Chapter 2
Job-Order Costing

Solutions to Questions

2-1 By definition, manufacturing overhead consists of costs that cannot be practically traced to jobs. Therefore, if these costs are to be assigned to jobs, they must be allocated rather than traced.

2-2 The first step is to estimate the total amount of the allocation base (the denominator) that will be required for next period's estimated level of production. The second step is to estimate the total fixed manufacturing overhead cost for the coming period and the variable manufacturing overhead cost per unit of the allocation base. The third step is to use the cost formula $Y = a + bX$ to estimate the total manufacturing overhead cost (the numerator) for the coming period. The fourth step is to compute the predetermined overhead rate.

2-3 The job cost sheet is used to record all costs that are assigned to a particular job. These costs include direct materials costs traced to the job, direct labor costs traced to the job, and manufacturing overhead costs applied to the job. When a job is completed, the job cost sheet is used to compute the unit product cost.

2-4 Some production costs such as a factory manager's salary cannot be traced to a particular product or job, but rather are incurred as a result of overall production activities. In addition, some production costs such as indirect materials cannot be easily traced to jobs. If these costs are to be assigned to products, they must be allocated to the products.

2-5 If actual manufacturing overhead cost is applied to jobs, the company must wait until the end of the accounting period to apply overhead and to cost jobs. If the company computes actual overhead rates more frequently to get around this problem, the rates may fluctuate widely due to seasonal factors or variations in output. For this reason, most companies use predetermined overhead rates to apply manufacturing overhead costs to jobs.

2-6 The measure of activity used as the allocation base should drive the overhead cost; that is, the allocation base should cause the overhead cost. If the allocation base does not really cause the overhead, then costs will be incorrectly attributed to products and jobs and product costs will be distorted.

2-7 Assigning manufacturing overhead costs to jobs does not ensure a profit. The units produced may not be sold and if they are sold, they may not be sold at prices sufficient to cover all costs. It is a myth that assigning costs to products or jobs ensures that those costs will be recovered. Costs are recovered only by selling to customers—not by allocating costs.

2-8 The Manufacturing Overhead account is credited when overhead cost is applied to Work in Process. Generally, the amount of overhead applied will not be the same as the amount of actual cost incurred because the predetermined overhead rate is based on estimates.

2-9 Underapplied overhead occurs when the actual overhead cost exceeds the amount of overhead cost applied to Work in Process inventory during the period. Overapplied overhead occurs when the actual overhead cost is less than the amount of overhead cost applied to Work in Process inventory during the period. Underapplied or overapplied overhead is disposed of by closing out the amount to Cost of Goods Sold. The adjustment for underapplied overhead increases Cost of Goods Sold whereas the adjustment for overapplied overhead decreases Cost of Goods Sold.

2-10 Manufacturing overhead may be underapplied for several reasons. Control over overhead spending may be poor. Or, some of the overhead may be fixed and the actual amount of the allocation base may be less than estimated at the beginning of the period. In this situation, the amount of overhead applied to inventory will be less than the actual overhead cost incurred.

2-11 Underapplied overhead implies that not enough overhead was assigned to jobs during the period and therefore cost of goods sold was understated. Therefore, underapplied overhead is added to cost of goods sold. On the other hand, overapplied overhead is deducted from cost of goods sold.

2-12 A plantwide overhead rate is a single overhead rate used throughout a plant. In a multiple overhead rate system, each production department may have its own predetermined overhead rate and its own allocation base. Some companies use multiple overhead rates rather than plantwide rates to more appropriately allocate overhead costs among products. Multiple overhead rates should be used, for example, in situations where one department is machine intensive and another department is labor intensive.

2-13 When automated equipment replaces direct labor, overhead increases and direct labor decreases. This results in an increase in the predetermined overhead rate—particularly if it is based on direct labor.

The Foundational 15

1. The estimated total manufacturing overhead cost is computed as follows:

$$Y = \$10{,}000 + (\$1.00 \text{ per DLH})(2{,}000 \text{ DLHs})$$

Estimated fixed manufacturing overhead	$10,000
Estimated variable manufacturing overhead:	
$1.00 per DLH × 2,000 DLHs	2,000
Estimated total manufacturing overhead cost.....	$12,000

The predetermined overhead rate is computed as follows:

Estimated total manufacturing overhead (a)....	$12,000	
Estimated total direct labor hours (DLHs) (b) .	2,000	DLHs
Predetermined overhead rate (a) ÷ (b).....	$6.00	per DLH

2. The manufacturing overhead applied to Jobs P and Q is computed as follows:

	Job P	*Job Q*
Actual direct labor hours worked (a).....	1,400	500
Predetermined overhead rate per DLH (b).....	$6.00	$6.00
Manufacturing overhead applied (a) × (b).....	$8,400	$3,000

3. The direct labor hourly wage rate can be computed by focusing on either Job P or Job Q as follows:

	Job P	*Job Q*
Direct labor cost (a).....	$21,000	$7,500
Actual direct labor hours worked (b).....	1,400	500
Direct labor hourly wage rate (a) ÷ (b).....	$15.00	$15.00

The Foundational 15

4. Job P's unit product cost and Job Q's assigned manufacturing costs are computed as follows:

   Total manufacturing cost assigned to Job P:

Direct materials	$13,000
Direct labor	21,000
Manufacturing overhead applied ($6 per DLH × 1,400 DLHs)	8,400
Total manufacturing cost	$42,400

   Unit product cost for Job P:

Total manufacturing cost (a)	$42,400
Number of units in the job (b)	20
Unit product cost (a) ÷ (b)	$2,120

   Total manufacturing cost assigned to Job Q:

Direct materials	$ 8,000
Direct labor	7,500
Manufacturing overhead applied ($6 per DLH × 500 DLHs)	3,000
Total manufacturing cost	$18,500

5. The journal entries are recorded as follows:

Raw Materials	22,000	
Accounts Payable		22,000
Work in Process	21,000	
Raw Materials		21,000

6. The journal entry is recorded as follows:

Work in Process	28,500	
Wages Payable		28,500

The Foundational 15

7. The journal entry is recorded as follows:

Work in Process	11,400	
Manufacturing Overhead		11,400

8. The Schedule of Cost of Goods Manufactured is as follows:

Direct materials:		
Raw materials inventory, beginning.....	$ 0	
Add: Purchases of raw materials	22,000	
Total raw materials available	22,000	
Deduct: Raw materials inventory, ending.....	1,000	
Raw materials used in production.....		$21,000
Direct labor.....		28,500
Manufacturing overhead applied to work in process inventory		11,400
Total manufacturing costs.....		60,900
Add: Beginning work in process inventory.....		0
		60,900
Deduct: Ending work in process inventory.....		18,500
Cost of goods manufactured		$42,400

9. The journal entry is recorded as follows:

Finished Goods.....	42,400	
Work in Process.....		42,400

10. The completed T-account is as follows:

Work in Process			
Beg. Bal.	0		
(a)	21,000		
(b)	28,500		
(c)	11,400	(d)	42,400
End. Bal.	18,500		

(a) Raw material used in production = $21,000
(b) Direct labor cost = $28,500
(c) Manufacturing overhead applied = $11,400
(d) Cost of goods manufactured = $42,400

The Foundational 15

11. The Schedule of Cost of Goods Sold is as follows:

Finished goods inventory, beginning	$ 0
Add: Cost of goods manufactured	42,400
Cost of goods available for sale	42,400
Deduct: Finished goods inventory, ending	0
Unadjusted cost of goods sold	$42,400

12. The journal entry is recorded as follows:

Cost of Goods Sold	42,400	
Finished Goods		42,400

13. The amount of underapplied overhead is computed as follows:

Actual direct labor-hours (a)	1,900
Predetermined overhead rate (b)	$6.00
Manufacturing overhead applied (a) × (b)	$11,400
Actual manufacturing overhead	$12,500
Deduct: Manufacturing overhead applied	11,400
Underapplied overhead	$ 1,100

14. The journal entry is recorded as follows:

Cost of Goods Sold	1,100	
Manufacturing Overhead		1,100

15. The income statement is as follows:

Sales	$60,000
Cost of goods sold ($42,400 + $1,100)	43,500
Gross margin	16,500
Selling and administrative expenses	14,000
Net operating income	$ 2,500

Exercise 2-1 (10 minutes)

The estimated total manufacturing overhead cost is computed as follows:

$$Y = \$94{,}000 + (\$2.00 \text{ per DLH})(20{,}000 \text{ DLHs})$$

Estimated fixed manufacturing overhead	$ 94,000
Estimated variable manufacturing overhead: $2.00 per DLH × 20,000 DLHs	40,000
Estimated total manufacturing overhead cost	$134,000

The predetermined overhead rate is computed as follows:

Estimated total manufacturing overhead	$134,000	
÷ Estimated total direct labor hours (DLHs).....	20,000	DLHs
= Predetermined overhead rate.....	$6.70	per DLH

Exercise 2-2 (10 minutes)

Actual direct labor-hours	10,800
× Predetermined overhead rate.....	$23.40
= Manufacturing overhead applied.....	$252,720

Exercise 2-3 (10 minutes)

1. Total direct labor-hours required for Job A-500:

Direct labor cost (a)	$108
Direct labor wage rate per hour (b)	$12
Total direct labor hours (a) ÷ (b)	9

Total manufacturing cost assigned to Job A-500:

Direct materials	$230
Direct labor	108
Manufacturing overhead applied ($14 per DLH × 9 DLHs)	126
Total manufacturing cost	$464

2. Unit product cost for Job A-500:

Total manufacturing cost (a)	$464
Number of units in the job (b)	40
Unit product cost (a) ÷ (b)	$11.60

Exercise 2-4 (15 minutes)

a.	Raw Materials	80,000	
	Accounts Payable		80,000
b.	Work in Process	62,000	
	Manufacturing Overhead.....	9,000	
	Raw Materials		71,000
c.	Work in Process	101,000	
	Manufacturing Overhead.....	11,000	
	Wages Payable		112,000
d.	Manufacturing Overhead.....	175,000	
	Various Accounts		175,000

Exercise 2-5 (20 minutes)

Parts 1 and 2.

Cash			
		(a)	94,000
		(c)	132,000
		(d)	143,000

Raw Materials			
(a)	94,000	(b)	89,000
Bal.	5,000		

Work in Process			
(b)	78,000		
(c)	112,000		
(e)	152,000	(f)	342,000
Bal.	0		

Finished Goods			
(f)	342,000	(f)	342,000
Bal.	0		

Manufacturing Overhead			
(b)	11,000	(e)	152,000
(c)	20,000		
(d)	143,000	(g)	22,000
Bal.	0		

Cost of Goods Sold			
(f)	342,000		
(g)	22,000		
Bal.	364,000		

Exercise 2-6 (20 minutes)

1. Cost of Goods Manufactured

Direct materials:		
Raw materials inventory, beginning	$12,000	
Add: Purchases of raw materials	30,000	
Total raw materials available	42,000	
Deduct: Raw materials inventory, ending	18,000	
Raw materials used in production	24,000	
Less indirect materials included in manufacturing overhead	5,000	$ 19,000
Direct labor		58,000
Manufacturing overhead applied to work in process inventory		87,000
Total manufacturing costs		164,000
Add: Beginning work in process inventory		56,000
		220,000
Deduct: Ending work in process inventory		65,000
Cost of goods manufactured		$155,000

2. Cost of Goods Sold

Finished goods inventory, beginning	$ 35,000
Add: Cost of goods manufactured	155,000
Goods available for sale	190,000
Deduct: Finished goods inventory, ending	42,000
Unadjusted cost of goods sold	148,000
Add: Underapplied overhead	4,000
Adjusted cost of goods sold	$152,000

Exercise 2-7 (10 minutes)

1. Manufacturing overhead incurred (a).....	$215,000
Actual direct labor-hours.....	11,500
× Predetermined overhead rate	$18.20
= Manufacturing overhead applied (b).....	$209,300
Manufacturing overhead underapplied (a) – (b).....	$5,700

2. Because manufacturing overhead is underapplied, the cost of goods sold would increase by $5,700 and the gross margin would decrease by $5,700.

Exercise 2-8 (10 minutes)

Direct material.....	$10,000
Direct labor	12,000
Manufacturing overhead:	
$12,000 × 125%.....	15,000
Total manufacturing cost.....	$37,000
Unit product cost:	
$37,000 ÷ 1,000 units.....	$37

Exercise 2-9 (30 minutes)

1.	a.	Raw Materials Inventory	210,000	
		Accounts Payable		210,000
	b.	Work in Process	178,000	
		Manufacturing Overhead	12,000	
		Raw Materials Inventory		190,000
	c.	Work in Process	90,000	
		Manufacturing Overhead	110,000	
		Salaries and Wages Payable		200,000
	d.	Manufacturing Overhead	40,000	
		Accumulated Depreciation		40,000
	e.	Manufacturing Overhead	70,000	
		Accounts Payable		70,000
	f.	Work in Process	240,000	
		Manufacturing Overhead		240,000
		30,000 MH × $8 per MH = $240,000.		
	g.	Finished Goods	520,000	
		Work in Process		520,000
	h.	Cost of Goods Sold	480,000	
		Finished Goods		480,000
		Accounts Receivable	600,000	
		Sales		600,000
		$480,000 × 1.25 = $600,000.		

2.

Manufacturing Overhead			
(b)	12,000	(f)	240,000
(c)	110,000		
(d)	40,000		
(e)	70,000		
			8,000 (Overapplied overhead)

Work in Process			
Bal.	42,000	(g)	520,000
(b)	178,000		
(c)	90,000		
(f)	240,000		
Bal.	30,000		

Exercise 2-10 (10 minutes)

Yes, overhead should be applied to value the Work in Process inventory at year-end.

Because $6,000 of overhead was applied to Job V on the basis of $8,000 of direct labor cost, the company's predetermined overhead rate must be 75% of direct labor cost.

Job W direct labor cost (a)	$4,000
Predetermined overhead rate (b).....	0.75
Manufacturing overhead applied to Job W (a) × (b)	$3,000

Exercise 2-11 (30 minutes)

1. Mason Company's schedule of cost of goods manufactured is as follows:

Direct materials:		
Beginning raw materials inventory	$ 7,000	
Add: Purchases of raw materials	118,000	
Raw materials available for use	125,000	
Deduct: Ending raw materials inventory	15,000	
Raw materials used in production		$110,000
Direct labor		70,000
Manufacturing overhead		90,000
Total manufacturing costs		270,000
Add: Beginning work in process inventory		10,000
		280,000
Deduct: Ending work in process inventory		5,000
Cost of goods manufactured		$275,000

2. Mason Company's schedule of cost of goods sold is as follows:

Beginning finished goods inventory	$ 20,000
Add: Cost of goods manufactured	275,000
Goods available for sale	295,000
Deduct: Ending finished goods inventory	35,000
Unadjusted cost of goods sold	$260,000
Deduct: Overapplied overhead	$10,000
Adjusted cost of goods sold	$250,000

3.

Mason Company
Income Statement

Sales		$524,000
Cost of goods sold ($260,000 – $10,000)		250,000
Gross margin		274,000
Selling and administrative expenses:		
Selling expenses	$140,000	
Administrative expense	63,000	203,000
Net operating income		$ 71,000

Exercise 2-12 (15 minutes)

1. Actual manufacturing overhead costs		$473,000
Manufacturing overhead cost applied:		
19,400 MH × $25 per MH.....		485,000
Overapplied overhead cost.....		$ 12,000
2. Direct materials:		
Raw materials inventory, beginning	$ 20,000	
Add purchases of raw materials.....	400,000	
Raw materials available for use	420,000	
Deduct raw materials inventory, ending ..	30,000	
Raw materials used in production	390,000	
Less indirect materials.....	15,000	$375,000
Direct labor.....		60,000
Manufacturing overhead cost applied to work in process		485,000
Total manufacturing costs.....		920,000
Add: Work in process, beginning		40,000
		960,000
Deduct: Work in process, ending.....		70,000
Cost of goods manufactured		$890,000

Exercise 2-13 (30 minutes)

Note to the instructor: This exercise is a good vehicle for introducing the concept of predetermined overhead rates. This exercise can also be used as a launching pad for a discussion of Appendix 3B.

1.

	Units Produced	*Manufacturing Overhead*
High activity level (First quarter) ...	80,000	$300,000
Low activity level (Third quarter)...	20,000	180,000
Change.....	60,000	$120,000

Variable cost = Change in cost ÷ Change in activity
= $120,000 ÷ 60,000 units
= $2.00 per unit produced

Total overhead cost (First quarter)	$300,000
Variable cost element ($2.00 per unit × 80,000 units) .	160,000
Fixed cost element	$140,000

These fixed and variable cost estimates can be used to estimate the total manufacturing overhead cost for the fourth quarter as follows:

Y = $140,000 + ($2.00 per unit)(60,000 units)

Estimated fixed manufacturing overhead	$140,000
Estimated variable manufacturing overhead $2.00 per unit × 60,000 units.....	120,000
Estimated total manufacturing overhead cost.....	$260,000

Total manufacturing cost and unit product cost:

Direct materials.....	$180,000
Direct labor	96,000
Manufacturing overhead.....	260,000
Total manufacturing costs.....	$536,000
÷ Number of units to be produced	60,000
= Unit product cost (rounded)	$8.93

Exercise 2-13 (continued)

2. The fixed portion of the manufacturing overhead cost is causing the unit product costs to fluctuate. The unit product cost increases as the level of production decreases because the fixed overhead is spread over fewer units.

3. The unit product cost can be stabilized by using a predetermined overhead rate that is based on expected activity for the entire year. The cost formula created in requirement 1 can be adapted to compute the annual predetermined overhead rate. The annual fixed manufacturing overhead is $560,000 ($140,000 per quarter × 4 quarters). The variable manufacturing overhead per unit is $2.00. The cost formula is as follows:

$$Y = \$560{,}000 + \$2.00 \text{ per unit} \times 200{,}000 \text{ units}$$

Estimated fixed manufacturing overhead	$560,000
Estimated variable manufacturing overhead	
$2.00 per unit × 200,000 units.....	400,000
Estimated total manufacturing overhead cost.....	$960,000

The annual predetermined overhead rate is computed as follows:

Estimated total manufacturing overhead	$960,000	
÷ Estimated total units produced.....	200,000	
= Predetermined overhead rate.....	$4.80	per unit

Using a predetermined overhead rate of $4.80 per unit, the unit product costs would stabilize as shown below:

	Quarter			
	First	*Second*	*Third*	*Fourth*
Direct materials.....	$240,000	$120,000	$ 60,000	$180,000
Direct labor.....	128,000	64,000	32,000	96,000
Manufacturing overhead:				
at $4.80 per unit, ...	384,000	192,000	96,000	288,000
Total cost	$752,000	$376,000	$188,000	$564,000
Number of units produced .	80,000	40,000	20,000	60,000
Unit product cost.....	$9.40	$9.40	$9.40	$9.40

Exercise 2-14 (20 minutes)

1. The estimated total manufacturing overhead cost is computed as follows:

$$Y = \$650{,}000 + (\$3.00 \text{ per MH})(100{,}000 \text{ MHs})$$

Estimated fixed manufacturing overhead	$650,000
Estimated variable manufacturing overhead: $3.00 per MH × 100,000 MHs	300,000
Estimated total manufacturing overhead cost	$950,000

The predetermined overhead rate is computed as follows:

Estimated total manufacturing overhead	$950,000	
÷ Estimated total machine-hours (MHs)	100,000	MHs
= Predetermined overhead rate	$9.50	per MH

2. Total manufacturing cost assigned to Job 400:

Direct materials	$ 450
Direct labor	210
Manufacturing overhead applied ($9.50 per MH × 40 MHs)	380
Total manufacturing cost	$1,040

3. Computing underapplied/overapplied overhead:

Actual manufacturing overhead (a)	$1,350,000
Actual machine-hours	146,000
× Predetermined overhead rate	$9.50
= Manufacturing overhead applied (b)	$1,387,000
Overapplied overhead (a) – (b)	$ (37,000)

The closing entry would decrease cost of goods sold by $37,000 and increase net operating income by $37,000.

Exercise 2-15 (15 minutes)

1. Cutting Department:

   The estimated total manufacturing overhead cost in the Cutting Department is computed as follows:

   Y = $264,000 + ($2.00 per MH)(48,000 MH)

Estimated fixed manufacturing overhead	$264,000
Estimated variable manufacturing overhead	
$2.00 per MH × 48,000 MHs	96,000
Estimated total manufacturing overhead cost.....	$360,000

   The predetermined overhead rate is computed as follows:

Estimated total manufacturing overhead	$360,000	
÷ Estimated total machine-hours.....	48,000	MHs
= Predetermined overhead rate.....	$7.50	per MH

   Finishing Department:

   The estimated total manufacturing overhead cost in the Finishing Department is computed as follows:

   Y = $366,000 + ($4.00 per DLH)(30,000 DLH)

Estimated fixed manufacturing overhead	$366,000
Estimated variable manufacturing overhead	
$4.00 per DLH × 30,000 DLHs.....	120,000
Estimated total manufacturing overhead cost.....	$486,000

   The predetermined overhead rate is computed as follows:

Estimated total manufacturing overhead	$486,000	
÷ Estimated total direct labor-hours	30,000	DLHs
= Predetermined overhead rate.....	$16.20	per DLH

Exercise 2-15 (continued)

2. Total manufacturing cost assigned to Job 203:

Direct materials ($500 + $310)		$810
Direct labor ($70 + $150)		220
Cutting Department (80 MHs × $7.50 per MH)	$600	
Finishing Department (20 DLH × $16.20 per DLH)	324	924
Total manufacturing cost		$1,954

3. Yes; if some jobs require a large amount of machine time and a small amount of labor time, they would be charged substantially less overhead cost if a plantwide rate based on direct labor hours were used. It appears, for example, that this would be true of Job 203 which required considerable machine time to complete, but required a relatively small amount of labor hours.

Exercise 2-16 (15 minutes)

1. Item (a): Actual manufacturing overhead costs incurred for the year.
   Item (b): Overhead cost applied to work in process for the year.
   Item (c): Cost of goods manufactured for the year.
   Item (d): Cost of goods sold for the year.

2.

Cost of Goods Sold	70,000	
Manufacturing Overhead		70,000

Exercise 2-17 (45 minutes)

1a. The estimated total manufacturing overhead cost is computed as follows:

$$Y = \$910{,}000 + (\$3.00 \text{ per MH})(50{,}000 \text{ MHs})$$

Estimated fixed manufacturing overhead	$ 910,000
Estimated variable manufacturing overhead: $3.00 per MH × 50,000 MHs	150,000
Estimated total manufacturing overhead cost	$1,060,000

The predetermined overhead rate is computed as follows:

Estimated total manufacturing overhead	$1,060,000	
÷ Estimated total machine-hours (MHs)	50,000	MHs
= Predetermined overhead rate	$21.20	per MH

1b. Total manufacturing cost assigned to Jobs D-70 and C-200:

	D-70	*C-200*
Direct materials	$700,000	$550,000
Direct labor	360,000	400,000
Manufacturing overhead applied ($21.20 per MH × 20,000 MHs; $21.20 per MH × 30,000 MHs)	424,000	636,000
Total manufacturing cost	$1,484,000	$1,586,000

1c. Bid prices for Jobs D-70 and C-200:

	D-75	*C-200*
Total manufacturing cost	$1,484,000	$1,586,000
× Markup percentage (150%)	150%	150%
= Bid price	$2,226,000	$2,379,000

1d. Because the company has no beginning or ending inventories and only Jobs D-70 and C-200 were started, completed, and sold during the year, the cost of goods sold is equal to the sum of the manufacturing costs assigned to both jobs of $3,070,000 (=$1,484,000 + $1,586,000).

Exercise 2-17 (continued)

2a. Molding Department:

The estimated total manufacturing overhead cost in the Molding Department is computed as follows:

$$Y = \$700{,}000 + (\$3.00 \text{ per MH})(20{,}000 \text{ MH})$$

Estimated fixed manufacturing overhead	$700,000
Estimated variable manufacturing overhead: $3.00 per MH × 20,000 MHs	60,000
Estimated total manufacturing overhead cost	$760,000

The predetermined overhead rate is computed as follows:

Estimated total manufacturing overhead	$760,000	
÷ Estimated total machine-hours	20,000	MHs
= Predetermined overhead rate	$38.00	per MH

Fabrication Department:

The estimated total manufacturing overhead cost in the Fabrication Department is computed as follows:

$$Y = \$210{,}000 + (\$3.00 \text{ per MH})(30{,}000 \text{ MH})$$

Estimated fixed manufacturing overhead	$210,000
Estimated variable manufacturing overhead: $3.00 per MH × 30,000 MHs	90,000
Estimated total manufacturing overhead cost	$300,000

The predetermined overhead rate is computed as follows:

Estimated total manufacturing overhead	$300,000	
÷ Estimated total direct labor-hours	30,000	MHs
= Predetermined overhead rate	$10.00	per MH

Exercise 2-17 (continued)

2b. Total manufacturing costs assigned to Jobs D-70 and C-200:

	D-70	*C-200*
Direct materials	$700,000	$550,000
Direct labor	360,000	400,000
Molding Department (14,000 MHs × $38 per MH; 6,000 MHs × $38 per MH)	532,000	228,000
Fabrication Department (6,000 MH × $10 per MH; 24,000 MH × $10 per MH)	60,000	240,000
Total manufacturing cost	$1,652,000	$1,418,000

2c. Bid prices for Jobs D-70 and C-200:

	D-70	*C-200*
Total manufacturing cost	$1,652,000	$1,418,000
× Markup percentage (150%)	150%	150%
= Bid price	$2,478,000	$2,127,000

2d. Because the company has no beginning or ending inventories and only Jobs D-70 and C-200 were started, completed, and sold during the year, the cost of goods sold is equal to the sum of the manufacturing costs assigned to both jobs of $3,070,000 (= $1,652,000 + $1,418,000).

3. The plantwide and departmental approaches for applying manufacturing overhead costs to products produce identical cost of goods sold figures. However, these two approaches lead to different bid prices for Jobs D-70 and C-200. The bid price for Job D-70 using the departmental approach is $252,000 higher than the bid price using the plantwide approach. This is because the departmental cost pools reflect the fact that Job D-70 is an intensive user of Molding machine-hours. The overhead rate in Molding ($38) is much higher than the overhead rate in Fabrication ($10). Conversely, Job C-200 is an intensive user of the less-expensive Fabrication machine-hours, so its departmental bid price is $252,000 lower than the plantwide bid price.

Exercise 2-17 (continued)

Whether a job-order costing system has only one plantwide overhead cost pool or numerous departmental overhead cost pools does not usually have an important impact on the accuracy of the cost of goods sold reported for the company as a whole. However, it can have a huge impact on internal decisions with respect to individual jobs, such as establishing bid prices for those jobs. Job-order costing systems that rely on one plantwide overhead cost pool are commonly used to value ending inventories and cost of goods sold for external reporting purposes, but they can create costing inaccuracies for individual jobs that adversely influence internal decision making.

Exercise 2-18 (30 minutes)

1. The predetermined overhead rate is computed as follows:

$$Y = \$128{,}000 + \$0.80 \text{ per MH} \times 80{,}000 \text{ MHs}$$

Estimated fixed manufacturing overhead	$128,000
Estimated variable manufacturing overhead	
$0.80 per MH × 80,000 MHs	64,000
Estimated total manufacturing overhead cost	$192,000

The predetermined overhead rate is computed as follows:

Estimated total manufacturing overhead	$192,000	
÷ Estimated total machine-hours	80,000	MHs
= Predetermined overhead rate	$2.40	per MH

2. The amount of overhead cost applied to Work in Process for the year would be: 75,000 machine-hours × $2.40 per machine-hour = $180,000. This amount is shown in entry (a) below:

Manufacturing Overhead			
(Maintenance)	21,000	(a)	180,000
(Indirect materials)	8,000		
(Indirect labor)	60,000		
(Utilities)	32,000		
(Insurance)	7,000		
(Depreciation)	56,000		
Balance	4,000		

Work in Process			
(Direct materials)	710,000		
(Direct labor)	90,000		
(Overhead) (a)	180,000		

3. Overhead is underapplied by $4,000 for the year, as shown in the Manufacturing Overhead account above. The entry to close out this balance to Cost of Goods Sold would be:

Cost of Goods Sold	4,000	
Manufacturing Overhead		4,000

Exercise 2-18 (continued)

4. When overhead is applied using a predetermined rate based on machine-hours, it is assumed that overhead cost is proportional to machine-hours. When the actual machine-hours turn out to be 75,000, the costing system assumes that the overhead will be 75,000 machine-hours × $2.40 per machine-hour, or $180,000. This is a drop of $12,000 from the initial estimated manufacturing overhead cost of $192,000. However, the actual manufacturing overhead did not drop by this much. The actual manufacturing overhead was $184,000—a drop of $8,000 from the estimate. The manufacturing overhead did not decline by the full $12,000 because of the existence of fixed costs and/or because overhead spending was not under control. These issues will be covered in more detail in later chapters.

Exercise 2-19 (20 minutes)

1. Because $120,000 of studio overhead was applied to Work in Process on the basis of $75,000 of direct staff costs, the predetermined overhead rate was 160%:

$$\frac{\text{Studio overhead applied}}{\text{Direct staff costs incurred}} = \frac{\$120{,}000}{\$75{,}000} = 160\% \text{ rate}$$

2. The Lexington Gardens Project is the only job remaining in Work in Process at the end of the month; therefore, the entire $35,000 balance in the Work in Process account at that point must apply to it. Recognizing that the predetermined overhead rate is 160% of direct staff costs, the following computation can be made:

Total cost in the Lexington Gardens Project			$35,000
Less:	Direct staff costs.....	$ 6,500	
	Studio overhead cost ($6,500 × 160%)..	10,400	16,900
Costs of subcontracted work			$18,100

With this information, we can now complete the job cost sheet for the Lexington Gardens Project:

Costs of subcontracted work	$18,100
Direct staff costs	6,500
Studio overhead	10,400
Total cost to January 31	$35,000

Exercise 2-20 (30 minutes)

1. a.	Raw Materials	325,000	
	Accounts Payable		325,000
b.	Work in Process	232,000	
	Manufacturing Overhead	58,000	
	Raw Materials		290,000
c.	Work in Process	60,000	
	Manufacturing Overhead	120,000	
	Wages and Salaries Payable		180,000
d.	Manufacturing Overhead	75,000	
	Accumulated Depreciation		75,000
e.	Manufacturing Overhead	62,000	
	Accounts Payable		62,000
f.	Work in Process	300,000	
	Manufacturing Overhead		300,000

$$\text{Predetermined overhead rate} = \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}}$$

$$= \frac{\$4{,}800{,}000}{240{,}000 \text{ MHs}} = \$20 \text{ per MH}$$

15,000 MH × $20 per MH = $300,000

2.

Manufacturing Overhead				Work in Process			
(b)	58,000	(f)	300,000	(b)	232,000		
(c)	120,000			(c)	60,000		
(d)	75,000			(f)	300,000		
(e)	62,000						

3. The cost of the completed job is $592,000 as shown in the Work in Process T-account above. The journal entry is:

Finished Goods	592,000	
Work in Process		592,000

4. The unit product cost on the job cost sheet would be:

$592,000 ÷ 16,000 units = $37 per unit

Problem 2-21A (45 minutes)

1. The cost of raw materials put into production was:

Raw materials inventory, 1/1	$ 15,000
Debits (purchases of materials)	120,000
Materials available for use	135,000
Raw materials inventory, 12/31	25,000
Materials requisitioned for production	$110,000

2. Of the $110,000 in materials requisitioned for production, $90,000 was debited to Work in Process as direct materials. Therefore, the difference of $20,000 was debited to Manufacturing Overhead as indirect materials.

3. Total factory wages accrued during the year (credits to the Factory Wages Payable account) $180,000
   Less direct labor cost (from Work in Process) 150,000
   Indirect labor cost $ 30,000

4. The cost of goods manufactured was $470,000—the credits to the Work in Process account.

5. The Cost of Goods Sold for the year was:

Finished goods inventory, 1/1	$ 40,000
Add: Cost of goods manufactured (from Work in Process)	470,000
Goods available for sale	510,000
Finished goods inventory, 12/31	60,000
Cost of goods sold	$450,000

6. The predetermined overhead rate was:

$$\text{Predetermined overhead rate} = \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}}$$

$$= \frac{\$240{,}000}{\$150{,}000 \text{ direct labor cost}} = 160\% \text{ of direct labor cost}$$

Problem 2-21A (continued)

7. Manufacturing overhead was overapplied by $10,000, computed as follows:

Actual manufacturing overhead cost for the year (debits)	$230,000
Applied manufacturing overhead cost (see Work in Process—this would have been the credits to the Manufacturing Overhead account)	240,000
Overapplied overhead	$(10,000)

8. The ending balance in Work in Process is $30,000. Direct materials make up $9,200 of this balance, and manufacturing overhead makes up $12,800. The computations are:

Balance, Work in Process, 12/31	$30,000
Less: Direct labor cost (given)	(8,000)
Manufacturing overhead cost ($8,000 × 160%)	(12,800)
Direct materials cost (remainder)	$ 9,200

Problem 2-22A (30 minutes)

1. The predetermined overhead rate was:

Y = $795,000 + $1.40 per hour × 75,000 hours

Estimated fixed manufacturing overhead	$795,000
Estimated variable manufacturing overhead $1.40 per computer hour × 75,000 hours	105,000
Estimated total manufacturing overhead cost	$900,000

The predetermined overhead rate is computed as follows:

Estimated total manufacturing overhead	$900,000	
÷ Estimated total computer hours	75,000	hours
= Predetermined overhead rate	$12.00	per hour

2.

Actual manufacturing overhead cost	$850,000
Manufacturing overhead cost applied to Work in Process during the year: 60,000 actual MHs × $12 per MH	720,000
Underapplied overhead cost	$130,000

3.

Cost of Goods Sold	130,000	
Manufacturing Overhead		130,000

Problem 2-23A (30 minutes)

Schedule of cost of goods manufactured:

Direct materials:		
Raw materials inventory, beginning*	$ 40,000	
Add: Purchases of raw materials*	290,000	
Raw materials available for use	330,000	
Deduct: Raw materials inventory, ending*	10,000	
Raw materials used in production		$320,000
Direct labor		78,000
Manufacturing overhead applied*		285,000
Total manufacturing costs*		683,000
Add: Work in process inventory, beginning		42,000
		725,000
Deduct: Work in process inventory, ending*		35,000
Cost of goods manufactured		$690,000

Schedule of cost of goods sold:

Finished goods inventory, beginning*	$ 50,000
Add: Cost of goods manufactured	690,000
Cost of goods available for sale*	740,000
Deduct: Finished goods inventory, ending	80,000
Unadjusted cost of goods sold*	660,000
Deduct: Overapplied overhead	15,000
Adjusted cost of goods sold	$645,000

Income statement:

Sales		$915,000
Cost of goods sold ($660,000 – $15,000)		645,000
Gross margin		270,000
Selling and administrative expenses:		
Selling expenses*	$140,000	
Administrative expense*	100,000	240,000
Net operating income*		$ 30,000

* Given in the problem

Problem 2-24A (30 minutes)

1. Molding Department:

   The estimated total manufacturing overhead cost in the Molding Department is computed as follows:

   Y = $497,000 + $1.50 per MH × 70,000 MH

Estimated fixed manufacturing overhead	$497,000
Estimated variable manufacturing overhead:	
$1.50 per MH × 70,000 MHs	105,000
Estimated total manufacturing overhead cost.....	$602,000

   The predetermined overhead rate is computed as follows:

Estimated total manufacturing overhead.....	$602,000	
÷ Estimated total machine-hours	70,000	MHs
= Predetermined overhead rate	$8.60	per MH

   Painting Department:

   The estimated total manufacturing overhead cost in the Painting Department is computed as follows:

   Y = $615,000 + $2.00 per DLH × 60,000 DLH

Estimated fixed manufacturing overhead	$615,000
Estimated variable manufacturing overhead:	
$2.00 per DLH × 60,000 DLHs.....	120,000
Estimated total manufacturing overhead cost.....	$735,000

   The predetermined overhead rate is computed as follows:

Estimated total manufacturing overhead.....	$735,000	
÷ Estimated total DLHs.....	60,000	DLHs
= Predetermined overhead rate	$12.25	per DLH

Problem 2-24A (continued)

2. Molding Department overhead applied:

110 machine-hours × $8.60 per machine-hour	$ 946
Painting Department overhead applied:	
84 direct labor-hours × $12.25 per DLH	1,029
Total overhead cost	$1,975

3. Total cost of Job 205:

	Molding Dept.	*Painting Dept.*	*Total*
Direct materials	$ 470	$ 332	$ 802
Direct labor	325	588	913
Manufacturing overhead applied	946	1,029	1,975
Total cost	$1,741	$1,949	$3,690

Unit product cost for Job 205:

Total manufacturing cost	$3,690	
÷ Number of units in the job	50	units
= Unit product cost	$73.80	per unit

4.

	Molding Dept.	*Painting Dept.*
Manufacturing overhead incurred	$570,000	$750,000
Manufacturing overhead applied:		
65,000 MHs × $8.60 per MH	559,000	
62,000 direct labor-hours × $12.25 per direct labor-hour		759,500
Underapplied (or overapplied) overhead	$ 11,000	$ (9,500)

Problem 2-25A (60 minutes)

1. a.

$$\text{Predetermined overhead rate} = \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}}$$

$$= \frac{\$800{,}000}{\$500{,}000 \text{ direct materials cost}} = 160\%$$

b. Before the underapplied or overapplied overhead can be computed, we must determine the amount of direct materials used in production for the year.

Raw materials inventory, beginning	$ 20,000
Add, Purchases of raw materials	510,000
Raw materials available	530,000
Deduct: Raw materials inventory, ending	80,000
Raw materials used in production	$450,000
Actual manufacturing overhead costs:	
Indirect labor	$170,000
Property taxes	48,000
Depreciation of equipment	260,000
Maintenance	95,000
Insurance	7,000
Rent, building	180,000
Total actual costs	760,000
Applied manufacturing overhead costs:	
$450,000 × 160%	720,000
Underapplied overhead	$ 40,000

Problem 2-25A (continued)

2.

Gitano Products
Schedule of Cost of Goods Manufactured

Direct materials:		
Raw materials inventory, beginning	$ 20,000	
Add purchases of raw materials	510,000	
Total raw materials available	530,000	
Deduct raw materials inventory, ending	80,000	
Raw materials used in production		$ 450,000
Direct labor		90,000
Manufacturing overhead applied to work in process		720,000
Total manufacturing costs		1,260,000
Add: Work in process, beginning		150,000
		1,410,000
Deduct: Work in process, ending		70,000
Cost of goods manufactured		$1,340,000

3. Unadjusted cost of goods sold:

Finished goods inventory, beginning	$ 260,000
Add: Cost of goods manufactured	1,340,000
Goods available for sale	1,600,000
Deduct: Finished goods inventory, ending	400,000
Unadjusted cost of goods sold	$1,200,000

4.

Direct materials	$ 8,500
Direct labor	2,700
Overhead applied ($8,500 × 160%)	13,600
Total manufacturing cost	$24,800

$24,800 × 125% = $31,000 price to the customer

Problem 2-25A (continued)

5. The amount of overhead cost in Work in Process was:

   $24,000 direct materials cost × 160% = $38,400

   The amount of direct labor cost in Work in Process is:

Total ending work in process.....		$70,000
Deduct: Direct materials	$24,000	
Manufacturing overhead.....	38,400	62,400
Direct labor cost.....		$ 7,600

   The completed schedule of costs in Work in Process was:

Direct materials.....	$24,000
Direct labor.....	7,600
Manufacturing overhead	38,400
Work in process inventory.....	$70,000

Problem 2-26A (120 minutes)

1. a.	Raw Materials	200,000	
	Accounts Payable		200,000
b.	Work in Process	185,000	
	Raw Materials		185,000
c.	Manufacturing Overhead	63,000	
	Utilities Expense	7,000	
	Accounts Payable		70,000
d.	Work in Process	230,000	
	Manufacturing Overhead	90,000	
	Salaries Expense	110,000	
	Salaries and Wages Payable		430,000
e.	Manufacturing Overhead	54,000	
	Accounts Payable		54,000
f.	Advertising Expense	136,000	
	Accounts Payable		136,000
g.	Manufacturing Overhead	76,000	
	Depreciation Expense	19,000	
	Accumulated Depreciation		95,000
h.	Manufacturing Overhead	102,000	
	Rent Expense	18,000	
	Accounts Payable		120,000
i.	Work in Process	390,000	
	Manufacturing Overhead		390,000

$$\text{Predetermined overhead rate} = \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}}$$

$$= \frac{\$360{,}000}{900 \text{ DLHs}} = \$400 \text{ per DLH}$$

975 actual DLH × $400 per DLH = $390,000

Problem 2-26A (continued)

j.	Finished Goods	770,000	
	Work in Process		770,000
k.	Accounts Receivable	1,200,000	
	Sales		1,200,000
	Cost of Goods Sold	800,000	
	Finished Goods		800,000

Problem 2-26A (continued)

2.

Accounts Receivable			
(k)	1,200,000		

Sales			
		(k)	1,200,000

Raw Materials			
Bal.	30,000		185,000
(a)	200,000	(b)	
Bal.	45,000		

Cost of Goods Sold			
(k)	800,000		

Work in Process			
Bal.	21,000	(j)	770,000
(b)	185,000		
(d)	230,000		
(i)	390,000		
Bal.	56,000		

Manufacturing Overhead			
(c)	63,000	(i)	390,000
(d)	90,000		
(e)	54,000		
(g)	76,000		
(h)	102,000		
		Bal.	5,000

Finished Goods			
Bal.	60,000	(k)	800,000
(j)	770,000		
Bal.	30,000		

Advertising Expense			
(f)	136,000		

Accumulated Depreciation			
		(g)	95,000

Utilities Expense			
(c)	7,000		

Accounts Payable			
		(a)	200,000
		(c)	70,000
		(e)	54,000
		(f)	136,000
		(h)	120,000

Salaries Expense			
(d)	110,000		

Depreciation Expense			
(g)	19,000		

Salaries & Wages Payable			
		(d)	430,000

Rent Expense			
(h)	18,000		

Problem 2-26A (continued)

3. Froya Fabrikker A/S
Schedule of Cost of Goods Manufactured

Direct materials:		
Raw materials inventory, beginning	$ 30,000	
Purchases of raw materials	200,000	
Materials available for use	230,000	
Raw materials inventory, ending	45,000	
Materials used in production		$185,000
Direct labor		230,000
Manufacturing overhead applied to work in process		390,000
Total manufacturing costs		805,000
Add: Work in process, beginning		21,000
		826,000
Deduct: Work in process, ending		56,000
Cost of goods manufactured		$770,000

4.	Manufacturing Overhead	5,000	
	Cost of Goods Sold		5,000

Schedule of cost of goods sold:		
Finished goods inventory, beginning		$ 60,000
Add: Cost of goods manufactured		770,000
Goods available for sale		830,000
Deduct finished goods inventory, ending		30,000
Unadjusted cost of goods sold		800,000
Deduct: Overapplied overhead		5,000
Adjusted cost of goods sold		$795,000

Problem 2-26A (continued)

5.

Froya Fabrikker A/S
Income Statement

Sales		$1,200,000
Cost of goods sold		795,000
Gross margin		405,000
Selling and administrative expenses:		
Advertising expense	$136,000	
Utilities expense	7,000	
Salaries expense	110,000	
Depreciation expense	19,000	
Rent expense	18,000	290,000
Net operating income		$ 115,000

6.

Direct materials	$ 8,000
Direct labor	9,200
Manufacturing overhead applied (39 hours × $400 per hour)	15,600
Total manufacturing cost	32,800
Add markup (60% × $32,800)	19,680
Total billed price of Job 412	$52,480

$52,480 ÷ 4 units = $13,120 per unit

Problem 2-27A (60 minutes)

1. a.	Raw Materials	275,000	
	Cash		275,000
b.	Work in Process	220,000	
	Manufacturing Overhead	60,000	
	Raw Materials		280,000
c.	Work in Process	180,000	
	Manufacturing Overhead	72,000	
	Sales Commissions Expense	63,000	
	Salaries Expense	90,000	
	Cash		405,000
d.	Manufacturing Overhead	13,000	
	Rent Expense	5,000	
	Cash		18,000
e.	Manufacturing Overhead	57,000	
	Cash		57,000
f.	Advertising Expense	140,000	
	Cash		140,000
g.	Manufacturing Overhead	88,000	
	Depreciation Expense	12,000	
	Accumulated Depreciation		100,000
h.	Work in Process	297,000	
	Manufacturing Overhead		297,000

$$\text{Predetermined overhead rate} = \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}}$$

$$= \frac{\$330{,}000}{\$200{,}000 \text{ direct labor cost}} = \text{165\% of direct labor cost}$$

$180,000 actual direct labor cost × 165% = $297,000

Problem 2-27A (continued)

i.	Finished Goods	675,000	
	Work in Process		675,000
j.	Cash	1,250,000	
	Sales		1,250,000
	Cost of Goods Sold	700,000	
	Finished Goods		700,000

2.

Raw Materials			
Bal.	25,000	(b)	280,000
(a)	275,000		
Bal.	20,000		

Work in Process			
Bal.	10,000	(i)	675,000
(b)	220,000		
(c)	180,000		
(h)	297,000		
Bal.	32,000		

Finished Goods			
Bal.	40,000	(j)	700,000
(i)	675,000		
Bal.	15,000		

Manufacturing Overhead			
(b)	60,000	(h)	297,000
(c)	72,000		
(d)	13,000		
(e)	57,000		
(g)	88,000		
		Bal.	7,000

Cost of Goods Sold			
(j)	700,000		

3. Manufacturing overhead is overapplied by $7,000 for the year. The entry to close this balance to Cost of Goods Sold would be:

Manufacturing Overhead	7,000	
Cost of Goods Sold		7,000

Problem 2-27A (continued)

4.

Gold Nest Company
Income Statement

Sales		$1,250,000
Cost of goods sold ($700,000 - $7,000)		693,000
Gross margin		557,000
Selling and administrative expenses:		
Sales commissions	$63,000	
Administrative salaries	90,000	
Rent expense	5,000	
Advertising expense	140,000	
Depreciation expense	12,000	310,000
Net operating income		$ 247,000

Problem 2-28A (60 minutes)

1. and 2.

Cash			
Bal.	63,000	(m)	785,000
(l)	850,000		
Bal.	128,000		

Accounts Receivable			
Bal.	102,000	(l)	850,000
(k)	925,000		
Bal.	177,000		

Raw Materials			
Bal.	30,000	(b)	200,000
(a)	185,000		
Bal.	15,000		

Prepaid Insurance			
Bal.	9,000	(g)	7,000
Bal.	2,000		

Videos in Process			
Bal.	45,000	(j)	550,000
(b)	170,000		
(f)	82,000		
(i)	290,000		
Bal.	37,000		

Finished Goods			
Bal.	81,000	(k)	600,000
(j)	550,000		
Bal.	31,000		

Studio and Equipment			
Bal.	730,000		

Accumulated Depreciation			
		Bal.	210,000
		(d)	84,000
		Bal.	294,000

Studio Overhead			
(b)	30,000	* (i)	290,000
(c)	72,000		
(d)	63,000		
(f)	110,000		
(g)	5,600		
(n)	9,400	Bal.	9,400

Depreciation Expense			
(d)	21,000		

Insurance Expense			
(g)	1,400		

* $280,000 ÷ 7,000 hours = $40 per hour;
7,250 hours × $40 per hour = $290,000

Advertising Expense			
(e)	130,000		

Miscellaneous Expense			
(h)	8,600		

Problem 2-28A (continued)

Administrative Salaries Expense			
(f)	95,000		

Sales			
		(k)	925,000

Cost of Goods Sold			
(k)	600,000	(n)	9,400
Bal.	590,600		

Accounts Payable			
(m)	500,000	Bal.	160,000
		(a)	185,000
		(c)	72,000
		(e)	130,000
		(h)	8,600
		Bal.	55,600

Salaries & Wages Payable			
(m)	285,000	(f)	287,000
		Bal.	2,000

Capital Stock			
		Bal.	420,000

Retained Earnings			
		Bal.	270,000

3. Overhead is overapplied for the year by $9,400. Entry (n) above records the closing of this overapplied overhead balance to Cost of Goods Sold.

4.

Supreme Videos, Inc.
Income Statement
For the Year Ended December 31

Sales of videos		$925,000
Cost of goods sold ($600,000 – $9,400)		590,600
Gross margin		334,400
Selling and administrative expenses:		
Depreciation expense	$ 21,000	
Advertising expense	130,000	
Administrative salaries	95,000	
Insurance expense	1,400	
Miscellaneous expense	8,600	256,000
Net operating income		$ 78,400

Case (60 minutes)

1. a.

$$\text{Predetermined overhead rate} = \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}}$$

$$= \frac{\$840{,}000}{\$600{,}000 \text{ direct labor cost}} = 140\% \text{ of direct labor cost}$$

b. $9,500 × 140% = $13,300

2. a.

	Fabricating Department	*Machining Department*	*Assembly Department*
Estimated manufacturing overhead cost (a)	$350,000	$400,000	$ 90,000
Estimated direct labor cost (b)	$200,000	$100,000	$300,000
Predetermined overhead rate (a) ÷ (b)	175%	400%	30%

b.

Fabricating Department:	
$2,800 × 175%	$4,900
Machining Department:	
$500 × 400%	2,000
Assembly Department:	
$6,200 × 30%	1,860
Total applied overhead	$8,760

3. The bulk of the labor cost on the Koopers job is in the Assembly Department, which incurs very little overhead cost. The department has an overhead rate of only 30% of direct labor cost as compared to much higher rates in the other two departments. Therefore, as shown above, use of departmental overhead rates results in a relatively small amount of overhead cost being charged to the job.

   Use of a plantwide overhead rate in effect redistributes overhead costs proportionately between the three departments (at 140% of direct labor cost) and results in a large amount of overhead cost being charged to the Koopers job, as shown in Part 1. This may explain why the company

Case (continued)

bid too high and lost the job. Too much overhead cost was assigned to the job for the kind of work being done on the job in the plant.

On jobs that require a large amount of labor in the Fabricating or Machining Departments the opposite will be true, and the company will tend to charge too little overhead cost to the jobs if a plantwide overhead rate is being used. The reason is that the plantwide overhead rate (140%) is much lower than the rates would be if these departments were considered separately.

4. The company's bid was:

Direct materials	$ 4,600
Direct labor	9,500
Manufacturing overhead applied (above)	13,300
Total manufacturing cost	$27,400
Bidding rate	× 1.5
Total bid price	$41,100

If departmental overhead rates had been used, the bid would have been:

Direct materials	$ 4,600
Direct labor	9,500
Manufacturing overhead applied (above)	8,760
Total manufacturing cost	$22,860
Bidding rate	× 1.5
Total bid price	$34,290

Note that if departmental overhead rates had been used, Teledex Company would have been the low bidder on the Koopers job because the competitor underbid Teledex by only $2,000.

5. a.

Actual overhead cost	$864,000
Applied overhead cost ($580,000 × 140%)	812,000
Underapplied overhead cost	$ 52,000

Case (continued)

b.

	Department			
	Fabricating	*Machining*	*Assembly*	*Total Plant*
Actual overhead cost	$360,000	$420,000	$84,000	$864,000
Applied overhead cost:				
$210,000 × 175%	367,500			
$108,000 × 400%		432,000		
$262,000 × 30%			78,600	878,100
Underapplied (over-applied) overhead cost	$ (7,500)	$ (12,000)	$ 5,400	$ (14,100)

Ethics Challenge (45 minutes)

1. Shaving 5% off the estimated direct labor-hours in the predetermined overhead rate will result in an artificially high overhead rate. The artificially high predetermined overhead rate is likely to result in overapplied overhead for the year. The cumulative effect of overapplying the overhead throughout the year is all recognized in December when the balance in the Manufacturing Overhead account is closed out to Cost of Goods Sold. If the balance were closed out every month or every quarter, this effect would be dissipated over the course of the year.

2. This question may generate lively debate. Where should Terri Ronsin's loyalties lie? Is she working for the general manager of the division or for the corporate controller? Is there anything wrong with the "Christmas bonus"? How far should Terri go in bucking her boss on a new job?

   While individuals can certainly disagree about what Terri should do, some of the facts are indisputable. First, understating direct labor-hours artificially inflates the overhead rate. This has the effect of inflating the Cost of Goods Sold in all months prior to December and overstating the costs of inventories. In December, the huge adjustment for overapplied overhead provides a big boost to net operating income. Therefore, the practice results in distortions in the pattern of net operating income over the year. In addition, because all of the adjustment is taken to Cost of Goods Sold, inventories are still overstated at year-end. This means, of course, that the net operating income for the entire year is also overstated.

   While Terri is in an extremely difficult position, her responsibilities under the IMA's Statement of Ethical Professional Practice seem to be clear. The Credibility Standard states that management accountants have a responsibility to "disclose all relevant information that could reasonably be expected to influence an intended user's understanding of the reports, analyses or recommendations." In our opinion, Terri should discuss this situation with her immediate supervisor in the controller's office at corporate headquarters. This step may bring her into direct conflict with the general manager of the division, so it would be a very difficult decision for her to make.

Ethics Challenge (continued)

In the actual situation that this case is based on, the corporate controller's staff were aware of the general manager's accounting tricks, but top management of the company supported the general manager because "he comes through with the results" and could be relied on to hit the annual profit targets for his division. Personally, we would be very uncomfortable supporting a manager who will resort to deliberate distortions to achieve "results." If the manager will pull tricks in this area, what else might he be doing that is questionable or even perhaps illegal?

Teamwork in Action

1. The types of transactions that are posted to the accounts may be summarized in T-account form as follows:

Raw Materials	
Beginning balance Purchases	Direct materials used (to Work in Process)

Accounts Payable	
	Beginning balance Purchases of raw materials
Payments to suppliers	

Work in Process	
Beginning balance Direct materials used (from Raw Materials) Direct labor Manufacturing overhead applied	Cost of goods manufactured (to Finished Goods)

Manufacturing Overhead	
Actual manufacturing costs Overhead overapplied (to COGS)	Manufacturing overhead applied Overhead underapplied (to COGS)

Finished Goods	
Beginning balance Cost of goods manufactured (from WIP)	Cost of goods sold

Cost of Goods Sold	
Cost of goods sold Overhead underapplied (from Manufacturing Overhead)	Overhead overapplied (from Manufacturing Overhead)

Teamwork in Action (continued)

2. The predetermined overhead rate and overhead applied amounts are:
   Predetermined overhead rate:
   $180,000 ÷ 60,000 DLHs = $3 per DLH
   Overhead applied:
   5,200 DLHs × $3 per DLH = $15,600

3. The balance in the work in process account is determined as follows:

Direct materials (given)	$2,600
Direct labor (300 DLHs × $6 per DLH).....	1,800
Overhead applied (300 DLHs × $3 per DLH)	900
Total	$5,300

4. The completed T-accounts follow:

Accounts Payable

(c)	Payments	40,000	(c)	Balance 4/1	6,000
			(plug)	Purchases	42,000
			(given)	Balance 4/30	8,000

Work in Process

(given)	Balance 4/1	4,500	(f)	Cost of goods manufactured	89,000
(b,d)	Direct labor*	31,200			
(above)	Overhead applied	15,600			
(plug)	Direct materials	43,000			
(above)	Balance 4/30	5,300			

* 5,200 DLHs × $6 per DLH = $31,200

Raw Materials

(given)	Balance 4/1	12,000	(above)	Direct materials	43,000
(above)	Purchases	42,000			
	Balance 4/30	11,000			

Teamwork in Action (continued)

Manufacturing Overhead

(given)	Actual costs for April	14,800	(above)	Overhead applied	15,600
	To cost of goods sold	800		Overapplied overhead	800

Finished Goods

(e)	Balance 4/1	11,000	(plug)	Cost of goods sold	84,000
(f)	Cost of goods manufactured	89,000			
(given)	Balance 4/30	16,000			

Cost of Goods Sold

(above)	Cost of goods sold	84,000	(above)	Overapplied overhead	800
		83,200			

Communicating in Practice

Date: Current date
To: Instructor
From: Student's Name
Subject: Talk with a Controller

The student's memorandum should address the following:

- The name, title and job affiliation of the individual interviewed. (Note: Not specifically required in problem but essential and, as such, a good topic for class discussion, if appropriate.)
- A list of the company's main products.
- Identification of the type of costing system in use (job-order, process or other).
- Brief description of how overhead is assigned to products (including basis for allocation and whether more than one overhead rate is in use).
- Indication as to whether any changes have been made to or are being considered in relation to the company's costing system, and, if applicable, a brief description of the changes.

Chapter 2
Take Two Solutions

Exercise 2-1 (10 minutes)

The estimated total manufacturing overhead cost is computed as follows:

Y = $94,000 + ($2.00 per DLH)(18,000 DLHs)

Estimated fixed manufacturing overhead	$ 94,000
Estimated variable manufacturing overhead: $2.00 per DLH × 18,000 DLHs	36,000
Estimated total manufacturing overhead cost	$130,000

The predetermined overhead rate is computed as follows:

Estimated total manufacturing overhead	$130,000	
÷ Estimated total direct labor hours (DLHs).....	20,000	DLHs
= Predetermined overhead rate	$6.50	per DLH

Exercise 2-2 (10 minutes)

Actual direct labor-hours	10,800
× Predetermined overhead rate.....	$23.40
= Manufacturing overhead applied.....	$252,720

Exercise 2-3 (10 minutes)

1. Total direct labor-hours required for Job A-500:

Direct labor cost (a)	$108
Direct labor wage rate per hour (b)	$12
Total direct labor hours (a) ÷ (b)	9

Total manufacturing cost assigned to Job A-500:

Direct materials	$230
Direct labor	108
Manufacturing overhead applied ($24 per DLH × 9 DLHs)	216
Total manufacturing cost	$554

2. Unit product cost for Job A-500:

Total manufacturing cost (a)	$554
Number of units in the job (b)	40
Unit product cost (a) ÷ (b)	$13.85

Exercise 2-6 (20 minutes)

1. Cost of Goods Manufactured

Direct materials:		
Raw materials inventory, beginning	$12,000	
Add: Purchases of raw materials	30,000	
Total raw materials available	42,000	
Deduct: Raw materials inventory, ending	25,000	
Raw materials used in production	17,000	
Less indirect materials included in manufacturing overhead	5,000	$ 12,000
Direct labor		58,000
Manufacturing overhead applied to work in process inventory		87,000
Total manufacturing costs		157,000
Add: Beginning work in process inventory		56,000
		213,000
Deduct: Ending work in process inventory		43,000
Cost of goods manufactured		$170,000

2. Cost of Goods Sold

Finished goods inventory, beginning	$ 35,000
Add: Cost of goods manufactured	170,000
Goods available for sale	205,000
Deduct: Finished goods inventory, ending	42,000
Unadjusted cost of goods sold	163,000
Add: Underapplied overhead	4,000
Adjusted cost of goods sold	$167,000

Exercise 2-7 (10 minutes)

1. Manufacturing overhead incurred (a).....	$198,000
Actual direct labor-hours.....	11,500
× Predetermined overhead rate	$18.20
= Manufacturing overhead applied (b).....	$209,300
Manufacturing overhead overapplied (a) – (b).....	$(11,300)

2. Because manufacturing overhead is overapplied, the cost of goods sold would decrease by $11,300 and the gross margin would increase by $11,300.

Exercise 2-8 (10 minutes)

Direct material.....	$10,000
Direct labor	10,000
Manufacturing overhead:	
$10,000 × 125%.....	12,500
Total manufacturing cost.....	$32,500
Unit product cost:	
$32,500 ÷ 1,000 units.....	$32.50

Exercise 2-10 (10 minutes)

Yes, overhead should be applied to value the Work in Process inventory at year-end.

Because $6,000 of overhead was applied to Job V on the basis of $2,000 of direct labor cost, the company's predetermined overhead rate must be 300% of direct labor cost.

Job W direct labor cost (a)	$4,000
Predetermined overhead rate (b).....	3.00
Manufacturing overhead applied to Job W (a) × (b)	$12,000

Exercise 2-11 (30 minutes)

1. Mason Company's schedule of cost of goods manufactured is as follows:

Direct materials:		
Beginning raw materials inventory	$ 7,000	
Add: Purchases of raw materials	118,000	
Raw materials available for use	125,000	
Deduct: Ending raw materials inventory	8,000	
Raw materials used in production		$117,000
Direct labor		70,000
Manufacturing overhead		90,000
Total manufacturing costs		277,000
Add: Beginning work in process inventory		10,000
		287,000
Deduct: Ending work in process inventory		16,000
Cost of goods manufactured		$271,000

2. Mason Company's schedule of cost of goods sold is as follows:

Beginning finished goods inventory	$ 20,000
Add: Cost of goods manufactured	271,000
Goods available for sale	291,000
Deduct: Ending finished goods inventory	35,000
Unadjusted cost of goods sold	$256,000
Deduct: Overapplied overhead	10,000
Adjusted cost of goods sold	$246,000

3.

Mason Company
Income Statement

Sales		$524,000
Cost of goods sold ($256,000 – $10,000)		246,000
Gross margin		278,000
Selling and administrative expenses:		
Selling expenses	$140,000	
Administrative expense	63,000	203,000
Net operating income		$ 75,000

Exercise 2-12 (15 minutes)

1. Actual manufacturing overhead costs		$473,000
Manufacturing overhead cost applied:		
19,400 MH × $25 per MH.....		485,000
Overapplied overhead cost.....		$ 12,000
2. Direct materials:		
Raw materials inventory, beginning	$ 20,000	
Add purchases of raw materials.....	350,000	
Raw materials available for use	370,000	
Deduct raw materials inventory, ending ..	30,000	
Raw materials used in production	340,000	
Less indirect materials.....	15,000	$325,000
Direct labor.....		60,000
Manufacturing overhead cost applied to work in process		485,000
Total manufacturing costs.....		870,000
Add: Work in process, beginning		40,000
		910,000
Deduct: Work in process, ending.....		70,000
Cost of goods manufactured		$840,000

Exercise 2-14 (20 minutes)

1. The estimated total manufacturing overhead cost is computed as follows:

$$Y = \$650{,}000 + (\$3.00 \text{ per MH})(120{,}000 \text{ MHs})$$

Estimated fixed manufacturing overhead	$650,000
Estimated variable manufacturing overhead: $3.00 per MH × 120,000 MHs	360,000
Estimated total manufacturing overhead cost	$1,010,000

The predetermined overhead rate is computed as follows:

Estimated total manufacturing overhead	$1,010,000	
÷ Estimated total machine-hours (MHs)	120,000	MHs
= Predetermined overhead rate (rounded)	$8.42	per MH

2. Total manufacturing cost assigned to Job 400:

Direct materials	$450
Direct labor	210
Manufacturing overhead applied ($8.42 per MH × 40 MHs) (rounded to the nearest dollar)	337
Total manufacturing cost	$997

3. Computing underapplied/overapplied overhead:

Actual manufacturing overhead (a)	$1,350,000
Actual machine-hours	146,000
× Predetermined overhead rate	$8.42
= Manufacturing overhead applied (b)	$1,229,320
Underapplied overhead (a) – (b)	$120,680

The closing entry would increase cost of goods sold by $120,680 and decrease net operating income by $120,680.

Exercise 2-18 (30 minutes)

1. The predetermined overhead rate is computed as follows:

$$Y = \$128{,}000 + \$0.75 \text{ per MH} \times 80{,}000 \text{ MHs}$$

Estimated fixed manufacturing overhead	$128,000
Estimated variable manufacturing overhead	
$0.75 per MH × 80,000 MHs	60,000
Estimated total manufacturing overhead cost	$188,000

The predetermined overhead rate is computed as follows:

Estimated total manufacturing overhead	$188,000	
÷ Estimated total machine-hours	80,000	MHs
= Predetermined overhead rate	$2.35	per MH

2. The amount of overhead cost applied to Work in Process for the year would be: 75,000 machine-hours × $2.35 per machine-hour = $176,250. This amount is shown in entry (a) below:

Manufacturing Overhead			
(Maintenance)	21,000	(a)	176,250
(Indirect materials)	8,000		
(Indirect labor)	60,000		
(Utilities)	32,000		
(Insurance)	7,000		
(Depreciation)	56,000		
Balance	7,750		

Work in Process			
(Direct materials)	710,000		
(Direct labor)	90,000		
(Overhead) (a)	176,250		

3. Overhead is underapplied by $7,750 for the year, as shown in the Manufacturing Overhead account above. The entry to close out this balance to Cost of Goods Sold would be:

Cost of Goods Sold	7,750	
Manufacturing Overhead		7,750

Exercise 2-18 (continued)

4. When overhead is applied using a predetermined rate based on machine-hours, it is assumed that overhead cost is proportional to machine-hours. When the actual machine-hours turn out to be 75,000, the costing system assumes that the overhead will be 75,000 machine-hours × $2.35 per machine-hour, or $176,250. This is a drop of $11,750 from the initial estimated manufacturing overhead cost of $188,000. However, the actual manufacturing overhead did not drop by this much. The actual manufacturing overhead was $184,000—a drop of $4,000 from the estimate. The manufacturing overhead did not decline by the full $11,750 because of the existence of fixed costs and/or because overhead spending was not under control. These issues will be covered in more detail in later chapters.