

CHAPTER 2

MEASURING PRODUCT COSTS

Questions, Exercises, Problems, and Cases: Answers and Solutions

- 2.1 See text or glossary at the end of the book.
- 2.2 Under a job-costing system, costs are accumulated by job. Thus, allocation of these "costs" to output is relatively simple since the product is a well-defined, specific customer order. Under process costing, costs are accumulated by department or production processes. Costs are then spread evenly over the units produced.
- 2.3 Service organizations do not have a tangible "good." Therefore, there is no tangible item which would qualify as an inventory item. All of the costs of service personnel are considered expired as incurred. The organization's product—service—is provided in the period in which service labor costs are incurred.
- 2.4 An operation is a standardized method of making a product that is repeatedly performed.
- 2.5 Operation costing has characteristics of both job costing and process costing, so it is called a "hybrid" of these two.
- 2.6 Beginning Balance + Transfers In = Transfers Out + Ending Balance.
- 2.7 Assigning costs to the wrong jobs gives misinformation about the costs of jobs. This misinformation affects the evaluation of the performance of job supervisors. It affects job pricing if the job is partially or totally cost-plus pricing. Managers use cost information about past jobs to estimate the costs, and therefore the prices, of future jobs. Misinformation about jobs affects the cost estimates and prices of future jobs.
- 2.8 We agree with the controller in this situation. Often, job costing is too detailed and expensive to operate for routine batches of homogeneous goods.
- 2.9 For JIT to be feasible, a company should have reliable suppliers of production inputs, customers who are predictable in placing orders, quality production, workers skilled to perform multiple tasks, and a high quality work ethic.

- 2.10 Just-in-time allows companies to reduce inventory levels and the time between production and delivery. Lower inventory levels and reduced delivery time enables accountants to expense virtually all costs in the period in which they are incurred, which reduces record-keeping, particularly for inventories. Companies have been known to save hundreds of thousands of journal entries every year.
- 2.11 Both service and manufacturing companies need good managerial accounting information; the difference in providing quality is in the timing. Service organizations do not produce inventory but deliver the service directly to the customer so that defects are harder to prevent. Manufacturing companies can check the quality of products before they are shipped to customers so errors can be detected and corrected.
- 2.12 A company using operation costing will typically use different materials for each type of product, which is similar to job costing where each job or batch is unique. The different products will pass through operations in which each product has the same work done on it in the operation. For example, a company may install different materials as seat covers in an automobile—leather, vinyl, or cloth. The operation of installing seat covers could be essentially the same for each type of material so the application of labor and overhead would be similar to process costing. In practice, differences in materials could affect the operation. It is easy to imagine that particular materials would be harder to install, for example. The essential costing system would still be operation costing, nevertheless.
- 2.13 JIT can save inventory carrying costs and accounting record-keeping costs. It also may reduce costs of production problems such as poor quality that can be hidden by keeping inventories and buffer stocks between production work stations.
- 2.14 Using JIT, production costs are immediately expensed through Cost of Goods Sold as those costs are incurred. If there are inventories at the end of a reporting period, the accountants credit Cost of Goods Sold and debit inventory accounts to "back out" inventory amounts from Cost of Goods Sold.
- 2.15 If a company maintains no inventories, it will have to shut down production whenever a supplier does not deliver the proper materials of the specified quality at the right time.
- 2.16 The manager of the Gravins Division reported overstated ending inventory levels to increase profits. However, after one period, he was faced with the dilemma of having to again overstate ending inventory so as to not reduce profits. This situation continued until top management noticed the unusually large amount of ending inventory and uncovered the fraud.

2.17 Some companies that make products using processes are:

Husch (wine)
Bethlehem Steel (steel)
Pillsbury (flour products)
Kellogg (cereal)
MJB (coffee)
Heinz (catsup)
Miller Brewing Company (beer)
ExxonMobil (petroleum)

2.18 Some companies that produce jobs are:

Accenture (consulting)
Guy F. Atkinson (construction)
Bechtel (engineering)
Any university (research grants)
Thomson/South-Western (this book)
Any hospital (surgeries)
Universal Studios (movies)

2.19 (Mark Landman; cost flow model.)

In general, apply the following model:

$$BB + TI = TO + EB$$

Midwest:

$$\begin{aligned} BB + \$200,000 &= \$180,000 + \$60,000 \\ BB &= \$180,000 + \$60,000 - \$200,000 \\ BB &= \$40,000 \end{aligned}$$

Northeast:

$$\begin{aligned} \$60,000 + \$200,000 &= \$220,000 + EB \\ EB &= \$60,000 + \$200,000 - \$220,000 \\ EB &= \$40,000 \end{aligned}$$

Southeast:

$$\begin{aligned} BB + \$160,000 &= \$150,000 + \$40,000 \\ BB &= \$150,000 + \$40,000 - \$160,000 \\ BB &= \$30,000 \end{aligned}$$

2.20 (BBQ Company; cost flow model.)

In general, apply the following model:

$$BB + TI = TO + EB$$

Lighter	\$40,000 + \$180,000	=	\$80,000 + EB
Fluid:	EB	=	\$40,000 + \$180,000 – \$80,000
	EB	=	\$140,000

Waterproof	\$60,000 + \$340,000	=	\$380,000 + EB
Matches:	EB	=	\$60,000 + \$340,000 – \$380,000
	EB	=	\$20,000

Burn	\$60,000 + \$120,000	=	\$140,000 + EB
Ointment:	EB	=	\$60,000 + \$120,000 – \$140,000
	EB	=	\$40,000

Fireplace Screens:

We cannot compute the ending inventory because we have two unknowns in the basic cost flow equation. We need to know beginning inventory to compute ending inventory.

2.21 (Aqua Man Corporation; cost flow model.)

In general, apply the following model:

$$BB + TI = TO + EB$$

Rubber	\$160,000 + \$180,000	=	\$240,000 + EB
Rafts:	EB	=	\$160,000 + \$180,000 – \$240,000
	EB	=	\$100,000

Rubber	\$60,000 + \$90,000	=	\$110,000 + EB
Duckies:	EB	=	\$60,000 + \$90,000 – \$110,000
	EB	=	\$40,000

Galoshes:	\$60,000 + \$480,000	=	\$540,000 + EB
	EB	=	\$60,000 + \$480,000 – \$540,000
	EB	=	\$0

Diving Equipment:

Cannot compute the ending inventory because we have two unknowns in the basic cost flow equation. We need to know beginning inventory to compute ending inventory.

2.22 (Candice & Bergman; cost flow model.)

In general, apply the following model:

$$BB + TI = TO + EB$$

to find what the ending inventory should be per the records.

$$\begin{aligned} \textbf{Computers: } \$20,000 + \$40,000 &= \$35,000 + EB \\ EB &= \$20,000 + \$40,000 - \$35,000 \\ EB &= \$25,000 \end{aligned}$$

\$5,000 (= \$25,000 – \$20,000 physical count) worth of computers is missing.

$$\begin{aligned} \textbf{Televisions: } \$20,000 + \$50,000 &= \$55,000 + EB \\ EB &= \$20,000 + \$50,000 - \$55,000 \\ EB &= \$15,000 \end{aligned}$$

\$10,000 (= \$15,000 – \$5,000 physical count) worth of televisions is missing.

$$\begin{aligned} \textbf{Compact Disc} \quad \$15,000 + \$20,000 &= \$25,000 + EB \\ \textbf{Players:} \quad EB &= \$15,000 + \$20,000 - \$25,000 \\ EB &= \$10,000 \end{aligned}$$

No discrepancy in compact-disc player.

2.23 (Franklin, LLP; cost flow model.)

Use the cost flow equation,

$$BB + TI = TO + EB$$

to find what the ending inventory should be per the records.

Computer $\$600,000 + \$1,600,000 = \$1,800,000 + EB$

Chips: $EB = \$600,000 + \$1,600,000 - \$1,800,000$

$EB = \$400,000$

The physical count shows \$200,000 (= \$600,000 – \$400,000) more than in the records. Apparently, there was a large error in the physical count or the records or both. After finding that error, the analysts can search for problems with missing inventory.

Potato $\$160,000 + \$600,000 = \$500,000 + EB$

Chips: $EB = \$160,000 + \$600,000 - \$560,000$

$EB = \$260,000$

\$20,000 (= \$260,000 – \$240,000 physical count) discrepancy between the records and actual potato chips in inventory.

Poker Chips $\$60,000 + \$200,000 = \$180,000 + EB$

$EB = \$60,000 + \$200,000 - \$180,000$

$EB = \$80,000$

\$30,000 (= \$80,000 – \$50,000 physical count) discrepancy between the records and actual poker chips in inventory.

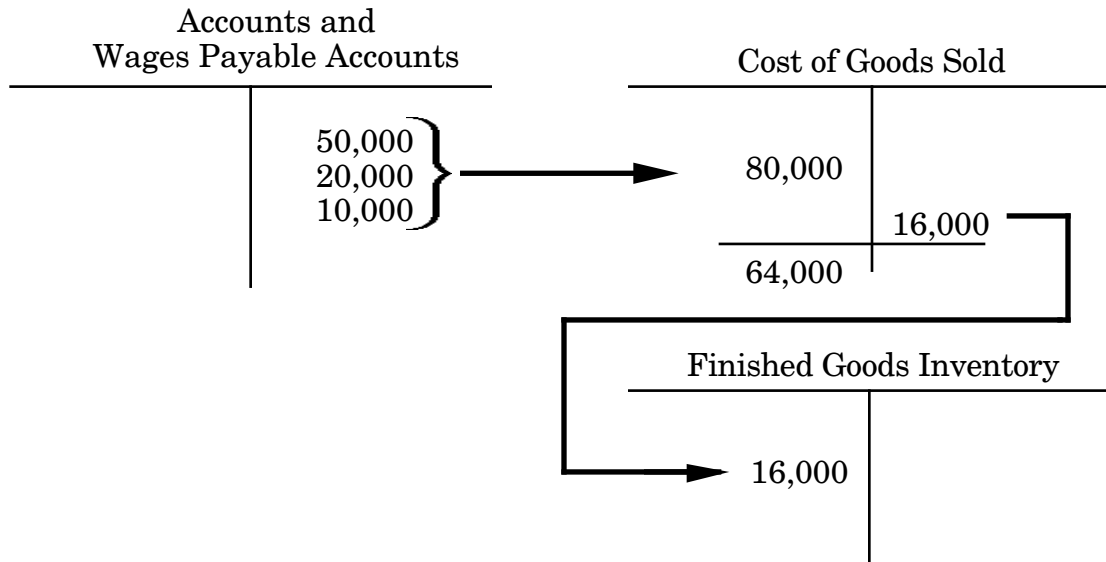
Comment: Because of inventory “shrinkage” due to theft, breakage or obsolescence and because inventory can be misclassified on the books, there are often small differences between what appears on the books and what exists in inventory. These differences between count and the accounting records appear large for normal “shrinkage.” We would double check the physical count for errors and check the records for errors in recording inventory flows.

2.24 (McNeal Products; just-in-time methods and backflush costing.)

Journal Entries:

(1) Cost of Goods Sold.....	80,000	
Accounts Payable—Materials.....		50,000
Accounts Payable—Other Manufacturing		
Costs		20,000
Wages Payable		10,000
To record costs of production.		
(2) Finished Goods Inventory.....	16,000 ^a	
Cost of Goods Sold.....		16,000
To record inventory.		

T-accounts:



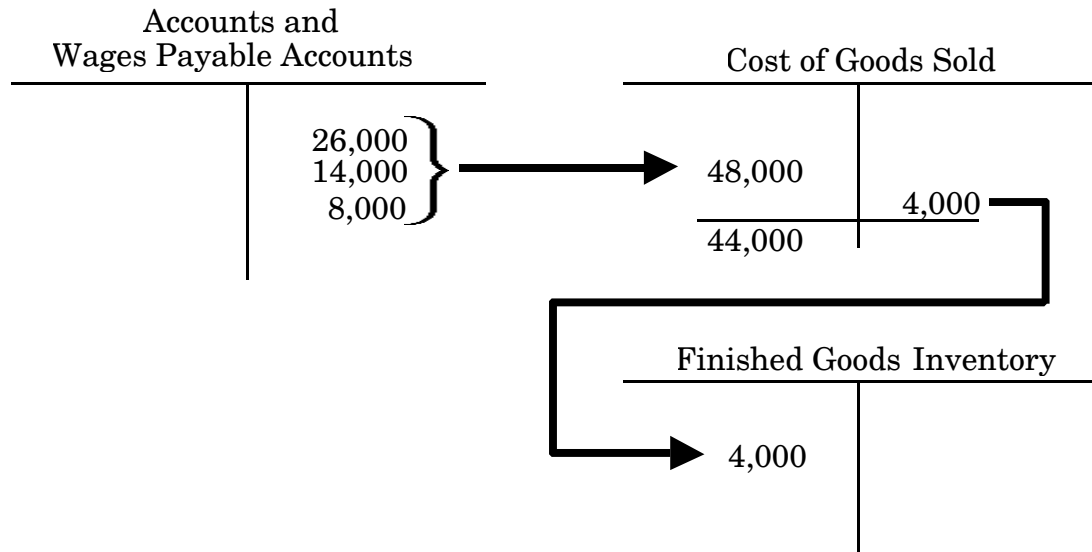
^a\$16,000 = 400 units at \$40 per unit. (\$40 = \$80,000/2,000 units.)

2.25 (Memory Bank; just-in-time methods and backflush costing.)

Journal Entries:

(1) Cost of Goods Sold	48,000	
Accounts Payable—Materials		26,000
Accounts Payable—Other Manufacturing		
Costs		14,000
Wages Payable		8,000
To record costs of production.		
(2) Finished Goods Inventory	4,000 ^a	
Cost of Goods Sold		4,000
To record inventory.		

T-accounts:



^a\$4,000 = 100 units at \$40.00 per unit. (\$40.00 = \$48,000/1,200 units.)

2.26 (Loomis and Associates; job costs in a service organization.)

a. **Journal Entries:**

(1)	Work in Process—Springsteen Productions.....	240,000	
	Work in Process—RCI Records.....	120,000	
	Direct Labor—Unbillable.....	24,000	
	Wages Payable.....		384,000
(2)	Work in Process—Springsteen Productions.....	80,000	
	Work in Process—RCI Records.....	40,000	
	Overhead (Applied).....		120,000
(3)	Overhead.....	140,000	
	Wages and Accounts Payable.....		140,000
(4)	Marketing and Administrative Costs.....	20,000	
	Wages and Accounts Payable		20,000
(5a)	Accounts Receivable	600,000	
	Revenue.....		600,000
(5b)	Cost of Services Billed.....	480,000	
	Work in Process—Springsteen Productions.....		320,000
	Work in Process—RCI Records.....		160,000

b. **LOOMIS AND ASSOCIATES**
Income Statement
For the Month Ending January 31

Revenue from Services	\$ 600,000
Less Cost of Services Billed	<u>480,000</u>
Gross Margin.....	\$ 120,000
Less:	
Direct Labor—Unbillable	(24,000)
Overhead—Underapplied	(20,000) ^a
Marketing and Administrative.....	<u>(20,000)</u>
Operating Profit.....	<u>\$ 56,000</u>

^a\$140,000 actual – \$120,000 applied.

2.27 (Internet Designs; job costs in a service organization.)

a. **Journal Entries:**

(1)	Work in Process—Mountain View Company.....	120,000	
	Work in Process—Palatine Productions	72,000	
	Direct Labor—Unbillable	8,000	
	Wages Payable		200,000
(2)	Work in Process—Mountain View Company.....	90,000	
	Work in Process—Palatine Productions	54,000	
	Overhead (Applied).....		144,000
(3)	Overhead	140,000	
	Various accounts (e.g., Wages and Accounts Payable)		140,000
(4)	Marketing and Administrative Costs	60,000	
	Various accounts (e.g., Wages and Accounts Payable)		60,000
(5a)	Accounts Receivable	300,000	
	Revenue (\$100,000 from Palatine and \$200,000 from Mountain View).....		300,000
(5b)	Cost of Services Billed	336,000	
	Work in Process—Mountain View Com- pany		210,000
	Work in Process—Palatine Produc- tions.....		126,000

b.

INTERNET DESIGNS
Income Statement
For the Month Ending November 30

Revenue from Services	\$ 300,000
Less Cost of Services Billed	<u>336,000</u>
Gross Margin	\$ (36,000)
Less Direct Labor—Unbillable	(8,000)
Plus Overhead—Over applied	4,000 ^a
Less Marketing and Administrative Expense	<u>(60,000)</u>
Operating Profit (Loss).....	<u><u>\$ (100,000)</u></u>

^a\$4,000 = \$144,000 applied to jobs and expensed as part of the cost of services billed – \$140,000 actual overhead incurred.

2.27 continued.

- c. Both jobs show negative gross margins, as follows:

Mountain View:

$$\text{Gross margin} = \$200,000 - \$210,000 = \$ (10,000).$$

Palatine Productions:

$$\text{Gross margin} = \$100,000 - \$126,000 = \$ (26,000).$$

Granted, there is some over applied overhead that increases the cost of billed, but not enough to turn the negative gross margins into positive gross margins.

2.28 (Computer Systems, Inc.; job costs in a service organization.)

a.

Wages and Accounts Payable		Work in Process: E-Gadgets		Cost of Services Billed	
	160,000 (1)	(1) 90,000			
	100,000 (3)	(2) 54,000	144,000 (5b)	(5b) 224,000	
	40,000 (4)				
Overhead		Work in Process: E-Shop		Marketing and Administrative Costs	
(3) 100,000	84,000 (2)	(1) 30,000			
		(2) 18,000	48,000 (5b)	(4) 40,000	
Accounts Receivable		Work in Process: E-Food		Revenues	
(5a) 280,000		(1) 20,000			
		(2) 12,000	32,000 (5b)		280,000 (5a)
Direct Labor— Unbillable					
(1) 20,000					

Entries:

- (1) Labor costs at \$100 per hour.
- (2) Overhead at \$60 per billable hour.
- (3) Overhead actually incurred in June.
- (4) Marketing and administrative costs.
- (5) Services billed.

2.28 continued.

b.

COMPUTER SYSTEMS, INC.
Income Statement
For the Month Ending June 30

Revenue from Services	\$ 280,000
Less Cost of Services Billed	<u>224,000</u>
Gross Margin	\$ 56,000
Less:	
Direct Labor—Unbillable	20,000
Overhead—Underapplied	16,000 ^a
Marketing and Administrative	<u>40,000</u>
Operating Profit (Loss)	<u>\$ (20,000)</u>

^a\$100,000 actual – \$84,000 applied.

2.29 (Crafty Ideas; Job costs in a service organization.)

a.

Wages and Accounts Payable		Work in Process: Franklin Groceries		Cost of Services Billed	
	165,000 (1)	(1) 50,000			
	70,000 (3)	(2) 20,000	70,000 (5b)	(5b) 210,000	
	20,000 (4)				
Overhead		Work in Process: Truman Trust		Marketing and Administrative Costs	
(3) 70,000	60,000 (2)	(1) 100,000			
		(2) 40,000	140,000 (5b)	(4) 20,000	
Accounts Receivable		Direct Labor— Unbillable		Revenues	
(5a) 300,000		(1) 15,000			
					300,000 (5a)

Entries:

- (1) Labor costs at \$50 per hour.
- (2) Overhead at \$20 per billable hour.
- (3) Overhead actually incurred in March.
- (4) Marketing and administrative costs.
- (5) (5a) Franklin Groceries billed for \$100,000 and Truman Trust billed for \$200,000. (5b) Cost of services billed: Franklin--\$70,000; Truman--\$140,000

2.29 continued.

b.

**CRAFTY IDEAS
Income Statement
For the Month Ending March 31**

Revenue from Services	\$ 300,000
Less Cost of Services Billed	<u>210,000</u>
Gross Margin	\$ 90,000
Less:	
Direct Labor—Unbillable	15,000
Overhead—Under-applied.....	10,000 ^a
Marketing and Administrative.....	<u>20,000</u>
Operating Profit.....	<u><u>\$ 45,000</u></u>

^a\$10,000 = \$70,000 actual overhead incurred – \$60,000 applied to jobs and expensed as part of the cost of services billed.

- c. Franklin has a gross margin of \$30,000 and Truman has a gross margin of \$60,000. The ratio of gross margin to revenue is the same (30%) for both, so they appear equally profitable. If we had to choose between the two, we would choose Truman because it generates the highest total gross margin

2.30 (Appendix 2.1) (Computing equivalent units.)

To Complete Beginning Inventory: $[(1.0 - .60) \times 60,000 \text{ Units}]$	24,000 E.U.
Started and Completed	160,000 E.U.
In Ending Inventory: $.30 \times 40,000 \text{ Units}$	<u>12,000 E.U.</u>
Total.....	<u><u>196,000 E.U.</u></u>

2.31 (Appendix 2.1) (Computing product costs with incomplete products.)

	Physical Units	% Completed During Period	Equivalent Units
Units to account for:			
Beginning WIP	60,000	40%	24,000
Started & Completed	160,000	100%	160,000
Ending WIP	<u>40,000</u>	30%	<u>12,000</u>
Total	<u>260,000</u>		<u>196,000</u>
Costs to be accounted for:			
Beginning WIP	\$ 80,000		
Current Period Costs	<u>300,000</u>		
→ Total costs to be accounted for	<u>\$ 380,000</u>		
Cost per E.U. done this period $\$300,000 \div 196,000 \text{ E.U.}$			<u>Cost per Unit</u> \$1.53061 per E.U.
Costs assigned to units transferred out:			
Costs from beginning WIP		\$ 80,000	
Current costs added to complete beginning WIP ($\$1.53061 \times 24,000 \text{ E.U.}$)		36,735	
Current costs of units started & completed ($\$1.53061 \times 160,000$)		<u>244,898</u>	
Total costs transferred out		\$ 361,633	
Costs assigned to ending WIP: ($\$1.53061 \times 12,000 \text{ E.U.}$)			<u>\$ 18,367</u>
→ Total costs accounted for:		<u>\$ 380,000</u>	

2.32 (Ohio River Company; actual costs and normal costs.)

a. **Actual Costs**

Direct Materials.....	\$ 5,000
Direct Labor	9,000
Variable Manufacturing Overhead	20,000
Fixed Manufacturing Overhead	26,000
Total Cost	<u>\$ 60,000</u>

b. **Normal Costs**

Direct Materials.....	\$ 5,000
Direct Labor	9,000
Variable Manufacturing Overhead	18,000 ^a
Fixed Manufacturing Overhead	27,000 ^b
Total Cost	<u>\$ 59,000</u>

^a\$18,000 = 200% × \$9,000.

^b\$27,000 = 300% × \$9,000.

2.33 (Applied overhead in a bank.)

a. Total overhead applied.

Quarter	Normal Overhead
1st	200 million × \$0.01 = \$2,000,000
2nd	200 million × \$0.01 = \$2,000,000
3rd	200 million × \$0.01 = \$2,000,000
4th	100 million × \$0.01 = \$1,000,000

b. Estimated overhead for the Year:

\$0.01 = estimated overhead/800 million

800 million × \$0.01 = estimated overhead

800 million × \$0.01 = \$8,000,000

2.34 (Job costing for the movies.)

- a. Carrying “flops” in inventory causes studios to report overstated assets. Writing down the “flop” to its market value will decrease both inventory in the asset section of the balance sheet, and profits in the income statement as the costs of the film are no longer held in inventory but expensed.

2.34 continued.

- b. Inventory should be reported at the lower of cost or market. Whenever the market value of a product is known to be below its cost, the product should be written down to its market value. The amount of the writedown is expensed in the period incurred.

2.35 (Job costing and ethics.)

- a) It would be unethical for Andre to falsify job cost reports by improperly assigning costs to the Canadian government job which were actually part of the cost of the General Electric job. Since Andre's boss suggested this course of action, he should approach higher levels of management with the problem. Given the potential illegality and other possible negative ramifications of this problem (such as lost reputation), it is likely that management will decide to write off the cost overruns instead of falsely reporting them.
- b) The fact that Andre's company is reimbursed on the Canadian government contract makes it particularly enticing to charge the excess costs to this project. However, since the Canadian government contract is based on costs, it may be an illegal action for the company to misrepresent costs charged to this project. If this action is discovered and proven in court, the company could be liable for the excess charges, interest and punitive damages. Andre and his boss could be held responsible for civil and criminal penalties plus the loss of their jobs and their reputations.

2.36 Just-in-time in the U.S. and Japan.

Japanese companies have been at the forefront in utilizing just-in-time techniques (particularly in the automobile industry), and therefore have more experience with JIT than U.S. companies. Japan also has limited resources in terms of land and storage, which leads to higher storage costs than for U.S. companies. Further, transportation distances are greater in the U.S. making reliable delivery more difficult. Thus, it is not surprising that the chemical industry in Japan is more effectively implementing just-in-time techniques

- 2.37 (Simon Construction Company; comparing job costs to management's expectations.)

Job 478:	Job Costs	Management's Expectations
Beginning Balance	\$19,600	
Labor	300	
Overhead Applied	180 (= .6 × 300)	
Total	<u>\$20,080</u>	\$20,000

Comment: The total job cost is as close to management's expectations as one can expect.

Job 479:	Job Costs	Management's Expectations
Beginning Balance	\$ 9,400	
Labor	2,600	
Overhead Applied	1,560 (= .6 × \$2,600)	
Total	<u>\$ 13,560</u>	\$13,000

Comment: The \$560 overrun is 4% of the expected job costs. Although 4% is a small percent of the expected total job costs, it is likely a large percent of company profits. Imagine that the profits on this job are 10% of job costs. Then the cost overrun is 40% (= 4%/10%) of those profits. Although apparently small, this cost overrun warrants examination and correction in future jobs.

Job 480:	Job Costs	Management's Expectations
Beginning Balance	\$ 5,000	
Materials	800	
Labor	7,800	
Overhead Applied	4,680 (= .6 × \$7,800)	
Total	<u>\$ 18,280</u>	\$15,000

Comment: The job's cost overrun is more than 20% of management's expected costs. This is a major problem that must be corrected in future jobs.

Job 481:	Job Costs	Management's Expectations
Materials	\$ 4,200	
Labor	5,900	
Overhead Applied	3,540 (= .6 × \$5,900)	
Total	<u>\$ 13,640</u>	\$10,000

Comment: Cost overrun is more than 35% of management's expected costs. (This problem is even bigger than the overrun on Job 480.)

2.37 continued.

Job 482:	Job Costs	Management's Expectations
Materials	\$ 2,500	
Labor	1,700	
Overhead Applied	<u>1,020</u> (= .6 × \$1,700)	
Total	<u>\$ 5,220</u>	\$4,000

Comment: The cost overrun is more than 30% of management's expected costs. (See comment for Job 481.)

It is important to note the relation of costs to work done. If both costs and work done exceed expectations, then the Company might not have a problem. The August data appear to support management's concerns, however.

As part of its effort to reduce costs, management should identify overhead cost drivers; that is, those things that cause overhead costs. It is unlikely that labor is the only cost driver for overhead, for example. Also, examine materials costs. Materials costs in construction are volatile. August is hurricane season. Have there been storms that caused destruction which required a lot of materials to rebuild buildings and infrastructure?

Note that actual overhead for the month (\$12,000) is \$1,020 higher than overhead applied of \$10,980 (= \$180 + \$1,560 + \$4,680 + \$3,540 + \$1,020). Here is the adjusting entry to clear the overhead account if instructors want to show it:

Dr. Cost of Goods Sold	1,020	
Cr. Overhead.....		1,020
(\$12,000 – \$10,980 = \$1,020 under applied)		

2.38 (Chu Engineering; analyzing costs in an engineering company.)

	City of X	Missouri River	Gulf States
Account Balance as of June 1:			
Direct Materials	\$ 1,000	\$ 800	
Direct Labor	4,000	3,200	
Overhead	<u>4,000</u>	<u>3,200</u>	
	<u>\$ 9,000</u>	<u>\$ 7,200</u>	
Added in June:			
Direct Materials	\$ 0	\$ 400	\$ 400
Direct Labor	1,200	2,000	1,600
Overhead	<u>1,200</u>	<u>2,000</u>	<u>1,600</u>
	<u>\$ 2,400</u>	<u>\$ 4,400</u>	<u>\$ 3,600</u>
Total Cost of Job	<u>\$11,400</u>	<u>\$11,600</u>	<u>\$ 3,600</u>

2.39 (Comparing job costs to management's expectations.)

Financial Towers:	Job Costs	Management's Expectations
Beginning Balance	\$2,000,000	
Labor added	1,300,000	
Overhead Applied	<u>910,000 (= .7 × \$1,300,000)</u>	
Total	<u>\$4,210,000</u>	\$4,000,000

Comment: Cost overrun is 5.25% [(=\$4,210,000 – \$4,000,000) / \$4,000,000] of management's expected costs. Although this is a small cost overrun, management still might want to investigate to learn causes of the overrun. Further, a small cost overrun could be a large percentage of profit. For example, if the company expects to make a profit of 10% of expected job costs, then this 5.25% overrun translates into 52.5% of expected profit. (Expected profit = .1 × \$4,000,000 = \$400,000. The overrun of \$210,000 is 52.5%. Even small cost overruns take a big bite out of profit.

Hyatt Suite:	Job Costs	Management's Expectations
Beginning Balance	\$ 1,800,000	
Labor	850,000	
Overhead Applied	<u>595,000 (= .7 × \$850,000)</u>	
Total	<u>\$ 3,245,000</u>	\$3,000,000

Comment: Cost overrun is 8.17% [(= \$3,245,000 – \$3,000,000) / \$3,000,000] of management's expected costs. Although this is a small cost overrun, management still might want to investigate to learn causes of the overrun. Further, a small cost overrun could be a large percentage of profit. For example, if the company expects to make a profit of 10% of expected job costs, then this 8.17% overrun translates into 81.7% of expected profit. (Expected profit = .1 × \$3,000,000 = \$300,000. The overrun of \$245,000 is 81.7% (= \$245,000 / \$300,000) of profits. Even small cost overruns take a big bite out of profits.

2.39 continued.

Bloomfield Stadium:	Job Costs	Management's Expectations
Materials	\$ 1,100,000	
Labor	1,500,000	
Overhead Applied	<u>1,050,000</u> (= .7 × \$1,500,000)	
Total	<u>\$ 3,650,000</u>	\$2,500,000

Comment: Cost overrun is 46% [(= \$3,650,000 – \$2,500,000)/\$2,500,000] of management's expected costs. This is a significant percentage requiring further investigation and correction to improve future cost overruns on this job and to prevent such overruns on future jobs. It might be the case that management bid this job too low. If so, knowing the costs of this job will help assure that bids are sufficiently high to exceed costs in future jobs.

Another possible cause for this cost overrun may be wrongful assignment of costs, which may have ethical implications. It may be that the company is under contract to build the stadium for a percentage over cost. This type of arrangement can lead a company to miss-assign job costs so that it can potentially recover the cost overruns. If the costs do belong to the other projects currently being worked on there are two immediate issues to address; unethical cost allocation and extremely poor job bidding practices. The company needs to take a very close look at its bidding process.

Healthy Hospital:	Job Costs	Management's Expectations
Materials	\$ 600,000	
Labor	260,000	
Overhead Applied	<u>182,000</u> (= .7 × \$260,000)	
Total	<u>\$ 1,042,000</u>	\$1,050,000

Comment: Costs are a bit lower than management's expectations.

It is important to note the relation of costs to work done. If both costs and work done exceed expectations, then the Company may not have a problem. The data appear to support management's concerns, however. It is also important to address the possibility that costs overruns are caused by the company using out-of-date cost data to generate its expectations.

As part of its effort to reduce costs, management should identify overhead cost drivers; that is, those things that cause overhead costs. Then find ways to reduce costs. For example, suppose building maintenance costs exceed expectations. Could people take steps to reduce maintenance?

2.40 (Heatnew; Compare just-in-time to a traditional accounting system.)

a. Backflush Costing

Cost of Goods Sold.....	1,550,000	
Wages and Accounts Payable.....		1,550,000
Work in Process Inventory (10% of costs).....	155,000	
Finished Goods Inventory (20% of costs)	310,000	
Cost of Goods Sold		465,000

b. Traditional Costing

Materials Inventory.....	500,000	
Wages and Accounts Payable.....		500,000
Work in Process Inventory.....	500,000	
Materials Inventory		500,000
Work in Process Inventory.....	1,050,000	
Wages and Accounts Payable.....		1,050,000
(For labor and overhead)		
Finished Goods Inventory (90% of costs)	1,395,000	
Work in Process Inventory		1,395,000
Cost of Goods Sold (70% of costs)	1,085,000	
Finished Goods Inventory		1,085,000

2.41 (Tarheel Publishing; compare just-in-time to a traditional accounting system.)

a. Backflush Costing

Cost of Goods Sold.....	220,000	
Wages and Accounts Payable.....		220,000
Work-in-Process Inventory.....	11,000 ^a	
Finished Goods Inventory	44,000 ^b	
Cost of Goods Sold		55,000

^a \$11,000 = 0.05 × \$220,000

^b \$44,000 = 0.20 × \$220,000

2.41 continued.

b. Traditional Costing

Materials Inventory.....	100,000	
Wages and Accounts Payable.....		100,000
Work in Process Inventory.....	100,000	
Materials Inventory.....		100,000
Work in Process Inventory.....	120,000	
Wages and Accounts Payable.....		120,000
(For labor and overhead)		
Finished Goods Inventory	209,000	
Work in Process Inventory		209,000
Cost of Goods Sold	165,000	
Finished Goods Inventory		165,000

- 2.42 (Appendix 2.1) (Sanchez Company; computing equivalent units and cost flows under process costing.)

Accounting for units:	Physical Units	% Completed During Period	Equivalent Units
Beginning WIP	20,000	60%	12,000
Started & completed	70,000 ^a	100%	70,000
Ending WIP	40,000 ^b	40%	16,000
Total	<u>130,000</u>		<u>98,000</u>

Accounting for costs:

Beginning WIP	\$ 296,000
Current period costs	<u>2,862,000</u>
→ Total	<u>\$3,158,000</u>

Costs per E. U. this period:	$\$2,862,000 \div 98,000$	<u>Cost per Unit</u> \$29.204 per E.U.
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Costs assigned to units transferred out:

Costs from beginning WIP	\$ 296,000	
Current costs added to complete beginning WIP ($\$29.204 \times 12,000$)	350,448	
Current costs of units started & completed ($\$29.204 \times 70,000$)	<u>2,044,280</u>	
Total costs transferred out	\$2,690,728	\$29.90 ^d

Costs assigned to ending WIP:
($\$29.204 \times 16,000$)

\$ 467,264

→ Total costs accounted for: \$3,157,992^c

^a70,000 units = 90,000 completed – 20,000 completed from beginning inventory.

^b40,000 Ending WIP = 20,000 Beginning Inventory + 110,000 started in September – 90,000 completed.

^c\$8 difference due to rounding.

^d\$29.90 = $\$2,690,728 \div (20,000 \text{ units} + 70,000 \text{ units})$.

2.43 (Appendix 2.1) (Equivalent units; solving for unknowns.)

a.

	Physical Units	% Completed this Period	Equivalent Units
To complete Beginning Inventory..	1,000	40% (2)	400 (1)
Units Started & Completed	4,000	100%	4,000
Ending Inventory.....	3,000	40%	<u>1,200</u>
			<u>5,600</u>

(1) $400 = 5,600 - 4,000 - 1,200$.

(2) $40\% = 400 \div 1,000$. Therefore, Beginning Inventory must have been 60% complete.

b.

	Equivalent Units	Conversion Costs
To complete Beginning Inventory	4,200	\$18,270 (1)
Units Started & Completed	6,000	26,100 (2)
Ending Inventory.....	2,000	<u>8,700</u>
Total Period Conversion Costs.....		<u>\$53,070</u>

First, compute unit conversion costs from what we know about ending inventory: $\$8,700 \div 2,000 \text{ E. U.} = \4.35 per E. U.

(1) $\$18,270 = 4,200 \times \4.35 .

(2) $\$26,100 = 6,000 \times \4.35 .

2.44 (Appendix 2.2) (Smiley Company; completing missing data.)

The answers appear (on the following page) as footnotes to these T-accounts.

Accounts Payable			Direct Materials Inventory			Work-in-Process Inventory			Finished Goods Inventory						
	6,000	4/1	4/1	12,000		4/1	4,500		4/1	11,000					
40,000	42,000 ^b			42,000 ^b	43,000 ^f		43,000 ^f				84,000 ^d				
	<u>8,000</u>	4/30	4/30	<u>11,000</u> ^g				89,000		89,000					
									4/30	<u>16,000</u>					
Overhead									Cost of Goods Sold						
Actual	Applied														
14,800	15,600 ^c							15,600 ^c							
800 ^e									84,000 ^d						
Wages Payable															
	31,200							31,200							
	(= 2,600 hrs. X \$12)							4/30	<u>5,300</u> ^a						
										Under/Overapplied Overhead					
											800 ^e				

2.44 continued.

$$\begin{aligned}\text{Note: Predetermined Overhead Rate} &= \frac{\$180,000}{30,000 \text{ Direct Labor Hours}} \\ &= \$6 \text{ per Direct Labor Hour.}\end{aligned}$$

^aWork-in-Process Inventory:

Direct Materials	\$ 2,600
Direct Labor (\$12 × 150 hours)	1,800
Overhead (\$6 × 150 hours)	<u>900</u>
Total	<u>\$ 5,300</u>

$$\begin{aligned}\text{bDirect Materials Purchased} &= \$40,000 + \$8,000 - \$6,000 \\ &= \$42,000.\end{aligned}$$

$$\begin{aligned}\text{cOverhead Applied} &= \$6 \times 2,600 \text{ direct labor hours} \\ &= \$15,600.\end{aligned}$$

$$\begin{aligned}\text{dCost of Goods Sold} &= \$11,000 + \$89,000 - \$16,000 \\ &= \$84,000.\end{aligned}$$

$$\begin{aligned}\text{eOverapplied Overhead} &= \$15,600 - \$14,800 \\ &= \$800. \text{ (Note: Credit may be to cost of Goods Sold} \\ &\quad \text{instead of Under/Overapplied Overhead.)}\end{aligned}$$

$$\begin{aligned}\text{fDirect Materials Used} &= \$89,000 + \$5,300 - \$4,500 - \$15,600 - \$31,200 \\ &= \$43,000.\end{aligned}$$

$$\begin{aligned}\text{gEnding Direct Materials Inventory} &= \$42,000 + \$12,000 - \$43,000 \\ &= \$11,000.\end{aligned}$$

2.45 (Premier Printing, Inc.; incomplete data—job costing.)

The following information should be included (in summary) in a report to management.

Cash		Work in Process		Cost of Goods Sold	
		Job No. 11		Job No. 11	
	9,200*	M	4,000*	M	4,000*
		L	19,200*	L	38,400
		O ³	9,600	O ²	19,200
		6/1	<u>32,800</u>		<u>61,600*</u>
		L ¹	19,200		
		O ⁴	9,600		
			<u>0</u>		

Wages Payable		Job No. 12		Job No. 12	
	64,000*	M ⁵	6,000	M	6,000
		L ⁶	24,000	L	24,000
		O ⁷	12,000	O	12,000
			<u>0</u>		<u>42,000</u>

Overhead		Job No. 13		Overhead Adjustment	
Actual	Applied	M	3,200*		8,000 ¹⁰
40,000*	32,000 ⁹	L	20,800*		
		O ⁸	10,400		
	8,000 ¹⁰	6/30	<u>34,400</u>		

Note: See footnotes on following page.

2.45 continued.

Footnotes to Problem 2.45.

M refers to direct materials.

L refers to direct labor.

O refers to manufacturing overhead.

*Numbers given in the problem.

¹Labor to complete job is \$19,200 since the beginning inventory was 50% complete.

²Applied overhead = \$61,600 – \$4,000 materials – \$38,400 direct labor.
= \$19,200

∴ Applied overhead = \$19,200/\$38,400 = 0.50 times labor dollars.

³Overhead in beginning inventory = 0.50 × \$19,200 = \$9,600.

⁴Overhead applied in June = 0.50 × \$19,200 = \$9,600.

⁵Materials for Job No. 12 = Purchases – materials for Job No. 13
= \$9,200 – \$3,200
= \$6,000

⁶Labor for Job No. 12 = Total direct labor costs – Labor for Job No. 11 – Labor for Job No. 13
= \$64,000 – \$19,200 – \$20,800
= \$24,000

⁷Overhead for Job No. 12 = 0.50 × \$24,000 = \$12,000.

⁸Overhead for Job No. 13 = 0.50 × \$20,800 = \$10,400.

⁹Applied Overhead = \$9,600 + \$12,000 + \$10,400 = \$32,000.

¹⁰Underapplied Overhead = Actual – Applied
= \$40,000 – \$32,000 = \$8,000.

2.46 (Kansas Rollerblades, Inc.; reconstruct missing data.)

This is a challenging problem. We put the work in process account on the board for the “big picture,” then solve for each item in the account as follows:

Work in Process			
Beginning Balance	(a) 86,200	53,500	(d) Transferred to
Direct Materials	(b) 70,314		Finished Goods
Direct Labor	(c) 67,700	204,014	(f) Disaster Loss
Overhead Applied	(e) 33,300		
Ending Balance	<u>-0-</u>		

The calculations are shown below. We usually present these using both T-accounts and the following formulas.

(a) Given.

$$\begin{aligned}
 \text{(b) Direct Materials} &= \text{Beginning Inventory} + \text{Purchases} - \text{Ending Inventory} - \text{Indirect Materials} \\
 &= \$49,000^a + \$66,400^* - \$43,000^a - \$2,086^a = \underline{\underline{\$70,314}}
 \end{aligned}$$

$$\begin{aligned}
 \text{*Purchases} &= \text{Account Payable, Ending} + \text{Cash Payments} - \text{Accounts Payable, Beginning} \\
 &= \$50,100^a + \$37,900^a - \$21,600^a = \underline{\underline{\$66,400}}
 \end{aligned}$$

$$\begin{aligned}
 \text{(c) Direct Labor} &= \text{Payroll} - \text{Indirect Labor} \\
 &= \$82,400^a - \$14,700^a = \underline{\underline{\$67,700}}
 \end{aligned}$$

$$\begin{aligned}
 \text{(d) Cost Transferred to Finished Goods} &= \text{Finished Goods, Ending} + \text{Cost of Goods Sold} - \text{Finished Goods, Beginning} \\
 &= \$37,500^a + (\$396,600^a - \$348,600^a) - \$32,000^a \\
 &= \underline{\underline{\$53,500}}
 \end{aligned}$$

$$\begin{aligned}
 \text{(e) Overhead Applied} &= \text{Ending Manufacturing Overhead} - \text{Beginning Manufacturing Overhead} + \text{Overapplied Overhead} \\
 &= \$217,000^a - \$184,900^a + \$1,200^a = \underline{\underline{\$33,300}}
 \end{aligned}$$

$$\begin{aligned}
 \text{(f) Loss} &= \$86,200^a + \$70,314 + \$67,700 + \$33,300 - \$53,500 \\
 &= \underline{\underline{\$204,014}}
 \end{aligned}$$

Note: The insurance company may dispute paying the \$1,200 overapplied overhead.

^aGiven in the problem.

2.47 (Midwest Insurance Company; evaluating cost systems used in financial service companies.)

a. Mr. Frank's decision regarding the most appropriate type of accounting system actually involves two decisions which are somewhat independent. Midwest currently uses the equivalent of a job-order system based on actual costs, which is being compared with Northern's system, effectively a process-cost system (within the three categories of loans) based on standard costs. The decisions to be made then involve the following dimensions:

1. The degree to which accounting data is accumulated to a *specific* unit of output as opposed to *groups* of units (job-order vs. process-cost), and
2. The degree to which *actual* cost data is used to satisfy the requirements of the users of accounting data as opposed to using *predetermined* data to satisfy these requirements.

In practice, the nature of the business will suggest the type of system to be used, but the decisions are by no means absolute—many different combinations and variations can and do exist.

Several specific characteristics of the product (service) and business are helpful in guiding the decision between potential systems. These include:

1. Homogeneity of output—standard data and process-costing are generally better in situations where output is relatively uniform.
2. Nature/knowledge of demand—in order to use predetermined rates (especially overhead), volume and mix of demand must be somewhat predictable.
3. Performance measurement—standard costs provide a (hopefully realistic) benchmark for evaluating performance, but actual data must be collected to allow comparison.
4. Impact of variances—where variances can be significant and more than temporary, the additional detail provided in actual and job-order systems may warrant their use.
5. Estimating/billing—where this must be performed for individual customers, detailed data are usually required.

2.47 a. continued.

Summarizing these two systems in terms of the advantages/disadvantages, Midwest's system provides detailed data which may be beneficial in performance measurement and projection of cost changes if the mix of loan types varies in the future, with the disadvantage of additional record keeping and clerical costs. Northern's system has the obvious advantage of being inexpensive and providing a standard for performance measurement, but may not provide the detail to make this measurement meaningful or allow effective variance analysis. In addition, Northern's overhead allocation scheme may rely on a relatively consistent mix of loan types.

Although the above characteristics would suggest a choice of systems given equal costs of the accounting systems, the cost/benefit question must be addressed due to the fact that costs of the accounting systems are *not* equal. The additional record keeping and clerical costs inherent in the job-order/actual system, which are currently of primary concern to Mr. Frank, should not be incurred unless they are justified by the benefits provided by greater cost visibility.

In the case of the Northern and Midwest systems, the following differences between the two are important in making the choice of an appropriate system:

- Both the average cost and the variability of Midwest's loan processing costs are much greater than those of Northern.
- The components of Midwest's loan processing costs can be significantly different from loan to loan (e.g., some loans involve travel costs while others do not).
- Midwest apparently receives loans on an individual basis rather than as a package.
- Midwest's processing costs include outside services such as consulting over which it may have very little control or ability to predict.

2.47 a. continued.

In light of the foregoing, Midwest should probably stay for the most part with its present system of using actual costs, since the variability in its loan processing costs would make it very difficult to develop meaningful standards in the first place. It would be very difficult to estimate in advance the processing costs for a specific loan, and performance measurement based on standard costs may not carry much meaning, especially in the area of outside services. It would also be difficult for Midwest to allocate overhead costs, since not all loans entail the same overhead cost components and there does not seem to be a rational basis for allocation of these costs. Midwest *could*, however, batch some of the loans together if there were no specific "need to know" the cost of processing a particular loan. Midwest probably looks at *overall* loan processing costs in developing an interest rate or fee charged to banks and other financial institutions, and, if so, should not be overly concerned with processing costs on individual loans. Although Midwest's Mortgage Division manager points to variability as an argument against standards, he does not mention any benefit related to collecting costs for each loan.

2.47 continued.

- b. Exhibit 1 shows the cost flows under the respective systems. Under both, total costs are initially accumulated in various Payables accounts. Under Northern's system, a "product" is a loan category, with a Direct Labor and an Overhead account maintained under each category. Costs are recorded in the other accounts (other than Payables) at standard, with the differences collected in Variance accounts. Thus, Northern maintains a total of eight accounts exclusive of Payables. Midwest, of course, does not require Variance accounts, but maintains up to six accounts for each loan and, hence, must maintain a significantly greater number of total accounts.

Exhibit 1
Comparative Cost Flows

Standard/Process Costing
Northern Insurance

Various Payables		FHA/VA Loans			
	58,172 (1)	Direct Labor		Overhead	
	74,626 (2)	(1) 4,200		(2) 5,460	
		Conventional Loans			
		Direct Labor		Overhead	
		(1) 31,160		(2) 40,508	
		Development Loans			
		Direct Labor		Overhead	
		(1) 20,440		(2) 26,572	
		Direct Labor Variance			
		(1) 2,372			
		Overhead Variance			
		(2) 2,086			

2.47 b. continued.

Exhibit 1 (cont.)

Actual/Job-Order Costing

Midwest Insurance

Various Payables	Loan #A48-10136					
47,291 (1)	<u>Direct Labor</u>	<u>Telephone</u>	<u>Travel</u>			
4,843 (2)	(1) 1,184	(2) 113	(3) 415			
2,739 (3)						
11,800 (4)						
9,950 (5)	<u>Appraisal</u>	<u>Legal</u>	<u>Other</u>			
1,470 (6)	(4) 1,500					
	Loan #A48-11237					
	<u>Direct Labor</u>	<u>Telephone</u>	<u>Travel</u>			
	(1) 3,631	(2) 42				
	<u>Appraisal</u>	<u>Legal</u>	<u>Other</u>			
	(4) 2,300					
	Loan #B42-19361					
	<u>Direct Labor</u>	<u>Telephone</u>	<u>Travel</u>			
	(1) 814	(2) 78				
	<u>Appraisal</u>	<u>Legal</u>	<u>Other</u>			
		(5) 1,500	(6) 150			
	Loan #C39-21341					
	<u>Direct Labor</u>	<u>Telephone</u>	<u>Travel</u>			
	(1) 4,191	(2) 240	(3) 110			
	<u>Appraisal</u>	<u>Legal</u>	<u>Other</u>			
		(5) 2,200				

Note: Debits do not equal credits for each entry because this is only a partial listing of loans processed in July as shown in the text Exhibit 2.12.

2.48 (Appendix 2.2) (Custer Manufacturing; job costing using equivalent units.)

a. Cost of WIP inventory on December 31, Year 1 for four departments:

Fabricating Department

Plastic		Direct Materials	Direct Labor	Overhead
\$12.75 per Square Foot	Cost per Equivalent Unit	\$12,750/100 = \$127.50	\$1,424/89 = \$16	\$.45 × 855/95 = \$4.05

Cost of Ending Inventory:

$$(\$127.50 \times 12) + (\$16 \times 6) + (\$4.05 \times 12) + (\$12.75 \times 50) = \underline{\underline{\$2,312.10}}$$

Testing Department

	Transfer-in Costs	Direct Labor	Overhead
Cost per Equivalent Unit	\$127.50 + \$16 + \$4.05 = \$147.55	\$444/74 = \$6	\$301.92/74 = \$4.08

Cost of Ending Inventory:

$$(\$147.55 \times 7) + (\$6 \times 7) + (\$4.08 \times 7) = \underline{\underline{\$1,103.41}}$$

Assembly Department

	Transfer-in Costs	Frames	Direct Labor	Overhead
Cost per Equivalent Unit	\$147.55 + \$6 + \$4.08 = \$157.63	\$408.52	\$612/51 = \$12	\$232.56/51 = \$4.56

Cost of Ending Inventory:

$$(\$157.63 \times 18) + (\$408.52 \times 31) + (\$12 \times 8) + (\$4.56 \times 8) = \underline{\underline{\$15,633.94}}$$

2.48 a. continued.

Shipping Department

	Transfer-in Costs	Packing Material	Direct Labor	Overhead
Cost per Equivalent Unit	\$157.63 + \$408.52 + 12 + \$4.56 = \$582.71	\$75	\$256/32 = \$8	\$64/32 = \$2

Cost of Ending Inventory:

$$(\$582.71 \times 19) + (\$75 \times 16) + (\$8 \times 8) + (\$2 \times 8) = \underline{\underline{\$12,351.49}}$$

b. Cost of Goods Sold for 23 Units Shipped:

$$(\$582.71 \times 23) + (\$75 \times 23) + (\$8 \times 23) + (\$2 \times 23) = \underline{\underline{\$15,357.33}}$$

c. Cost of Units Spoiled:

Testing Department

Shipping Department

$$(\$147.55 \times 15) + (\$6 \times 6) + (\$4.08 \times 6) + (\$582.71 \times 1) + (\$75 \times 1) + (\$8 \times 1) + (\$2 \times 1) = \underline{\underline{\$2,941.44}}$$

d. The cost of units sold = \$688 (= \$15,357/23 units), which is less than the target of \$700 per unit. The spoilage of \$2,941.44 is greater than 10% of the cost of goods sold (CGS = \$15,357). So costs of good units are slightly lower than target (which is good) and the cost of spoilage is greater than target (which is bad). Even if the unit had not been dropped in shipping, the spoilage costs would have been greater than 10% of cost of goods sold. Spoilage appears to be an area of concern.