to reduce demands on top management time.

1-19.

This is a tricky question. The problem is that if each firm tries to minimize its own cost, some of the necessary processes might not be done satisfactorily. For example, if every firm decides not to hold inventory to lower costs, customers might not be able to obtain products in a timely manner and look elsewhere. The goal is to increase value, not minimize costs.

In addition, as illustrated in the Business Application, it might lower cost if part of the value creation is moved from one firm in the chain to another through in-sourcing or outsourcing.

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1-20.

The purpose of accounting is to communicate the economic reality of the firm. This requires estimates of the effect of events not yet realized. Always choosing the most pessimistic outcome does not communicate the reality any more than always choosing the most optimistic outcome. We want accountants to use their best judgment on what will happen. A problem arises when the judgment is affected by a desire to present a particular result.

1-21.

Cost accountants provides information to decision makers in the firm. They need to provide the best information possible, given the costs. As information technology improves, the cost of information falls and the quality of information the cost accountant can provide improves.

1-22.

Studying cost accounting will most likely increase Adam's chances of success with his store. As illustrated in the chapter, he has a better idea of the costs of his business and the financial status of its different operations. Of course, it cannot guarantee success. A successful business depends on many things, including identifying the right products, efficient operations, and good marketing. Cost accounting helps managers make better decisions about these aspects, but cannot forecast trends or overcome bad managerial decision-making.

1-23.

There are two types of costs the airline or hotel incur with such upgrades. One type of cost results from the incremental resources that are a part of the upgraded service (perhaps a free meal on the airline or the costs of cleaning a larger room). These costs will be shown in the accounting records. In addition to these "direct" costs, there are "opportunity" costs. These costs arise when customers purchase a economy airline fare or smaller room in the hopes of an upgrade. If these customers would have purchased a first-class airfare or a more expensive room, this represents a lost opportunity. These opportunity costs will not be recorded in the accounting records.

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Solutions to Exercises

1-24. (10 Min.) Value Chain and Classification of Costs: Pfizer Inc.

Cost	Stage in the Value Chain
Salaries for employees to develop most efficient dropper to administer drug.	2. Design
Costs of chemicals to make the drug.	5. Production
Costs to visit doctors to explain value of drug.	4. Marketing
Expenses to deliver products to customers.	6. Distribution
Laboratory experiments to evaluate drug effectiveness.	3. Research & Development
Employee costs to work with hospitals to ensure adequate supplies.	1. Customer Service

1-25. (10 Min.) Value Chain and Classification of Costs: Tesla, Inc.

Cost	Stage in the Value Chain
Engineering costs to develop optimal batteries.	6. Research & Development
Costs for employees to develop grill logo.	3. Design
Cost to assemble cars.	1. Production
Costs to attend the Detroit Auto Show.	4. Marketing
Costs to ship cars to sales centers for customer delivery.	5. Distribution
Call center to handle maintenance calls from customers with problems on the road.	2. Customer Service

1-26. (5 Min.) Supply Chain and Supply Chain Costs: Marquette Company.

It is important that costs are minimized in the supply chain. Because it is cheaper for Goulburn Furnishings to carry the inventory, the resolution should result in Goulburn carrying the inventory. You might suggest that the two firms share the inventory savings through price decreases or other contractual agreements.

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1-27. (10 Min.) Accounting Systems: Five Below.

Decision Maker	System
a. Competitor*	Financial (F)
b. Labor organization*	Financial (F)
c. Advertising manager.....	Cost (C)
d. Marketing manager	Cost (C)
e. Investor*	Financial (F)

*Note that all these decision makers might like information from the cost accounting system, but they would be unlikely to be given access to this information.

1-28. (10 Min.) Accounting Systems: John Deere.

Answers will vary, but examples include the following.

Manager	Example Decision
a. Quality supervisor.....	Where to focus quality improvement efforts.
b. Purchasing manager.....	Which supplier to use.
c. Personnel manager.....	Where to recruit workers.
d. Maintenance supervisor...	Whether to repair or replace a machine.
e. Plant manager.	How to layout the plant.

1-29. (10 min.) Cost Data for Managerial Purposes: Delta Air Lines.

a. Differential costs are costs that would change, which are the labor costs in this situation. Other costs would presumably not be affected by the change in labor. Other issues include the quality and dependability of the new approach.

   Differential costs next year are $0.60 (= $2.00 – $1.40) calculated as follows:

	Labor Cost	
	Old Method	New Method
Next year	$2.00	$1.40 [= (1 – .30) x $2.00]

b. Management would use the information to help decide whether to use the new method. Management would also want to know the effect of quality (lost bags, delays in delivering bags to the baggage claim, etc.).

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1-30. (20 Min.) Cost Data for Managerial Purposes: Lessing Toy & Hobby.

Considering the following costs as differential shows that closing the Northern Division stores will lower profits for the chain.

Lessing Toy & Hobby
Cornwell Street Store Income Statement
Differential Revenues and Costs
For the Year Ending January 31

Sales revenue	$12,040,000	Differential[a]
Costs		
Cost of goods sold	$ 6,020,000	Differential[a]
Advertising	490,000	Differential[b]
Administrative salaries	810,000	Differential[a]
Sales commissions	1,624,000	Differential
Rent and occupancy expense	2,058,000	Differential[a]
Allocated corporate support	–0–	Not differential
Total differential costs	$11,002,000	
Net differential gain before income tax	$ 1,038,000	
Tax expense at 25% rate	259,500	Differential
Net differential gain from store	$ 778,500	

[a] These revenues and costs are differential if the sales (and the associated cost of sales) will be lost to LTH. If customers go to stores in the Southern Division when the Northern Division stores are closed, a portion of these revenues and costs will not be differential.

[b] If some of the advertising is "brand" advertising that benefits all stores, some of the advertising costs may not be differential.

Before making the decision, it would be important to determine whether closing the Northern Division stores will affect the sales in the Southern Division. For example, if LTH operates in a broader area, the brand name might be useful when customers travel outside their home areas. Another possibility is that customers might be more likely to buy gifts for friends and family that live in areas served by LTH.

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1-31. (20 Min.) Cost Data for Managerial Purposes: Swain Athletic Gear.

Considering the following costs as differential shows that closing the Cornwall Street store will lower profits for the chain.

Swain Athletic Gear
Cornwell Street Store Income Statement
Differential Revenues and Costs
For the Year Ending February 28

Sales revenue	$12,300,000	Differential[a]
Costs		
Cost of goods sold	$ 5,289,000	Differential[a]
Advertising	1,421,000	Differential[b]
Store administrative salaries	975,000	Differential[a]
Sales commissions	1,056,000	Differential
Leases and utilities	2,100,000	Differential[a]
Allocated corporate support	–0–	Not differential
Total costs	$10,841,000	
Net differential gain before income tax	$ 1,459,000	
Tax expense at 25% rate	364,750	Differential
Net differential gain from store	$ 1,094,250	

[a] These revenues and costs are differential if the sales (and the associated cost of sales) will be lost to the chain. If customers go to other stores in the chain when the Cornwall Street store is closed, these a portion of these revenues and costs will not be differential.

[b] If some of the advertising is "brand" advertising that benefits all stores, some of the advertising costs may not be differential.

Before making the decision, it would be important to determine whether closing the Cornwall Street store will affect the sales at the other stores. For example, if people value the convenience of being able to return items during the work week (and work in the city center), they might be less likely to shop at the other stores. Another possibility is that shoppers see items during the week at the Cornwall Street store and go into the other stores on the weekend.

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1-32. (20 Min.) Cost Data for Managerial Purposes: City Art Museum.

Considering the following costs as differential shows that dropping the lecture series will decrease the contribution (profit) for the museum by $113,000.

City Art Museum
Neighborhood Outreach: Evening Lecture Series
Differential Revenues and Costs
For the Year Ending June 30

Revenue	$ 386,000	Differential
Costs		
Advertising	15,000	Differential[a]
Lecturer fees and expenses	195,000	Differential
Operating costs (staff)	26,000	Differential
Space rental	12,000	Differential
Food and beverage expenses	25,000	Differential
Allocated museum overhead	–0–	Not differential
Total costs	$ 273,000	
Net differential gain from evening series	$ 113,000	

[a] If some of the advertising is "brand" advertising that benefits all programs, some of the advertising costs may not be differential.

Before making the decision, it would also be important to determine whether dropping the Lecture Series will affect the demand for the other museum programs. In addition, it might be important to estimate the impact on philanthropic giving if those that attend the Series also donate to the museum.

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1-33. (20 Min.) Cost Data for Managerial Purposes: City Art Museum.

a. The following differential analysis shows that the combined contribution of the two Series program will be positive.

City Art Museum
Neighborhood Outreach: Weekend and Evening Lecture Series
Differential Revenues and Costs
For the Year Ending June 30

Revenue	$ 386,000 x 1.9	$733,400
Costs		
Advertising	$15,000 x 2.50	37,500
Lecturer fees and expenses	$195,000 x 1.75	341,250
Operating costs (staff)	26,000 x 1.25	32,500
Space rental	12,000 + 12,000	24,000
Food and beverage expenses	25,000 x 1.6	40,000
Additional museum overhead	Given	8,000
Allocated museum overhead		–0–
Total costs		$483,250
Net gain from combined Series		$ 250,150

b. The Director should consider whether additional advertising might increase demand for the current evening Lecture Series enough to make that program profitable without incurring the additional costs for the weekend Series. The Director should also ensure that there is adequate lecturer and staff capacity to expand the program to this extent.

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1-34. (20 Min.) Cost Data for Managerial Purposes—Budgeting

	A	B	C	D	E
1	**THE AM BAKERY**				
2	Bakery Sales				
3	Budgeted Costs				
4	For the Month Ending October 31				
5		Actual	Budgeted		
6		(August)	(October)		
7	Ingredients				
8	Flour	$ 3,900	$ 4,680		(= $3,900 * 1.2)
9	Butter	3,500	4,200		(= $3,500 * 1.2)
10	Oil	1,700	2,040		(= $1,700 * 1.2)
11	Fruit	1,300	1,560		(= $1,300 * 1.2)
12	Nuts	900	1,080		(= 900 * 1.2)
13	Chocolate	800	960		(= $800 * 1.2)
14	Other	400	480		(= $400 * 1.2)
15	Total ingredients	$ 12,500	$ 15,000		
16	Labor				
17	Channel manager	$ 4,500	$ 5,000		(given)
18	Other	10,700	13,375		(= $10,700 * 1.25)
19	Utilities	2,400	2,400		(No change)
20	Rent	3,600	3,600		(No change)
21	Marketing	200	200		(No change)
22	Total bakery costs	$ 33,900	$ 39,575		
23					
24	Revenues	$ 52,200	$ 62,640		(= $52,200 * 1.2)
25					
26					

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1-35. (20 Min.) Cost Data for Managerial Purposes—Budgeting: Lessing Toy & Hobby

	A	B	C	D	E	F	G	H
1				**LESSING TOY & HOBBY**				
2				Northern Division				
3				Budgeted Income				
4				For the Year 2 Ending January 31				
5				($000)				
6				Base Income	Budget			
7	Sales revenue			$12,040	$10,234.0		(= $12,040*0.85)	
8								
9	Costs							
10		Cost of goods sold		$6,020	$5,418.0		(= $6,020*0.90)	
11		Advertising		490	539.0		(= $490*1.10)	
12		Administrative salaries		810	567.0		(= 810*0.70)	
13		Sales commissions		1,624	1,380.4		(= $1,624*0.85)	
14		Rent and occupancy expense		2,058	1,749.3		(= $2,058*0.85)	
15		Allocated corporate support		1,330	1,200.0		(Given)	
16	Total costs			$12,332	$10,853.7			
17	Net loss before tax benefit			($292)	($619.7)			
18	Tax benefit at 25%			(73)	(154.9)			
19	Net loss			($219)	($464.8)			
20								

1-36. (20 min.) Trends in Cost Accounting

Answers will vary.

a. Activity-based costing might be used in the Design component to help designers identify designs that will lead to less costly production requirements.

b. Benchmarking might be used in Purchasing to ensure the firm is not paying too much for inputs.

c. Cost of quality might be used in Customer Service to monitor the costs associated with producing defective units.

d. Customer relationship management might be used in Marketing to identify profitable customers.

e. Lean accounting might be used in production to help identify and avoid waste.

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1-37. (10 min.) Critical Thinking in Cost Accounting: AM Bakery.

Answers will vary.

(1) What are the relevant questions (what decisions do I need to make)?

Adam needs to decide whether to expand his operation or close it down.

(2) What are the data relevant to the analysis and where do I find them?

The data relevant to the decision are the financial results of remaining in business (and expanding) or closing.

(3) What are the appropriate tools for analyzing data?

In this case, the appropriate tools for the analysis would be the financial statements and the resulting profit under the two alternatives.

(4) How can I effectively and persuasively communicate the results of my analysis?

In this simple case, a summary of the financial results under the two alternatives (expand or close) would likely be sufficient.

1-38. (15 Min.) Data Visualization: AM Bakery.

a. Yes, it is possible to identify the most profitable District from the intern's heat map. The information contained in the table is the same as in Exhibit 1-10.

b. The intern's heat map is not as effective as the heat map in Exhibit 1-10. The reason is that it did not analyze revenues and profits separately. Because profits are lower than revenues, the profits are all red and the revenues are all green. The profits of District 5 do not stand out.

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1-39. (15 Min.) Ethics and Channel Stuffing: Continental Condiments.

Note: The IMA's Statement on Ethical Professional Practice can be found at: https://www.imanet.org/-/media/b6fbeeb74d964e6c9fe654c48456e61f.ash

a. As a management accountant, the controller has a responsibility to perform the professional duties with competence in accordance with relevant laws and regulations. Channel stuffing borders on illegal activity, especially if it is done to defraud investors by presenting results that are not achieved. As a professional, the controller must communicate both favorable and unfavorable information in an objective and fair manner. The controller cannot simply ignore the fact that the managers are engaging in this behavior.

b. The controller should first follow Continental's established policy on the resolution of ethical conflict (assuming there is one!). If there isn't an established policy the controller should confront the next higher level of management that not thought to be involved in the marketing scheme. This could be the CFO or, perhaps, the CEO. If the matter remains unresolved, the controller should take the issue to the Audit Committee and the Board of Directors. Perhaps the controller should seek a confidential discussion with an objective advisor, such as a personal attorney. When all levels of internal review have been exhausted without satisfactory results, the controller should resign and submit an informative memorandum to the chairman of the Board of Directors.

1-40. (15 Min.) Ethics and Cost Analysis: City Art Museum.

Note: The IMA's Statement on Ethical Professional Practice can be found at: https://www.imanet.org/-/media/b6fbeeb74d964e6c9fe654c48456e61f.ash

a. As a management accountant, the analyst has a responsibility to perform the professional duties with competence in accordance with relevant laws and regulations. Choosing a location in which the decision maker has a financial interest when a lower cost equivalent location is available is unethical and may be illegal. As a professional, the analyst must communicate both favorable and unfavorable information in an objective and fair manner. Thus, the analyst cannot simply ignore the fact that the Museum Director is engaging in this behavior.

b. The analyst should first follow the Museum's established policy on the resolution of ethical conflict (assuming there is one!). If there isn't an established policy the analyst should take the issue to the oversight board for the Museum (the Board of Trustees, for example). (In this case, the next highest level of management is the Museum Director, who only reports to the Board.)

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Solutions to Problems

1-41. (20 Min.) Cost Data for Managerial Purposes: Haverhill Electronics.

This problem demonstrates the ambiguity of cost-based contracting and, indeed, the measurement of "cost." This problem can stimulate a lively discussion in class.

Recommended prices may range from the $216 suggested by the county government to the $348 charged by Haverhill Electronics. The key is to negotiate the cost-based price prior to the signing of the contract. Considerations that affect the base costs are reflected in the following options:

Options:

A. Only the differential production costs could be considered as the cost basis.

B. The total cost per device for normal production of 20,000 devices could be used as the cost basis.

C. The total cost per device for production of 22,000 devices, excluding marketing costs, could be used as the cost basis.

D. The total cost per device for production of 22,000 devices, including marketing costs, could be used as the cost basis.

Costs		Unit Cost Options (One Unit = One Device)			
		A	B	C	D
Materials (variable)...	$50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00
Labor (variable).....	100.00	100.00	100.00	100.00	100.00
Supplies (variable) ...	30.00	30.00	30.00	30.00	30.00
Indirect costs (fixed).	600,000	N/A	30.00 [a]	27.27 [b]	27.27
Marketing (variable) .	20.00	N/A	20.00	N/A	20.00
Administrative (fixed)	1,200,000	N/A	60.00 [c]	54.55 [d]	54.55
Per device cost basis		$180.00	$290.00	$261.82	$281.82
Per device price (Cost + 20%).....		$216.00	$348.00	$314.18	$338.18

[a] $30.00 = $600,000 ÷ 20,000 units.
[b] $27.27 = $600,000 ÷ 22,000 units.
[c] $60.00 = $1,200,000 ÷ 20,000 units.
[d] $54.55 = $1,200,000 ÷ 22,000 units.

We believe the most justifiable options exclude marketing costs and reflect the potential production level of 22,000 devices. These are Options A and C. (As stockholders in Haverhill Electronics, we would prefer Option C.) Also, depending on the resolution of the term "cost," we may want to consider whether the 20 percent markup in the next contract is sufficient.

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1-42. (20 Min.) Cost Data for Managerial Purposes: Durham Parts.

This problem demonstrates the ambiguity in measuring "costs."

Western Division's controller included the "per unit" fixed costs, which were calculated for allocation purposes under normal production volume, when calculating the per unit cost of the additional production. The controller charged Eastern Division on that basis, ignoring the differential costs as a basis for interdivision sales.

Possible options available are as follows:

A. Use the full per unit cost for normal production of 4,800 units.

B. Use only differential costs as the cost basis.

C. Use differential costs plus a share of fixed costs, based on actual production volume (with Eastern's order) of 6,000 units.

Costs		Unit Cost Options:		
		A	B	C
Direct materials (variable)	$ 50 [a]	$ 50.00	$ 50.00	$ 50.00
Direct Labor (variable)	24 [b]	24.00	24.00	24.00
Other variable costs.....	16 [c]	16.00	16.00	16.00
Fixed costs	288,000	60.00 [d]	N/A	48.00 [e]
Per unit cost.....		150.00	$ 90.00	$ 138.00
Cost plus 25%		187.50	112.50	172.50
Total price (1,200 units)..		$225,000	$135,000	$207,000

[a] $50 = $240,000 ÷ 4,800 units.
[b] $24 = $115,200 ÷ 4,800 units.
[c] $16 = $76,800 ÷ 4,800 units.
[d] $60 = $288,000 ÷ 4,800 units.
[e] $48 = $288,000 ÷ 6,000 units.

If fixed costs are not differential and Western has no alternative uses of the excess capacity (between 6,000 units available capacity and 4,800 units used), then Option B is the most defensible. Options A and C overstate the differential cost of production which could inappropriately affect Eastern Division's decisions about buying internally or externally, or about pricing its product, among other decisions. (If option B is used and managers forget that there are fixed costs of production, then it is also possible that Eastern Division's pricing decision could be affected inappropriately.)

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1-43. (20 Min.) Cost Data for Managerial Purposes: Bates Courier Services.

a.

	A	B	C	D	E
1	**BATES COURIER SERVICES**				
2	**Annual Income Statement before Expansion**				
3		Status Quo	Alternative		
4		No Express Service	With Express Service	Difference	
5		(1)	(2)	(3) = (2) - (1)	
6					
7	Sales revenue.....	$ 190,000	$ 252,500	$ 62,500	(Given)
8	Costs				
9	Vehicle leases	$ 75,000	$ 85,000	$ 10,000	(Given)
10	Labor.....	60,000	90,000	30,000	(= 50% x $60,000)
11	Utilities.....	10,000	15,000	5,000	(= 50% x $10,000)
12	Rent.....	20,000	24,000	4,000	(= 20% x $20,000)
13	Other costs.....	10,000	12,000	2,000	(= 20% x $10,000)
14	Manager's salary.....	30,000	30,000	-0-	(Given)
15	Total costs.....	$ 205,000	$ 256,000	$ 51,000	
16	Operating profit (loss).....	$ (15,000)	$ (3,500)	$ 11,500	
17					

b. The decision to expand and offer the express service results in differential profits of $11,500, so it is profitable to expand. Note that only differential costs and revenues figured in the decision. The manager's salary did not change, so it did not affect the decision.

c. Managers need to consider whether the new service will have an effect on their current business (perhaps reducing demand).

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1-44. (20 Min.) Cost Data for Managerial Purposes: Kendall & Floyd.

a.

	A	B	C	D	E
1	**KENDALL & FLOYD**				
2	**Annual Income Statement**				
3					
4		(Before Droppin	(After Dropping		
5		Service)	Service)		
6					
7	Sales revenue.....	$ 684,000	$ 559,000	(Revenues fall by $125,000)	
8	Costs				
9	Equipment leases	$ 270,000	$ 216,000	(= .80 x $270,000)	
10	Labor.....	216,000	172,800	(= .80 x $216,000)	
11	Utilities.....	36,000	30,600	(= .85 x $36,000)	
12	Rent.....	72,000	61,200	(= .85 x $72,000)	
13	Other costs.....	36,000	28,800	(= .80 x $36,000)	
14	Manager's salary.....	90,000	90,000	(No change)	
15	Total costs.....	$ 720,000	$ 599,400		
16	Operating profit (loss)....	$ (36,000)	$ (40,400)		
17					

b. The decision to drop the lawn service results in a differential loss of $4,400 [= ($36,000) – ($40,400)], so it is not profitable to drop that service. Note that only differential costs and revenues figured in the decision. The manager's salary did not change, so it did not affect the decision.

c. Sara should consider whether there are other, more profitable uses that the resources could be used for instead of lawn services.

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1-45. (20 Min.) Cost Data for Managerial Purposes: B-You

a. The following differential costs would be incurred:

Item	Differential Cost	Calculation
Consultant labor	$85,000	(Given)
Equipment lease.....	8,000	(= 20% x $40,000)
Supplies	2,700	(= 10% x $27,000)
Other costs.....	2,550	(= 15% x $17,000)
Total	$98,250	

b. Since acceptance of the contract would result in an increase of operating profits by $1,750 (= $100,000 paid according to the contract less $98,250 in differential costs), it would seem that the contract should be accepted. Of course, as a practical matter, the amount is so small that differential profit probably would not be the deciding factor. Errors in estimation alone could change the decision easily.

c. Other factors would include (1) whether this will enable the company to get into a new, profitable line of business; (2) what other opportunities the company has for expanding; and (3) whether the contract will provide for more revenues in the future. In short, the company must consider the long run as well as the first year's results.

1-46. (20 Min.) Cost Data for Managerial Purposes: Forman's Services.

a. The following differential costs would be incurred:

Item	Differential Cost	Calculation
Labor costs.....	$30,000	(Given)
Equipment lease.....	7,560	(= 10% x $75,600)
Supplies	7,290	(= 15% x $48,600)
Other costs.....	1,710	(= 5% x $34,200)
Total	$46,560	

b. Since the addition of the customer would result in an increase of operating profits by $3,440 (= $50,000 in revenues from the store – $46,560 differential costs), Will could offer to lower the fees by this amount (to $46,560) and not lose money on the client.

c. Other factors would include (1) whether this will lead to demands by other clients for lower fees; (2) what other opportunities the company has for its payroll professionals; and (3) whether the business is likely to expand in the future. In short, Will must consider the long run as well as the first year's results.

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1-47. (30 Min.) Cost Data for Managerial Purposes: Langholm Bistro.

a. The following is the income for dinner service only:

	A	B	C	D	E	F
1	**Langholm Bistro**					
2	**Annual Income Statement**					
3						
4		**Lunch and**	**Dinner**			
5		**Dinner Service**	**Service Only**			
6						
7	Sales revenue	$ 676,000	$ 540,800	(= $676,000 ÷ 1.25)		
8	Costs					
9	Food costs	$ 196,000	$ 140,000	(= $196,000 ÷ 1.40)		
10	Labor	270,000	216,000	(= $270,000 ÷ 1.25)		
11	Rent	36,000	36,000	(No change)		
12	Utilities	52,500	43,750	(= $52,500 ÷ 1.20)		
13	Other costs	39,050	35,500	(= $39,050 ÷ 1.10)		
14	Manager's salary	60,000	60,000	(No change)		
15	Total costs	$ 653,550	$ 531,250			
16	Operating profit (loss)	$ 22,450	$ 9,550			
17						

Adding the lunch service would increase profit from $9,550 to $22,450 based on Brian's estimates. Based on financial projections he should add the lunch service.

b. Other factors to consider include (1) whether this will lead to customers switching from dinner to lunch (assuming this was not part of Brian's estimates); (2) what other restaurants might do (one serving lunch might start offering dinner, for example); and (3) whether the longer opening hours might cause the restaurant to lose some of its appeal.

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1-48. (30 Min.) Cost Data for Managerial Purposes: Holborn Appliance Shop.

a. The following is the income for repair service only:

	A	B	C	D	E
1	**Holborn Appliance Shop**				
2	**Annual Income Statement**				
3					
4		Repair and	Repair		
5		Training Service	Service Only		
6					
7	Sales revenue	$ 474,500	$ 365,000	(= $474,500 ÷ 1.3)	
8	Costs				
9	Parts	$ 110,000	$ 100,000	(= $110,000 ÷ 1.1)	
10	Labor	180,000	120,000	(= $180,000 ÷ 1.5)	
11	Rent	52,000	40,000	(= $52,000 ÷ 1.3)	
12	Utilities	39,000	30,000	(= $39,000 ÷ 1.3)	
13	Insurance	4,130	3,500	(= $4,130 ÷ 1.18)	
14	Other costs	21,600	18,000	(= $21,600 ÷ 1.2)	
15	Total costs	$ 406,730	$ 311,500		
16	Operating profit (loss)	$ 67,770	$ 53,500		
17					

Adding the training service would increase profit from $53,500 to $67,770 based on Katie's estimates. Based on financial projections she should add the training service.

b. Other factors to consider include (1) whether training will lead to customers using Katie's repair services (assuming this was not part of Katie's estimates); (2) what Katie could make by teaching at the local technical college; and (3) whether the difference in the estimates is really significant enough to base the decision based on financial estimates.

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1-49. (20 Min.) Cost Data for Managerial Purposes—Budgeting

a.

	A	B	C	D	E
1	**THE AM BAKERY**				
2	Bakery Sales				
3	Actual and Budgeted Costs				
4	For the Month Ending Noveber 30				
5		Actual	Budgeted	Difference	Budget Calculations
6	Ingredients				
7	Flour	$ 4,950	$ 4,875	$ 75	(= $3,900 * 1.25)
8	Butter	4,600	4,375	225	(= $3,500 * 1.25)
9	Oil	2,030	2,125	(95)	(= $1,700 * 1.25)
10	Fruit	1,550	1,625	(75)	(= $1,300 * 1.25)
11	Nuts	1,200	1,125	75	(= $900 * 1.25)
12	Chocolate	1,030	1,000	30	(= $800 * 1.25)
13	Other	460	500	(40)	(= $400 * 1.25)
14	Total ingredients	$ 15,820	$ 15,625	$ 195	
15	Labor				
16	Channel manager	$ 5,000	$ 5,000	$ -	(Given)
17	Other	14,120	13,910	210	(= $10,700 * 1.30)
18	Utilities	2,400	2,400	-	(No change)
19	Rent	3,600	3,600	-	(No change)
20	Marketing	200	200	-	(No change)
21	Total bakery costs	$ 41,140	$ 40,735	$ 405	
22					
23	Revenues	$ 68,000	$ 67,860	$ 140	(= $52,200 * 1.30)
24					

b. The three items that we would investigate would be (a) butter; (b) other labor; and (c) oil. These three have the largest difference between what we actually incurred and the budget. Even though we incurred less cost for the oil than expected, we would still investigate this to understand why. For example, if we are using a lower quality oil or less oil in the bakery goods than budgeted, this might eventually affect sales adversely.

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1-50. (20 Min.) Cost Data for Managerial Purposes—Budgeting

a.

	A	B	C	D	E
1	**THE AM BAKERY**				
2	Bakery Sales				
3	Actual and Budgeted Costs				
4	For the Month Ending December 31				
5		Actual	Budgeted	Difference	Budget Calculations
6	Ingredients				
7	Flour	$ 8,465	$ 8,580	$ (115)	(= $3,900 * 2.20)
8	Butter	7,680	7,700	(20)	(= $3,500 * 2.20)
9	Oil	3,800	3,740	60	(= $1,700 * 2.20)
10	Fruit	3,125	2,860	265	(= $1,300 * 2.20)
11	Nuts	2,200	1,980	220	(= $900 * 2.20)
12	Chocolate	1,600	1,760	(160)	(= $800 * 2.20)
13	Other	850	880	(30)	(= $400 * 2.20)
14	Total ingredients	$ 27,720	$ 27,500	$ 220	
15	Labor				
16	Channel manager	$ 5,000	$ 5,000	$ -	(Given)
17	Other	24,400	24,610	(210)	(= $10,700 * 2.30)
18	Utilities	3,125	2,760	365	(= $2,400 * 1.15)
19	Rent	3,600	3,600	-	(No change)
20	Marketing	210	200	10	(No change)
21	Total bakery costs	$ 64,055	$ 63,670	$ 385	
22					
23	Revenues	$ 103,200	$ 104,400	$ (1,200)	(= $52,200 * 2)
24					
25					

b. The three items that we would investigate would be (a) utilities; (b) fruit; and (c) nuts. These three have the largest difference between what we actually incurred and the budget. For example, we would like to understand why our utility costs are much more than expected. Perhaps there has been an increase in rates and we can expect higher costs in the future. Alternatively, perhaps some of our heating systems are inefficient and we can save money by replacing them. Although the actual cost of the three items we identify are greater than the budget, we would still investigate if the actual cost was less than budget. Consider, for example, the chocolate. If this difference was large (meaning we spent much less than budgeted), we might want to investigate to see if we are using lower quality chocolate in the bakery goods than budgeted. This might affect their quality and, as a result, future sales adversely.

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1-51. (40 Min.) Cost Data for Managerial Purposes—Budgeting: Luce Original Baking Supplies.

a.

	A	B	C	D	E	F
1	**LUCE ORIGINAL BAKING SUPPLIES**					
2	Differential Revenues and Costs from Dropping Retail Distribution Channel					
3	For the Year Ending October 31					
4				Differential		
5	Sales revenue			$7,640,000	(= 0.40 x $19,100,000)	
6						
7	Costs					
8		Cost of goods sold		$4,488,800	(= 0.40 x $11,222,000)	
9		Advertising		723,750	(= 0.25 x $2,895,000)	
10		Retail store staff costs		607,800	(= 0.60 x $1,013,000)	
11		Sales commissions		500,000	(No commissions paid on online sales)	
12		Retail store lease expenses		1,640,000	(Lease will be cancelled)	
13		Allocated corporate costs		0	(Corporate costs unchanged)	
14		Additional online shipping costs		(200,000)	(Given)	
15	Total costs			$7,760,350		
16	Net differential revenues less costs			($120,350)		
17	Tax benefit at 25%			(30,088)		
18	Net loss (gain) from dropping Retail Channel			($90,263)		
19						

The net effect of dropping the Retail Channel on LOBS income will be an increase of $90,263. LOBS revenues will drop by $7,640,000. Costs from the Retail Channel before considering the effect on shipping costs in the Online Channel will drop by $7,960,350 (= $7,760,350 + $200,000). This is a net savings (before taxes) for LOBS of $320,350 (= $7,640,000 – $7,960,350). This savings is reduced by the additional $200,000 required for the additional online sales.

b. Other impacts to consider in addition to the switch from Retail to Online is whether the sales staff in Retail (who are paid commission) were effective in generating additional sales. In addition, customers who are new might prefer to shop in person before switching to online purchases.

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1-52. (40 Min.) Cost Data for Managerial Purposes—Finding Unknowns: Whitcomb Foods.

	A	B	C	D	E	F	G	H	I
1				**WHITCOMB FOODS**					
2				**Projected Annual Income Statement**					
3		Status Quo: Single Product		% Increase (Decrease)		Alternative: Two Products		Difference	
4	Sales.....	$ 150,000	d	30%		$195,000		$ 45,000	e
5									
6	Costs.....								
7	Material.....	30,000		40%		42,000		12,000	
8	Labor.....	37,500	k	20%		45,000	m	7,500	o
9	Rent.....	27,000	l	0%		27,000	n	-	p
10	Depreciation.....	6,000		25%		7,500		1,500	
11	Utilities.....	3,000		25%		3,750	h	750	i
12	Other.....	10,500		50%	j	15,750		5,250	
13	Total costs.....	$ 114,000				$141,000	g	27,000	f
14	Operating profit.....	$ 36,000		50%	a	$ 54,000	b	$ 18,000	c
15									
16	a. From statement that profit would increase by 50%								
17	b. = $36,000 x 1.50								
18	c. = $54,000 - $36,000								
19	d. = $195,000/1.30								
20	e. = $195,000 - $150,000								
21	f. = $45,000 (from e) - $18,000 (from c)								
22	g. = $195,000 - $54,00								
23	h. = $3,000 x 1.25								
24	i. = $3,750 - $3,000								
25	j. = $5,250 ÷ $10,500								
26	k. - p. Labor plus Rent with a single product is $64,500 (= $114,000 - $30,000 - $6,000 - $3,000 - $10,500)								
27	Labor plus Rent with two products is $72,000 (= $141,000 - $42,000 - $7,500 - $3,750 - $15,750)								
28	The increase of $7,500 (= $72,000 - $64,500) in the Labor plus Rent is all due to the 20% increase in Labor								
29	because there is no change in Rent. Therefore, Labor with a single product must be $37,500 (= $7,500 ÷ 20%).								
30	Rent with a single product (and with two products) is $27,000 (= $64,500 - $37,500, or $72,000 - $45,000).								
31									

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1-53. (50 Min.) Cost Data for Managerial Purposes—Finding Unknowns: Clifton Instruments.

Note: This is more difficult than Problem 1-52 because you cannot use the lettering to determine the order in which to solve for the individual cells.

	A	B	C	D	E	F	G	H	I	J
1				**CLIFTON INSTRUMENTS**						
2				Projected Income Statement						
3				For One Year						
4				($000)						
5										
6		Status Quo:		% Increase		Alternative				
7		Single Product		(Decrease)		Two Products		Difference		
8	Sales revenue	$ 80,000	(a)	25%	(b)	$ 100,000	(c)	$ 20,000		
9										
10	Costs									
11	Material	$ 24,000		22%		$ 29,280	(d)	$ 5,280	(e)	
12	Labor	12,800	(f)	30%	(g)	16,640		3,840		
13	Rent	3,200		10%	(h)	3,520	(i)	320	(j)	
14	Depreciation	8,000		15%		9,200		1,200		
15	Utilities	12,800	(k)	30%		16,640		3,840	(l)	
16	Other	4,800		25%	(m)	6,000	(n)	1,200		
17	Total costs	$ 65,600				$ 81,280	(o)	$ 15,680	(p)	
18	Operating profit	$ 14,400	(q)			$ 18,720		$ 4,320	(r)	
19										

The following is one approach to the solution. There are many paths that will lead to the same solution.

h. 10% (given in the problem)

i. = $3,200 x 1.10 (h)

j. = $3,520 – $3,200

d. = $24,000 x 1.22

n. = $4,800 + $1,200

m. = ($6,000 ÷ $4,800) – 1

o. = ($29,280 + $16,640 + $3,520 + $9,200 + $16,640 + $6,000)

c. = $81,280 + $18,720

a. = $100,000 – $20,000

b. = ($100,000 ÷ 80,000) – 1

f. = $16,640 – $3,840

g. = ($16,640 ÷ 12,800) – 1

k. = $16,640 ÷ 1.3

l. = $16,640 – $12,800

p. = $81,280 – $65,600

q. = $80,000 – $65,600

r. = $18,720 – $14,400

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1-54. (40 Min.) Cost Data for Managerial Purposes—Finding Unknowns: Henderson Designs.

Note: This is more difficult than Problem 1-52 because you cannot use the lettering to determine the order in which to solve for the individual cells. In addition, it is not possible to determine all of the cells.

	A	B	C	D	E	F	G	H	I
1		**HENDERSON DESIGNS**							
2		Projected Income Statement For the Year							
3									
4		Status Quo:		% Increase		Alternative			
5		Current Services		(Decrease)		Enhanced Services		Difference	
6	Sales revenue	$ 1,875,000	(a)	20%	(b)	$ 2,250,000		$ 375,000	(c)
7									
8	Costs								
9	Equipment lease	$ 500,000		10%		$ 550,000		$ 50,000	
10	Labor	360,000	(d)	30%	(e)	468,000		108,000	(f)
11	Rent	62,500	(g)	20%		75,000		12,500	(h)
12	Depreciation	100,000		5%		105,000	(i)	5,000	(j)
13	Utilities	275,000		**??**	(k)	**??**	(l)	**??**	(m)
14	Other	100,000		**??**	(n)	**??**	(o)	**??**	(p)
15	Total costs	$ 1,397,500	(q)			$ 1,653,000	(r)	$ 255,500	(s)
16	Operating profit	$ 477,500				$ 597,000	(t)	$ 119,500	
17									

The following is one approach to the solution. There are many paths that will lead to the same solution.

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f. = $108,000 (given in the problem)

d. = $468,000 – $108,000

g. = $75,000 ÷ 1.20

q. = $500,000 + $360,000 + $62,500 + $100,000
+ $275,000 + $100,000

a. = $1,397,500 + $477,500

b. = ($2,250,000 ÷ $1,875,000) – 1

c. = $2,250,000 – $1,875,000

i. = $100,000 x 1.05

j. = $105,000 – $100,000

f. = $468,000 – $360,000

h. = $75,000 – $62,500

e. = ($468,000 ÷ $360,000) – 1

t. = $477,500 + $119,500

r. = $2,250,000 – $597,000

s. = $1,653,000 – $1,397,500

k. – p. Cannot be determined. The total cost for utilities and other labor under the alternative can be calculated as $455,000 (= $1,653,000 – $550,000 – $468,000 – $75,000 – $105,000) but cannot be separated into the two components. Similarly, the increase or decrease for the total, but not the separate components, can be determined.

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1-55. (40 Min.) Critical Thinking in Cost Accounting—Data Analysis: AM Bakery.

Note: Answers will vary. The analysis should include consideration of:

a. Total profits;

b. Profits per store;

c. Profits as a percentage of revenue.

Points b and c reflect measures of size, so the assessment of the district profitability is adjusted to some sort of common basis. This is discussed later in the text, especially when covering performance measures.

The following is a summary of three measures of performance;

a. Profitability by total profits;

b. Profitability by average profits per store;

c. Profitability measured as return-on-sales (Profits/Sales).

	A	B	C	D	E	F	G
1	**THE AM BAKERY**						
2	**Annual Revenue and Profit by District**						
3							
4	**District**	**Number of Stores**	**Annual Revenue**	**Annual Profit**		**ROS**	**Profit/Store**
5	District 1	5	$3,926,503	$1,050,686		26.8%	$210,137
6	District 2	4	3,749,256	1,165,390		31.1%	291,348
7	District 3	6	5,568,574	1,769,757		31.8%	294,960
8	District 4	5	3,690,913	1,217,799		33.0%	243,560
9	District 5	6	6,159,927	2,212,114		35.9%	368,686
10	District 6	4	4,927,492	2,056,521		41.7%	514,130
11	Total/Average	30	28,022,665	9,472,267		33.8%	315,742
12							

Based on the information in the spreadsheet, the following summarizes the rankings of the six districts:

District	Profit by Total Profits	Profit by Average Store Profits	Profitability by Return-on Sales
1	5	6	6
2	6	5	5
3	3	3	4
4	4	2	3
5	2	4	2
6	1	1	1

Based on this, District 1 is the least profitable across a range of measures. District 5 is most profitable based on total profits, but District 6 is most profitable once size (measured either in total revenues or number of stores).

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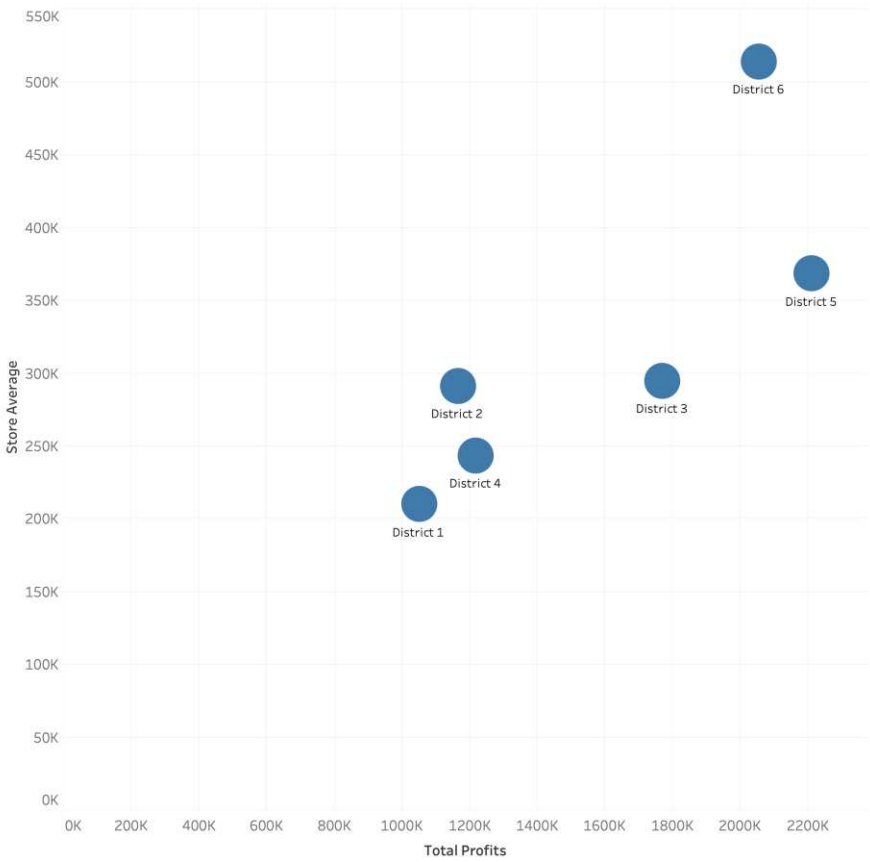
1-56. (40 Min.) Critical Thinking in Cost Accounting—Data Visualization: AM Bakery.

Note: Answers will vary. The visualization will depend on the analysis followed in Problem 1-55 and the software used to graph the results. The visualization should both support the conclusions reached in Problem 1-55 and should be an accurate representation of the data. For example, the bars in a bar chart or the size of the circles in a bubble chart should be proportional to the amounts being reflected (dollar amounts or percentages). One common issue with generating default bar charts using Excel, for example, is that the bars for ROS will not be visible when graphed with the bars for total profits or store average. The problem, of course, is that with the default charts only one axis is shown and the profit numbers are of a magnitude several time greater than those of the percentages measuring ROS.

Two example charts follow. The first shows store average and total profits by district.



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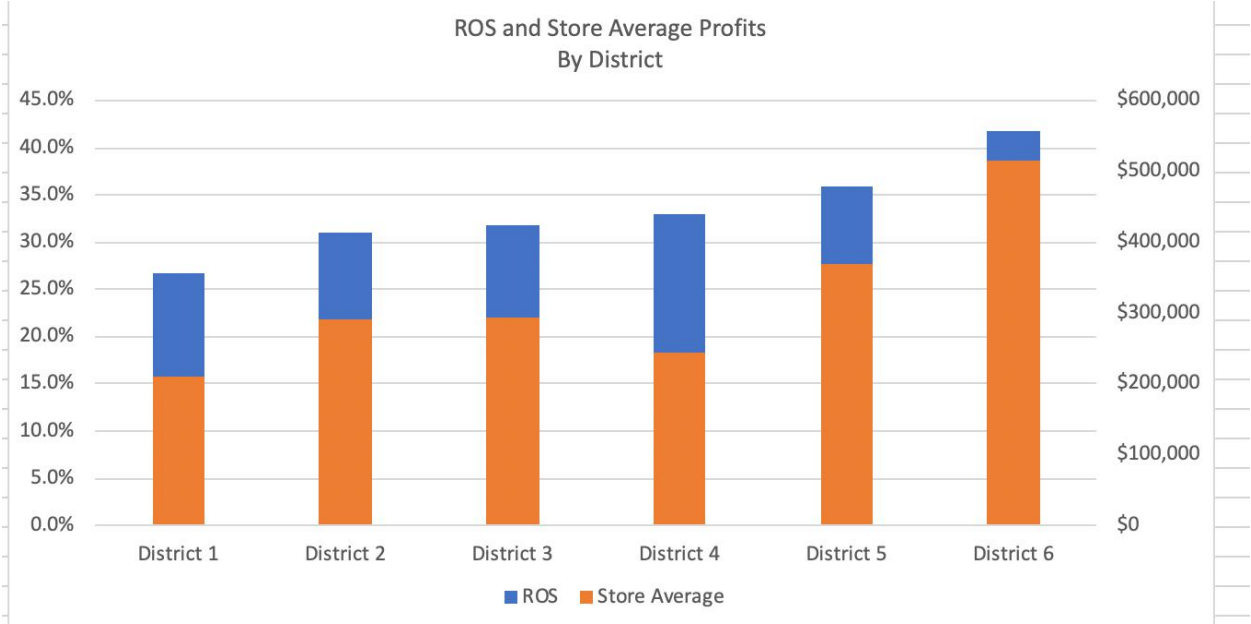
1-56. (continued)

The shows store average profits and ROS by district.



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1-57. (15 Min.) Responsibility for Ethical Action: Giant Engineering.

a. As a management accountant Dewi has a responsibility to perform her professional duties with competence in accordance with relevant laws and regulations. Clearly, overbilling the federal government is a violation of the law. As such, Dewi might have both a legal and ethical responsibility to take some action. As a professional, she must communicate both favorable and unfavorable information in an objective and fair manner. Thus, she cannot simply ignore the fact that Giant is involved in illegal contracting activities.

b. The first possible course of action is to discuss the situation with the controller. This is an appropriate approach to the problem. Always take a problem to your immediate supervisor first. If the controller indicates that he or she is aware of the situation and that Dewi should not worry about it, then she should take the matter up with her controller's superior. Dewi should move up the layers of management until someone is concerned and will deal with the problem. She should also consult her personal attorney to learn her legal rights and responsibilities in this situation.

   As for the second course of action, the proper authorities should be notified by someone in the company. The local newspaper, however, is not the proper authority. Dewi should discuss the matter with the Board of Directors only after exhausting possibilities of discussing the matter with internal management.

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Solutions to Integrative Cases

1-58. (20 Min.) Identifying Unethical Action

Note: The IMA Statement of Ethical Professional Practice is available at:

https://www.imanet.org/-/media/b6fbeeb74d964e6c9fe654c48456e61f.ash

a. We recommend that Accountant B be retained to help Whitcomb Foods with their expansion plans. Accountant B has experience with small companies and growth. Although Accountant A has experience in the local area, the experience is with not-for-profit firms and, therefore, might not be particularly applicable. We would not retain Accountant C because he or she is willing to share information from another company's experience. Therefore, he or she might be willing to divulge our information to another competitor.

b. Accountant C is violating the IMA's code of ethics, specifically the portion of the code dealing with confidentiality. Accountant C could use general knowledge of expansion plans gained as part of his or her work, but, unless legally obligated to, cannot offer to share another company's experience.

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1-59. (20 Min.) Cost Data for Managerial Purposes—Finding Unknowns: Miller Cereals.

	A	B	C	D	E	F	G	H	I
1	**MILLER CEREALS**								
2	**Projected Income Statement**								
3	**For One Year**								
4		Status Quo: Single Product		% Increase (Decrease)		Alternative: Two Products		Difference	
5	Sales revenue.....	$ 150,000	(a)	40%		$ 210,000	(b)	$60,000	
6									
7	Costs.....								
8	Material.....	40,000		50%	(j)	60,000		20,000	(k)
9	Labor.....	50,000	(l)	20%		60,000		10,000	(m)
10	Rent.....	6,000	(q)	50%		9,000	(s)	3,000	(u)
11	Depreciation.....	8,000		0%	(n)	8,000		-	
12	Utilities.....	4,000	(o)	25%	(p)	5,000		1,000	
13	Other.....	12,000	(r)			36,500	(t)	$24,500	(v)
14	Total costs.....	$ 120,000	(g)			$ 178,500	(i)	58,500	(h)
15	Operating profit.....	$ 30,000	(c)	5%	(f)	$ 31,500	(e)	$ 1,500	(d)
16									
17	a. = $60,000/0.40								
18	b. = $150,000 + $60,000								
19	c. = .2 x $150,000								
20	d. = .025 x $60,000								
21	e. = $30,000 + $1,500								
22	f. = $1,500/$30,000								
23	g. = $150,000 - $30,000								
24	h. = $60,000 - $1,500								
25	i. = $120,000 + $58,500								
26	j. = ($60,000/$40,000) - 1								
27	k. = $60,000 - $40,000								
28	l. = $60,000/1.2								
29	m. = $60,000 - $50,000								
30	n. no change								
31	o. = $5,000 - $1,000								
32	p. = $1,000/$4,000								
33	q. to r. Rent (q) + Other (r) = $120,000 - $40,000 - $50,000 - $8,000 - $4,000 = $18,000								
34	Other costs are twice rent, so rent is $6,000 and Other costs are $12,000.								
35	s. = $6,000 x 1.5								
36	t. = $178,500 - $60,000 - $60,000 - $9,000 - $8,000 - $5,000								
37	u. = $9,000 - $6,000								
38	v. = $36,500 - $12,000								

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1-60. (20 Min.) Identifying Unethical Actions: Miller Cereals.

Note: The IMA Statement of Ethical Professional Practice is available at:

https://www.imanet.org/-/media/b6fbeeb74d964e6c9fe654c48456e61f.ash

Yes. This action would violate both the Integrity and Credibility Principles.

1-61. (20 Min.) Responsibility for Unethical Action

a. We can understand, but not justify, what Charles did. He was under considerable pressure in both his professional and personal life and he probably felt that he had no choice. The problem is that his behavior was unethical and illegal.

b. People in this situation should contact a personal attorney (not the company attorney) for advice. The next step would normally be to contact the most trustworthy member of the board of directors. If the board failed to take action, Charles could have used the IMA confidential call-in number or contacted the Securities and Exchange Commission.

   Charles told us that he should have developed a sufficient financial reserve so he could have quit when his boss told him to manipulate the numbers. Also, he should have contacted the former CFO during the first few months after he took the CFO job.

c. Answers will vary. Here is what actually happened. The Securities and Exchange Commission and the U.S. Department of Justice investigated this fraud. Both Charles and his boss were brought up on criminal and civil charges. Both did jail time. Charles has had difficulty getting a good job. He says that prospective employers shy away from hiring him because he has to answer “yes” to the question on employment forms: “Have you ever been convicted of a felony?”

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2
Cost Concepts and Behavior

Solutions to Review Questions

2-1.

Cost is a more general term that refers to a sacrifice of resources and may be either an opportunity cost or an outlay cost. An expense is an outlay cost charged against sales revenue in a particular accounting period and usually pertains only to external financial reports.

2-2.

Product costs are those costs that are attributed to units of production, while period costs are all other costs and are attributed to time periods.

2-3.

Outlay costs are those costs that represent a past, current, or future cash outlay. Opportunity cost is the value of what is given up by choosing a particular alternative.

2-4.

Common examples include the value forgone because of lost sales by producing low quality products or substandard customer service. For another example, consider a firm operating at capacity. In this case, a sale to one customer precludes a sale to another customer.

2-5.

Yes. The costs associated with goods sold in a period are not expected to result in future benefits. They provided sales revenue for the period in which the goods were sold; therefore, they are expensed for financial accounting purposes.

2-6.

The costs associated with goods sold are a product cost for a manufacturing firm. They are the costs associated with the product and recorded in an inventory account until the product is sold.

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2-7.

Both accounts represent the cost of the goods acquired from an outside supplier, which include all costs necessary to ready the goods for sale (in merchandising) or production (in manufacturing).

The merchandiser expenses these costs as the product is sold, as no additional costs are incurred. The manufacturer transforms the purchased materials into finished goods and charges these costs, along with conversion costs to production (work in process inventory). These costs are expensed when the finished goods are sold.

2-8.

A retailer does not typically have a Work-in-Process account, because it buys finished products and does not manufacture them. Therefore, nothing is "in-process."

2-9.

Direct materials:	Materials in their raw or unconverted form, which become an integral part of the finished product are considered direct materials. In some cases, materials are so immaterial in amount that they are considered part of overhead.
Direct labor:	Costs associated with labor engaged in manufacturing activities. Sometimes this is considered as the labor that is responsible for converting the materials into finished product. Assembly workers, cutters, finishers and similar "hands on" personnel are classified as direct labor.
Manufacturing overhead:	All other costs directly related to product manufacture. These costs include the indirect labor and materials, costs related to the facilities and equipment required to carry out manufacturing operations, supervisory costs, and all other support activities.

2-10.

Gross margin is the difference between revenue (sales) and cost of goods sold. Contribution margin is the difference between revenue (sales) and variable cost.

2-11.

Contribution margin is likely to be more important, because it reflects better how profits will change with decisions.

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2-12.

Step costs change with volume in steps, such as when supervisors are added. Semivariable or mixed costs have elements of both fixed and variable costs. Utilities and maintenance are often mixed costs.

2-13.

Total variable costs change in direct proportion to a change in volume (within the relevant range of activity). Total fixed costs do not change as volume changes (within the relevant range of activity).

2-14.

A value income statement typically uses a contribution margin framework, because the contribution margin framework is more useful for managerial decision-making. In addition, it splits out value-added and nonvalue-added costs. Therefore, it differs in two ways from the gross margin income statement: classifying costs by behavior and highlighting value-added and nonvalue-added costs. It differs from the contribution margin income statement by highlighting the value-added and nonvalue-added costs.

2-15.

A value income statement is useful to managers, because it provides information that is useful for them in identifying and eliminating nonvalue-added activities.

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Solutions to Critical Analysis and Discussion Questions

2-16.

The statement is not true. Materials can be direct or indirect. Indirect materials include items such as lubricating oil, gloves, paper supplies, and so on. Similarly, indirect labor includes plant supervision, maintenance workers, and others not directly associated with the production of the product.

2-17.

No. Statements such as this almost always refer to the full cost per unit, which includes fixed and variable costs. Therefore, multiplying the cost per seat-mile by the number of miles is unlikely to give a useful estimate of flying one passenger. We should multiply the *variable* cost per mile by 1,980 miles to estimate the costs of flying a passenger from Detroit to Los Angeles.

2-18.

Marketing and administrative costs are treated as period costs and expensed for financial accounting purposes in both manufacturing and merchandising organizations. However, for decision making or assessing product profitability, marketing and administrative costs that can be reasonably associated with the product (product-specific advertising, for example) are just as important as the manufacturing costs.

2-19.

There is no "correct" answer to this allocation problem. Common allocation procedures would include: (1) splitting the costs equally (25% each), (2) dividing the costs by the miles driven and charging based on the miles each person rides, (3) charging the incremental costs of the passengers (almost nothing), assuming you were going to drive to Texas anyway.

2-20.

The costs will not change. Your allocation in 2-19 was not "incorrect," because the purpose of the allocation is not to determine incremental costs.

2-21.

Answers will vary. The major cost categories include servers (mostly fixed), personnel (mostly fixed), and licensing costs (mostly variable).

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2-22.

Based on the policies included in the Target financial statements, the costs in the distribution center will be included in the Cost of Goods Sold (product cost) and the costs incurred in the retail stores will be treated as period expenses. This would be consistent with the current treatment of other operating costs.

2-23.

Most store cleaning costs associated with the virus (additional wipe downs, additional sanitary wipes dispensers, and so on) would be outlay costs. Enforcement of social distancing protocols such as limiting the number of customers in the store would lead to opportunity costs if customers decided to forgo purchases.

2-24.

Direct material costs include the cost of supplies and medicine. One possible direct labor cost would be nursing staff assigned to the unit. Indirect costs include the costs of hospital administration, depreciation on the building, security costs, and so on.

2-25.

Answers will vary. Common suggestions are number of students in each program, usage (cafeteria: meals; library: study rooms reserved; or career placement: interviews, for example), assuming usage is measured, or revenue (tuition dollars).

2-26.

No, R&D costs are relevant for many decisions. For example, should a program of research be continued? Was a previous R&D project profitable? Should we change our process of approving R&D projects? R&D costs are expensed (currently) for financial reporting, but for managerial decision-making the accounting treatment is not relevant.

2-27.

This question can create a good discussion of the different roles of financial and managerial accounting. An important issue is identifying the activities that are non value-added. These are almost certainly better known to the managers of the firm than to outsiders. These costs are also difficult to measure, meaning there are many different “reasonable” numbers that might be reported. Because managers have an interest in reporting favorable numbers (however favorable is defined), there is a potential for managerial bias in the reports.

A second reason is that most firms would be concerned about revealing potentially valuable competitive information.

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Solutions to Exercises

2-28. (15 min.) Basic Concepts.

a. False. The statement refers to an expense. For example, R&D costs are incurred in expectation of *future* benefits.
b. False. Variable costs can be direct (direct materials) or indirect (lubricating oil for machines that produce multiple products.)
c. True. Each unit of a product has the same amount of direct material (same cost per unit), but producing more units requires more material (and more cost).

2-29. (15 min.) Basic Concepts.

a. True. Cost accountants need to consider both types of costs regardless of financial treatment, because both affect firm value.
b. False. Opportunity costs, such as lost sales or reduction in brand value because of poor quality control, tend to be more difficult to measure than outlay costs such as materials and labor.
c. False. Cost accountants should be concerned with both, because both affect value. The fact that opportunity costs might not be observable or more difficult to measure does not mean that they should be ignored.

2-30. (15 min.) Basic Concepts.

	Cost Item	Fixed (F) Variable (V)	Period (P) Product (M)
a.	Administrative support for sales supervisors	F	P
b.	Assembly line workers' wages	V	M
c.	Cafeteria costs for the factory	F	M
d.	Controller's office rental	F	P
e.	Depreciation on buildings for administrative staff offices	F	P
f.	Energy to run machines producing units of output in the factory	V	M
g.	Overtime pay for assembly workers	V	M
h.	Salaries of top executives in the company	F	P
i.	Sales commissions for sales personnel	V	P
j.	Transportation-in costs on materials purchased	V	M

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2-31. (10 min.) Basic Concepts.

a. Transportation-in costs for steel.	P
b. Lease payments on the factory.	C
c. Steel used in making the components	P
d. Maintenance on the manufacturing machines.	C
e. Machine operator wages.	B

2-32. (15 min.) Basic Concepts.

	Concept	Definition
1	Cost.....	Sacrifice of resources.
6	Direct cost	Cost that can be directly related to a cost object.
5	Expense	Cost charged against revenue in a particular accounting period.
10	Fixed cost.....	Cost that does not vary with the volume of activity.
4	Full absorption cost ..	Cost used to compute inventory value according to GAAP.
2	Indirect cost.....	Cost that *cannot* be directly related to a cost object.
8	Opportunity cost	Lost benefit from the best forgone alternative.
7	Outlay cost	Past, present, or near-future cash flow.
9	Period cost	Cost that can more easily be attributed to time intervals.
11	Product cost	Cost that is part of inventory.
3	Variable cost	Cost that varies with the volume of activity.

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2-33. (15 min.) Basic Concepts: Multiple Choice. Gregorie Tool & Die.

a. (2) Variable cost per unit: $35 (= $15 + $12 + $3 + $5)
b. (1) Variable production cost per unit: $30 (= $15 + $12 + $3)
c. (4) Full cost per unit: $45 (= [$35 + ($250,000 ÷ 25,000 units)])
d. (3) Full absorption cost per unit: $37 (= [$30 + ($175,000 ÷ 25,000 units)])
e. (3) Prime cost per unit: $27 (= $15 + $12)
f. (2) Conversion cost per unit: $22 (= [$12 + $3 + ($175,000 ÷ 25,000 units)])
g. (2) Contribution margin per unit: $20 (= $55 – variable cost per unit of $35)
h. (2) Gross margin per unit: $18 (= $55 – full absorption cost of $37)

2-34. (15 min.) Basic Concepts: Multiple Choice. Alcoy Partners.

a. (3) Variable cost per unit: $21 (= $9 + $3 + $6 + $3)
b. (2) Variable production cost per unit: $18 (= $9 + $3 + $6)
c. (3) Full cost per unit: $28 (= [$21 + ($980,000 ÷ 140,000 units)])
d. (3) Full absorption cost per unit: $22 (= [$18 + ($560,000 ÷ 140,000 units)])
e. (2) Prime cost per unit: $12 (= $9 + $3)
f. (4) Conversion cost per unit: $13 (= [$3 + $6 + ($560,000 ÷ 140,000 units)])
g. (3) Contribution margin per unit: $13 (= $34 – variable cost per unit of $21)
h. (2) Gross margin per unit: $12 (= $34 – full absorption cost of $22)

2-35. (15 min.) Basic Concepts.

Cost Item	Fixed (F) Variable (V)	Period (P) Product (M)
a. Straight-line depreciation on corporate headquarters	F	P
b. Plant manager's salary.....	F	M
c. Property taxes on land on which factory is located	F	M
d. Factory supplies for cleaning assembly machines	V	M
e. Freight costs for shipping products to customers.....	V	P

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2-36. (15 min.) Basic Concepts: Elmo Security Consultants.

a.	Variable review (production) cost per unit: ($250 + $40 + $10 + $20) ..	$320
b.	Variable total cost per unit: ($320 + $30)	$350
c.	Full cost per unit: [$350 + ($120,000 ÷ 2,500 units)].....	$398
d.	Full absorption cost per unit: [$320 + ($70,000 ÷ 2,500)].....	$348
e.	Prime cost per unit: (materials + labor + outsource)	$300
f.	Conversion cost per unit: (labor + overhead + outsource)	$338
g.	Contribution margin per unit: ($500 – $350)	$150
h.	Gross margin per unit: ($500 – full absorption cost of $348).....	$152
i.	Suppose the number of units decreases to 2,000 reviews per month, which is within the relevant range. Which parts of (*a*) through (*h*) will change? For each amount that will change, give the new amount for a volume of 2,000 units.	c, d, f, and h will change, as follows

c. Full cost = $350 + ($120,000 ÷ 2,000) = $410
d. Full absorption cost = $320 + ($70,000 ÷ 2,000) = $355
f. Conversion costs = $250 + $40 + ($70,000 ÷ 2,000) + $20 = $345
h. Gross margin = $500 – $355 = $145

2-37. (15 min.) Basic Concepts: Lillibridge & Friends, Inc.

a.	Prime cost per unit: (materials + labor)	$19
b.	Contribution margin per unit: ($50 – $8 – $11 – $9 – $5).....	$17
c.	Gross margin per unit: ($50 – full absorption cost of $37)	$13
d.	Conversion cost per unit: (labor + overhead)	$26
e.	Variable cost per unit: ($8 + $11 + $9 + $5).....	$33
f.	Full absorption cost per unit: [$28 + ($4,500,000 ÷ 500,000)].....	$37
g.	Variable production cost per unit: ($8 + $11 + $9)	$28
h.	Full cost per unit: [$33 + ($6,000,000 ÷ 500,000 units)].....	$45
i.	Suppose the number of units increase to 600,000 units per quarter, which is within the relevant range. Which parts of (*a*) through (*h*) will change? For each amount that will change, give the new amount for a volume of 600,000 units.	c, d, f and h will change, as follows

c. Gross margin = $50.00 – $35.50 = $14.50
d. Conversion costs = $8 + $9 + ($4,500,000 ÷ 600,000) = $24.50
f. Full absorption cost = $28 + ($4,500,000 ÷ 600,000) = $35.50
h. Full cost = $33 + ($6,000,000 ÷ 600,000) = $43.00

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2-38. (15 min.) Cost Allocation—Ethical Issues

This problem is based on the experience of the authors' research at several companies.

a. Answers will vary as there are several defensible bases on which to allocate the product development costs. As an example, many government-purchasing contracts are based on the cost of the product or service. In this case, using expected sales (units or revenue) leads to a potential circularity. Price depends on cost, which depends on sales, which depends on price.

b. The company has an incentive to allocate as much cost as possible to government sales. This cost will be reimbursed (and the government may be less price-sensitive). Of course, the government recognizes this and has detailed allocation guidelines in place and an agency (the Defense Contract Audit Agency) that monitors contracts and the allocation of costs.

2-39. (15 min.) Cost Allocation—Ethical Issues

This problem is based on the experience of the authors' research at several companies.

a. Answers will vary as there are several defensible bases on which to allocate the common costs. One possibility is relative sales revenue. (We ignore here whether we should allocate these costs, something we discuss in Chapter 4.)

b. You should explain to the manager that you cannot agree with the allocation basis, especially given the reason for selecting the basis. If this fails to persuade the manager, you should disclose to the manager's supervisor at corporate headquarters your disagreement with the analysis and the relation between the manager and the pastry vendor.

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2-40. (30 min.) Prepare Statements for a Manufacturing Company: Greusel Fabrication.

Greusel Fabrication
Cost of Goods Sold Statement
For the Month Ended March 31

Beginning work in process inventory			$ 62,000
Manufacturing costs:			
Direct materials:			
Beginning inventory	$36,000		
Purchases	530,000 (a)*		
Materials available	$566,000		
Less ending inventory	41,000		
Direct materials used (given)		$525,000	
Other manufacturing costs		910,900 **	
Total manufacturing costs			1,435,900 (c)
Total costs of work in process			$1,497,900
Less ending work in process			66,200
Cost of goods manufactured			$1,431,700 (b)
Beginning finished goods inventory			42,500
Finished goods available for sale			$1,474,200
Ending finished goods inventory			38,200
Cost of goods sold (given)			$1,436,000

* Letters (a), (b), and (c) refer to amounts found in solutions to requirements *a, b,* and *c.*
** Difference between total manufacturing costs of $1,435,900 and direct materials used of $525,000.

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2-41. (30 min.) Prepare Statements for a Manufacturing Company: Birwood Furniture.

Birwood Furniture
Cost of Goods Sold Statement
For the Year Ended December 31
($000)

Beginning work in process inventory			$1,154
Manufacturing costs:			
Direct materials:			
Beginning inventory	$712		
Purchases	1,168 (a)*		
Materials available	$1,880		
Less ending inventory	784		
Direct materials used (given)		$1,096	
Other manufacturing costs		483 **	
Total manufacturing costs			1,579 (c)
Total costs of work in process			$2,733
Less ending work in process			1,330
Cost of goods manufactured			$1,403 (b)
Beginning finished goods inventory			139
Finished goods available for sale			$1,542
Ending finished goods inventory			264
Cost of goods sold (given)			$1,278

* Letters (a), (b), and (c) refer to amounts found in solutions to requirements *a, b,* and *c.*
** Difference between total manufacturing costs of $1,579,000 and direct materials used of $1,096,000.

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2-42. (15 min.) Prepare Statements for a Service Company: Harbor Island Investments.

	A	B	C
1	Harbor Island Investments		
2	Income Statement		
3	For the Month Ending November 30		
4			
5	Sales revenue		
6	Brokerage commissions	$ 3,300,000	
7	Advisory fees	1,650,000	
8	Total revenues		$ 4,950,000
9	Cost of services sold		
10	Employee compensation	$ 880,000	
11	Fees paid to execute trades	2,200,000	
12	Total costs of services		3,080,000
13	Gross margin		$ 1,870,000
14	Marketing and administrative costs		
15	Employee training programs	$ 467,500	
16	Lease and facilities costs	192,500	
17	Marketing	99,000	
18	Sales commissions to brokers	275,000	
19	Supervisors' salaries	330,000	
20	Total marketing and administrative costs		1,364,000
21	Operating profit		$ 506,000
22			

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2-43. (15 min.) Prepare Statements for a Service Company: Tuscola Counseling Services.

	A	B	C
1	Tuscola Counseling Services		
2	Income Statement		
3	For the Year Just Ended		
4			
5	Sales revenue		$ 264,000
6	Cost of services sold		
7	Wages and Salaries	$ 81,000	
8	Supplies	51,000	
9	Total cost of services sold		132,000
10	Gross margin		$ 132,000
11	Marketing and administrative costs		
12	Employee training	$ 8,300	
13	Marketing	70,000	
14	Rent and facilities costs	28,000	
15	Travel	39,700	
16	Total marketing and administrative costs		146,000
17	Operating profit (loss)		$ (14,000)

2-44. (10 min.) Prepare Statements for a Service Company: Gray Services.

Sales revenue	$1,640,000	(Given)
Cost of services sold (b)	1,005,000	(Sales revenue – gross margin)
Gross margin	$635,000	(Given)
Marketing and administrative costs (a)	395,000	(Gross margin – operating profit)
Operating profit	$240,000	(Given)

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2-45. (20 min.) Prepare Statements for a Service Company: Sheffield Advisors.

You can solve this in the order shown below.

Sheffield Advisors
Income Statement
For the Month Ended October 31

Sales revenue	$840,000	a
Cost of services sold	504,000	c
Gross margin	$336,000	d
Marketing and administrative costs	151,200	e
Operating profit ($840,000 x 22%)	$184,800	b

a. Given

b. $184,800 = 22% x $840,000.

c. To find the cost of services sold plus marketing and administrative costs, start with the operating profit (b). Then cost of services plus marketing and administrative costs is $655,200 (= $840,000 – $184,800). But, marketing and administrative costs equal 30% of cost of services sold, so,

Cost of services sold + marketing and administrative costs = $655,200 and

Marketing and adminstrative costs = .30 x Cost of services sold.

Combining these equations yields,

1.30 x Cost of services sold = $655,200

or cost of services sold = $504,000 (= $655,200 ÷ 1.30).

d. $336,000 = $840,000 – $504,000.

e. $151,200 = 30% x $504,000.

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2-46. (30 min.) Prepare Statements for a Manufacturing Company: Santa Maria Parts.

Santa Maria Parts
Cost of Goods Sold Statement
For the Quarter Ended September 30

Beginning work-in-process inventory			$ 69,600
Manufacturing costs:			
Direct materials:			
Beginning inventory	$ 76,800		
Purchases (given)	480,000		
Materials available.....	$556,800		
Less ending inventory	94,400		
Direct materials used.....		$ 462,400 (a)*	
Other manufacturing costs		1,239,200 **	
Total manufacturing costs			1,701,600 (c)
Total costs of work in process.....			$1,771,200
Less ending work in process			37,200
Cost of goods manufactured...			$1,734,000 (b)
Beginning finished goods inventory.....			78,000
Finished goods available for sale			$1,812,000
Ending finished goods inventory			72,000
Cost of goods sold (given)			$1,740,000

* The best approach to solving this problem is to lay out the format of the Cost of Goods Sold Statement first, then fill in the amounts known. Next find the subtotals that are possible (e.g., Finished goods available for sale). Finally, solve for letters (a), (b), and (c) where (a), (b), and (c) refer to amounts found in solutions to requirements *a, b,* and *c.*

** Difference between total manufacturing costs and direct materials used.

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2-47. (15 min.) Basic Concepts: Bonita Components.

a. From the basic inventory equation,
Beginning Inventory + Transferred in
= Transferred out + Ending Inventory, so
Beginning Materials Inventory, May 1,
= Transferred out + Ending balance – Transferred in
= $22,000 + $3,900 – $25,000 ..... = $900

b. Total manufacturing costs = Cost of goods manufactured
– Beginning work-in-process + Ending work-in-process
= $87,000 – $4,000 + $5,200 ..... = $88,200
(also can be found solving for Transferred in to Finished Goods)

c. Gross margin = Sales revenue – Cost of Goods Sold
= $108,000 – $85,000 ..... = $23,000

d. Total manufacturing costs = Direct materials + Direct labor
+ Manufacturing overhead, so,
Direct labor = Total manufacturing costs
– Direct materials used – Manufacturing overhead,
= $88,200 – $22,000 – $20,500 ..... = $45,700

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2-48. (25 min.) Basic Concepts: Sterritt Co.

a. From the basic inventory equation,
Beginning materials inventory + Purchases of direct materials = Ending direct materials inventory + Direct materials used
Direct materials used = Beginning materials inventory + Direct materials purchases – Ending materials inventory
= $205 + $565 – $213 ..... = $557

b. Gross margin = Sales revenue – Cost of goods sold
= $5,050 – $3,250 ..... = $1,800

c. Total manufacturing costs = Direct materials used + Direct labor + Manufacturing overhead
= $557 (from *a* above) + $1,170 + $680..... = $2,407

d. From the basic inventory equation,
Beginning work-in-process inventory + Total manufacturing cost
= Ending work-in-process inventory + Cost of goods manufactured, so
Beginning work-in-process inventory, July 1,
= Ending balance, June 30 + Cost of goods manufactured – Total manufacturing cost
= $51 + $2,800 – $2,407 ..... = $444

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2-49. (15 min.) Prepare Statements for a Retailing Company: Sunset Fashions.

Sunset Fashions
Income Statement
For the Quarter Ended June 30

Sales revenue	$2,970,000
Cost of goods sold (see statement below)	1,861,500
Gross margin	$1,108,500
Marketing and administrative costs ($208,000 + $21,000 + $132,000 + $47,000 + $55,500 + $710,000).....	1,173,500
Operating profit (loss).....	($ 65,000)

Sunset Fashions
Cost of Goods Sold Statement
For the Quarter Ended June 30

Merchandise inventory, April 1		$ 49,000
Merchandise purchases	$1,730,000	
Transportation-in	122,000	
Total cost of goods purchased		1,852,000
Cost of goods available for sale		$1,901,000
Merchandise inventory, June 30		39,500
Cost of goods sold		$1,861,500

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2-50. (15 min.) Prepare Statements for a Retailing Company: Norwood Stationary.

Norwood Stationary
Income Statement
For the Month Ended October 31
($000)

Sales revenue	$526.7
Cost of goods sold (see statement below)	297.2
Gross margin	$229.5
Selling, general, and administrative costs ($16.3 + $58.0 + $10.8 + $23.5 + $4.2 + $13.4)	126.2
Operating profit (loss).....	$103.3

Norwood Stationary
Cost of Goods Sold Statement
For the Month Ended October 31
($000)

Merchandise inventory, October 1		$ 16.2
Merchandise purchases	$291.3	
Transportation-in	9.8	
Total cost of goods purchased		301.1
Cost of goods available for sale		$317.3
Merchandise inventory, October 31		20.1
Cost of goods sold		$297.2

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2-51. (15 min.) Cost Behavior for Forecasting: Trumball Catering.

The variable costs will be 20 percent higher because there will be an increase of 4,800 – 4,000 = 800 meals (20% = 800 ÷ 4,000).

Variable costs:	
Ingredients used ($10,200 × 1.2)	$12,240
Direct labor ($22,500 × 1.2)	27,000
Indirect materials and supplies ($9,300 × 1.2)	11,160
Utilities ($3,600 × 1.2)	4,320
Truck fuel and other variable expenses ($6,200 x 1.2)	7,440
Total variable costs	$62,160
Fixed costs:	
Managers' salaries	$28,700
Rent	14,200
Depreciation on equipment	7,600
Miscellaneous fixed costs	3,500
Total fixed costs	54,000
Total costs for 4,800 units	$116,160
Unit costs (= $116,160 ÷ 4,800)	$24.20

Note that the variable cost per unit is $12.95 at both 4,000 units and at 4,800 units.

Total variable cost at 4,000 units is $51,800 (= $10,200 + $22,500 + $9,300+ $3,600 + $6,200).

Unit variable cost = $12.95 per unit = ($62,160 ÷ 4,800 units) or ($51,800 ÷ 4,000 units).

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2-52. (15 min.) Cost Behavior for Forecasting: Otsego Industries.

The variable costs will be 15 percent lower, because there will be a decrease of 300,000 – 255,000 = 45,000 units (15% = 45,000 ÷ 300,000).

Variable costs ($000):	
Direct materials used ($6,120 × .85)	$ 5,202.0
Direct labor ($4,060 × .85)	3,451.0
Indirect materials and supplies ($1,420 × .85)	1,207.0
Power to run plant equipment ($1,300 × .85)	1,105.0
Total variable costs	$10,965.0
Fixed costs ($000):	
Supervisory salaries	$ 560.0
Plant utilities (other than power to run plant equipment)	851.7
Depreciation on plant and equipment	1,335.0
Property taxes on building	568.3
Total fixed costs	3,315.0
Total costs for 36,000 units	$14,280.0
Unit costs (= $14,280,000 ÷ 255,000)	$56

Note that the variable cost per unit is $43 at both 300,000 units and at 255,000 units.

Total variable cost at 300,000 units is $12,900,000 (= $6,120,000 + $4,060,000 + $1,420,000 + $1,300,000).

Unit variable cost = $43 per unit = ($12,900,000 ÷ 300,000 units) or ($10,965,000 ÷ 255,000 units).

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2-53. (15 min.) Cost Behavior for Forecasting: Trumball Catering.

The variable costs will be 30 percent higher because there will be a 30 percent increase in the number of meals to 5,200 (= 1.30 × 4,000). This also means an additional part-time manager.

Variable costs:	
Ingredients used ($10,200 × 1.30)	$13,260
Direct labor ($22,500 × 1.30)	29,250
Indirect materials and supplies ($9,300 × 1.30)	12,090
Utilities ($3,600 × 1.30)	4,680
Depreciation on trucks and equipment ($6,200 x 1.30)	8,060
Total variable costs	$67,340
Fixed costs:	
Managers' salaries ($28,700 + $3,195)	$31,895
Rent	14,200
Depreciation on equipment	7,600
Miscellaneous fixed costs ($3,500 × 1.15)	4,025
Total fixed costs	57,720
Total costs for 5,750 units	$125,060
Unit costs (= $125,060 ÷ 5,200)	$24.05

Note that the variable cost per unit is $12.95 at both 5,200 units and at 4,000 units.

Total variable cost at 4,000 units is $51,800 (= $10,200 + $22,500 + $9,300+ $3,600 + $6,200).

Unit variable cost = $12.95 per unit = ($67,340 ÷ 5,200 units) or ($51,800 ÷ 4,000 units).

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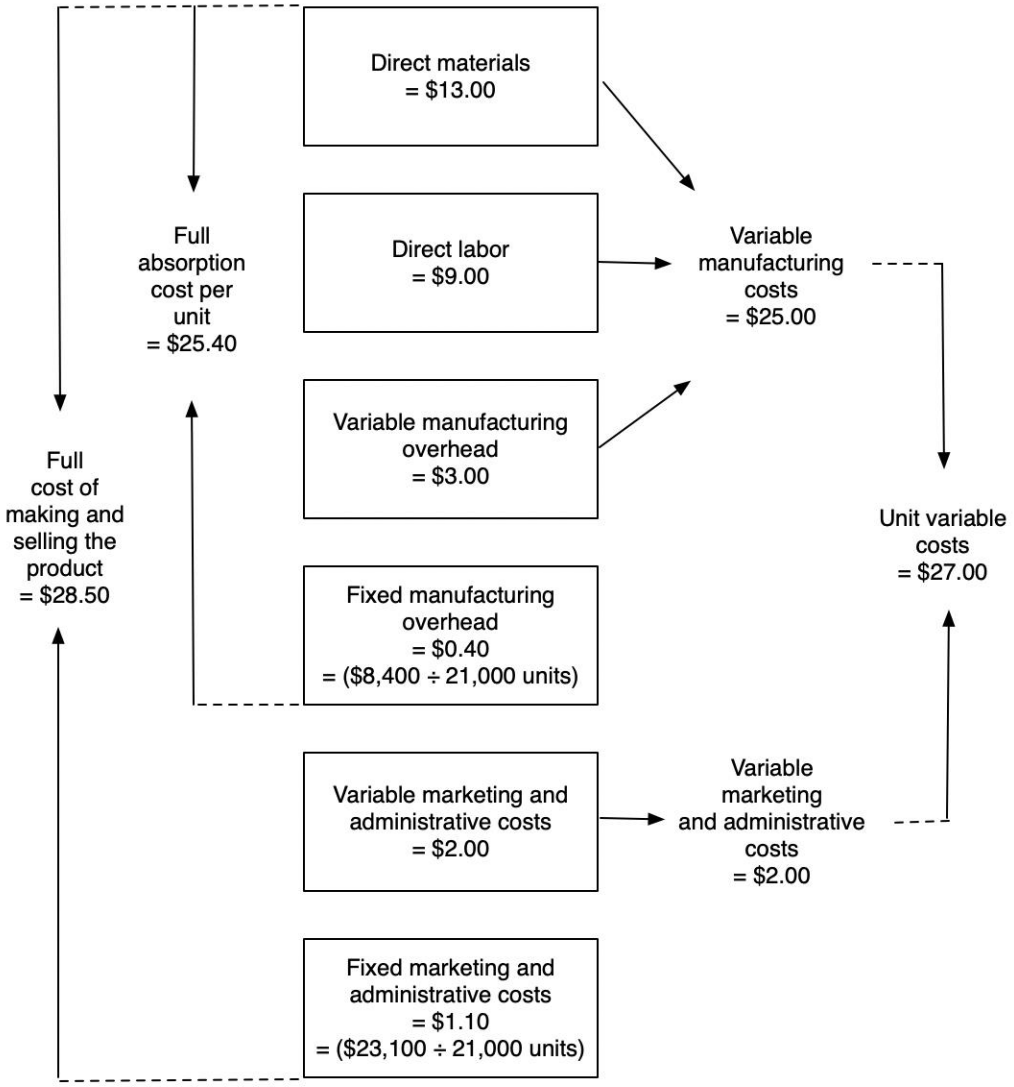
2-54. (30 min.) Components of Full Costs: Acacia Manufacturing.



a. Variable manufacturing cost: $13.00 + $9.00 + $3.00= $25.00
b. Variable cost: $13.00 + $9.00 + $3.00 + $2.00 = $27.00
c. Full absorption cost: $13.00 + $9.00 + $3.00 + ($8,400 ÷ 21,000 units) = $25.40
d. Full cost: $13.00 + $9.00 + $3.00 + $2.00 + ($8,400 ÷ 21,000 units) + ($23,100 ÷ 21,000 units) = $28.50

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2-55. (15 min.) Components of Full Costs: Acacia Manufacturing.

a. Product cost = Direct materials + Direct labor + Manufacturing overhead.
Product cost per unit: $13.00 + $9.00 + $3.00 + ($8,400 ÷ 21,000 units) = $25.40

b. Period costs = Marketing and administrative costs.
Period costs for the period: $23,100 + ($2 x 21,000 units) = $65,100

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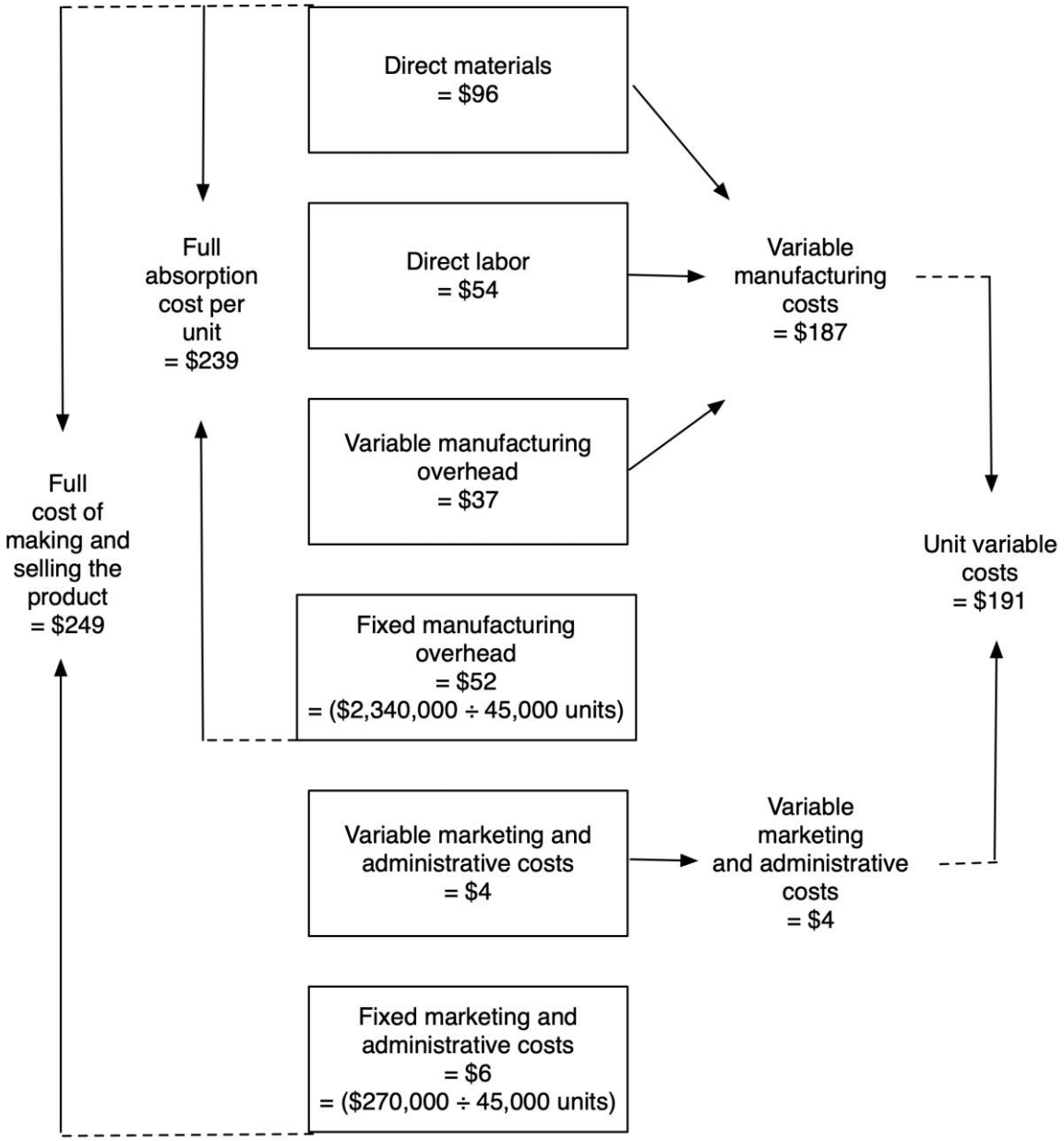
2-56. (30 min.) Components of Full Cost: Wesson Company.



a. Variable cost: $96 + $54 + $37 + $4 = $191

b. Variable manufacturing cost: $96 + $54 + $37 = $187

c. Full-absorption cost: $96 + $54 + $37 + ($2,340,000 ÷ 45,000 units) = $239

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2-56. (continued)

d. Full cost: $96 + $54 + $37 + ($2,340,000 ÷ 45,000 units) + $4.00 + ($270,000 ÷ 45,000 units) = $249

e. Profit margin = Sales price – full cost = $325 – $249 = $76

f. Gross margin = Sales price – full absorption cost = $325 – $239 = $86

g. Contribution margin = Sales price – variable cost = $325 – $191 = $134

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2-57. (20 Min.) Gross Margin and Contribution Margin Income Statements: The Ralston Company.

Gross Margin Income Statement	
Sales revenue	$369,600
Variable manufacturing costs[a]	166,600
Fixed manufacturing costs	61,600
Gross margin.....	$141,400
Variable marketing and administrative costs.....	19,500
Fixed marketing and administrative costs.....	46,700
Operating profit	$75,200

Contribution Margin Income Statement	
Sales revenue	$369,600
Variable manufacturing costs	166,600
Variable marketing and administrative costs	19,500
Contribution margin	$183,500
Fixed manufacturing costs...	61,600
Fixed marketing and administrative costs.....	46,700
Operating profit.....	$75,200

[a] Variable manufacturing costs = $95,200 + $47,600 + $23,800 = $166,600

2-58. (20 Min.) Gross Margin and Contribution Margin Income Statements: Wesson Company.

Gross Margin Income Statement	
Sales revenue(a).....	$14,625,000
Variable manufacturing costs (b)	8,415,000
Fixed manufacturing overhead costs.....	2,340,000
Gross margin.....	$3,870,000
Variable marketing and administrative costs (c)	180,000
Fixed marketing and administrative costs..	270,000
Operating profit	$3,420,000

Contribution Margin Income Statement	
Sales revenue	$14,625,000
Variable manufacturing costs.....	8,415,000
Variable marketing and administrative costs	180,000
Contribution margin	$6,030,000
Fixed manufacturing overhead costs.....	2,340,000
Fixed marketing and administrative costs	270,000
Operating profit	$3,420,000

(a) $325 x 45,000 units = $14,625,000
(b) $187 x 45,000 units = $8,415,000; $187 = ($96 direct material + $54 direct labor + $37 variable manufacturing overhead).
(c) $4 x 45,000 units = $180,000

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2-59. (20 Min.) Gross Margin and Contribution Margin Income Statements: Tracey Packaged Snax.

Gross Margin Income Statement		Contribution Margin Income Statement	
Sales revenue[a]	$992,000	Sales revenue	$992,000
Variable manufacturing costs[b]	448,000	Variable manufacturing costs	448,000
Fixed manufacturing overhead costs[c]	288,000	Variable marketing and administrative costs	32,000
Gross margin	$256,000	Contribution margin	$512,000
Variable marketing and administrative costs[d]	32,000	Fixed manufacturing overhead costs	288,000
Fixed marketing and administrative costs[e]	160,000	Fixed marketing and administrative costs	160,000
Operating profit	$64,000	Operating profit	$64,000

[a] Revenue = $3.10 x 320,000 = $992,000
[b] Variable manufacturing costs = ($1.00 + $0.25 + $0.15) x 320,000 = $448,000
[c] Fixed manufacturing overhead costs = $0.90 x 320,000 = $288,000
[d] Variable marketing and administrative costs = $0.10 x 320,000 = $32,000
[e] Fixed marketing and administrative costs = $0.50 x 320,000 = $160,000

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2-60. (20 min.) Value Income Statement: Coastal Bistro.

a.

Coastal Bistro
Value Income Statement
For the month ending July 31

	Nonvalue-added activities	Value-added activities	Total
Sales revenue		$125,000	$125,000
Cost of merchandise			
Cost of food served[a]	9,900	35,100	45,000
Gross margin	$(9,900)	$89,900	$80,000
Operating expenses			
Employee salaries and wages[b]	4,160	27,840	32,000
Managers' salaries[c]	2,100	11,900	14,000
Building costs[d]	5,400	12,600	18,000
Operating income (loss)	$(21,560)	$37,560	$16,000

[a] 22% nonvalue-added activities (= 10% not used + 12% incorrectly prepared)
[b] 13% nonvalue-added activities
[c] 15% nonvalue-added activities
[d] 30% unused and nonvalue-added activities

b. The information in the value income statement enables managers at Coastal Bistro to identify nonvalue-added activities. They could eliminate such activities without reducing value to customers. For example. they can take steps to ensure that food is used prior to the expiration date, either by changing scheduling or purchasing procedures. They can also spend time training staff to take orders more carefully. Preparing a monthly statement helps the managers see whether the restaurant is improving in reducing nonvalue-added activities.

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2-61. (30 min.) Value Income Statement: Baubee Meal Delivery Service.

a.

	A	B	C	D	E
1	Baubee Meal Delivery Service				
2	Value Income Statement				
3	For the Quarter Ending September 30				
4		Nonvalue-added		Value-added	
5		Activities		Activities	Total
6					
7	Sales revenue			$ 210,000	$ 210,000
8	Cost of services sold				
9	Variable costs of operations, excluding labor costs	5,200	a	46,800	52,000
10	Employee wages and salaries	6,300	a	56,700	63,000
11	Fixed cost of delivery vans	4,200	b	9,800	14,000
12	Gross margin	$ (15,700)		$ 96,700	$ 81,000
13	Administrative expenses				
14	Managers' salaries	2,250	c	12,750	15,000
15	Building costs	1,840	d	7,360	9,200
16	IT costs including support	12,000	e	18,000	30,000
17	Operating income (loss)	$ (31,790)		$ 58,590	$ 26,800
18					
19					
20	a. 10 percent nonvalue-added.				
21	b. 30 percent nonvalue-added.				
22	c. 15 percent nonvalue-added.				
23	d. 20 percent nonvalue-added.				
24	e. 40 percent nonvalue-added.				
25					

b. The information in the value income statement enables the managers at BMDS to identify nonvalue-added activities. They could eliminate such activities without reducing value to customers. They can take steps to improve how directions are given to drivers and reduce customer complaints, for example. By preparing the same information in the fourth quarter (and beyond), they can see how BMDS is improving (or becoming worse) in reducing nonvalue-added activities.

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Solutions to Problems

2-62. (30 min.) Cost Concepts: Roland Industries

a.

Prime costs = direct materials + direct labor

Direct materials = beginning inventory + purchases – ending inventory
= $20,700 + $271,500 – $17,100
= $275,100

Direct labor is given as $202,000

Prime costs = $275,100 + $202,000
= $477,100

b.

Conversion costs = Direct labor + Manufacturing overhead

Conversion costs = $202,000 + $293,000 = $495,000

c.

Total manufacturing costs = Direct materials + Direct labor + Manufacturing overhead
= $275,100 (from *a* above) + $202,000 + $293,000
= $770,100

d.

Cost of goods manufactured = Beginning Work-in-Process + Total manufacturing costs – Ending Work-in-Process
= $11,700 + $770,100 (from *c* above) – $8,900
= $772,900

e.

Cost of Goods Sold	=	Cost of Goods Manufactured	+	Beginning Finished Goods Inventory	–	Ending Finished Goods Inventory
	=	$772,900 (from *d* above)	+	$61,000	–	$80,400
	=	$753,500				

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2-63. (30 Minutes) Cost Concepts: Bethune Chemicals.

a. **$276,600.**

Prime costs	=	Direct materials used + Direct labor costs
Direct materials used	=	Prime costs – Direct labor costs
	=	$460,600 – $184,000
	=	$276,600

b. **$59,400.**

Direct materials used	=	Beginning inventory + purchases – ending inventory
Direct materials, beginning inventory	=	Direct materials used – purchases + ending inventory
		$276,600 – $263,200 + $46,000
	=	$59,400

c. **$577,800.**

Total manufacturing costs	=	Prime costs + Conversion costs – Direct labor cost
Conversion cost	=	Total manufacturing costs – Prime costs + Direct labor cost
	=	$854,400 – $460,600 + $184,000
	=	$577,800 OR
		= Total manufacturing costs – Direct materials used
		= $854,400 - $276,600
		= $577,800

d. **$28,600.**

Work-in-process, ending	=	Work-in-process, beginning + Total manufacturing costs – Cost of goods manufactured
		$20,200 + $854,400 – $846,000
	=	$28,600

e. **$393,800.**

Conversion cost	=	Direct labor costs + Manufacturing overhead
Manufacturing overhead	=	Conversion costs – Direct labor costs
	=	$577,800 – $184,000
	=	$393,800

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2-63. (continued)

f. **$51,800.**

Cost of goods sold	=	Finished goods, beginning + Cost of goods manufactured – Finished goods, ending
Finished goods, beginning	=	Cost of goods sold – Cost of goods manufactured + Finished goods, ending
		$667,400 – $846,000 + $230,400
	=	$51,800

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2-64. (30 minutes) Cost Concepts: Loretto Audio.

a. Amounts per unit:

(1) $267.

Variable manufacturing cost = Manufacturing overhead + Direct labor + Direct materials
= $86 + $44 + $137
= $267

(2) $478.

Full unit cost = All unit fixed costs + All unit variable costs
Unit fixed manufacturing = ($62,250 ÷ 750 units) = $83
Unit fixed marketing and administrative cost = ($83,250 ÷ 750 units) = $111
= $83 + $111 + $44 + $137 + $86 + $17
= $478

(3) $284.

Variable cost = All variable unit costs
= $17 + $86 + $44 + $137
= $284

(4) $350.

Full absorption cost = Fixed and variable manufacturing overhead + Direct labor + direct materials
= $83 + $86 + $44 + $137
= $350

(5) $181.

Prime cost = Direct labor + Direct materials
= $44 + $137
= $181

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2-64. (continued)

(6) $213.

Conversion cost = Direct labor + Manufacturing overhead
= $44 + ($86 + $83)
= $213

(7) $217.

Profit margin = Sales price – Full cost
= $695 – $478
= $217

(8) $217.

Contribution margin = Sales price – Variable costs
= $695 – $284
= $411

(9) $345.

Gross margin = Sales price – Full absorption cost
= $695 – $350
= $345

b. As the number of units increases (reflected in the denominator), fixed manufacturing cost per unit (and the total cost per unit) decreases. The numerator (i.e., total fixed costs) remains the same. However, that does not mean Loretto should produce more units. That decision should be based on the *total* profits (revenues minus costs), not on *unit* profits. In addition, of course, if there is no demand for the additional products, the company will incur more costs, but not earn any additional revenue.

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2-65. (30 min.) Prepare Statements for a Manufacturing Company: East Ferry Tool & Die.

East Ferry Tool & Die
Statement of Cost of Goods Sold
For the Year Ended December 31
($000)

Work in process, Jan. 1			$ 56
Manufacturing costs:			
Direct materials:			
Beginning inventory, Jan. 1	$ 47		
Add material purchases	4,674		
Direct materials available	4,721		
Less ending inventory, Dec. 31	54		
Direct materials used		$4,667	
Direct labor		3,546	
Manufacturing overhead:			
Indirect plant labor	1,558		
Indirect plant supplies	652		
Machine depreciation	3,951		
Plant depreciation	1,235		
Plant supervision	956		
Plant utilities	633		
Property taxes on plant and equipment	281		
Total manufacturing overhead		9,266	
Total manufacturing costs			17,479
Total cost of work in process during the year			17,535
Less work in process, Dec. 31			49
Costs of goods manufactured during the year			17,486
Beginning finished goods, Jan. 1			624
Finished goods inventory available for sale			18,110
Less ending finished goods inventory, Dec. 31			643
Cost of goods sold			$17,467

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2-65. (continued)

East Ferry Tool & Die
Income Statement
For the Year Ended December 31
($000)

Sales revenue		$20,234
Less: Cost of goods sold		17,467
Gross margin		$2,767
Administrative costs	$1,540	
Marketing costs	984	
Total marketing and administrative costs		2,524
Operating profit		$ 243

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2-66. (30 min.) Prepare Statements for a Manufacturing Company: Mount Elliott Fixtures.

Mount Elliott Fixtures
Statement of Cost of Goods Sold
For the Year Ended December 31
($000)

Work in process, Jan. 1			$ 210
Manufacturing costs:			
Direct materials:			
Beginning inventory, Jan. 1	$ 154		
Add materials purchases	14,030		
Direct materials available	$14,184		
Less ending inventory, Dec. 31	172		
Direct materials used		$14,012	
Direct labor		20,137	
Manufacturing overhead:			
Depreciation (Factory)	8,002		
Depreciation (Factory machines)	14,112		
Indirect labor (Factory)	4,981		
Indirect materials (Factory)	1,421		
Property taxes (Factory)	528		
Utilities (Factory)	1,499		
Total manufacturing overhead		30,543	
Total manufacturing costs			64,692
Total cost of work in process during the year			$64,902
Less work in process, Dec. 31			184
Costs of goods manufactured during the year			$64,718
Beginning finished goods, Jan. 1			2,918
Finished goods inventory available for sale			$67,636
Less ending finished goods inventory, Dec. 31			3,265
Cost of goods sold			$64,371

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2-66. (continued)

Mount Elliott Fixtures
Income Statement
For the Year Ended December 31
($000)

Sales revenue		$70,897
Less: Cost of goods sold		64,371
Gross margin		$ 6,526
Administrative costs	$6,891	
Depreciation (Corporate building)	654	
Property taxes (Corporate building)	142	
Selling costs	3,211	
Total marketing and administrative costs		10,898
Operating profit (loss)		($4,372)

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2-67. (30 min.) Prepare Statements for a Manufacturing Company: Alwar Brothers.

.

Alwar Brothers
Statement of Cost of Goods Sold
For the Year Ended December 31
($ 000)

Beginning work in process, Jan. 1			$ 16.1
Manufacturing costs:			
Direct materials:			
Beginning inventory, Jan. 1	$ 10.2		
Add: Purchases	2,058.0		
Direct materials available	$2,068.2		
Less ending inventory, Dec. 31	13.1		
Direct materials used		$2,055.1	
Direct labor		511.0	
Manufacturing overhead:			
Utilities (80% of $810.0)	648.0		
Indirect factory labor	566.0		
Depreciation (85% of $480.0)	408.0		
Property taxes (60% of 470)	282.0		
Factory supplies	415.0		
Factory supervision	311.0		
Total manufacturing overhead		$2,630.0	
Total manufacturing costs			$5,196.1
Total cost of work in process during the year			$5,212.2
Less work in process, Dec. 31			14.2
Costs of goods manufactured during the year			$5,198.0
Beginning finished goods, Jan. 1			41.0
Finished goods available for sale			$5,239.0
Less ending finished goods, Dec. 31			46.0
Cost of goods sold			$5,193.0

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2-67. (continued)

Alwar Brothers
Income Statement
For the Year Ended December 31
($ 000)

Sales revenue		$7,985.0
Less: Cost of goods sold (per statement)		5,193.0
Gross profit		$2,792.0
Marketing and administrative costs:		
Administrative costs	$976.0	
Utilities (20% of $810.0)	162.0	
Marketing costs	532.0	
Depreciation (15% of $480.0)	72.0	
Property taxes (40% of $470.0)	188.0	
Total marketing and administrative costs		1,930.0
Operating profit		$ 862.0

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2-68. (10 Min.) Cost Allocation with Cost Flow Diagram: Merton Electronics.

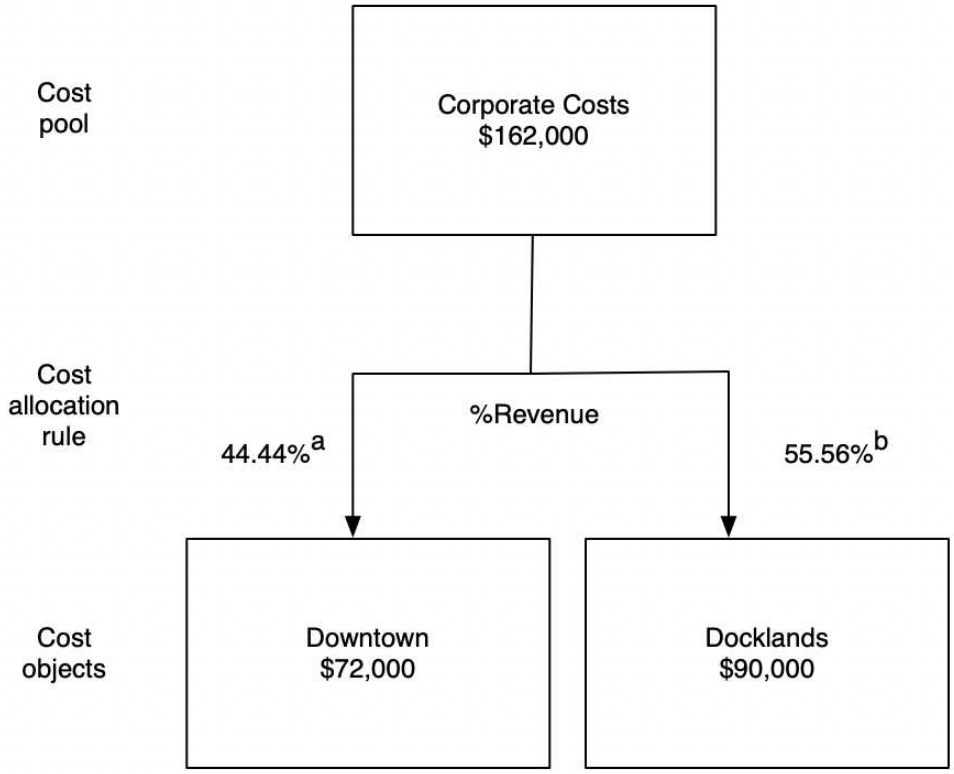
a.

(1)

	Downtown	Docklands	Total
Number of employees	45	30	75
Percentage	60%	40%	100%
Allocated Accounting Corporate costs ($162,000)	$97,200	$64,800	$162,000

(2)

	Downtown	Docklands	Total
Revenue	$720,000	$900,000	$1,620,000
Percentage	44.44%	55.56%	100%
Allocated Accounting Corporate costs ($162,000)	$72,000	$90,000	$162,000



[a] 44.44% = $720,000 ÷ ($720,000 + $900,000)
[b] 55.56% = $900,000 ÷ ($720,000 + $900,000)

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2-69. (20 Min.) Cost Allocation with Cost Flow Diagram: Algonac Moldings.

a.

(1)

	Liebold Metals	Cecil Distributors	Total
Material purchased (tons)	64.8	115.2	180
Percentage	36%	64%	100%
Allocated waste handling cost ($1,200,000).....	$432,000	$768,000	$1,200,000

(2)

	Liebold Metals	Cecil Distributors	Total
Amount of waste (tons)	9.0	11.0	20
Percentage	45%	55%	100%
Allocated waste handling cost ($1,200,000).....	$540,000	$660,000	$1,200,000

(3)

	Liebold Metals	Cecil Distributors	Total
Cost of materials purchased	$1,488,000	$3,312,000	$4,800,000
Percentage	31%	69%	100%
Allocated waste handling cost ($1,200,000).....	$372,000	$828,000	$1,200,000

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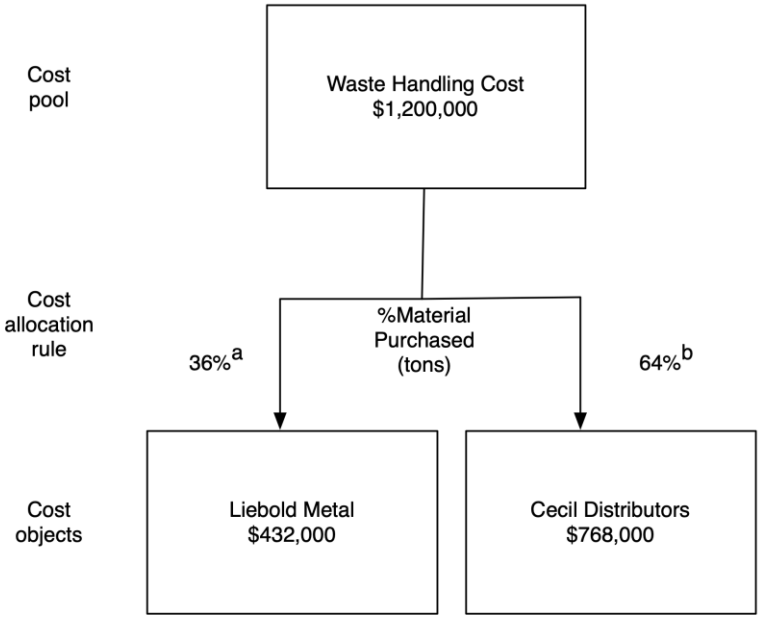
2-69. (continued)

b.



[a] 36% = 64.8 tons ÷ (64.8 tons + 115.2 tons)
[b] 48% = 115.2 tons ÷ (64.8 tons + 115.2 tons)

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2-70. (20 Min.) Cost Allocation with Cost Flow Diagram: Norfolk School of Commerce.

a.

	Undergraduate	Graduate	Total
Enrollment (students)	825	275	1,100
Percentage	75%	25%	100%
Usage (hours)	9,450	17,550	27,000
Percentage	35%	65%	100%
Allocation of enrollment-related costs[a].....	$1,692,900	$564,300	$2,257,200
Allocation of usage-related costs[b]	623,700	1,158,300	1,782,000
Total Allocations	$2,316,600	$1,722,600	$4,039,200

[a] $1,692,900 = 75% x $2,257,200; $564,300 = 40% x $2,257,200.

[b] $623,700 = 35% x $1,782,000; $1,158,300 = 65% x $1,782,000.

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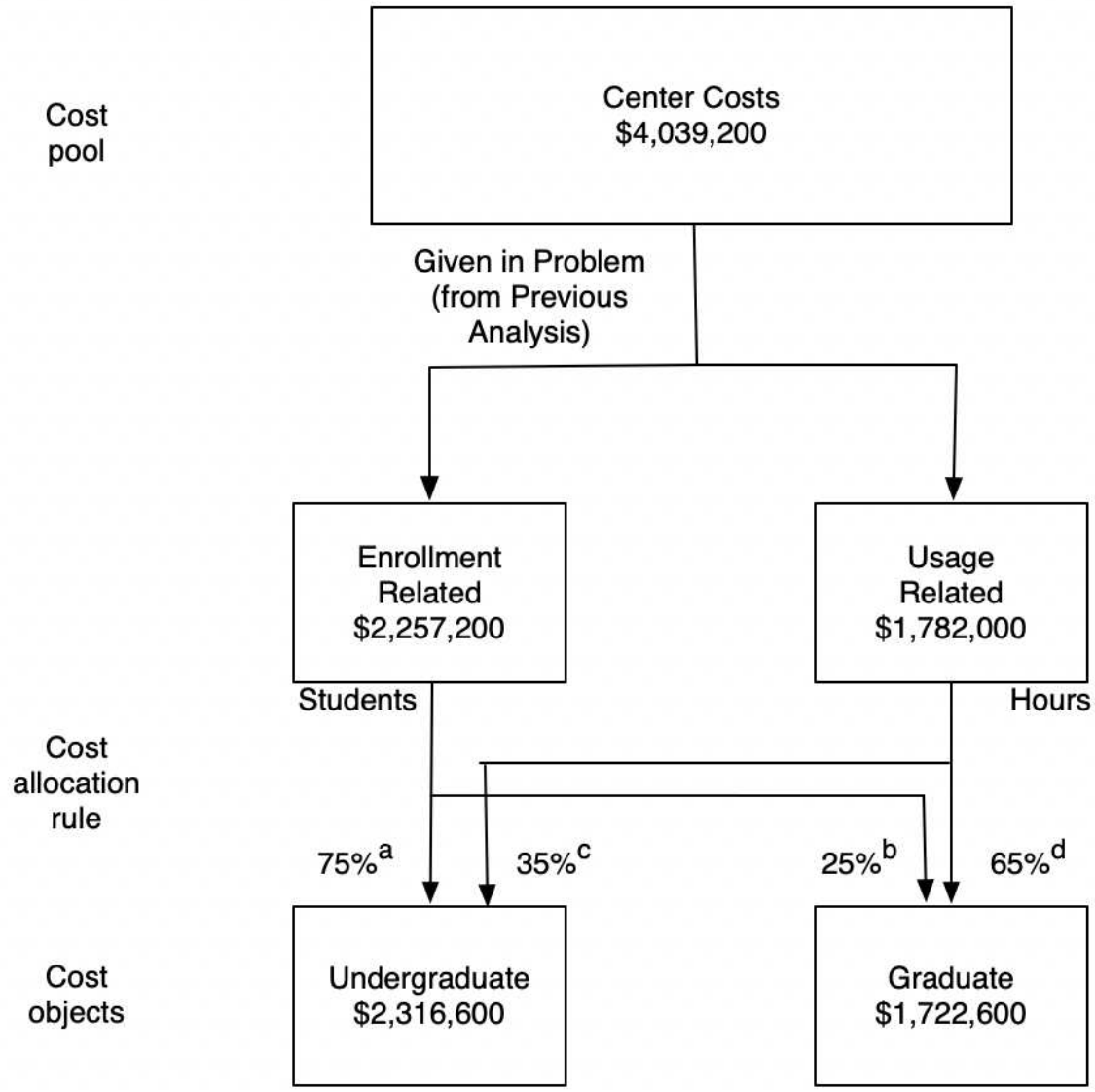
2-70. (continued)

b.



[a] 75% = 825 students ÷ (825 students + 275 students)
[b] 25% = 275 students ÷ (825 students + 275 students)
[c] 35% = 9,450 hours ÷ (9,450 hours + 17,550 hours)
[d] 65% = 17,550 hours ÷ (9,450 hours + 17,550 hours)

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2-71. (30 Min.) Cost Allocation and Pricing: Woodrow Economic Advisors.

a.

1.	Commercial	Defense	Total
Direct cost	$1,470,000	$3,430,000	$4,900,000
Percentage	30%	70%	100%
Allocation of indirect cost.....	$1,911,000	$4,459,000	$6,370,000
($6,370,000)	30%	70%	100%

2.	Corporate	Government	Total
Direct cost.....		$3,430,000	
Allocated indirect cost.....		4,459,000	
Total cost.....		$7,889,000	
Fixed fee (Corporate).....	$3,000,000		
Fixed fee Government		1,183,350	
(= 0.15 x $7,889,000)			
Total revenue.....	$3,000,000	$9,072,350	$12,072,350

b.

1.	Commercial	Defense	Total
Direct contract hours.....	1,760	6,240	8,000
Percentage	22%	78%	100%
Allocation of indirect cost.....	$1,401,400	$4,968,600	$6,370,000
($6,370,000)	22%	78%	100%

2.	Commercial	Defense	Total
Direct cost.....		$3,430,000	
Allocated indirect cost.....		4,968,600	
Total cost.....		$8,398,600	
Fixed fee (Corporate).....	$3,000,000		
Fixed fee Government		1,259,790	
(= 0.15 x $8,398,600)			
Total revenue.....	$3,000,000	$9,658,390	$12,658,390

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2-72. (20 Min.) Cost Allocation and Pricing: Woodrow Economic Advisors.

a. Answers will vary. Either allocation of the indirect costs in this case can be justified on some sort of cause-and-effect basis. Indirect costs are likely related to (though not necessarily caused by) a number of things related to the activity of the consultants (direct contract hours) and the direct costs incurred (travel costs, for example).

b. The ethical issue that arises for the Controller is to ensure that the basis for the allocation is related to some view of the underlying cost process. It is also important that once a basis is chosen, it is not changed with every billing cycle depending on the activity undertaken every period.

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2-73. (40 Min.) Basic Cost Behaviors: Salvay Company.

a. and b.

	A	B	C	D
1			**Units Produced and Sold**	
2			**500,000**	**750,000**
3		Notes:		
4	Revenue	(a)	$10,000,000	$15,000,000
5	Cost of goods sold			
6	Direct materials	(b)	$1,500,000	$2,610,000
7	Direct labor	(c)	2,250,000	3,375,000
8	Overhead			
9	Indirect plant labor	(d)	1,125,000	1,687,500
10	Indirect plant supplies	(e)	625,000	937,500
11	Machine depreciation	(f)	218,000	218,000
12	Plant depreciation	(g)	102,000	102,000
13	Plant maintenance	(h)	105,000	210,000
14	Plant supervision	(i)	280,000	560,000
15	Plant utilities	(j)	210,000	210,000
16	Property taxes on plant and equipment	(k)	65,000	65,000
17	Total overhead		$2,730,000	$3,990,000
18	Cost of goods sold	(l)	$6,480,000	$9,975,000
19	Gross margin	(m)	$3,520,000	$5,025,000
20				
21	Cost per unit	(n)	$12.96	$13.30
22				
23	Gross margin per unit	(o)	$7.04	$6.70
24				

Notes:

(a). $10,000,000 (= 500,000 units x $20); $15,000,000 (= 750,000 units x $20).

(b). $1,500,000 (= 500,000 units x $3.00);

$2,610,000 [= (550,000 units x $3.00) + (750,000 units – 550,000 units) x $4.80.

(c). $2,250,000 (= 500,000 units x $4.50); $3,375,000 (= 750,000 units x $4.50)

(d). $1,125,000 (= 500,000 x $2.25); $1,687,500 (= 750,000 units x $2.25).

(e) $625,000 (= 500,000 x $1.25); $937,500 (= 750,000 units x $1.25).

(f). $218,000 (fixed cost; does not vary with production).

(g). $102,000 (fixed cost; does not vary with production).

(h). $105,000 (one shift; production is less than 600,000 units);

$210,000 (two shifts; production is greater than 600,000 units).

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2-73. (continued)

(i). $280,000 (one shift; production is less than 600,000 units);
$560,000 (two shifts; production is greater than 600,000 units).

(j). $210,000 (fixed cost; does not vary with production).

(k). $65,000 (f ixed cost; does not vary with production).

(l). $6,480,000 (= sum of materials, labor, overhead; with no inventories, cost of goods sold is equal to cost of goods manufactured is equal to total manufacturing cost);
$9,975,000 (= sum of materials, labor, overhead; with no inventories, cost of goods sold is equal to cost of goods manufactured is equal to total manufacturing cost).

(m). $3,520,000 (= revenue minus cost of goods sold);
$5,025,000 (= revenue minus cost of goods sold).

(n). $12.96 (= $3,520,000 ÷ 500,000 units); $13.30 (= $9,975,000 ÷ 750,000 units).

(o). $7.04 (= $3,520,000 ÷ 500,000 units); $6.70 (= $5,025,000 ÷ 750,000 units).

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2-74. (30 Min.) Basic Cost Behaviors -- Visualization: Salvay Company.

Answers will vary.

Some of the issues that should be addressed in the presentation include:

- Factors that lead to different costs per unit (and the effect on gross margin per unit).
    - The effect of fixed costs and volume changes.
    - The effect of semi-variable costs and step costs.
    - The fact that not all direct costs are strictly variable.
- Although it is common that increasing volume in a setting with fixed costs will reduce unit costs, we see that the opposite has occurred here. This is the result of two factors:
    - The semi-variable materials unit cost, making production above 550,000 units more costly;
    - The step-fixed costs, meaning higher production incurs higher (total) fixed costs.
- Although the unit costs are higher (and the unit gross margin is lower) for the higher production volume, the total gross margin is higher at the 750,000 unit level.

The visuals that will be used will vary by what conclusions are highlighted and what software is used for producing the visuals. The following are two possibilities produced using the charting function in Microsoft Excel.

The first chart shows the two major components of the unit cost along with the unit gross margin. This shows that the reduction unit overhead costs resulting from higher production is more than offset by the higher materials cost per unit at the higher level of production.

The second chart shows how the percentage of the total unit cost for each of the individual costs components changes at different volumes.

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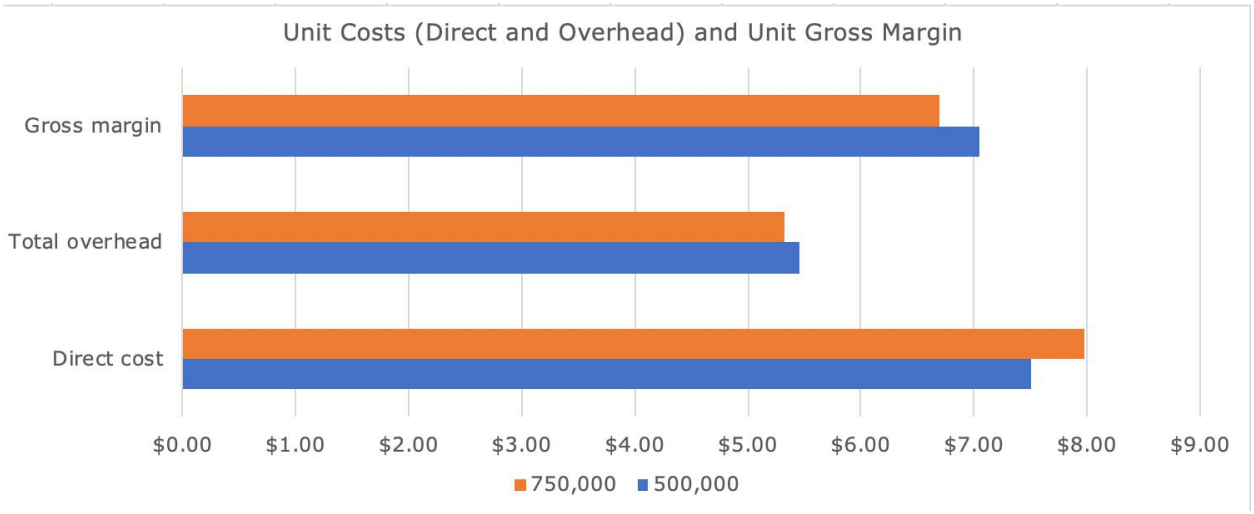
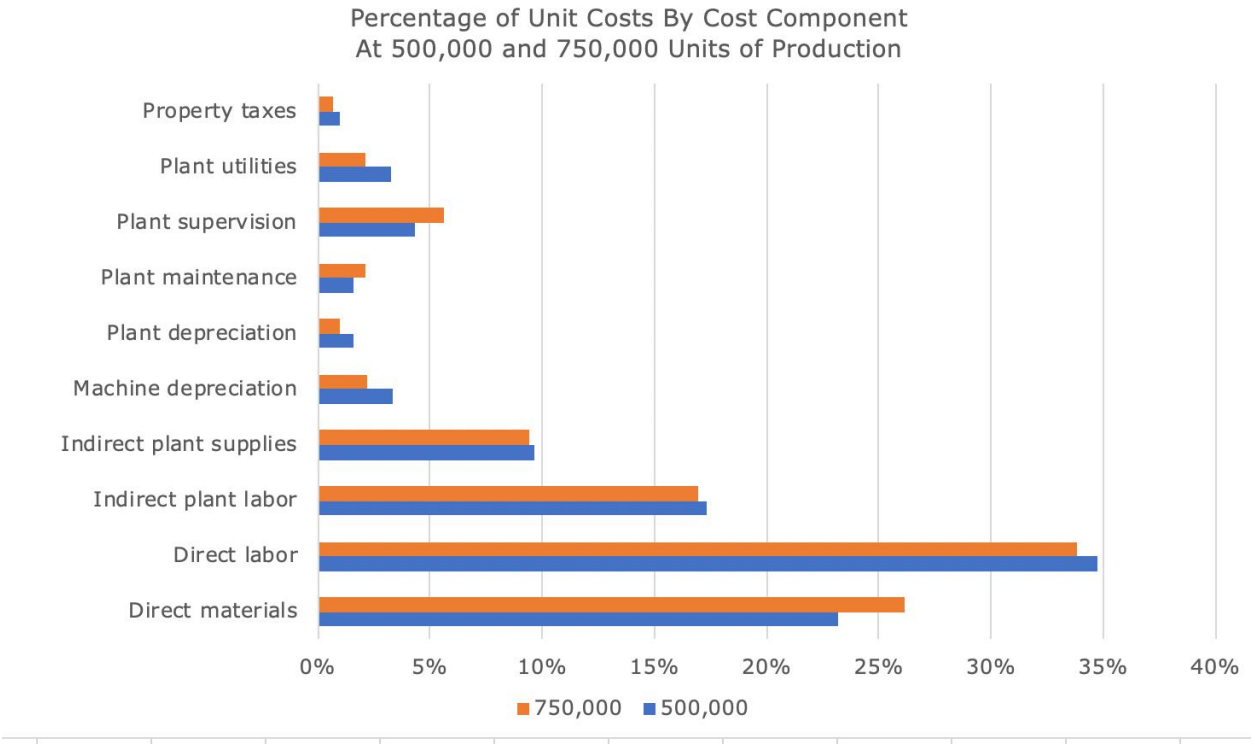
2-74. (continued)





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2-75. (40 Min.) Basic Cost Behaviors: Cheyenne Contractors.

a. and b.

	A	B	C	D
1			**Units Produced and Sold**	
2			**25,000**	**45,000**
3		Notes:		
4	Revenue	(a)	$7,800,000	$14,040,000
5	Cost of goods sold			
6	Direct materials	(b)	$1,300,000	$2,340,000
7	Direct labor	(c)	625,000	1,125,000
8	Overhead			
9	Indirect plant labor	(d)	1,500,000	2,700,000
10	Indirect plant supplies	(e)	350,000	630,000
11	Machine leases	(f)	698,000	1,233,000
12	Overtime	(g)	0	225,000
13	Plant depreciation	(h)	122,000	122,000
14	Plant maintenance	(i)	210,000	420,000
15	Plant supervision	(j)	200,000	450,000
16	Plant utilities	(k)	190,000	190,000
17	Miscellaneous overhead	(l)	105,000	105,000
18	Total overhead		$3,375,000	$6,075,000
19	Cost of goods sold	(m)	$5,300,000	$9,540,000
20	Gross margin	(n)	$2,500,000	$4,500,000
21				
22	Cost per unit	(o)	$212.00	$212.00
23				
24	Gross margin per unit	(p)	$100.00	$100.00
25				

Notes:

(a). $7,800,000 (= 25,000 units x $312); $14,040,000 (= 45,000 units x $312).

(b). $1,300,000 (= 25,000 units x $52); $2,340,000 (= 45,000 units x $52).

(c). $625,000 (= 25,000 units x $25); $1,125,000 (= 45,000 units x $25).

(d). $1,500,000 (= 25,000 x $60); $2,700,000 (= 45,000 units x $60).

(e) $350,000 (= 25,000 x $14); $630,000 (= 45,000 units x $14).

(f). $698,000 (fixed cost below 35,000 units); $1,233,000 (fixed cost above 35,000 units).

(g). $0 (no overtime); $225,000 [= (45,000 units – 30,000 units)] x $15.

(h). $122,000 (fixed cost; does not vary with production)

(i). $210,000 (one shift; production is less than 35,000 units);
$420,000 (two shifts; production is greater than 35,000 units).

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2-75. (continued)

(j). $200,000 (one shift; production is less than 35,000 units);

$450,000 (two shifts; production is greater than 35,000 units plus $50,000 shift differential).

(k). $190,000 (fixed cost; does not vary with production).

(l). $105,000 (fixed cost; does not vary with production).

(m). $5,300,000 (= sum of materials, labor, overhead; with no inventories, cost of goods sold is equal to cost of goods manufactured is equal to total manufacturing cost);

$9,540,000 (= sum of materials, labor, overhead; with no inventories, cost of goods sold is equal to cost of goods manufactured is equal to total manufacturing cost).

(n). $2,500,000 (= revenue minus cost of goods sold);

$4,500,000 (= revenue minus cost of goods sold).

(0). $212 (= $5,300,000 ÷ 25,000 units); $212 (= $9,540,000 ÷ 45,000 units).

(p). $100 (= $2,500,000 ÷ 25,000 units); $100 (= $4,500,000 ÷ 45,000 units).

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2-76. (30 Min.) Basic Cost Behaviors -- Visualization: Cheyenne Contractors.

Answers will vary.

Some of the issues that should be addressed in the presentation include:

- Factors that lead to different costs per unit (and the effect on gross margin per unit).
    - The effect of fixed costs and volume changes.
    - The effect of semi-variable costs and step costs.
    - The fact that not all direct costs are strictly variable.
- Perhaps unexpectedly, the unit costs and gross margins are identical even with fixed costs as a result of:
    - The semi-variable materials unit cost, making production above 550,000 units more costly;
    - The step-fixed costs, meaning higher production incurs higher (total) fixed costs.
- It should be emphasized that the gross margins are identical only coincidentally. This is not true for any production level. Therefore, there should be no conclusion that unit gross margin will be $100 regardless of production and sales levels.

The visuals that will be used will vary by what conclusions are highlighted and what software is used for producing the visuals. The following are two possibilities produced using the charting function in Microsoft Excel.

The first chart shows the unit cost of the components of overhead. There is little to be gained by including the direct costs as these are both variable and do not change. This shows that the reduction in unit overhead costs resulting from higher production for some elements of overhead (for example miscellaneous overhead) is offset by the higher supervisory cost per unit at the higher level of production.

The second chart shows how the percentage of the total overhead cost for each of the individual costs components changes at different volumes.

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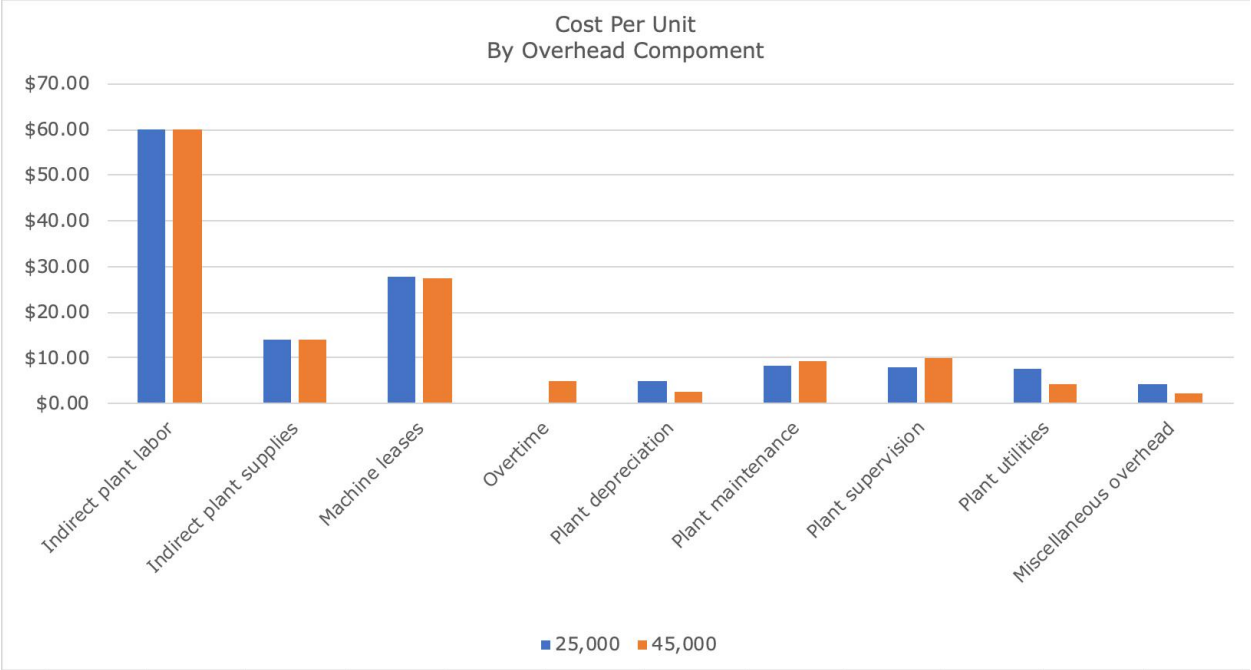
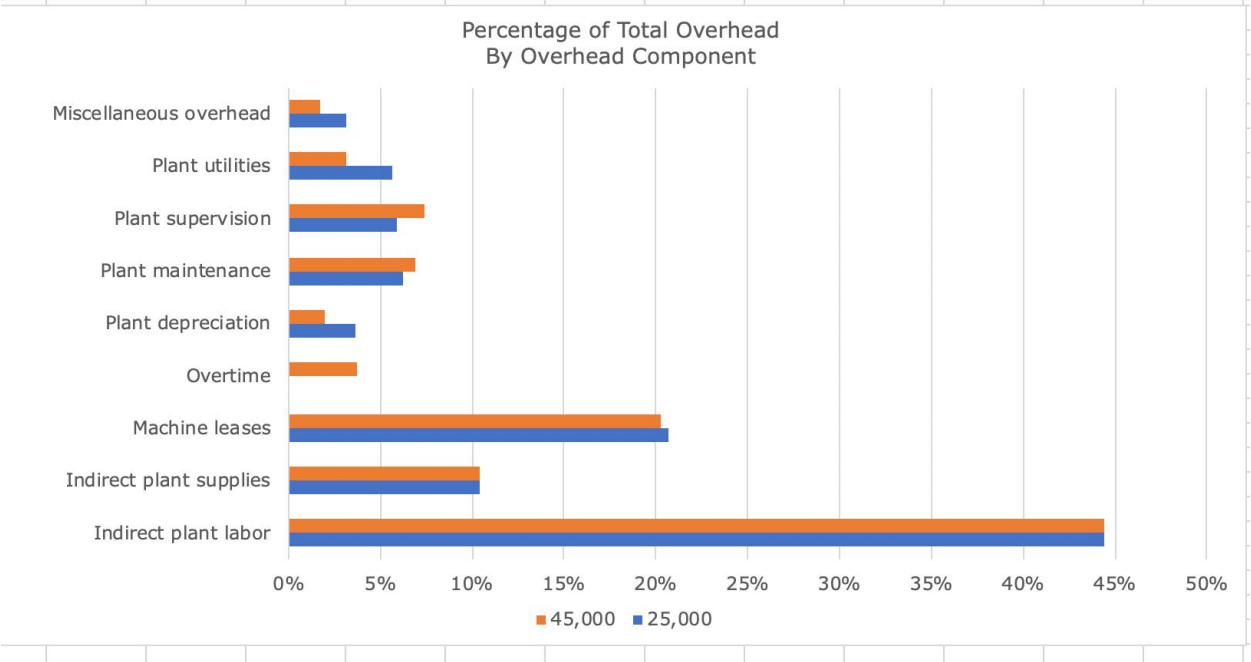
2-76. (continued)





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2-77. (40 Min.) Find the Unknown Information: Gates Manufacturing.

a.

Finished goods beginning inventory	+	Cost of goods manufactured	=	Cost of goods sold	+	Finished goods ending inventory

Cost of goods manufactured	=	Cost of goods sold	+	Finished goods ending inventory	–	Finished goods beginning inventory
Cost of goods manufactured	=	$221,000	+	$31,800	–	$30,800
Cost of goods manufactured	=	<u>$222,000</u>				

b.

Work-in-process beginning inventory	+	Total manufacturing costs	=	Cost of goods manufactured	+	Work-in-process ending inventory

Total manufacturing costs	=	Cost of goods manufactured	—	Change in work-in-process inventory
Total manufacturing costs	=	222,000	—	28,000
Total manufacturing costs	=	<u>$194,000</u>		

c.

Total manufacturing costs	=	Direct materials used	+	Direct labor	+	Manufacturing overhead

Direct materials used	=	Total manufacturing costs	—	Direct labor costs	—	Manufacturing overhead
Direct materials used	=	$194,000	—	$30,400	—	$57,600
Direct materials used	=	<u>$106,000</u>				

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2-77. (continued)

d.

Gross margin %	=	Gross margin	÷	Sales revenue
	=	(Sales revenue – COGS)	÷	Sales revenue

Rearranging,

Sales revenue	=	Cost of Goods Sold	÷	(1.0 – Gross Margin %)
		$221,000	÷	(1.0 – .35)
		$221,000	÷	0.65

Sales revenue = <u>$340,000</u>

e.

Direct materials beginning inventory	+	Direct materials purchases	=	Direct materials used	+	Direct materials ending inventory

Change in direct materials inventory	=	Direct materials used	–	Direct materials purchases
Change in direct materials inventory	=	$106,000	–	$96,000
Decrease in direct materials inventory	=	<u>$10,000</u>		

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2-78. (40 Min.) Find the Unknown Information: Paul & Paul, Inc.

a.

Cost of goods manufactured	=	Cost of goods sold	+	Finished goods ending inventory	–	Finished goods beginning inventory
	=	$2,083,200	+	$57,575		
Cost of goods manufactured	=	<u>$2,140,775</u>				

b.

Total manufacturing costs	=	Direct materials used	+	Direct labor	+	Manufacturing overhead
$2,143,120	=	Direct materials used	+	$946,400	+	$787,500
Direct materials used	=	<u>$409,220</u>	(= $2,143,120 – $946,400 – $787,500)			

c.

Direct materials used	=	Materials purchased	+	Beginning Inventory	–	Ending inventory
$409,220	=	Materials purchased	–	$1,512		
Materials purchased	=	<u>$407,708</u>	(= $409,22 – $1,512)			

d.

Gross margin %	=	Gross margin	÷	Sales revenue
30%	=	(Sales revenue – Cost of goods sold)	÷	Sales revenue
30% x Sales revenue	=	Sales revenue	–	Cost of goods sold
Cost of goods sold	=	Sales revenue	–	(30% x Sales revenue)
Cost of goods sold	=	Sales revenue	x	(1 – 30%)
Sales revenue	=	Cost of goods sold	÷	(100% – 30%)
	=	$2,083,200	÷	70%
		$2,976,000		

Units sold	=	Sales revenue	÷	Sales price
	=	$2,976,000	÷	$64
	=	<u>46,500 units</u>		

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2-78. (continued)

e.

Cost of goods manufactured	=	Total manufacturing cost	+	Work-in-process beginning Inventory	–	Work-in-process ending inventory

Cost of goods manufactured	=	Total manufacturing cost	–	Change in work-in-process inventory
	=	$2,143,120	–	Change in work-in-process inventory
	=	$2,140,775		

Change in work-in-process inventory	=	$2,143,120 – $2,140,775
	=	$2,345

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2-79. (40 min.) Cost Allocation and Regulated Prices: Alpine Township.

a. The rate is 20 percent above the average cost of collection:

Total cost of collection	=	$480,000 + $1,536,000 + $384,000
	=	$2,400,000
Total waste collected (tons)	=	4,000 + 12,000
	=	16,000 tons
	=	32,000,000 pounds
Average cost per pound	=	$2,400,000 ÷ 32,000,000 pounds
	=	$.075 per pound
Price per pound	=	$.075 x 1.20
	=	$.09 per pound

b.

First, allocate costs to the two cost objects: households and businesses:

Allocation of administrative costs and truck costs:

Total costs	=	$480,000 + $1,536,000
	=	$2,016,000
Number of customers	=	11,520 + 2,880
	=	14,400 customers
Allocated cost per customer	=	$2,016,000 ÷ 14,400 customers
	=	$140 per customer

Allocation of other collection costs:

Total costs	=	$384,000
Total waste collected (tons)	=	4,000 + 12,000
	=	16,000 tons
Allocated cost per ton of waste	=	$384,000 ÷ 16,000 tons
	=	$24 per ton

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2-79. (continued)

Allocation to customer types:

	Households	Business
Allocation of customer cost:		
Allocated cost per customer	$140	$140
Number of customers	11,520	2,880
Allocated cost	$1,612,800	$403,200
Allocation of other costs:		
Allocated cost per ton	$24	$24
Number of tons	4,000	12,000
Allocated cost	$96,000	$288,000
Total allocated cost	$1,708,800	$691,200
Total number of tons	4,000	12,000
Number of pounds	8,000,000	24,000,000
Average allocated cost per pound	$.2136	$.0288
Price per pound (= 1.20 x average cost)	$.2563	$.0346

c. Answers will vary. This problem illustrates that cost allocation can have an important effect on decisions when the allocated costs are used as if they are actual costs. In the current example, the proposed allocation approach allows the company to compete with other haulers for business customers because they maintain a monopoly on the household business.

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2-80. (20 min.) Reconstruct Financial Statements: Melville Manufacturing.

Problems 2-80 through 2-82 are similar, but vary in difficulty. Problem 2-80 is a straightforward completion of the statements based on the data provided. Problem 2-81 requires students to compute some of the information from the data provided, but they can complete the two statements in sequence. Problem 2-82 requires students to complete the income statement before they finish the Cost of Goods Manufactured and Sold Statement, although they will likely begin with the Cost of Goods Manufactured and Sold Statement.

	A	B	C	D	E	F	G
1	MELVILLE MANUFACTURING						
2	Cost of Goods Manufactured and Sold Statement						
3	For the Month Ending September 30						
4							
5							
6	Work in process, September 1					$ 80,650	
7	Manufacturing costs:						
8	Direct materials:						
9	Direct materials inventory, September 1	$ 213,840					
10	Direct materials purchased	1,791,200					
11	Direct materials available for use	$ 2,005,040					
12	Less materials inventory, September 30	247,000					
13	Materials used			$ 1,758,040			
14	Direct labor			938,500			
15	Manufacturing overhead:						
16	Depreciation on the manufacturing plant	$ 350,000					
17	Indirect manufacturing labor	108,400					
18	Insurance on manufacturing plant	10,640					
19	Maintenance (on the manufacturing plant)	43,080					
20	Manufacturing plant utilities	156,820					
21	Other manufacturing plant costs	126,176					
22	Taxes (on manufacturing plant and property)	43,120					
23	Total overhead			838,236			
24	Total manufacturing costs					3,534,776	
25	Total cost of work in process during the year					$ 3,615,426	
26	Less work in process, September 30					79,340	
27	Cost of goods manufactured this year					$ 3,536,086	
28	Add finished goods, September 1					328,400	
29	Cost of goods available for sale					$ 3,864,486	
30	Less finished goods, September 30					273,900	
31	Cost of goods sold (to income statement)					$ 3,590,586	
32							
33							

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2-80. (continued)

	A	B	C	D
1	MELVILLE MANUFACTURING			
2	Income Statement			
3	For the Month Ending September 30			
4				
5				
6	Sales revenue			$ 4,530,984
7	Less: Cost of goods sold (per statement)			3,590,586
8	Gross margin			$ 940,398
9				
10	Administrative salaries	$ 525,000		
11	Depreciation on the administrative building	228,400		
12	Distribution costs	131,400		
13	Legal fees	99,260		
14	Marketing costs	149,850		
15	Total operating costs			1,133,910
16	Operating profit (loss)			$ (193,512)
17				
18				

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2-81. (30 min.) Reconstruct Financial Statements: Omira Cycle Parts.

	A	B	C	D	E	F
1	OMIRA CYCLE PARTS					
2	Cost of Goods Manufactured and Sold Statement					
3	For the Year Ending December 31					
4						
5	Work in process, January 1					$ 362,600
6	Manufacturing costs:					
7	Direct materials:					
8	Direct materials inventory, January 1	$1,549,400	a			
9	Direct materials purchased	5,040,000				
10	Direct materials available for use	$6,589,400				
11	Less materials inventory, December 31	1,240,000				
12	Materials used			$ 5,349,400		
13	Direct labor			5,600,000	b	
14	Manufacturing overhead:					
15	Indirect labor	$ 448,000	b			
16	Plant utilities	520,800				
17	Building depreciation	907,200				
18	Other plant costs	410,800				
19	Maintenance on plant machinery	169,400				
20	Insurance on plant machinery	266,000				
21	Taxes on manufacturing property	194,000				
22	Total overhead			2,916,200		
23	Total manufacturing costs					$ 13,865,600
24	Total cost of work in process during the year					$ 14,228,200
25	Less work in process, December 31					344,400
26	Cost of goods manufactured this year					$ 13,883,800
27	Add finished goods, January 1					1,120,000
28	Cost of goods available for sale					$ 15,003,800
29	Less finished goods, December 31					1,260,000
30	Cost of goods sold (to income statement)					$ 13,743,800
31						

[a]Materials used is given, but this number is not. To obtain it,
Beg. Bal. + Purchases = Mat. Used + End. Bal.
Beg. Bal. = Mat. Used + End. Bal. – Purchases
Beg. Bal. = $5,349,400 + $1,240,000 – $5,040,000
= $1,549,400

[b]Total labor = Indirect labor + Direct labor = $6,048,000
= 0.08 Direct labor + Direct labor
Direct labor = $6,048,000 ÷ 1.08 = $5,600,000
Indirect labor = 0.08 x $5,600,000 = $448,000

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2-81 (continued)

	A	B	C	D
1	OMIRA CYCLE PARTS			
2	Income Statement			
3	For the Year Ending December 31			
4	Sales revenue			$ 22,750,000
5	Less: Cost of goods sold (per statement)			13,743,800
6	Gross margin			$ 9,006,200
7	Administrative salaries	$ 960,000		
8	Attorney fees	114,800		
9	Building depreciation	226,800	a	
10	Distribution costs	22,400		
11	Marketing costs	518,000		
12	Total operating costs			$ 1,842,000
13	Operating profit			$ 7,164,200
14				

[a] Total depreciation = Depreciation on plant + Depreciation on administrative building portion

Depreciation on plant is 80% of the total depreciation, so total depreciation is,

= $907,200 ÷ 0.80
= $1,134,000

Depreciation on administrative portion = $1,134,000 x (1.0 – 0.8)
= $226,800.

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2-82. (40 Min.) Reconstruct Financial Statements: Kessler Brothers.

	A	B	C	D	E	F	G
1	KESSLER BROTHERS						
2	Cost of Goods Manufactured and Sold Statement						
3	For the Year Ending December 31						
4	(Thousands of Dollars)						
5							
6	Work in process, January 1					$ 240	
7	Manufacturing costs:						
8	Direct materials:						
9	Direct materials inventory, January 1	$ 45					
10	Direct materials purchased	4,710					
11	Direct materials available for use	$ 4,755					
12	Less materials inventory, December 31	60					
13	Materials used			$ 4,695			
14	Direct labor			3,060	(a)		
15	Manufacturing overhead:						
16	Depreciation on plant	$ 900	(b)				
17	Indirect labor	540					
18	Maintenance on plant machinery	420					
19	Other plant overhead	249					
20	Plant supervision and administration	465					
21	Plant supplies and indirect materials	201					
22	Taxes on manufacturing property	351					
23	Total overhead			$ 3,126			
24	Total manufacturing costs					$ 10,881	
25	Total cost of work in process during the year					$ 11,121	
26	Less work in process, December 31					330	
27	Cost of goods manufactured this year					$ 10,791	
28	Add finished goods, January 1					429	(e)
29	Cost of goods available for sale					$ 11,220	(d)
30	Less finished goods, December 31					240	
31	Cost of goods sold (to income statement)					$ 10,980	(c)
32							

[a] Total labor is $3,600 (= $540 indirect labor ÷ 0.15)
Direct labor is $3,060 [= $3,600 x (1.00 – 0.15)]

[b] The manufacturing portion of the building occupies 75 percent of the floor space or 180,000 square feet (= 240,000 x 0.75). Plant depreciation is $900,000 (= $1,200,000 x 0.75).

[c] From the completed Income Statement.

[d] Cost of Goods Available for Sale is $11,220 (= $10,980 cost of goods sold + $240 Finish Goods Inventory, December 31).

[e] Finished Goods Inventory, January 1 is $429 (= $11,220 Cost of Goods Available for Sale − $10,791 Cost of Goods Manufactured).

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2-82 (continued)

	A	B	C	D	E
1	KESSLER BROTHERS				
2	Income Statement				
3	For the Year Ending December 31				
4	(Thousands of Dollars)				
5					
6	Sales revenue			$ 15,000	
7	Less: Cost of goods sold			10,980	(c)
8	Gross margin			$ 4,020	(b)
9					
10	Administrative costs	$ 480			
11	Marketing costs	360			
12	Depreciation on admin portion of	300	(a)		
13	Total operating costs			$ 1,140	
14	Operating profit			$ 2,880	
15					

[a] The administrative portion of the building occupies 25 percent of the floor space or 60,000 square feet (= 240,000 x 0.25). Administrative depreciation is $300,000 (= $1,200,000 x 0.25).

[b] Gross margin is $4,020 (= $2,880 Operating profit + $1,140 Total operating costs).

[c] Cost of Goods Sold is $10,980 (= $15,000 Sales revenue − $4,020 Gross margin).

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2-83. (20 Min.) Finding Unknowns: Conner's Fixtures.

a. $5,625.

Direct materials cost per unit = Direct materials cost ÷ Units produced

= $24,000 ÷ 10,000 units = $2.40 per unit.

Direct materials used per unit = 3.2 pounds.

Direct materials cost per pound = $2.40 ÷ 3.20 pounds = $0.75 per pound.

Direct materials inventory = 7,500 pounds × $0.75 per pound = $5,625.

b. 1,375 units.

Finished goods inventory (in units)

= Finished goods inventory ÷ Manufacturing cost per unit.

Manufacturing cost per unit

= (Direct material + Direct labor + Indirect manufacturing cost) ÷ Units produced

= ($24,000 + $108,000 + $21,600 + $24,000) ÷ 10,000 = $177,600 ÷ 10,000

= $17.76 per unit.

Finished goods inventory (in units) December 31, Year 1 = $24,420 ÷ $17.76

= 1,375 units

c. $34.

Selling price per unit = Sales revenue ÷ Units sold

= Sales revenue ÷ (Units produced – units in ending finished goods inventory)

= $293,250 ÷ (10,000 – 1,375) = $293,250 ÷ 8,625 = $34.

d. $54,570.

Operating profit for year 1:

Sales revenue		$293,250
Cost of goods sold (8,625 x $17.76)		153180
Gross margin.....		$140,070
Less marketing and administrative costs.....		
Variable marketing and administrative costs ..	$13,500	
Fixed marketing and administrative costs	72,000	85,500
Operating profit		$54,570

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2-84. (40 Min.) Finding Unknowns: Guilford Boards.

Note: This problem can be challenging, because there is no indication of how to begin or the order in which to solve for the unknowns.

	A	B	C	D
1	Direct labor cost per unit	$6.25		
2	Direct labor hours worked, August	3,000	hours	(f)
3	Direct labor wage rate per hour	$20.00		
4	Direct materials cost per unit	$5.00		
5	Direct materials cost per pound of material	$10.00		
6	Direct materials inventory (cost), August 31	$3,500		
7	Direct materials inventory (units), August 31	350	pounds	(a)
8	Finished goods inventory (cost), August 31	$10,800		
9	Finished goods inventory (units), August 31	400	units	(b)
10	Manufacturing overhead cost per unit	$15.75		
11	Operating profit, August	$55,200		
12	Production (units), August	9,600	units	(e)
13	Sales revenues, August	$414,000		
14	Sales (units), August	9,200	units	(c)
15	Selling price per unit	$45		(d)
16	Selling, general, and administrative costs per unit	$12.00		
17				

We begin by computing the following unit costs:

Manufacturing cost per unit = Direct materials + Direct labor + Manufacturing overhead
= $40 + $50 + $126 = $216.00

Full cost per unit = Manufacturing cost per unit + Selling, general & administrative
= $216 + $96 = $312

a. Direct material inventory (pounds) = Direct material inventory (cost) ÷ Cost per pound
= $1,600 ÷ $8 = 200 pounds.

b. Finished goods inventory, units = (Finished goods inventory, cost) ÷ (Manufacturing cost per unit)
= $8,640 ÷ $216 = 40 units

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2-84 (continued)

c. Full costs = Cost of goods sold + Selling, general, and administrative costs

Then,

Operating profit = Sales revenue – Cost of goods sold – Selling, general, and administrative costs

= Sales revenue – Full costs

$9,545 = $45,425 – Full costs

Full costs = $45,425 — $9,545 = $35,880

Full costs = Units sold x Full cost per unit

$35,880 = Units sold x $312

Units sold = $35,880 ÷ $312

= 115 units sold

d. Sales revenue = Selling price per unit x Units sold

$45,425 = Selling price per unit x 115 units sold

Selling price per unit = $45,425 ÷ 115

= $395

e. Finished goods ending (units) = Finished goods beginning (units) + Units produced – Units sold

40 = 0 + Units produced — 115

Units produced = 115 + 40 = 155

f. Direct labor cost incurred = Direct-labor hours worked x Wage rate per hour

Direct labor cost incurred = Units produced x Direct labor cost per unit

= 155 x $50 = $7,750

$7,750 = Direct-labor hours worked x $20

Direct-labor hours worked = $7,750 ÷ $20.00

= 387.5 direct-labor hours

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Solutions to Integrative Case

2-85. (30 min.) Analyze the Impact of a Decision on Income Statements: Milbank Technologies.

a. This year's income statement:

	Baseline (Status Quo)	Rent Equipment	Difference	
Sales revenue	$3,200,000	$3,200,000	0	
Operating costs:				
Variable	(400,000)	(400,000)	0	
Fixed (cash expenditures)	(1,500,000)	(1,500,000)	0	
Equipment depreciation	(300,000)	(300,000)	0	
Other depreciation	(250,000)	(250,000)	0	
Loss from equipment write-off	0	(1,700,000) [a]	$1,700,000	lower
Operating profit (before taxes)	$750,000	$ (950,000)	$1,700,000	lower

[a] Equipment write-off = $2 million cost – $300,000 accumulated depreciation for one year (equipment was purchased on January 1 of the year).

b. Next year's income statement:

	Baseline (Status Quo)	Rent Equipment	Difference	
Sales revenue	$3,200,000	$3,424,000 [a]	$224,000	higher
Operating costs:				
Equipment rental	0	(460,000)	460,000	higher
Variable	(400,000)	(400,000)	0	
Fixed cash expenditures	(1,500,000)	(1,410,000) [b]	90,000	lower
Equipment depreciation	(300,000)	0	300,000	lower
Other depreciation	(250,000)	(250,000)	0	
Operating profit	$750,000	$904,000	$154,000	higher

[a] $3,424,000 = 1.07 × $3,200,000
[b] $1,410,000 = (1.00 – 0.06) × $1,500,000

c. Despite the effect on next year's income statement, the company should not rent the new machine because net cash inflow as a result of installing the new machine ($224,000 + $90,000) does not cover cash outflow for equipment rental ($460,000). In terms of your bonus, renting the new equipment will increase you bonus next year (operating profit is higher), but lower it this year (because of the loss from the equipment disposal).

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Chapter 1
Cost Accounting: Information for Decision Making

Learning Objectives

1. Describe the way managers use accounting information to create value in organizations.

2. Distinguish between the uses and users of cost accounting and financial accounting information.

3. Explain how cost accounting information is used for decision making and performance evaluation in organizations.

4. Identify current trends in cost accounting, including data analytics and data visualization.

5. Understand ethical issues faced by accountants and ways to deal with ethical problems that you face in your career.

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Chapter Overview

I. VALUE CREATION IN ORGANIZATIONS
- Why Start with Value Creation?
- Value Chain
- Supply Chain and Distribution Chain
- Using Cost Information to Increase Value
- Accounting and the Value Chain

II. ACCOUNTING SYSTEMS
- Financial Accounting
- Cost Accounting
- Cost Accounting, GAAP, and IFRS
- Customers of Cost Accounting

III. KEY FINANCIAL PLAYERS IN THE ORGANIZATION

IV. OUR FRAMEWORK FOR ASSESSING COST ACCOUNTING SYSTEMS
- The Manager's Job Is to Make Decisions
- Decision Making Requires Information
- Finding and Eliminating Activities That Don't Add Value
- Identifying Strategic Opportunities Using Cost Analysis
- Owners Use Cost Information to Evaluate Managers

V. COST DATA FOR MANAGERIAL DECISIONS
- Costs for Decision Making
- Costs for Control and Evaluation
  - Budgeting
- Different Data for Different Decisions

VI. TRENDS IN COST ACCOUNTING AND BUSINESS DECISIONS
- Cost Accounting in the Value Chain
- Creating Value in the Organization
- Enterprise Resource Planning
- Critical Thinking and Data Analytics
  - What are the relevant questions (what decisions do I need to make)?
  - What are the data relevant to the analysis and where do I find them?
  - What are the appropriate tools for analyzing data?
  - How can I effectively and persuasively communicate the results of my analysis?
- Applying the Framework

VII. CHOICES: ETHICAL ISSUES FOR ACCOUNTANTS
- What Makes Ethics So Important?

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Chapter Overview, continued

- IMA Code of Ethics
- The Sarbanes-Oxley Act of 2002 and Ethics

VIII. COST ACCOUNTING AND OTHER BUSINESS DISCIPLINES

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Chapter Outline

LO 1-1 Describe the way managers use accounting information to create value in organizations.

VALUE CREATION IN ORGANIZATIONS

- Why Start with Value Creation?
  - Goal of cost accounting is to assist managers in achieving the maximum value for their organizations.
- Value Chain
  - The **value chain** is the set of activities that transforms raw resources into the goods and services end users purchase and consume.
    - It includes the treatment or disposal of any waste generated by the end users.
  - **Value-added activities** are those that customers perceive as adding utility to the goods or services they purchase.
  - Exhibit 1.1 identifies the individual components of the value chain and provides examples of the activities in each component, along with some of the costs associated with these activities. Although the list of value chain components suggests a sequential process, many of the components overlap.
    - Research and development (R&D): The creation and development of ideas related to new products, services, or processes.
    - Design: The detailed development and engineering of products, services, or processes.
    - Purchasing: The acquisition of goods and services needed to produce a good or service.
    - Production: The collection and assembly of resources to produce a product or deliver a service.
    - Marketing and Sales: The process of informing potential customers about the attributes of products or services that leads to their sale.
    - Distribution: The process for delivering products or services to customers.

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        - Customer service: The support activities provided to customers for a product or service.

    - Before product ideas are formulated, no value exists. Once an idea is established, however, value is created.

        - When research and development of the product begins, value increases.

        - As the product reaches the design phase, value continues to increase.

        - Each component adds value to the product or service.

    - Administrative functions, such as human resource management and accounting, are not included as part of the value chain; they are included instead in every business function of the value chain.

- Supply Chain and Distribution Chain

    - The **supply chain** includes the set of firms and individuals that sells goods and services to the firm. (See Business Application box "Choosing Where to Operate in the Supply Chain.")

    - The **distribution chain** includes the set of firms and individuals that buys and distributes goods and services from the firm.

    - These suppliers and customers are on the firm's *boundaries*. Thus, the supply chain and distribution chain are the parts of the value chain outside the firm.

- Using Cost Information to Increase Value

    - The measurement and reporting of costs is a valuable activity.

    - Cost information that is received too late to help managers make decisions would not add value.

- Accounting and the Value Chain

    - Cost accounting focuses on how the individual stages contribute to the value and how to work with other managers to improve performance.

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LO 1-2 Distinguish between the uses and users of cost accounting and financial accounting information.

ACCOUNTING SYSTEMS

- Financial Accounting
  - **Financial accounting** is the field of accounting that reports financial position and income according to accounting rules.
    - It is designed for decision makers who are not directly involved in the daily management of the firm.
    - The users are often external to the firm.
    - The managers in the company are keenly interested in the information contained in the financial accounting reports generated; however, the information is not sufficient for making operational decisions.
- Cost Accounting
  - **Cost accounting** is the field of accounting that measures, records, and reports information about costs.
    - The important criterion is that the information be relevant for the decisions made by managers in a particular business environment with a particular strategy.
    - Managers add value to the organization by the decisions they make; accountants add value by providing good information to managers making the decision.
  - Exhibit 1.2 summarizes some of the major differences between financial and cost accounting.
- Cost Accounting, GAAP, and IFRS
  - The primary purpose of financial accounting is to provide investors (for example, shareholders) or creditors (for example, banks) information regarding company and management performance.

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- The financial data prepared for this purpose are governed by generally accepted accounting principles (GAAP) in the United States and international financial reporting standards (IFRS) in many other countries.
    - **Generally accepted accounting principles (GAAP)** are the rules, standards, and conventions that guide the preparation of financial accounting statements for firms registered in the U.S.
    - **International financial reporting standards (IFRS)** are the rules, standards, and conventions that guide the preparation of the financial accounting statements in many other countries.
- Although GAAP and IFRS are converging, differences remain.
- In contrast to cost data for financial reporting to shareholders, cost data for managerial use (that is, within the organization) need not comply with GAAP or IFRS.
    - Management is free to set its own definitions for cost information.
    - The accounting data used for external reporting are often entirely inappropriate for managerial decision making.
    - The cost information is being developed for internal use by managers and does not have to comply with GAAP or IFRS.

- Customers of Cost Accounting
    - Cost information itself is a product with its own customers; the customers are managers.
        - At the production level, where products are assembled or services are performed, information is needed to control and improve operations.
        - At the middle management level, cost information is used to identify problems by highlighting when some aspect of operations is different from expectations.
        - At the executive level, financial information is used to assess the company's overall performance.
    - Cost accountants must work with the users (or customers) of cost accounting information to provide the best possible information for managerial purposes.
    - The most serious problems with accounting systems appear to occur when managers attempt to use accounting information that was developed for external reporting for decision making.

KEY FINANCIAL PLAYERS IN THE ORGANIZATION

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- Exhibit 1.3 identifies the key financial managers in an organization, lists their major responsibilities and primary duties, and provides example activities for each.

- People from engineering, production, marketing, finance, and accounting often work together in cross-functional teams to add value to decision making.

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LO 1-3 Explain how cost accounting information is used for decision making and performance evaluation in organizations.

OUR FRAMEWORK FOR ASSESSING COST ACCOUNTING SYSTEMS

- The Manager's Job Is to Make Decisions
  - The common theme among all managerial jobs, however, is decision making.
  - Managers are paid to make decisions.
- Decision Making Requires Information
  - Accounting systems are important because they are a primary source of information for managers.
  - Many, if not most, decisions require information that is likely to come from the accounting system.
  - Our concern with the accounting system is whether it is providing the "best" information to managers.
- Finding and Eliminating Activities that Don't Add Value
  - **Nonvalue-added activities** are activities that do not add value to the goods or services from the customer's perspective.
    - Activities cause costs.
    - In general, if activities that do not add value to the company can be eliminated, then costs associated with them will also be eliminated.
    - A well-designed cost accounting system can also identify nonvalue-added activities that cross boundaries in the value chain.
  - **Cost-benefit analysis** is the process of comparing benefits (often measured in savings or increased profits) with costs associated with a proposed change within an organization.
    - Managers should perform cost-benefit analyses to assess whether proposed changes in an organization are worthwhile.

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- Identifying Strategic Opportunities Using Cost Analysis
  - Companies use the value chain and other information about the costs of activities to identify strategic advantages in the marketplace.
  - Alternatively, a company can identify activities that customers value and which the company can provide at lower cost.
- Owners Use Cost Information to Evaluate Managers
  - When owners of a business are not also its managers, both parties' interests may not be properly aligned.
  - The second role of the accounting system, in addition to aiding managerial decision making, is to provide information to the owners of the organization about the performance of the organization and the manager.

COST DATA FOR MANAGERIAL DECISIONS

- Costs for Decision Making
  - To evaluate the financial consequences of alternatives, estimates have to be made for future costs, revenues, and/or assets based on past information.
    - Experience and knowledge of the company's costs can be used to estimate cost changes.
    - A **cost driver** is a factor that causes, or "drives," costs.
  - When there are two or more alternatives to be considered:
    - **Differential costs** are those that differ among or between alternatives. (See Business Application box "Reducing Costs by Making Small Changes.")
    - **Differential revenues** are the revenues that change in response to a particular course of action.
  - Exhibit 1.4 illustrates how to compare the status quo with an alternative; the differential revenues and differential costs are identified.

See Demonstration Problem

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- Costs for Control and Evaluation
  - Organizations divide responsibility for specific functions among employees.
    - Functions are grouped into organizational units, which may be called departments, divisions, segments, or subsidiaries.
    - Reporting relations are shown on an organization chart.
  - A **responsibility center** is a specific unit of an organization assigned to a manager who is held accountable for its operations and resources.
  - Exhibit 1.5 illustrates an organization chart along with the statements for two centers.
  - Budgeting
    - Each responsibility center has a **budget**, which is a financial plan of the revenues and resources needed to carry out activities and meet financial goals.
    - Budgeting helps managers decide whether their goals can be achieved and, if not, what modifications are necessary.
    - Managers are responsible for achieving the targets set in the budget.
      - As part of the planning and control process, managers prepare budgets containing expectations about revenues and costs for the coming period.
      - At the end of the period, they compare actual results with the budget, which allows them to see whether changes can be made to improve future operations.
      - Exhibit 1.6 illustrates budgeted versus actual costs for a responsibility center.
- Different Data for Different Decisions
  - Different decisions often require different cost data.
  - "One size fits all" does not apply to cost accounting.

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LO 1-4 Identify current trends in cost accounting, including data analytics and data visualization.

TRENDS IN COST ACCOUNTING AND BUSINESS DECISIONS

- Cost Accounting in the Value Chain
  - Exhibit 1.7 summarizes how cost accounting methods have developed with various management practices
- Creating Value in the Organization
- Enterprise Resource Planning
  - **Enterprise resource planning (ERP)** is information technology that links the various systems of the enterprise into a single comprehensive information system.
- Critical Thinking and Data Analytics
  - **Critical thinking** is a systematic process used to analyze a business issue or decision.
    - The following questions are answered using critical thinking:
      - What are the relevant questions (what decisions do I need to make)?
      - What are the data relevant to the analysis and where do I find them?
        - Big data is the volume and speed with which information is generated and made available.
      - What are the appropriate tools for analyzing data?
      - How can I effectively and persuasively communicate the results of my analysis?
        - Data visualization represents how the results of the data analysis are summarized and presented.
- Applying the Framework
  - Exhibits 1.8, 1.9 and 1.10 illustrate the concepts of critical thinking, data analytics, and data visualization with an example.

See Demonstration Problem

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LO 1-5 Understand ethical issues faced by accountants and ways to deal with ethical problems that you face in your career.

CHOICES: ETHICAL ISSUES FOR ACCOUNTANTS

- What Makes Ethics So Important?
  - Accounting information is used to evaluate the performance of managers.
    - Managers are generally held accountable for achieving financial performance targets; failure to achieve them can have serious negative consequences for the managers, including losing their jobs.
    - Both users and preparers of cost need to be aware of the implications of the way in which information is used and when the system has the potential for abuse.
  - Professional organizations such as the Institute of Management Accountants (IMA), Institute of Internal Auditors (IIA), and the American Institute of Certified Public Accountants (AICPA) have developed codes of ethics to help their members maintain the highest levels of ethical conduct and resolve ethical dilemmas.
    - Many businesses use these codes as a public statement of their commitment to certain business practices with respect to their customers and as a guide for their employees.
    - The IMA code of conduct appears in the Appendix to this chapter.
- IMA Code of Ethics
  - The IMA Code of Ethics discusses the steps cost accountants should take when faced with an ethical conflict.
    - Discuss the conflict with your immediate superior, or, if the conflict involves your superior, the next level in authority.
    - Clarify the relevant issues and concepts by discussions with a disinterested party or by contacting an appropriate and confidential ethics "hotline."
    - Consult an attorney about your rights and obligations.
    - In its "Statement of Ethical Professional Practice," the IMA states that management (and cost) accountants have a responsibility to maintain the highest levels of ethical conduct.

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- The Sarbanes-Oxley Act of 2002 and Ethics
  - Congress passed the Sarbanes-Oxley Act of 2002 to address some of the more serious problems of corporate governance.
    - Provisions in Title III and IV of the Act deals with corporate responsibility and enhanced financial disclosure, respectively.
      - The CEO and CFO are responsible for signing financial statements and stipulating that the financial statements do not omit material information.
      - The CEO and CFO must further disclose that they have evaluated the company's internal controls and that they have notified the company's auditors and the audit committee of the board of any fraud that involves management.
    - Section 404 of Title IV requires managers to attest to the adequacy of their internal controls.
  - The Sarbanes-Oxley Act of 2002 has important implications for managers who design cost information systems.
    - The managers must be aware of the potential for the resulting information to be misleading or to further fraudulent activity.
    - Compliance with Sarbanes-Oxley does not mean that the manager has met all of his or her ethical responsibilities. (See Business Application Box "Accounting Decisions at Tesco: Choices and Consequences.")

COST ACCOUNTING AND OTHER BUSINESS DISCIPLINES

- The boundary between what is cost accounting and what belongs in another discipline is often blurred.

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Matching

A. Benchmarking
B. Cost accounting
C. Cost-benefit analysis
D. Cost driver
E. Differential revenues
F. Distribution chain
G. Enterprise resource planning
H. Just-in-time method
I. Outsourcing
J. Responsibility center
K. Supply chain
L. Value chain

_____ 1. The set of activities that transforms raw resources into the goods and services end users purchase and consume and includes the treatment or disposal of any waste generated by the end users.

_____ 2. The field of accounting that measures, records, and reports information about costs.

_____ 3. Factor that causes, or "drives," costs.

_____ 4. The set of firms and individuals that buys and distributes goods and services from the firm.

_____ 5. A specific unit of an organization assigned to a manager who is held accountable for its operations and resources.

_____ 6. The continuous process of measuring a company's own products, services, and activities against best practices either inside or outside the organization.

_____ 7. May be used in production or purchasing where each unit is purchased or produced just in time for its use.

_____ 8. Represents the information technology that links the various systems of the enterprise into a single comprehensive information system.

_____ 9. One or more of the firm's activities will be performed by another firm or individual in the supply or distribution chain for improved efficiency and cost savings.

_____ 10. Revenues that change in response to a particular course of action.

_____ 11. The process of comparing benefits (often measured in savings or increased profits) with costs associated with a proposed change within an organization.

_____ 12. The set of firms and individuals that sells goods and services to the firm.

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Matching Answers

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

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Multiple Choice Questions

1. Cost accounting:
   a. provides information to managers for decision making.
   b. information is not comparable across organizations.
   c. is not based on GAAP.
   d. All of the above.

2. A cost accounting system:
   a. adds value to the organization.
   b. is part of Enterprise Resource Planning (ERP) systems.
   c. is beyond any ethical issues.
   d. Both a and b.

3. Which of the following positions/functions is not under the supervision of the Chief Financial Officer (CFO)?
   a. Treasurer
   b. Controller
   c. Human resources
   d. Cost accountants

4. Which of the following statements is correct?
   a. All activities add value to the organization.
   b. All value chain functions are within the organization.
   c. Supply chain and value chain do not overlap.
   d. Cost information reduces value.

5. In cost-benefit analysis:
   a. benefits are often measured in savings or increased profits.
   b. proposed changes within the organizational structure are evaluated.
   c. benefits should outweigh costs to be acceptable.
   d. All of the above.

6. Cost drivers are:
   a. factors that drive costs.
   b. activities that consume resources in Activity-Based Costing (ABC).
   c. few in traditional costing systems.
   d. All of the above.

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Use the following information to answer questions 7 and 8:
Company A's quarterly sales revenue and operating costs are $12,000 and $9,500, respectively. Operating costs include $1,500 of leasing charge for computers. A new product line will increase sales revenue by 30 percent and costs (other than the leasing charge, which remains unchanged) by 35 percent.

7. If Company A includes the new product line, then:
   a. sales revenue will increase by $3,200.
   b. operating costs will increase to $12,300.
   c. operating profits will increase by $1,100.
   d. operating costs are not relevant.

8. The leasing charge:
   a. is differential.
   b. is relevant to the decision.
   c. plays no role in the decision.
   d. will not change in the future.

9. New trends in cost accounting include:
   a. the just-in-time method.
   b. total quality management.
   c. benchmarking and continuous improvement.
   d. All of the above.

10. Ethical conflicts in cost accounting:
   a. are governed by the code of ethics of the professional organizations.
   b. will not have implications for cost accountants' decisions.
   c. should be resolved to meet the demands of managers.
   d. will never lead to resignation of cost accountants.

11. Financial statements for external users are characterized as:
   a. user-specific.
   b. managerial reports.
   c. governed by GAAP.
   d. not consistent with GAAP.

12. Which of the following statements is correct?
   a. Design for manufacturability is not compatible with activity-based costing.
   b. Performance of key suppliers and business partners must be constantly evaluated.
   c. Cost of quality is a system that identifies the costs of producing high-quality items.
   d. Enterprise resource planning systems duplicate the effort and costs of standalone systems.

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Multiple Choice Answers

1. d (LO1)

2. d (LO1)

3. c (LO4)

4. b (LO1)

5. d (LO1)

6. d (LO2, LO3)

7. b (LO3)

   Sales revenue increase = $12,000 × 30% = $3,600.
   Operating cost increase = ($9,500 − $1,500) × 35% = $2,800.
   Operating cost = $9,500 + $2,800 = $12,300.
   Operating profit increase = $3,600 − $2,800 = $800.

8. c (LO3)

9. d (LO4)

10. a (LO5)

11. c (LO2)

12. b (LO4)

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Demonstration Problem

Jim is a florist who runs Bountiful Flower Shop as a sole owner. His typical monthly operating results include the following: sales revenue $4,000, flower costs $800, supplies $300, labor costs $600, utilities $250, rent $720, and other costs $350.

He recently attended a trade show and was attracted by a national chain that offered him referral service, baskets, and new flower arrangements in exchange for a monthly licensing fee of $1,000. He figures that the additional business from referrals will increase his revenues by 40 percent, flower materials, supplies, and labor costs by 45 percent, utilities by 10 percent, and other costs by 20 percent. Rent will not change as he will still use the same facility.

Required:

1. Should Jim expand his business to be associated with the national chain? Support your answer.
2. If Jim can negotiate a different term with the national chain, what licensing fee makes him indifferent between the two choices (i.e., the status quo of going solo vs. the alternative of being associated with the national chain)?

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Demonstration Problem – Solution

Part 1

Jim should not expand his business because the projected results show that he will be worse off by $260 per month. Rent remains the same under either option and is irrelevant to the decision.

Bountiful Flower Shop
Projected Income Statement
For One Month

	Status Quo: Run Business "As Is"	Alternative: Associate with National Chain		Difference
Sales revenue	$4,000	$5,600	[a]	$1,600
Costs:				
Flower	800	1,160	[b]	360
Supplies	300	435	[b]	135
Labor	600	870	[b]	270
Utilities	250	275	[c]	25
Rent	720	720		0
Licensing fee	0	1,000		
Other costs	350	420	[d]	70
Total costs	$3,020	$4,880		$1,860
Operating profits	$ 980	$ 720		$ (260)

[a] Increase by 40%
[b] Increase by 45%
[c] Increase by 10%
[d] Increase by 20%

Part 2

Considering the loss of $260 if Jim associates with the national chain, a licensing fee of $740 per month (or the proposed monthly licensing fee of $1,000 − the decrease in operating profits of $260 that otherwise results) will generate the status quo operating profits of $980. As a result, any licensing fee of less than $740 per month will make associating with the national chain a better alternative.

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Chapter 2
Cost Concepts and Behavior

Learning Objectives

1. Explain the basic concept of "cost."
2. Explain how costs are presented in financial statements.
3. Explain the process of cost allocation.
4. Understand how material, labor, and overhead costs are added to a product at each stage of the production process.
5. Define basic cost behaviors, including fixed, variable, semivariable, and step costs.
6. Identify the components of a product's costs.
7. Understand the distinction between financial and contribution margin income statements.

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Chapter Overview

I. WHAT IS A COST?
- Cost versus Expenses

II. PRESENTATION OF COSTS IN FINANCIAL STATEMENTS
- Service Organizations
- Retail and Wholesale Companies
- Manufacturing Companies
- Direct and Indirect Manufacturing (Product) Costs
- Prime Costs and Conversion Costs
- Nonmanufacturing (Period) Costs

III. COST ALLOCATION
- Direct versus Indirect Costs

IV. DETAILS OF MANUFACTURING COST FLOWS

V. HOW COSTS FLOW THROUGH THE STATEMENTS
- Income Statements
- Cost of Goods Manufactured and Sold
- Direct Materials
- Work in Process
- Finished Goods Inventory
- Cost of Goods Manufactured and Sold Statement

VI. COST BEHAVIOR
- Fixed versus Variable Costs

VII. COMPONENTS OF PRODUCT COSTS
- Unit Fixed Costs Can Be Misleading for Decision Making

VII. HOW TO MAKE COST INFORMATION MORE USEFUL FOR MANAGERS
- Gross Margin versus Contribution Margin Income Statements
- Developing Financial Statements for Decision Making

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Chapter Outline

- The cost accounting system records and maintains the use of economic resources by the organization.
  - The financial statements prepared by the firm for external reporting use information from the cost accounting system.
  - Cost accounting systems also provide information to help managers make better decisions. Managers need to understand the common terms used in cost accounting.
  - Companies are interested in the costs of their products and services for many reasons.

LO 2-1 Explain the basic concept of "cost."

WHAT IS A COST?

- Cost versus Expenses
  - **Cost** represents a sacrifice of resources (typically cash or a line of credit). The price of each item purchased measures the sacrifice made to acquire it.
    - **Expense** is a cost charged against (i.e., deducted from) revenue in an accounting period.
    - Cost initially recorded as an asset becomes an expense when the asset has been consumed (e.g., the prepaid rent becomes rent expense after the office space has been used for a period of time). Generally accepted accounting principles (GAAP) and regulations such as tax laws govern when and how costs are to be treated as expenses.
    - Cost accounting focuses on costs; expenses are referred to only in the context of external financial reporting (in this text).
  - The two major categories of costs are:
    - **Outlay cost:** a past, present, or future cash outflow, such as tuition, books, and fees paid for a college education.
    - **Opportunity cost:** the forgone benefit that could have been realized from the best forgone alternative course of a resource, such as the time and income sacrificed to get a college education.

See Demonstration Problem 1

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- Managers tend to overlook or ignore opportunity costs while making decisions because:
  - No one can ever know all possible opportunities available at any moment.
  - Typical accounting system only records outlay costs but not opportunity costs.
  - Opportunity costs are relevant for managerial decisions and should be captured in a well-designed cost accounting system.

LO 2-2 Explain how costs are presented in financial statements.

PRESENTATION OF COSTS IN FINANCIAL STATEMENTS

- **Operating profit** is the excess of operating revenues over the operating costs incurred to generate those revenues.
  - Operating profit differs from net income.
  - Net income is operating profit adjusted for interest, income taxes, extraordinary items, and other adjustments required to comply with GAAP or other regulations.
  - Information generated by the cost accounting system is used to help managers make decisions that improve firm value. It is a means to an end.
    - Such information is best (in terms of relevancy) for various decisions but not necessarily most accurate.
    - How the cost information is used in decision making and the costs of preparing and using such information should also be considered.
  - A generic income statement for a firm, a division, a product, or any unit has the following format:

Income statement

Revenue	xxx
Costs	(xx)
Operating profit	xxx

- Service Organizations
  - Service organizations provide customers an intangible product, such as advice and analyses. Labor costs and/or costs of information technology represent the most significant cost category for service organizations.

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- Exhibit 2.2 illustrates the income statement of a typical service company. Cost of services sold includes costs of billable hours, which are the hours billed to clients plus the cost of other items billed to clients. Costs that are not part of services billable to clients are included in the marketing and administrative costs.

- Retail and Wholesale Companies

  - Retail and wholesale companies sell but do not make a tangible product, such as food, clothes, or a book.

  - Exhibit 2.3 illustrates an income statement for a merchandising company. Cost of goods sold keeps track of the tangible goods the company buys and sells.

  - A typical income statement for a merchandising company has the following format:

Income Statement

Sales revenue	xxx
Cost of goods sold	(xx)
Gross margin	xxx
Marketing and administrative costs	(xx)
Operating profit	xxx

  - The cost of goods sold statement shows how the cost of goods sold was computed. The typical format follows:

Cost of Goods Sold Statement

Beginning inventory		xxx
Cost of goods purchased		
Merchandise cost	xxx	
Transportation-in costs	xxx	
Total costs of goods purchased		xxx
Cost of goods available for sale		xxx
Less cost of goods in ending inventory		(xx)
Cost of goods sold		xxx

    - The gross margin reflects the amount available to cover marketing and administrative costs and earn a profit.

    - Cost of goods sold includes only the actual costs of the goods that were sold. It does not include the costs required to sell them, such as the salaries of salespeople, which are marketing costs, or the salaries of top executives, which are administrative costs. (See Business Application box, "Components of Cost of Goods Sold for a Retailer")

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- Manufacturing Companies
  - Manufacturing companies make the goods for sale and need to know the different costs associated with making them.
    - **Product costs** are those costs assigned to units of production and recognized (i.e., expensed) when the product is sold. Product costs follow the product through inventory.
    - Period costs are recognized for financial reporting when incurred.
- Direct and Indirect Manufacturing (Product) Costs
  - Product costs consists of two types—direct and indirect costs.
    - **Direct manufacturing costs** are product costs that can be identified with units (or batches of units) at relatively low cost, including:
      - **Direct materials** are those that can be feasibly identified directly, at relatively low cost, with the product. (For manufacturers, direct materials are purchased parts, including transportation-in.) Direct materials are often called raw materials.
      - **Direct labor** represents labor costs that can be identified with the product at reasonable cost. Direct labor of workers transforms the materials into a finished product.
    - **Indirect manufacturing costs** are all product costs other than direct manufacturing costs, often referred to in total as manufacturing overhead.
      - **Manufacturing overhead** represents all other costs of transforming the materials into a finished product, including:
      - Indirect labor (the cost of workers who do not work directly on the product, yet are required so that the factory can operate, such as supervisors, maintenance workers, inventory storekeepers, etc.)
      - Indirect materials (materials not a part of the finished product but are necessary to manufacture it, such as lubricants, polishing and cleaning materials, etc.)
      - Other manufacturing costs (expenses incurred to keep the factory running, such as depreciation of the factory building and equipment, taxes and insurance on the factory assets, heat, light, power, etc.)
    - In practice, manufacturing overhead is also called factory burden, factory overhead, burden, factory expense, or just overhead.

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- Prime Costs and Conversion Costs
  - **Prime costs** = Direct materials + Direct labor.
    - Companies with relatively low manufacturing overhead tend to focus on managing prime costs.
  - **Conversion costs** = Direct labor + Manufacturing overhead.
    - Conversion costs are the costs that convert direct materials into the final product.

      Companies with high direct labor and/or manufacturing overhead tend to emphasize

      more about conversion costs.
    - Exhibit 2.4 summarizes the relationship between prime costs, conversion costs, and the three elements of manufactured product costs: direct materials, direct labor, and manufacturing overhead.
- Nonmanufacturing (Period) Costs
  - **Period costs** (nonmanufacturing costs) are all other costs recognized for financial reporting when incurred, including marketing and administrative costs.
    - **Marketing costs** are the costs required to obtain customer orders and provide customers with finished products, including advertising, sales commissions, and shipping costs.
    - **Administrative costs** are the costs required to manage the organization and provide staff support, including executive and clerical salaries; costs for legal, financial, data processing, and accounting services; and building space for administrative personnel.
  - For financial accounting purposes, nonmanufacturing costs are expensed in the period incurred; for managerial purposes, however, these costs (especially advertising and commissions) may be assigned to products.
  - The distinction between manufacturing and nonmanufacturing costs is not always clear-cut. Companies usually set their own guidelines and follow them consistently.
  - Service companies often have costs that are mostly indirect. Managing indirect costs is extremely important in these firms if they are to remain profitable.
  - Most firms are made up of activities that combine features of all three types of activities (service, retailing, and manufacturing).

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- In many of the firms which are usually considered to be of manufacturing type, virtually all employees are engaged in service-related activities.

LO 2-3 Explain the process of cost allocation.

COST ALLOCATION

- **Cost allocation** is the process of assigning indirect costs to product, services, people, business units, etc. Cost allocation is necessary when several departments share facilities or services.
  - **Cost object** is any end to which a cost is assigned. Examples include a unit of product or service, a department, or a customer.
  - **Cost pool** is the collection of costs to be assigned to the cost objects. Examples are department costs, rental costs, or travel costs a consultant incurs to visit multiple clients.
  - **Cost allocation rule** refers to the method or process used to assign costs in the cost pool to the cost objects.
- **Cost flow diagram** is a diagram or flowchart illustrating the cost allocation process.
  - Fundamental approach to cost allocation:
    - Identify the cost objects
    - Determine the cost pools
    - Select a cost allocation rule
  - Cost flow diagrams help managers understand:
    - How a cost system works.
    - The likely effects on the reported costs of different cost objects from changes in the cost allocation rule.
  - Exhibit 2.5 illustrates an example of cost flow diagram.

See Demonstration Problem 2

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- Direct versus Indirect Costs
  - **Direct cost** is any cost that can be directly (unambiguously) related to a cost object at reasonable cost; **indirect cost** is any cost that cannot be directly related to a cost object.
    - A cost may be direct to one cost object and indirect to another.
    - Whether a cost is considered direct or indirect also depends on the costs of linking it to the cost object. (See Business Application box, "Indirect Costs and Allocating Costs to Contracts.")

LO 2-4 Understand how material, labor, and overhead costs are added to a product at each stage of the production process.

DETAILS OF MANUFACTURING COST FLOWS

- Any production process involves three basic steps:
  - Delivering direct materials to receiving area, inspecting, and then placing in direct material inventory area (store).
  - Transporting direct materials to an assembly line and undergoing the production process. **Work in process** is a product in the production process but not yet complete.
  - Moving the product to separate area in factory with other completed products. **Finished goods** are products fully completed, but not yet sold.
- For manufacturing companies, there are three inventory accounts in a cost accounting system. Each inventory account is likely to have the following structure (in T-account):

Inventory Account
(Direct materials, Work-in-process, or Finished goods)

Beginning inventory *Debit: Additions*	*Credit: Withdrawals*
Ending inventory	

  - **Inventoriable costs** are costs added (debited) to inventory accounts.
- The cost flows coincide with the physical flows of goods in and out of their respective storage areas.

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Direct materials inventory	
Beginning inventory Add: Purchases	Less: *Direct materials put into production* →
Ending inventory	

Work-in-process inventory	
Beginning inventory Add: *Direct materials* Add: Direct labor Add: Manufacturing overhead	Less: *Cost of goods manufactured* →
Ending inventory	

Finished goods inventory	
Beginning inventory Add: *Cost of goods manufactured*	Less: Cost of goods sold
Ending inventory	

- The inventory account balances at the end of an accounting period appear on the balance sheet as part of the current assets.
- If the company uses just-in-time (JIT) inventory people in direct materials receiving department send the components to the machining line immediately; if not, people in this department send the components to a materials warehouse until it is needed for production.

HOW COSTS FLOW THROUGH THE STATEMENTS

- Income Statements
  - Exhibit 2.7 illustrates an income statement for a manufacturing firm.
- Cost of Goods Manufactured and Sold
  - Exhibit 2.8 illustrates a cost of goods manufactured and sold statement for a manufacturing company.
  - A typical cost of goods sold statement for a manufacturing company is more complicated than that of a merchandising firm and has the following structure:

Cost of Goods Manufactured and Sold Statement

Beginning work-in-process inventory			xx
Manufacturing costs during the year:			
Direct materials			
Beginning inventory	xx		
Add: Purchase of direct materials	xx		
Direct materials available	xx		
Less ending inventory	(xx)		
Direct material put into production		xx	
Direct labor		xx	
Manufacturing overhead		xx	
Total manufacturing costs incurred			xx

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Total work in process during the year	xx
Less ending work-in-process inventory	(xx)
Cost of goods manufactured	xx
Beginning finished goods inventory	xx
Finished goods available for sale	xx
Less ending finished goods inventory	(xx)
Cost of goods sold	xx

    - The three shaded areas deal with direct materials, work-in-process, and finished goods, respectively.

  - The cost of goods manufactured and sold statement is prepared through the internal reporting system and is for managerial use only.

- Direct Materials

  - Total manufacturing costs incurred equals the sum of direct material put into production, direct labor, and manufacturing overhead incurred during the period. Managers in production and operations give careful attention to these costs.

- Work in Process

  - The total cost of work in process during the year (i.e., the sum of the beginning work-in-process inventory and total manufacturing costs incurred) is a measure of the resources that have gone into production.

  - Cost of goods manufactured represents the cost of goods that were finished during the year. Production departments usually have a goal for goods completed each period. Managers usually compare cost of goods manufactured to that goal to see whether the production departments are successful in meeting it.

- Finished Goods Inventory

  - Beginning finished goods inventory and cost of goods manufactured together determine the cost of finished goods available for sale. The available finished goods either are sold and become cost of goods sold, or are still on hand as part of the ending finished goods inventory.

  - The actual formats of financial statements vary a lot in practice. For managerial purposes, it is important that the format be tailored to what users want.

- Cost of Goods Manufactured and Sold Statement

See Demonstration Problem 3

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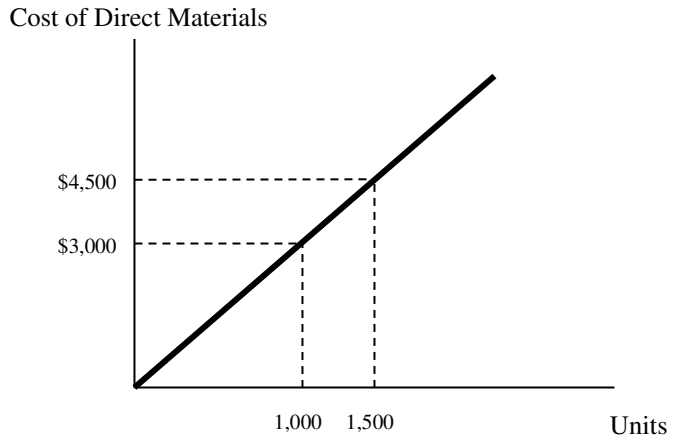
LO 2-5 Define basic cost behaviors, including fixed, variable, semivariable, and step costs.

COST BEHAVIOR

- Fixed versus Variable Costs
  - Cost behavior deals with the way costs respond to changes in activity levels; a cost driver is a factor that causes, or "drives," costs.
    - Managers need to know how costs behave to make informed decisions about products, to plan, and to evaluate performance.
    - Exhibit 2.9 illustrates the four cost behavior patterns to be discussed: fixed costs, variable costs, semivariable costs, and step costs.
  - **Fixed costs** are costs that are unchanged as volume changes within the relevant range of activity. Examples: much of manufacturing overhead, many nonmanufacturing costs.
  - **Variable costs** are costs that change in direct proportion with a change in volume within the relevant range of activity. Examples: for manufacturing companies, direct materials, and certain manufacturing overhead, direct labor in some cases; for merchandising businesses, cost of the product, some marketing and administrative costs; for service organizations, certain types of labor, supplies, copying, and printing costs.

The following graph shows a variable cost relationship between activity (units of production) and the resulting cost of direct materials used.



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When the production volume is increased from 1,000 units to 1,500 units, it represents a 50 percent increase in activity (i.e., $\frac{1,500 - 1,000}{1,000} \times 100\% = 50\%$). There is a corresponding 50 percent increase in direct materials costs as well (i.e., $\frac{\$4,500 - \$3,000}{\$3,000} \times 100\% = 50\%$). This example demonstrates the direct and proportionate relationship between activity and variable costs.

- **Relevant range** refers to the activity levels within which a given total fixed cost or unit variable cost will be unchanged.

- A **semivariable cost** is a cost that has both fixed and variable components; also called mixed cost. Examples: electric utility costs, phone charges.

- A **step cost** is a cost that increases with volume in steps; also called semifixed cost. Examples: supervisors' salaries as each supervisor has a limited span of control.

- Five aspects of cost behavior complicate the task of classifying costs into fixed or variable categories.

  - Not all costs are strictly fixed or variable.

  - Some costs increase with volume in "steps."

  - The cost relations are valid only within a relevant range of activity.

  - Although we have defined four types of cost behavior here, these are idealized abstractions and do not account for random distortions, unique events, and other "real world" phenomena.

  - The classification of costs as fixed or variable depends on the measure of activity used.

LO 2-6 Identify the components of a product's costs.

COMPONENTS OF PRODUCT COSTS

- Some cost concepts are determined by the rules of financial accounting. Some are more useful for managerial decision making.

  - **Full cost** is the sum of all fixed and variable costs of manufacturing and selling a unit of product.

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- **Full absorption cost** is the sum of all variable and fixed manufacturing costs. Full absorption cost is used to compute a product's inventory value under GAAP; as such, it excludes nonmanufacturing costs.

- Exhibit 2.11 illustrates the product cost components for a company.

- On a per-unit basis:

  - Full absorption cost = Direct materials + Direct labor + Variable manufacturing overhead + Fixed manufacturing overhead.

  - Full cost = Full absorption cost + Variable marketing and administrative costs + Fixed marketing and administrative costs.

  - Variable manufacturing cost = Direct materials + Direct labor + Variable manufacturing overhead.

  - Variable cost = Variable manufacturing cost + Variable marketing and administrative cost.

- The diagram below demonstrates the relationship among various product cost components.

- Unit Fixed Costs Can Be Misleading for Decision Making

  - Unit fixed costs are valid only at one volume.

  - When fixed costs are allocated to each unit, accounting records often make the costs appear as though they are variable.

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- It is easy to interpret unit costs incorrectly and make incorrect decisions.

See Demonstration Problem 4

- Gross margin as reported in the external financial statements is the difference between revenue and cost of goods sold, or
  - Gross margin = Revenue − Cost of goods sold.
  - Gross margin per unit = Sales price − Full absorption cost per unit.
  - Cost of goods sold = Full absorption cost per unit × Number of units sold.
  - The income statement format that emphasizes gross margin is referred to as the traditional income statement.
- Contribution margin per unit = Sales price − Variable costs per unit. Contribution margin is the amount available to cover fixed costs and earn a profit.
  - The income statement format that emphasizes contribution margin is referred to as the contribution margin income statement.
    - Exhibit 2.12 highlights gross margin information while Exhibit 2.13 showcases contribution margin information. In both cases, the operating profit per unit remains the same.
    - The interaction behind the calculations of gross margin per unit and contribution margin per unit is presented below.

Traditional Income Statement	**Components**	**Contribution margin Income Statement**
Sales price		Sales price
Less: Full absorption cost	= Variable manufacturing cost + Fixed manufacturing costs	Less: Variable cost
Gross margin		Contribution margin
Less: Marketing and administrative costs	= Variable marketing and administrative cost + Fixed marketing and administrative cost	Less: Fixed costs
Operating profit		Operating profit

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LO 2-7 Understand the distinction between financial and contribution margin income statements.

HOW TO MAKE COST INFORMATION MORE USEFUL FOR MANAGERS

- Period costs can be determined once product costs are properly defined. Three approaches to determining product costs are available.
  - Full absorption costing (traditional income statement): As required by GAAP, all fixed and variable manufacturing costs are product costs. All other costs are period costs.
  - Variable costing (contribution margin income statement): Only variable manufacturing costs are product costs. All other costs are period costs.

Managerial costing: Management determines which costs are associated with the product. Any new costs resulting from adding a product are considered product costs.

See Demonstration Problem 5

- Gross Margin versus Contribution Margin Income Statements
  - A comparison of the first two income statement formats is shown below.

Gross Margin Income Statement	**Contribution Margin Income Statement**
Sales revenue	Sales revenue
Less: Cost of goods sold (including variable manufacturing costs and fixed manufacturing costs)	Less: Variable costs (including variable manufacturing and variable marketing and administrative costs)
Gross margin	Contribution margin
Less: Marketing and administrative costs (including variable marketing and administrative costs and fixed marketing and administrative costs)	Less: Fixed costs (including fixed manufacturing and fixed marketing and administrative costs)
Operating profit	Operating profit

  - Exhibit 2.14 illustrates the differences between gross margin and contribution margin income statements.
  - The product costs assigned to inventory are carried in the accounts as assets. When the goods are sold, the costs flow from inventory to the cost of goods sold account of the income statement.

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See Demonstration Problem 6

- Developing Financial Statements for Decision Making
  - The cost accounting system is designed to provide managers with relevant information for decision making. Financial statements may be developed to serve special purposes.
  - Case in point is the development of a value income statement that classifies costs into value-added and nonvalue-added categories. By classifying activities as value added or nonvalue added, managers are better able to reduce or eliminate nonvalue-added activities and therefore reduce costs.
  - Exhibit 2.15 illustrates a value income statement.
  - Depending on the business and strategic environment of the firm, it is possible to construct financial statements around activities related to quality, environmental compliance, or new product development.

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Matching

A. Administrative costs
B. Conversion costs
C. Cost allocation
D. Cost object
E. Cost pool
F. Direct cost
G. Full absorption cost
H. Indirect cost
I. Opportunity cost
J. Prime costs
K. Semivariable cost
L. Work in process

_____ 1. The foregone benefit from the best (forgone) alternative course of action.

_____ 2. Sum of direct labor and manufacturing overhead.

_____ 3. All variable and fixed manufacturing costs; used to compute a product's inventory value under GAAP.

_____ 4. The process of assigning indirect costs to products, services, people, business units, etc.

_____ 5. Any cost that cannot be directly related to a cost object.

_____ 6. Any end to which a cost is assigned.

_____ 7. Costs required to manage the organization and provide staff support.

_____ 8. Sum of direct materials and direct labor.

_____ 9. Collection of costs to be assigned to the cost objects.

_____ 10. A cost that has both fixed and variable components.

_____ 11. A product in the production process but not yet complete.

_____ 12. Any cost that can be directly (unambiguously) related to a cost object at reasonable cost.

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Matching Answers

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

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Multiple Choice Questions

1. Which of the following statements about costs and expenses is correct?
   a. A cost is a sacrifice of resources.
   b. Cost and expense are the same.
   c. All assets will become expenses.
   d. There is no guidance as to when costs are to be treated as expenses.

2. A cost of goods sold statement for a retail business:
   a. includes transportation-in costs.
   b. has a cost of goods manufactured section.
   c. covers a period of time.
   d. Both a and c.

3. A period cost:
   a. is also known as manufacturing cost.
   b. includes both marketing and administrative costs.
   c. will be expensed when products are sold.
   d. is part of cost of goods sold.

Use the following information to answer questions 4 through 7:
A product is sold for $75 each with unit cost of direct materials $20, direct labor $15, variable manufacturing overhead $12, and fixed manufacturing overhead $10. The volume produced and sold is 6,000 units. Variable and fixed marketing and administrative costs are $4 and $3, respectively.

4. Which of the following statements is correct?
   a. Prime cost is $35.
   b. Conversion cost is $37.
   c. Inventoriable cost is $57.
   d. All of the above.

5. What is the amount of cost of goods sold?
   a. $342,000
   b. $201,500
   c. $364,000
   d. None of the above.

6. Which of the following statements is correct?
   a. Operating profit is $66,000.
   b. Gross margin is $108,000.
   c. Contribution margin is $144,000.
   d. All of the above.

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7. What is the full absorption cost per unit?
   a. The same as full cost.
   b. The same as inventoriable cost.
   c. The full absorption cost per unit is $55.
   d. The sum of variable manufacturing cost and variable marketing and administrative cost.

8. Which of the following statements regarding cost behavior within the relevant range is incorrect?
   a. Total fixed cost remains the same.
   b. Fixed cost per unit remains constant.
   c. Variable cost per unit remains constant.
   d. Semivariable cost is also called mixed cost.

9. Unit fixed cost:
   a. is treated as variable cost when allocated to each unit.
   b. can be used for decision making under any circumstances.
   c. is misleading as the total fixed cost does not change.
   d. Both a and c.

10. A value income statement:
   a. is developed for managerial decision making.
   b. distinguishes between value-added and nonvalue-added activities.
   c. is governed by GAAP.
   d. Both a and b.

11. Which of the following statements is correct?
   a. A cost object is any end to which a cost is assigned.
   b. A cost pool is the collection of costs to be assigned to the cost objects.
   c. A cost flow diagram is a diagram illustrating the cost allocation process.
   d. All of the above.

12. The annual operating expense of running a copy center is shared by the three departments that use its service: Human resource, Accounting, and Legal. Last year, the copy center incurred $30,000 while HR copied 20,000 pages, Accounting 30,000 pages, and Legal 50,000 pages. What was Accounting department's share of the copy center cost?
   a. $15,000
   b. $6,000
   c. $9,000
   d. $7,500

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Multiple Choice Answers

1. a (LO1)

2. d (LO2)

3. b (LO2)

4. d (LO4)

Prime cost = \$20 + \$15 = \$35
Conversion cost = \$15 + \$12 + \$10 = \$37
Inventoriable cost = \$20 + \$15 + \$12 + \$10 = \$57

5. a (LO4)

\$57 × 6,000 = \$342,000

6. d (LO4, LO7)

Gross margin = (\$75 × 6,000) − \$342,000 = \$108,000
Operating profit = \$108,000 − [(\$4 + \$3) × 6,000] = \$66,000
Contribution margin = (\$75 − \$20 − \$15 − \$12 − \$4) × 6,000 = \$144,000

7. b (LO6)

8. b (LO5)

9. d (LO6)

10. d (LO7)

11. d (LO3)

12. c (LO3)

Accounting department's share of usage = $\frac{30,000}{20,000+30,000+50,000} \times 100\% = 30\%$

Accounting department's share of cost = \$30,000 × 30% = \$9,000

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Demonstration Problem 1

A developer plans to buy a parcel of land and construct an office building on top of it. He narrows his search to two possible lots in adjacent states with convenient access to highways. The expected returns from Lots C and D are $190,000 and $210,000, respectively.

Required:

What is the opportunity cost of funds the developer uses to purchase Lot D?

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Demonstration Problem 1 – Solution

The opportunity cost of funds the developer uses to purchase Lot D is the forgone return the developer could have earned from purchasing Lot C, assuming that both investments are equal in risk and liquidity.

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Demonstration Problem 2

Kahn Industry, Inc. has three divisions. The following information was available for last quarter.

	Division A	Division B	Division C	Company
Revenues	$200,000	$320,000	$140,000	$660,000
Cost of goods (or services) sold	160,000	240,000	100,000	500,000
Gross margin	$240,000	$ 80,000	$ 40,000	$160,000
Marketing and administrative costs	18,000	20,000	12,000	50,000
Operating profit	$ 22,000	$ 60,000	$ 28,000	$110,000
Interest				10,000
Income taxes (30%)				30,000
Net income				$ 70,000

The CEO of Kahn Industry wanted to allocate the interest cost of $10,000 to the three divisions.

Required:

1. Identify the cost object(s) and the cost pool.
2. Allocate the interest cost based on each division's (1) revenues, (2) gross margin, and (3) operating profit.
3. Draw a cost flow diagram assuming the allocation of interest cost is based on revenues.

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Demonstration Problem 2 – Solution

Part 1

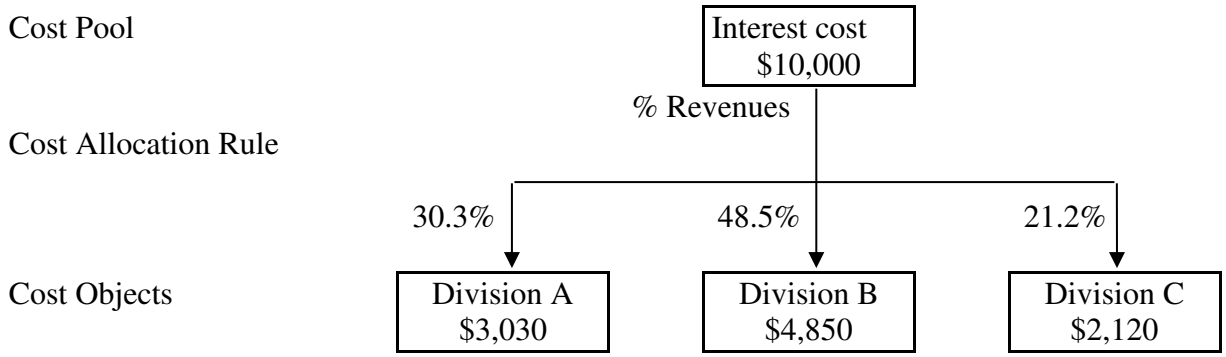
The cost objects are the three divisions; the cost pool is the interest cost incurred for the company as a whole.

Part 2

	Division A	Division B	Division C	Total
(1) Revenues	$200,000	$320,000	$140,000	$660,000
Allocation rule	30.3%[a]	48.5%[b]	21.2%[c]	100%
Allocation	$3,030	$4,850	$2,120	$10,000
(2) Gross margin	$40,000	$80,000	$40,000	$160,000
Allocation rule	25%	50%	25%	100%
Allocation	$2,500	$5,000	$2,500	$10,000
(3) Operating profit	$22,000	$60,000	$28,000	$110,000
Allocation rule	20.0%	54.5%	25.5%	100%
Allocation	$2,000	$5,450	$2,550	$10,000

[a] $200,000 ÷ $660,000 = 0.303, or 30.3%.
[b] $320,000 ÷ $660,000 = 0.485, or 48.5%.
[c] $140,000 ÷ $660,000 = 0.212, or 21.2%.

Part 3



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Demonstration Problem 3

The account balances are listed below for Eagle Manufacturing Company for the month of March.

Finished goods inventory, March 31	$29,000
Direct materials purchases	70,000
Indirect labor	21,000
Direct labor	48,000
Work-in-process inventory, March 31	73,000
Factory supervisory salaries	12,000
Direct materials inventory, March 1	12,000
Factory utilities expense	4,000
Direct materials inventory, March 31	21,000
Work-in-process inventory, March 1	54,000
Factory depreciation expense	5,000
Finished goods inventory, March 1	33,000

Required:

Prepare a cost of goods manufactured and sold statement for Eagle Manufacturing Company for the month ended March 31.

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Demonstration Problem 3 – Solution

Eagle Manufacturing Company
Cost of Goods Manufactured and Sold Statement
For the month of March

Beginning work-in-process inventory			$54,000
Manufacturing costs during the year:			
Direct materials			
Beginning inventory	$12,000		
Add: Purchase of direct materials	70,000		
Direct materials available	$82,000		
Less ending inventory	(21,000)		
Direct material put into production		$61,000	
Direct labor		48,000	
Manufacturing overhead:			
Indirect labor	$21,000		
Factory supervisory salaries	12,000		
Factory utilities expense	4,000		
Factory depreciation expense	5,000		
Total manufacturing overhead		42,000	
Total manufacturing costs incurred			151,000
Total work in process during the year			$205,000
Less ending work-in-process inventory			(73,000)
Cost of goods manufactured			$132,000
Beginning finished goods inventory			33,000
Finished goods available for sale			$165,000
Less ending finished goods inventory			(29,000)
Cost of goods sold			$136,000

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Demonstration Problem 4

Gourmet Industry manufactures pasta machines. The accountant of the company provides the cost structure for each pasta machine produced as follows:

Variable manufacturing cost	$ 85
Fixed manufacturing cost	
$\left(= \dfrac{\text{Fixed manufacturing cost per year}}{\text{Units produced per year}} = \dfrac{\$120,000}{2,000}\right)$	60
	$145

The regular price for each pasta machine is $200. A regional restaurant chain wants to buy 150 pasta machines for $120 each. Gourmet Industry is also responsible for a one-time shipping cost of $850. Marketing, administrative, total fixed costs, and regular sales are not affected by the decision. Gourmet Industry has enough idle capacity to handle the order.

Required:

Determine if Gourmet Industry should accept the special order.

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Demonstration Problem 4 – Solution

By accepting the special order, Gourmet Industry will increase its operating profit by $4,400.

Revenues from special order ($120 × 150)	$18,000
Variable manufacturing cost ($85 × 150)	(12,750)
One-time shipping cost	(850)
Contribution of special order to operating profit	$ 4,400

The fixed manufacturing cost of $60 per unit will not affect the decision as the total fixed cost remains unchanged. Based on the analysis, Gourmet Industry should accept the special order.

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Demonstration Problem 5

The following information is available for each unit of the finished product produced and sold:

Sales price	$60
Variable manufacturing cost	20
Fixed manufacturing cost*	12
Variable marketing and administrative cost	6
Fixed marketing and administrative cost*	4

* The unit fixed manufacturing cost and fixed marketing and administrative costs are based on an estimated volume of 6,000 units produced and sold.

Required:

Determine full absorption cost, variable cost, full cost, gross margin, contribution margin, and operating profit per unit.

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Demonstration Problem 5 – Solution

Full absorption cost = \$20 + \$12 = \$32

Variable cost = \$20 + \$6 = \$26

Full cost = (\$20 + \$12 + \$6 + \$4) = \$42

Gross margin = \$60 − \$32 = \$28

Contribution margin = \$60 − \$26 = \$34

Operating profit (from traditional income statement format) = \$28 − (\$6 + \$4) = \$18

Operating profit (from contribution margin income statement format) = \$34 − (\$12 + \$4) = \$18

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Demonstration Problem 6

(Continued from Demonstration Problem 5)

The following information is available for each unit of the finished product produced and sold:

Sales price	$60
Variable manufacturing cost	20
Fixed manufacturing cost*	12
Variable marketing and administrative cost	6
Fixed marketing and administrative cost*	4

* The unit fixed manufacturing cost and fixed marketing and administrative costs are based on an estimated volume of 6,000 units produced and sold.

Required:

Prepare a traditional income statement and contribution margin income statement when 6,000 units are produced and sold.

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Demonstration Problem 6 – Solution

Traditional Income Statement		Contribution Margin Income Statement	
Revenues	$360,000	Revenues	$360,000
Less: Cost of goods sold	(192,000)	Less: Variable cost	(156,000)
Gross margin	168,000	Contribution margin	204,000
Less: Marketing and administrative costs	(60,000)	Less: Fixed costs	(96,000)
Operating profit	$108,000	Operating profit	$108,000

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