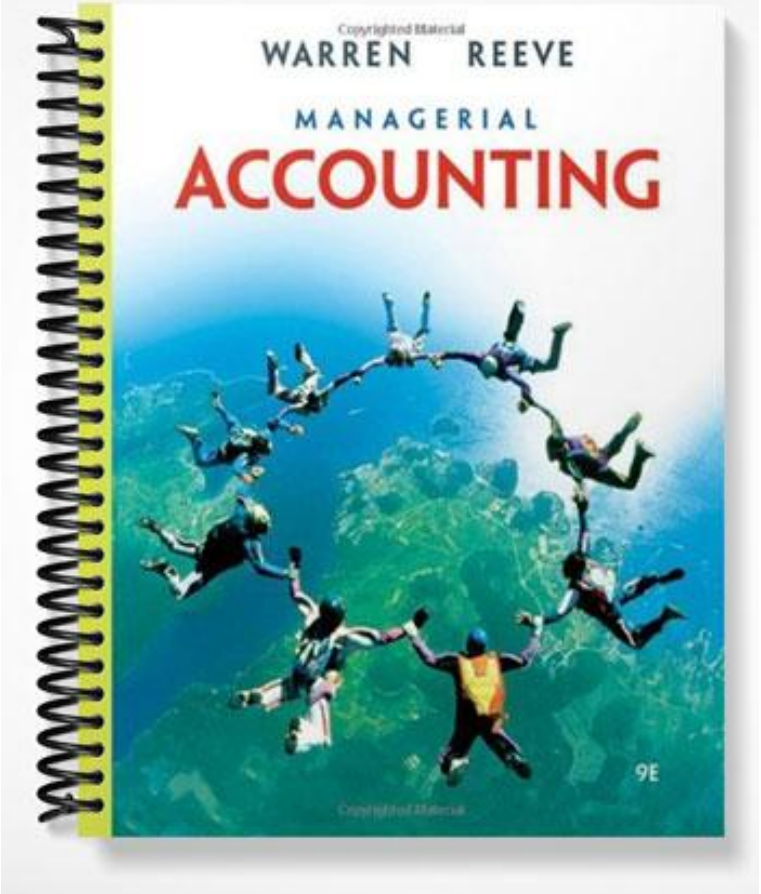
SOLUTIONS MANUAL



CHAPTER 17 (FIN MAN); CHAPTER 2 (MAN)
JOB ORDER COST SYSTEMS

Number	Objective	Description	Difficulty	Time	AACSB	IMA	SS	GL
EO17(2)-1	17-1		Easy	5 min	Analytic	Cost Management		
EO17(2)-2	17-1		Easy	5 min	Analytic	Cost Management		
EO17(2)-3	17-1		Easy	5 min	Analytic	Cost Management		
EO17(2)-4	17-1		Easy	5 min	Analytic	Cost Management		
EO17(2)-5	17-2		Easy	5 min	Analytic	Cost Management		
EO17(2)-6	17-2		Easy	5 min	Analytic	Cost Management		
EO17(2)-7	17-2		Easy	5 min	Analytic	Cost Management		
EO17(2)-8	17-2		Easy	5 min	Analytic	Cost Management		
EO17(2)-9	17-2		Easy	5 min	Analytic	Cost Management		
EO17(2)-10	17-2		Easy	5 min	Analytic	Cost Management		
EO17(2)-11	17-2		Easy	5 min	Analytic	Cost Management		
EO17(2)-12	17-2		Easy	5 min	Analytic	Cost Management		
EO17(2)-13	17-2		Easy	5 min	Analytic	Cost Management		
EO17(2)-14	17-2		Easy	5 min	Analytic	Cost Management		
EO17(2)-15	17-2		Easy	5 min	Analytic	Cost Management		
EO17(2)-16	17-3		Easy	5 min	Analytic	Cost Management		
EO17(2)-17	17-4		Easy	5 min	Analytic	Cost Management		
PE17(2)-1A	17-2	Cost of materials issuances	Easy	5 min	Analytic	Cost Management		
PE17(2)-1B	17-2	Cost of materials issuances	Easy	5 min	Analytic	Cost Management		
PE17(2)-2A	17-2	Entry for factory labor costs	Easy	5 min	Analytic	Cost Management		
PE17(2)-2B	17-2	Entry for factory labor costs	Easy	5 min	Analytic	Cost Management		
PE17(2)-3A	17-2	Entry for factory overhead costs	Easy	5 min	Analytic	Cost Management		
PE17(2)-3B	17-2	Entry for factory overhead costs	Easy	5 min	Analytic	Cost Management		
PE17(2)-4A	17-2	Predetermined factory overhead rate and applying factory overhead	Easy	10 min	Analytic	Cost Management		
PE17(2)-4B	17-2	Predetermined factory overhead rate and applying factory overhead	Easy	10 min	Analytic	Cost Management		

Number	Objective	Description	Difficulty	Time	AACSB	IMA	SS	GL
PE17(2)-5A	17-2	Job costs	Easy	10 min	Analytic	Cost Management		
PE17(2)-5B	17-2	Job costs	Easy	10 min	Analytic	Cost Management		
PE17(2)-6A	17-2	Cost of goods sold	Easy	5 min	Analytic	Cost Management		
PE17(2)-6B	17-2	Cost of goods sold	Easy	5 min	Analytic	Cost Management		
Ex17(2)-1	17-2	Transactions in a job order cost system	Easy	5 min	Analytic	Cost Management		
Ex17(2)-2	17-2	Cost flow relationships	Easy	10 min	Analytic	Cost Management		
Ex17(2)-3	17-2	Cost of materials issuances under the FIFO method	Moderate	30 min	Analytic	Cost Management	Exl	
Ex17(2)-4	17-2	Entry for issuing materials	Easy	5 min	Analytic	Cost Management		
Ex17(2)-5	17-2	Entries for materials	Moderate	30 min	Analytic	Cost Management		
Ex17(2)-6	17-2	Entry for factory labor costs	Easy	5 min	Analytic	Cost Management		
Ex17(2)-7	17-2	Entry for factory labor costs	Moderate	15 min	Analytic	Cost Management		
Ex17(2)-8	17-2	Entries for direct labor and factory overhead	Easy	10 min	Analytic	Cost Management		
Ex17(2)-9	17-2	Factory overhead rates, entries, and account balance	Moderate	30 min	Analytic	Cost Management		
Ex17(2)-10	17-2	Predetermined factory overhead rate	Moderate	15 min	Analytic	Cost Management		
Ex17(2)-11	17-2	Predetermined factory overhead rate	Moderate	15 min	Analytic	Cost Management		
Ex17(2)-12	17-2	Entry for jobs completed; cost of unfinished jobs	Moderate	15 min	Analytic	Cost Management		
Ex17(2)-13	17-2	Entries for factory costs and jobs completed	Moderate	30 min	Analytic	Cost Management		
Ex17(2)-14	17-2	Financial statements of a manufacturing firm	Moderate	30 min	Analytic	Cost Management	Exl	
Ex17(2)-15	17-3	Decision making with job order costs	Moderate	1 hr	Analytic	Cost Management		
Ex17(2)-16	17-3	Decision making with job order costs	Moderate	30 min	Analytic	Cost Management		
Ex17(2)-17	17-4	Job order cost accounting entries for a service business	Moderate	1 hr	Analytic	Cost Management		
Ex17(2)-18	17-4	Job order cost accounting entries for a service business	Moderate	30 min	Analytic	Cost Management		
Pr17(2)-1A	17-2	Entries for costs in a job order cost system	Moderate	45 min	Analytic	Cost Management		KA
Pr17(2)-2A	17-2	Entries and schedules for unfinished jobs and completed jobs	Difficult	1 1/2 hr	Analytic	Cost Management	Exl	KA
Pr17(2)-3A	17-2, 17-3	Job order cost sheet	Difficult	1 hr	Analytic	Cost Management		
Pr17(2)-4A	17-2	Analyzing manufacturing cost accounts	Difficult	1 1/4 hr	Analytic	Cost Management	Exl	

Number	Objective	Description	Difficulty	Time	AACSB	IMA	SS	GL
Pr17(2)-5A	17-2	Flow of costs and income statement	Difficult	1 1/2 hr	Analytic	Cost Management	Exl	
Pr17(2)-1B	17-2	Entries for costs in a job order cost system	Moderate	45 min	Analytic	Cost Management		KA
Pr17(2)-2B	17-2	Entries and schedules for unfinished jobs and completed jobs	Difficult	1 1/2 hr	Analytic	Cost Management	Exl	KA
Pr17(2)-3B	17-2, 17-3	Job order cost sheet	Difficult	1 hr	Analytic	Cost Management		
Pr17(2)-4B	17-2	Analyzing manufacturing cost accounts	Difficult	1 1/4 hr	Analytic	Cost Management	Exl	
Pr17(2)-5B	17-2	Flow of costs and income statement	Difficult	1 1/2 hr	Analytic	Cost Management	Exl	
SA17(2)-1	17-2	Managerial analysis	Easy	15 min	Analytic	Cost Management		
SA17(2)-2	17-2	Factory overhead rate	Moderate	30 min	Analytic	Cost Management		
SA17(2)-3	17-2	Job order decisions making and rate deficiencies	Moderate	30 min	Analytic	Cost Management		
SA17(2)-4	17-3	Recording manufacturing costs	Difficult	1 hr	Analytic	Cost Management		
SA17(2)-5	17-2	Predetermined overhead rates	Moderate	45 min	Analytic	Cost Management		

EYE OPENERS

1. Product cost information is used by managers to (1) establish product prices, (2) control operations, and (3) develop financial statements.

2. **a.** Job order cost system and process cost system.

b. The job order cost system provides a separate record of each quantity of product that passes through the factory.

c. Process cost systems accumulate costs for each department or process within a factory.

3. Job order costing is used by firms that sell custom goods and services to customers. The job order system is frequently associated with firms that will produce a product or service specifically to a customer order.

4. No. A job order cost system is not appropriate because workers could not physically differentiate between the products being worked on in different orders.

5. Work in Process

6. Materials should not be issued by the storekeeper without a properly authorized materials requisition. Both the storekeeper and the recipient of the materials should initial the materials requisition when the materials are issued to indicate release of the proper amount of materials from the storeroom.

7. **a.** Purchase invoice or receiving report

b. Materials requisition

8. A job cost sheet is the subsidiary ledger to the work in process control account. The costs of materials, labor, and overhead are listed on the job cost sheet for each job. A summary of all the job cost sheets during an accounting period is the basis for journal entries to the control accounts.

9. **a.** The clock card is a means of recording the hours spent by employees in the factory. The time ticket is a means of recording the time the employee spends on a specific job or, in cases of indirect labor (factory overhead), the department in which the time was spent.

b. The total time reported on an employee's time tickets for a payroll period is compared with the time reported on the employee's clock cards as an internal check on the accuracy of payroll disbursements.

10. The sources of the debits to Work in Process are:

a. Summary of the materials requisitions for direct materials.

b. Summary of the time tickets for direct labor.

c. Data obtained when applying the predetermined factory overhead rate for factory overhead.

11. The use of a predetermined factory overhead rate in job order cost accounting assists management in pricing jobs. By estimating the cost of direct materials and direct labor based on past experience and by applying the factory overhead rate, the cost of a job can be estimated. The predetermined rate also permits the determination of the cost of a job shortly after it is finished, which enables management to adjust future pricing policies to achieve the best combination of revenue and expense.

12. **a.** The predetermined factory overhead rate is determined by dividing the budgeted factory overhead for the forthcoming year by an estimated activity base, one that will equitably apply the factory overhead costs to the goods manufactured.

b. Direct labor cost, direct labor hours, and machine hours.

13. **a.** **(1)** If the amount of factory overhead applied is greater than the actual factory overhead, factory overhead is overapplied.

(2) If the amount of actual factory overhead is greater than the amount applied, factory overhead is underapplied.

b. Underapplied

c. Deferred credit

14. The simplest satisfactory procedure for disposing of a relatively minor balance in the factory overhead account is to transfer it to Cost of Goods Sold.

15. **a.** Materials

b. Work in Process

c. Finished Goods

16. Job cost information can be used to identify trends in unit costs over time for like products. Comparative job cost sheets for like products can be used to investigate possible

reasons for cost changes. This information can help managers identify changes in efficiency, methods, procedures, and prices used in the manufacturing process.

17. Job order cost accumulation would be most appropriate for professional service firms that provide extended, project-type services for clients. Examples would be architectural, consulting, advertising, or legal services. Job cost sheets would accumulate all direct costs of servicing the client. Such costs would include labor, materials, travel, and subcontracted services. In addition, overhead would be applied using a predetermined overhead rate. The costs accumulated by the job cost sheet would be treated as work in process (a current asset) until the service is completed. Once completed, the cost would be transferred to the cost of services on the income statement.

PRACTICE EXERCISES

PE 17–1A (FIN MAN); PE 2–1A (MAN)

Nov.	7	Materials	240,000	
		Accounts Payable		240,000

$240,000 = 24,000 × $10.

Nov.	11	Work in process	25,300*	
		Materials		25,300

*Job 80 $12,800 = 1,600 × $8
Job 82 12,500 = 1,250 × $10
Total $25,300

PE 17–1B (FIN MAN); PE 2–1B (MAN)

Apr.	12	Materials	48,000	
		Accounts Payable		48,000

$48,000 = 8,000 × $6.

Apr.	21	Work in Process	6,600*	
		Materials		6,600

*Job 50 $3,000 = 750 × $4
Job 51 3,600 = 600 × $6
Total $6,600

PE 17–2A (FIN MAN); PE 2–2A (MAN)

Work in Process		23,600*	
Wages Payable			23,600

*Job 80 $14,000 = 1,000 hours × $14
Job 82 9,600 = 800 hours × $12
Total $23,600

PE 17–2B (FIN MAN); PE 2–2B (MAN)

Work in Process	**50,000***	
Wages Payable		**50,000**

***Job 50 $30,000 = 1,500 hours × $20**
Job 51 20,000 = 1,250 hours × $16
Total $50,000

PE 17–3A (FIN MAN); PE 2–3A (MAN)

Factory Overhead	**20,800**	
Materials		**6,500**
Wages Payable		**8,000**
Utilities Payable		**3,500**
Accumulated Depreciation		**2,800**

PE 17–3B (FIN MAN); PE 2–3B (MAN)

Factory Overhead	**13,300**	
Materials		**4,000**
Wages Payable		**4,700**
Utilities Payable		**2,000**
Accumulated Depreciation		**2,600**

PE 17–4A (FIN MAN); PE 2–4A (MAN)

a. $5.00 = $250,000/50,000 direct labor hours

b. Job 80 $5,000 = 1,000 hours × $5.00 per hour
Job 82 4,000 = 800 hours × $5.00 per hour
Total $9,000

c. Work in Process	**9,000**	
Factory Overhead		**9,000**

PE 17–4B (FIN MAN); PE 2–4B (MAN)

a. $8.00 = $160,000/20,000 direct labor hours

b. Job 50 $12,000 = 1,500 hours × $8.00 per hour
Job 51 10,000 = 1,250 hours × $8.00 per hour
Total $22,000

c.

Work in Process	22,000	
Factory Overhead		22,000

PE 17–5A (FIN MAN); PE 2–5A (MAN)

a.

	Job 80	Job 82
Direct materials	$12,800	$12,500
Direct labor	14,000	9,600
Factory overhead	5,000	4,000
Total costs	$31,800	$26,100

b. Job 80 $53.00 = $31,800/600 units
Job 82 $29.00 = $26,100/900 units

PE 17–5B (FIN MAN); PE 2–5B (MAN)

a.

	Job 50	Job 51
Direct materials	$ 3,000	$ 3,600
Direct labor	30,000	20,000
Factory overhead	12,000	10,000
Total costs	$45,000	$33,600

b. Job 50 $30.00 = $45,000/1,500 units
Job 51 $28.00 = $33,600/1,200 units

PE 17–6A (FIN MAN); PE 2–6A (MAN)

$412,500 = $100,000 + (25,000 × $12.50)*

***Cost per unit of goods produced during the year = $12.50 = $500,000/40,000 units**

PE 17–6B (FIN MAN); PE 2–6B (MAN)

$675,000 = $75,000 + (60,000 × $10.00)*

***Cost per unit of goods produced during the year = $10.00 = $900,000/90,000 units**

EXERCISES

Ex. 17–1 (FIN MAN); Ex. 2–1 (MAN)

a. Materials requisitioned for use (both direct and indirect).
b. Factory labor used (both direct and indirect).
c. Application of factory overhead costs to jobs.
d. Jobs completed.
e. Cost of goods sold.

Ex. 17–2 (FIN MAN); Ex. 2–2 (MAN)

a.

Cost of goods sold:		
Sales	$775,000	
Less gross profit	265,000	
Cost of goods sold	$510,000	

b.

Direct materials cost:		
Materials purchased		$303,000
Less: Indirect materials	$ 32,000	
Materials inventory	35,000	67,000
Direct materials cost		$236,000

c.

Direct labor cost:		
Total manufacturing costs for the period		$620,000
Less: Direct materials cost	$236,000	
Factory overhead	112,500*	348,500
Direct labor cost		$271,500

*$63,000 + $32,000 + $17,500

Ex. 17–3 (FIN MAN); Ex. 2–3 (MAN)

a.

RECEIVED			ISSUED			BALANCE			
Receiving Report Number	Quantity	Unit Price	Materials Requisition Number	Quantity	Amount	Date	Quantity	Amount	Unit Price
						Aug. 1	200	$3,200	$16.00
110	240	$18.00				Aug. 3	200	3,200	16.00
							240	4,320	18.00
			108	300	$5,000*	Aug. 5	140	2,520	18.00
139	160	20.00				Aug. 19	140	2,520	18.00
							160	3,200	20.00
			120	180	3,320**	Aug. 25	120	2,400	20.00

*Aug. 5 issuance	200 at $16.00	$3,200
	100 at $18.00	1,800
		$5,000
**Aug. 25 issuance	140 at $18.00	$2,520
	40 at $20.00	800
		$3,320

b. Ending wire cable balance:

120 at $20.00	$2,400	

c.

Work in Process ($5,000 + $3,320)	8,320	
Materials		8,320

d. Comparing quantities on hand as reported in the materials ledger with predetermined order points enables management to order materials before a lack of materials causes idle time. Also, the subsidiary ledger can include columns for recording quantities ordered, so that management can have easy access to information about materials on order.

Ex. 17–4 (FIN MAN); Ex. 2–4 (MAN)

Work in Process	72,225	
Factory Overhead	325	
Materials		72,550

Ex. 17–5 (FIN MAN); Ex. 2–5 (MAN)

a.	Materials	1,637,800	
	Accounts Payable		1,637,800
b.	Work in Process	1,632,700	
	Factory Overhead	11,700	
	Materials		1,644,400

c.

	Fabric	Polyester Filling	Lumber	Glue
Balance, November 1	$ 33,500	$ 8,100	$107,400	$ 1,600
November purchases	549,900	104,200	969,500	14,200
Less: November requisitions	551,700	88,700	992,300	11,700
Balance, November 30	$ 31,700	$ 23,600	$ 84,600	$ 4,100

Ex. 17–6 (FIN MAN); Ex. 2–6 (MAN)

Work in Process	15,370	
Factory Overhead	13,400	
Wages Payable		28,770

Ex. 17–7 (FIN MAN); Ex. 2–7 (MAN)

a.	Work in Process	1,312.20	
	Factory Overhead	153.80	
	Wages Payable		1,466.00

Supporting Calculations:

		Labor Costs (Hourly rate × Hours)				
	Hourly Rate	Job 111	Job 112	Job 113	Direct Labor (sum of job costs)	Indirect Labor
Johnny Daniels	$11.40	$205.20	$114.00	$ 57.00	$ 376.20	$ 79.80
Jack Walker	13.50	94.50	108.00	310.50	513.00	27.00
Jim Morgan	11.75	94.00	141.00	188.00	423.00	47.00
					$1,312.20	$153.80

b. The direct labor costs in the completed jobs would become part of finished goods inventory. The direct labor costs in Job 113 would remain part of work in process inventory.

Ex. 17–8 (FIN MAN); Ex. 2–8 (MAN)

a.	Work in Process	6,072	
	Factory Overhead	2,760	
	Wages Payable		8,832
b.	Work in Process	10,120	
	Factory Overhead		10,120

$6,072/$12 per hour = 506 hours
506 hours × $20 per hour = $10,120

Ex. 17–9 (FIN MAN); Ex. 2–9 (MAN)

a. Factory 1: $18.50 per machine hour ($236,800/12,800 machine hours)

b. Factory 2: $13.00 per direct labor hour ($118,300/9,100 direct labor hours)

c. Factory 1:

Work in Process	23,495	
Factory Overhead ($18.50 × 1,270)		23,495

Factory 2:

Work in Process	11,505	
Factory Overhead ($13.00 × 885)		11,505

d. Factory 1—$295 credit (overapplied) ($23,495 – $23,200)

Factory 2—$120 debit (underapplied) ($11,505 – $11,625)

Ex. 17–10 (FIN MAN); Ex. 2–10 (MAN)

The estimated shop overhead is determined as follows:

Shop and repair equipment depreciation	$ 12,800
Shop supervisor salaries	93,125
Shop property tax	22,300
Shop supplies	12,650
Total shop overhead	$140,875

The engine parts and shop labor are direct to the jobs and are not included in the shop overhead rate. The advertising and administrative expenses are selling and administrative expenses that are not included in the shop overhead but are treated as period expenses.

Ex. 17–10 (FIN MAN); Ex. 2–10 (MAN) Concluded

The estimated activity base is determined by dividing the shop direct labor cost by the direct labor rate, as follows:

$$\frac{\$520{,}625}{\$17 \text{ per hour}} = 30{,}625 \text{ hours}$$

The predetermined shop overhead rate is:

$$\frac{\$140{,}875}{30{,}625} = \$4.60 \text{ per direct labor hour}$$

Ex. 17–11 (FIN MAN); Ex. 2–11 (MAN)

a. Estimated annual operating room overhead: $367,500

Estimated operating room activity base, number of operating room hours:

Hours per day	7
Days per week.....	× 6
Weeks per year (net of maintenance weeks)	× 50
Estimated annual operating room hours.....	2,100

Predetermined surgical overhead rate:

$$\frac{\$367{,}500}{2{,}100 \text{ hours}} = \$175 \text{ per hour}$$

b. Allison Mann's procedure:

Number of surgical room hours	5
Predetermined surgical room overhead rate	× $175
Procedure overhead.....	$ 875

c. Actual hours used in August	182
Predetermined surgical room overhead rate	× $175
Surgical room overhead applied, August.....	$31,850
Actual surgical room overhead incurred, August.....	30,700
Overapplied surgical room overhead (credit balance)	$ 1,150

Ex. 17–12 (FIN MAN); Ex. 2–12 (MAN)

a.	Finished Goods	253,900	
	Work in Process		253,900
b.	Cost of unfinished jobs at January 31:		
	Balance in Work in Process at January 1	$ 15,500	
	Add: Direct materials	86,200	
	Direct labor	64,300	
	Factory overhead	93,700	$259,700
	Less: Jobs finished during January		253,900
	Balance in Work in Process at January 31		$ 5,800

Ex. 17–13 (FIN MAN); Ex. 2–13 (MAN)

a.	Work in Process	20,000	
	Factory Overhead	725	
	Materials		20,725
b.	Work in Process	4,290	
	Factory Overhead	6,380	
	Wages Payable		10,670
c.	Work in Process	10,725	
	Factory Overhead		10,725

Predetermined overhead rate: $3,900/$1,560 = 250% or
$2,200/$880 = 250%

Direct labor cost × Predetermined factory overhead rate:
$4,290 × 250% = $10,725

d.	Finished Goods	18,340*	
	Work in Process		18,340

* $12,260 + $6,080

Ex. 17–14 (FIN MAN); Ex. 2–14 (MAN)

a.

WRECKIN RONNIE INC.
Income Statement
For the Month Ended July 31, 2008

Revenues		$520,000
Cost of goods sold		301,300
Gross profit		$218,700
Selling expenses	$119,000	
Administrative expenses	52,100	171,100
Income from operations		$ 47,600

b. Materials inventory:

Purchased materials		$165,800
Less: Materials used in production		147,600
Materials inventory, July 31		$ 18,200

Work in process inventory:

Materials used in production		$147,600
Direct labor		96,250
Factory overhead (80% × $96,250)		77,000
Additions to work in process		$320,850
Less: Transferred to finished goods		302,900
Work in process inventory, July 31		$ 17,950

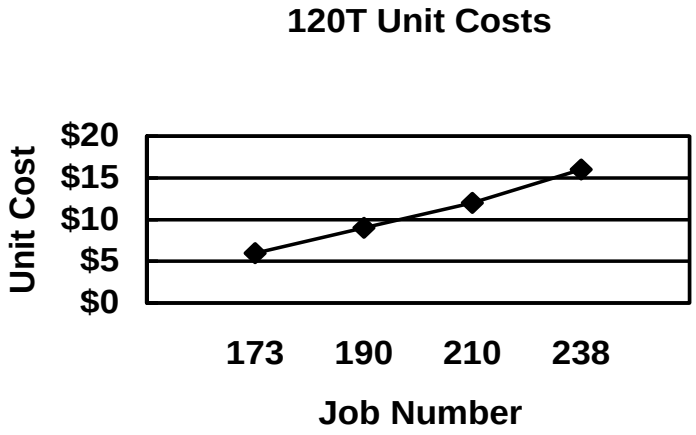
Finished goods inventory:

Transferred to finished goods		$302,900
Less: Cost of goods sold		301,300
Finished goods inventory, July 31		$ 1,600

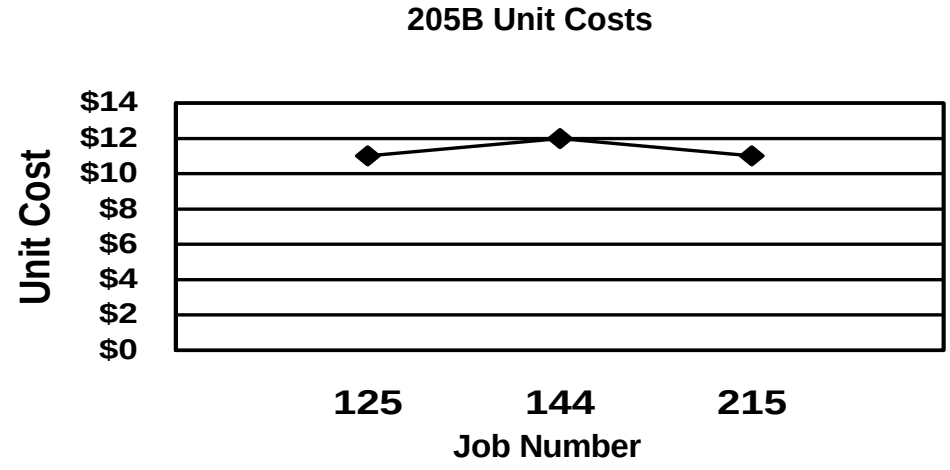
Ex. 17–15 (FIN MAN); Ex. 2–15 (MAN)

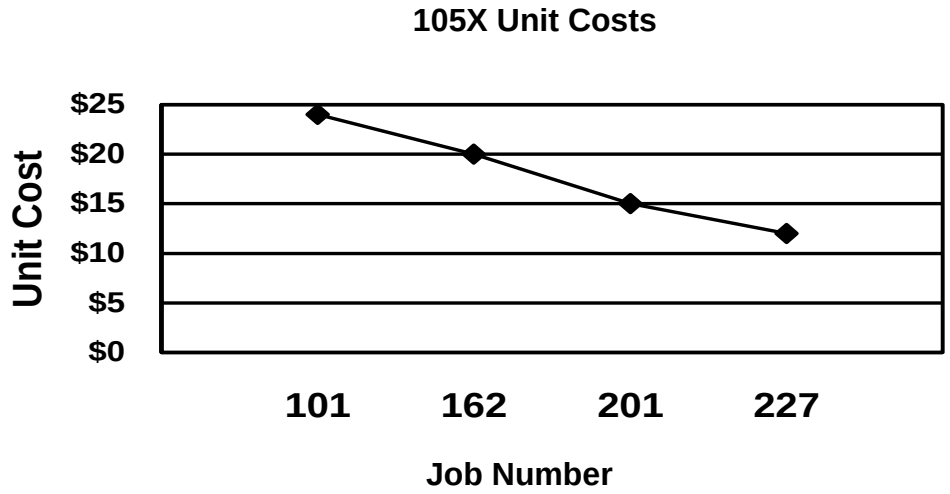
a.

Date	Job No.	Quantity	Product	Amount	Unit Cost
Jan. 2	101	450	105X	$10,350	$23
Jan. 24	125	1,500	205B	16,500	11
Feb. 18	144	750	205B	9,000	12
Mar. 4	162	500	105X	10,000	20
Mar. 28	173	1,100	120T	6,600	6
May 20	190	1,250	120T	11,250	9
June 10	201	450	105X	6,750	15
Aug. 9	210	1,900	120T	22,800	12
Sept. 16	215	500	205B	5,500	11
Nov. 11	227	650	105X	7,800	12
Dec. 9	238	1,050	120T	16,800	16



Ex. 17–15 (FIN MAN); Ex. 2–15 (MAN) Concluded





As can be seen, the unit costs behave differently for each product. 120T has increasing unit costs during the year, 205B is steady, and 105X has decreasing unit costs during the year.

b. Management should want to determine why 120T costs are increasing and why 105X costs are decreasing. This information can be determined from the job cost sheets for each job. By comparing the cost sheets from job to job (for a particular product), management can isolate the cause of the cost changes. The cost sheets will show how materials, labor, and overhead are consumed across the production process for each job. This information can isolate the problem or opportunity areas.

Ex. 17–16 (FIN MAN); Ex. 2–16 (MAN)

a. The first item to note is that the cost did not go up due to any increases in the cost of labor or materials. Rather, the cost of the plaques increased because Job 116 used more labor and materials per unit than did Job 103. Specifically, Job 103 required exactly the same number of backboards and brass plates as the number of actual plaques shipped. However, Job 116 required five more backboards and brass plates than the number actually shipped (25 vs. 20). In addition, the labor hours for Job 103 were as follows:

Engraving: (30 units × 6 min. per unit)/60 min. = 3 hours

Assembly: (30 units × 3 min. per unit)/60 min. = 1.5 hours

These are the labor hours to be expected for 30 plaques. However, the labor hours for Job 116 were:

Engraving: (20 units × 6 min. per unit)/60 min. = 2 hours

Assembly: (20 units × 3 min. per unit)/60 min. = 1 hour

Job 116's 6 labor hours are 3 more than should have been expected for a job of 20 plaques [(20 × 9 min.)/60 min. = 3 hrs.]. As a result, the additional hours of labor cost, applied factory overhead, and direct materials cost cause the unit cost of Job 116 to increase.

b. Apparently, the engraving and assembly work is becoming sloppy. Job 116 required 25 engraved brass plates in order to get 20 with acceptable quality. It is likely that the engraver is not being careful in correctly spelling the names. The names should be supplied to the engraver using large typewritten fonts so that it is easy to read the names. The engraver should be instructed to be careful in engraving the names. The assembly operation also needs some improvement. It took 25 assembly operations to properly assemble 20 plaques. It may be that the plates are assembled off-register (crooked) to the backboard. This could be improved by using a fixture to properly align the plate to the backboard. Alternatively, it's possible misengraved plaques were assembled to backboards and needed to be disassembled, reengraved, and reassembled to new backboards.

Ex. 17–17 (FIN MAN); Ex. 2–17 (MAN)

a.

May	7	Work in Process (440 hrs. × $175)	77,000	
		Salaries Payable		77,000
	11	Work in Process	24,000	
		Cash		24,000
	22	Work in Process (225 hrs. × $250)	56,250	
		Salaries Payable		56,250
	25	Work in Process	47,000	
		Consultant Fees Payable		47,000
	30	Work in Process (665 × $45)	29,925	
		Office Overhead		29,925
	31	Office Overhead	20,000	
		Cash		20,000
	31	Office Overhead	6,000	
		Supplies		6,000
	31	Salaries Payable	55,000	
		Cash		55,000
	31	Accounts Receivable	260,000	
		Fees Earned		260,000
	31	Cost of Services	234,175	
		Work in Process		234,175*

*$77,000 + $24,000 + $56,250 + $47,000 + $29,925

b.

Office overhead incurred ($20,000 + $6,000)	$ 26,000
Office overhead applied	29,925
Overapplied overhead	$ (3,925)

c.

Fees earned	$260,000
Cost of services	230,250*
Gross profit	$ 29,750

*$234,175 – $3,925. Assumes the over- or underapplied office overhead is closed to cost of services annually.

Note to Instructors: The consultant fees and travel costs can be directly assigned to the case and thus are not treated as office overhead. Costs such as secretarial and administrative salaries and supplies would be part of office overhead incurred.

Ex. 17–18 (FIN MAN); Ex. 2–18 (MAN)

a.	Work in Process	247,000	
	Salaries Payable		247,000
b.	Work in Process	508,000	
	Accounts Payable		508,000
c.	Work in Process (40% × $508,000)	203,200	
	Agency Overhead		203,200
d.	Cost of Services	609,800	
	Work in Process		609,800

Cost of completed jobs, $609,800:

	Spitzer Hotel	Gonzalez Bank
July 1 balance	$120,000	$ 15,000
July costs:		
Direct labor	42,000	17,000
Media purchases	154,000	143,000
Overhead	61,600	57,200
Total costs	$377,600	$232,200

PROBLEMS

Prob. 17–1A (FIN MAN); Prob. 2–1A (MAN)

a.	Materials	233,000	
	Accounts Payable		233,000
b.	Work in Process	202,700	
	Factory Overhead	5,600	
	Materials		208,300
c.	Work in Process	128,000	
	Factory Overhead	62,500	
	Wages Payable		190,500
d.	Factory Overhead	89,300	
	Selling Expenses	64,000	
	Administrative Expenses	37,800	
	Accounts Payable		191,100
e.	Factory Overhead	7,500	
	Selling Expenses	1,300	
	Administrative Expenses	1,250	
	Prepaid Expenses		10,050
f.	Factory Overhead	18,900	
	Depreciation Expense—Office Equipment	14,700	
	Depreciation Expense—Store Equipment	2,600	
	Accumulated Depreciation—Fixed Assets		36,200
g.	Work in Process	190,000	
	Factory Overhead		190,000
h.	Finished Goods	583,300	
	Work in Process		583,300
i.	Cost of Goods Sold	577,700	
	Finished Goods		577,700

Prob. 17–2A (FIN MAN); Prob. 2–2A (MAN)

1.	a.	Materials	137,000	
		Accounts Payable		137,000
	b.	Work in Process	238,000	
		Factory Overhead	53,600	
		Materials		125,750
		Wages Payable		165,850
	c.	Factory Overhead	4,950	
		Accounts Payable		4,950
	d.	Factory Overhead	3,700	
		Accumulated Depreciation—Machinery and Equipment		3,700
	e.	Work in Process	71,179	
		Factory Overhead (1,343 hours × $53)		71,179
	f.	Finished Goods	177,204	
		Work in Process		177,204

Computation of cost of jobs finished:

Job	Direct Materials	Direct Labor	Factory Overhead	Total
No. 601	$18,100	$17,000	$11,395	$ 46,495
No. 602	20,000	25,500	12,190	57,690
No. 603	13,050	9,700	9,275	32,025
No. 605	15,700	14,800	10,494	40,994
Total				$177,204

	g.	Accounts Receivable	236,030	
		Sales		236,030
		Cost of Goods Sold	145,179	
		Finished Goods		145,179

Computation of cost of jobs sold:

Job	
No. 601	$ 46,495
No. 602	57,690
No. 605	40,994
Total	$145,179

Prob. 17–2A (FIN MAN); Prob. 2–2A (MAN) Concluded

2.

Work in Process				Finished Goods			
(b)	238,000	(f)	177,204	(f)	177,204	(g)	145,179
(e)	71,179						
Bal.	131,975			Bal.	32,025		

3. Schedule of unfinished jobs:

Job	Direct Materials	Direct Labor	Factory Overhead	Total
No. 604	$34,500	$33,550	$15,900	$ 83,950
No. 606	17,800	18,300	11,925	48,025
Balance of Work in Process, April 30				$131,975

4. Schedule of completed jobs:

Job	Direct Materials	Direct Labor	Factory Overhead	Total
Finished Goods, June 30 (Job 603).....	$13,050	$9,700	$9,275	$32,025

Prob. 17–3A (FIN MAN); Prob. 2–3A (MAN)

1. and 2.

JOB ORDER COST SHEET

Customer	**Ed Douthett**	**Date**	**July 1, 2008**
Address	**411 Austin Lane**	**Date wanted**	**Sept. 13, 2008**
	Alexandria	**Date completed**	**Sept. 10, 2008**
Item	**Reupholster couch and chairs**	**Job. No.**	**00–10–23**

ESTIMATE

Direct Materials		Direct Labor		Summary	
	Amount		**Amount**		**Amount**
17 meters at $23	391.00	24 hours at $14	336.00	Direct materials	391.00
				Direct labor	336.00
				Factory overhead	218.40
Total	391.00	Total	336.00	Total cost	945.40

ACTUAL

Direct Materials			Direct Labor			Summary	
Mat. Req. No.	Descrip-tion	Amount	Time Ticket No.	Descrip-tion	Amount	Item	Amount
3480	7 meters at $23	161.00	H143	13 hours at $14	182.00	Direct materials	414.00
						Direct labor	392.00
3492	11 meters at $23	253.00	H151	15 hours at $14	210.00	Factory overhead	254.80
Total		414.00	Total		392.00	Total cost	1,060.80

Comments:
The direct materials cost exceeded the estimate by $23 because two meters of materials were spoiled. The direct labor cost exceeded the estimate by $56 because an additional four hours of labor were used by an inexperienced employee.

Prob. 17–4A (FIN MAN); Prob. 2–4A (MAN)

1. Supporting calculations:

Job No.	Quan-tity	Nov. 1 Work in Process	Direct Materials	Direct Labor	Factory Overhead	Total Cost	Unit Cost	Units Sold	Cost of Goods Sold
No. 111	70	$ 20,000	$ 15,000	$ 12,000	$ 9,000	$ 56,000	$800.00	60	$ 48,000
No. 112	100	30,000	23,000	18,000	13,500	84,500	$845.00	100	84,500
No. 113	120		27,500	25,000	18,750	71,250	$593.75	80	47,500
No. 114	100		11,000	12,500	9,375	32,875		0	0
No. 115	175		28,000	27,500	20,625	76,125	$435.00	150	65,250
No. 116	80		15,000	14,500	10,875	40,375		0	0
Total	645	$ 50,000	$119,500	$109,500	$ 82,125	$361,125			$245,250

A. $122,500. Materials applied to production in November + indirect materials. ($119,500 + $3,000)

B. $50,000. From table above and problem.

C. $119,500. From table above.

D. $109,500. From table above.

E. $82,125. $109,500 × 0.75 and from table above.

F. $287,875. ($56,000 + $84,500 + $71,250 + $76,125)

G. $245,250. From table above.

H. $20,500. Wages incurred less direct labor applied to production in November. ($130,000 – $109,500)

2. November 30 balances:

Materials	$ 7,500	($10,000 + $120,000 – $122,500)
Work in Process	$73,250*	($32,875 + $40,375, Job 114 and Job 116)
Finished Goods	$42,625**	($287,875 – $245,250)
Factory Overhead	$ 3,875 Dr.	underapplied ($2,500 + $20,500 + $3,000 + $60,000 – $82,125)

* or ($50,000 + $119,500 + $109,500 + $82,125 – $287,875)

**

Job No.	Units in Inventory	Unit Cost	Total Cost
Job 111	10	$ 800.00	$ 8,000
Job 112	0	0	0
Job 113	40	593.75	23,750
Job 115	25	435.00	10,875
Total			$42,625

Prob. 17–5A (FIN MAN); Prob. 2–5A (MAN)

1.

OUTDOOR SOFTWARE INC.
Income Statement
For the Year Ended December 31, 2008

Sales		$ 8,000,000
Cost of goods sold		1,002,000
Gross profit		$ 6,998,000
Selling expenses:		
Advertising expenses	$ 2,500,000	
Salespersons commissions	800,000	
Advertising design	700,000	
Total selling expenses		4,000,000
Income from operations		$ 2,998,000

Supporting calculations:

Sales: 40,000 units × $200 = $8,000,000

Cost of goods sold: 40,000 units × $25.05 = $1,002,000

Manufacturing cost per unit:

Direct materials:		
Blank CD	$ 4.50	
Packaging	8.00	
Manual	11.00	
Total direct materials		$23.50
Direct labor		0.75
Factory overhead cost		0.80*
Total manufacturing cost per CD		$25.05

***$1,200/1,500 CDs per hour**

Salespersons commissions: $8,000,000 × 10% = $800,000

2. Finished Goods balance, December 31, 2008:

(45,000 units – 40,000 units) × $25.05 = $125,250

Work in Process, December 31, 2008:

1,000 units × ($23.50 + $0.80) = $24,300

The materials and copying have already been applied to the 1,000 units. Only the direct assembly labor has yet to be applied for these units.

Prob. 17–1B (FIN MAN); Prob. 2–1B (MAN)

a.	Materials	705,000	
	Accounts Payable		705,000
b.	Work in Process	482,000	
	Factory Overhead	45,000	
	Materials		527,000
c.	Work in Process	322,800	
	Factory Overhead	95,000	
	Wages Payable		417,800
d.	Factory Overhead	340,500	
	Selling Expenses	215,000	
	Administrative Expenses	128,500	
	Accounts Payable		684,000
e.	Factory Overhead	23,000	
	Selling Expenses	15,000	
	Administrative Expenses	9,000	
	Prepaid Expenses		47,000
f.	Depreciation Expense—Office Building	39,000	
	Depreciation Expense—Office Equipment	19,700	
	Depreciation Expense—Warehouse Equipment	12,300	
	Accumulated Depreciation—Fixed Assets		71,000
g.	Work in Process	579,600	
	Factory Overhead		579,600
h.	Finished Goods	1,643,700	
	Work in Process		1,643,700
i.	Cost of Goods Sold	1,650,000	
	Finished Goods		1,650,000

Prob. 17–2B (FIN MAN); Prob. 2–2B (MAN)

1.	a.	Materials	9,400	
		Accounts Payable		9,400
	b.	Work in Process	13,375	
		Factory Overhead	1,270	
		Materials		7,505
		Wages Payable		7,140
	c.	Factory Overhead	405	
		Accounts Payable		405
	d.	Factory Overhead	520	
		Accumulated Depreciation—Machinery and Equipment		520
	e.	Work in Process	2,345	
		Factory Overhead (67 hours × $35)		2,345
	f.	Finished Goods	8,920	
		Work in Process		8,920

Computation of cost of jobs finished:

Job	Direct Materials	Direct Labor	Factory Overhead	Total
No. 101	$ 875	$ 750	$210	$1,835
No. 102	1,275	985	350	2,610
No. 103	660	500	280	1,440
No. 105	1,300	1,350	385	3,035
Total				$8,920

	g.	Accounts Receivable	11,500	
		Sales		11,500
		Cost of Goods Sold	5,885	
		Finished Goods		5,885

Computation of cost of jobs sold:

Job	
No. 101	$1,835
No. 102	2,610
No. 103	1,440
Total	$5,885

2.

Work in Process				Finished Goods			
(b)	13,375	(f)	8,920	(f)	8,920	(g)	5,885
(e)	2,345						
Bal.	6,800			Bal.	3,035		

3. Schedule of unfinished jobs:

Job	Direct Materials	Direct Labor	Factory Overhead	Total
No. 104	$2,200	$1,765	$875	$4,840
No. 106	925	790	245	1,960
Balance of Work in Process, May 31.....				$6,800

4. Schedule of completed jobs:

Job	Direct Materials	Direct Labor	Factory Overhead	Total
Finished Goods, May 31 (Job 105).....	$1,300	$1,350	$385	$3,035

Prob. 17–3B (FIN MAN); Prob. 2–3B (MAN)
1. and 2.

JOB ORDER COST SHEET

Customer	**Ed Stone**	**Date**	**July 10, 2008**
Address	**10 Publishers Lane**	**Date wanted**	**Aug. 16, 2008**
	New York	**Date completed**	**Aug. 11, 2008**
Item	**Reupholster couch and chair**	**Job. No.**	**00–8–38**

ESTIMATE

Direct Materials		Direct Labor		Summary	
	Amount		Amount		Amount
12 meters at $20	240.00	15 hours at $13	195.00	Direct materials	240.00
				Direct labor	195.00
				Factory overhead	68.25
Total	240.00	Total	195.00	Total cost	503.25

ACTUAL

Direct Materials			Direct Labor			Summary	
Mat. Req. No.	Description	Amount	Time Ticket No.	Description	Amount	Item	Amount
U642	6 meters at $20	120.00	1519	10 hours at $12	120.00	Direct materials	280.00
						Direct labor	216.00
U651	8 meters at $20	160.00	1520	8 hours at $12	96.00	Factory overhead	75.60
Total		280.00	Total		216.00	Total cost	571.60

Comments:
The direct materials cost exceeded the estimate by $40 because two meters of materials were spoiled. The direct labor cost exceeded the estimate by $21 because an additional three hours of labor were used by an inexperienced employee that worked for $1/hr. less.

Prob. 17–4B (FIN MAN); Prob. 2–4B (MAN)

1. Supporting calculations:

Job No.	Quan-tity	Oct. 1 Work in Process	Direct Materials	Direct Labor	Factory Overhead	Total Cost	Unit Cost	Units Sold	Cost of Goods Sold
No. 51	175	$ 5,000	$ 17,000	$ 13,000	$ 18,200	$ 53,200	$304.00	150	$ 45,600
No. 52	375	11,000	28,000	17,000	23,800	79,800	$212.80	215	45,752
No. 53	175		10,000	4,500	6,300	20,800		0	0
No. 54	200		27,500	11,000	15,400	53,900	$269.50	160	43,120
No. 55	150		18,000	10,500	14,700	43,200	$288.00	100	28,800
No. 56	100		5,000	3,700	5,180	13,880		0	0
Total	1,175	$ 16,000	$105,500	$ 59,700	$ 83,580	$264,780			$163,272

A. $108,000. Materials applied to production in October + indirect materials. ($105,500 + $2,500)

B. $16,000. From table above and problem.

C. $105,500. From table above.

D. $59,700. From table above.

E. $83,580. ($59,700 × 1.4) and from table above.

F. $230,100. ($53,200 + $79,800 + $53,900 + $43,200)

G. $163,272. From table above.

H. $16,300. Wages incurred less direct labor applied to production in October. ($76,000 – $59,700)

2. October 31 balances:

Materials	$12,000	($20,000 + $100,000 – $108,000)
Work in Process	$34,680*	($20,800 + $13,880, Job 53 and Job 56)
Finished Goods	$66,828**	($230,100 – $163,272)
Factory Overhead	$ 2,280 Cr.	overapplied ($5,000 + $16,300 + $2,500 + $57,500 – $83,580)

* or ($16,000 + $105,500 + $59,700 + $83,580 – $230,100)

**

Job No.	Units in Inventory	Unit Cost	Total Cost
Job 51	25	$304.00	$ 7,600
Job 52	160	212.80	34,048
Job 54	40	269.50	10,780
Job 55	50	288.00	14,400
Total			$66,828

Prob. 17–5B (FIN MAN); Prob. 2–5B (MAN)

1.

NEW MUSIC INC.
Income Statement
For the Year Ended December 31, 2008

Sales			$13,000,000
Cost of goods sold			5,250,000
Gross profit			$ 7,750,000
Selling expenses:			
Media campaign	$ 3,500,000		
Promotional materials	1,500,000		
Shipping expenses	150,000		
Total selling expenses		$5,150,000	
Administrative expenses:			
Legal expenses		800,000	
Total operating expenses			5,950,000
Income from operations			$ 1,800,000

Supporting calculations:

Sales: 1,000,000 units × $13 = $13,000,000

Cost of goods sold: 1,000,000 units × $5.25 = $5,250,000

Manufacturing cost per unit (CD):

Direct materials:		
Blank CD	$3.00	
Jewel case	1.00	
Song lyric insert	0.50	
Total direct materials		$4.50
Direct labor		0.50
Factory overhead		0.25*
Total manufacturing cost per CD		$5.25

*$500/2,000 CDs per hour

Promotional materials: 50,000 stores × $30 = $1,500,000

Shipping expenses: 1,000,000 units × $0.15 = $150,000

2. Finished Goods balance, December 31, 2008:

(1,500,000 units – 1,000,000 units) × $5.25 = $2,625,000

Work in Process, December 31, 2008:

20,000 units × ($4.50 + $0.25) = $95,000

The materials and copying have already been applied to the 20,000 units. Only the direct assembly labor has yet to be applied for these units.

SPECIAL ACTIVITIES

SA 17–1 (FIN MAN); SA 2–1 (MAN)

Two or three trends seem apparent. Starting with the most obvious:

a. There appears to be a strong "Friday effect." The unit cost on Friday increases dramatically, then falls on Monday. Apparently, the workforce is preparing early for the weekend.

b. There also appears to be a general increasing trend in the unit cost. Every Friday effect is larger than the previous Friday. Much the same can be said about the other days of the week.

c. It's hard to tell, but there may also be a "within week" trend. The unit cost appears to increase gradually from Monday through Thursday, before jumping on Friday. At the very least, Mondays are the best operating days, while Fridays are the worst.

A number of further pieces of information should be requested.

a. First, it would be good to verify these trends with some other products. This trend is probably not product-related but related generally to the day of the week. This would mean that the trend should be apparent in the other products.

b. The data should be sorted by shift and by employee. It's possible that the effect is stronger on one shift than on another or that just a few employees are responsible for the effect. It may not be prevalent in the general population of workers.

c. The Friday–Monday phenomenon is likely related to the workforce, but the same cannot be said about the larger increasing trend over the four weeks. It could be caused by any number of factors. A good first look would be to isolate materials costs to see if these are contributors. How much of the effect is labor and how much is material should be verified. It's possible that the general increase in cost over time is the result of loss of machine tolerances. Thus, more and more material is being required to produce a unit of product.

d. Has there been any significant change in supervisors or crucial employees that may explain this effect?

e. Have prices increased gradually for the raw materials?

SA 17–2 (FIN MAN); SA 2–2 (MAN)

1. **The engineer is concerned that direct labor is not related to overhead consumption because direct labor is a small part of the cost structure. Apparently, the company has replaced labor with expensive machine technology and support. This, of course, represents more factory overhead. Just because the direct labor is "designed out" of the product will not mean that this overhead will magically disappear. More likely, the direct labor hours will be replaced by machine-related factory overhead. Thus, the factory overhead goes up while the activity base (direct labor) goes down. Hence, the factory overhead rate will go up.**
2. **Since each direct labor hour now has $1,500 of factory overhead, small mistakes in the direct labor time estimates can have a large impact on the estimated cost of a product. This is very critical. If the company underestimates the direct labor content by a small amount, it will underbid and win the job. Unfortunately, the job will turn out to have less profitability than expected because the price is smaller than it should be. If the company overestimates the labor time, it will overbid the job. Thus, it will lose out to competitors who bid more accurately. This puts the company into a lose-lose situation when such small labor time errors have such large dollar impacts on the final cost estimate.**
3. **The engineer's concern is valid. The company should consider replacing its direct labor time activity base with one that more accurately reflects its present resources. If the company is now highly automated, then machine hours may be a much more reasonable activity base.**

SA 17–3 (FIN MAN); SA 2–3 (MAN)

1. **The unit costs are influenced by both the price and quantity of inputs. On the price side, the cost of steel has dropped from $800 to $750 per ton. This is apparently the result of the purchasing manager's decision to reduce the cost of raw materials by going to a new vendor. No other input prices change. Some of the input quantities changed for the worse. Specifically:**

	Job 500	Job 750
Steel input per unit of product	2.0 tons	2.32 tons
Foundry labor per unit of product	12 hours	13 hours
Welding labor per unit of product.....	8 hours	10 hours

These numbers were determined by dividing the number of units produced by the total input quantities to discover the inputs per unit. The inputs for the components and shipping labor were unchanged between the two jobs.

2. **A possible reason for this deterioration in performance is related to the purchasing manager's decision to change vendors in order to secure a lower price per ton. The new vendor is apparently delivering a lower quality steel product to the company. As a result, the foundry operation is having to spend more time forming the steel parts. Moreover, the increased steel tons per unit is likely to be caused by scrapping some of the formed parts. The scrapped parts would need to be replaced by additional steel inputs, which would have the effect of increasing the number of tons required to make a unit of product. The welding operators are also apparently having difficulty welding the lower quality steel parts. As a result, longer welding time is required to assemble a completed unit.**

   Overall, management has learned that the drive for lower raw materials prices was a poor decision. The overall net result was higher costs from the additional waste caused by lower quality steel.

SA 17–4 (FIN MAN); SA 2–4 (MAN)

1. **Jake should record the debits for factory wages as a debit to Work in Process. The factory wages are product costs that must be accumulated in the cost of producing the product. Eventually, these wage costs will become part of finished goods inventory and cost of goods sold when the gift items are sold. Likewise, the depreciation should be recorded as a debit to Factory Overhead. The overhead is then applied to production work in process. Like the wages, the depreciation will also eventually become part of the finished goods inventory and cost of goods sold when the gift items are sold. Thus, both the wages and depreciation will end up on the income statement as cost of goods sold, not as individual expenses. The reason is because the accountant wants to match revenues and costs. Costs that are accumulated in the manufacture of products do not become expenses until the items are sold. Until that time, the costs are capitalized as inventory. If these costs were expensed immediately, the income for the firm would be understated for the period to the extent that there were any increases in the work in process or finished goods inventories.**
2. **Ronnie would not be concerned about immediately expensing administrative wages and depreciation because the benefits received from these costs are not product costs. Instead, these costs benefit a period of time. Thus, these costs should be expensed for the period.**

SA 17–5 (FIN MAN); SA 2–5 (MAN)

1. Direct labor cost:

Total actual overhead, 2004–2008	$3,025,000
Total direct labor cost, 2004–2008	$11,000,000
Predetermined overhead rate ($3,025,000/$11,000,000)	27.5% of direct labor cost

Machine hours:

Total actual overhead, 2004–2008	$3,025,000
Total machine hours, 2004–2008	250,000 hours
Predetermined overhead rate ($3,025,000/250,000 hours)	$12.10 per machine hour

2.

	2008		2007		2006	
	Direct Labor Cost	Machine Hours	Direct Labor Cost	Machine Hours	Direct Labor Cost	Machine Hours
Actual overhead	$590,000	$590,000	$918,000	$918,000	$450,000	$450,000
Applied overhead	591,250	605,000	921,250	907,500	448,250	423,500
(Over-) underapplied overhead	$ (1,250)	$(15,000)	$ (3,250)	$ 10,500	$ 1,750	$ 26,500

	2005		2004	
	Direct Labor Cost	Machine Hours	Direct Labor Cost	Machine Hours
Actual overhead	$566,000	$566,000	$501,000	$501,000
Applied overhead	561,000	580,800	503,250	508,200
(Over-) underapplied overhead	$ 5,000	$(14,800)	$ (2,250)	$ (7,200)

SA 17–5 (FIN MAN); SA 2–5 (MAN) Concluded

3. The best predetermined overhead rate is 27.5% of direct labor cost. Although the total overhead applied for each rate developed in part (1) is the same over the entire 5-year period (as a result of the method by which the predetermined overhead rates were developed), the predetermined overhead rate based on direct labor cost yields the least fluctuations in the amounts of over- or underapplied overhead considered on a year-by-year basis. With the rate based on direct labor cost, the over- or underapplied overhead ranges from $3,250 overapplied to $5,000 underapplied. This fluctuation in the over- or underapplied overhead compares favorably with the fluctuation resulting from using the current overhead base of direct materials ($10,000 overapplied to $21,000 underapplied over the past five years). For the machine-hour base, the over- or underapplied overhead ranges from $15,000 overapplied to $26,500 underapplied.