

Introduction to Accounting: The Language of Business

Lesson 12: Product Cost

Supplemental Textbook



Product Costs

Learning objectives

After studying this chapter, you should be able to:

- Compare and contrast managerial accounting and financial accounting.
- Describe the basic components of a products cost.
- Explain the difference between product costs and period costs.
- Compare financial reporting by a merchandiser to that of a manufacturer and prepare a statement of cost of goods manufactured, an income statement, and a balance sheet for a manufacturer.
- Explain the pattern of cost flows for a company.
- Compare and contrast different production methods and accounting systems.
- Describe job cost flows and determine the cost of jobs.
- Explain how and why predetermined overhead rates are computed.
- Describe the differences in net income under absorption costing and variable costing (appendix).

Merchandiser and manufacturer accounting: Differences in cost concepts

Cost is a financial measure of the resources used or given up to achieve a stated purpose. Product costs are the costs a company assigns to units produced. **Product costs** are the costs of making a product, such as an automobile; the cost of making and serving a meal in a restaurant; or the cost of teaching a class in a university.

Manufacturing companies use the most complex product costing methods. To ensure that you understand how and why product costing is done in manufacturing companies, we use many manufacturing company examples. However, since many of you could have careers in service or merchandising companies, we also use nonmanufacturing examples.

An ethical perspective: High pressure sales tactics and creative accounting

The most common financial fraud is premature recording of revenues. For instance, a manager or accountant recorded a sale before the end of Year 1 when, in fact, the sale occurred in Year 2. That sale and its profits appear on the Year 1 financial statements, instead of the Year 2 financial statements. A company known as Comserv provides an example of this type of fraud.

Comserv was a software development company that installed specialized software for companies. Comserv recorded revenue for a software installation as follows: First, it recorded a portion of the revenue when the customer signed a contract. Second, it recorded the rest of the revenue when the installation was complete. This approach complied with generally accepted accounting principles for external reporting and with company policy for internal reporting.

Using this method, salespeople had incentives to pressure customers to sign contracts before the end of the fiscal year. Subsequent investigations by Comserv's external auditors and the Securities

and Exchange Commission uncovered several fraudulent activities. For instance, employees backdated sales contracts by recording a contract signed on January 28 of Year 2 as being signed on December 28 of Year 1. (The end of the fiscal year was December 31.)

Comserv salespeople also persuaded customers to sign contracts for software installations before the end of the fiscal year while providing a separate side agreement that allowed customers to withdraw from the deal at a later date. Because of this side agreement, the company should not have recorded revenue at the time the contract was signed. Comserv should have waited until customers could no longer withdraw from the contract. The accounting department, not knowing of the separate side agreement, recorded revenue at the time of the contract.

The Securities and Exchange Commission alleged many people at Comserv were involved in fraudulent activities, including salespeople and accountants who unwittingly supported these activities. In the end, several people were charged with committing fraud by the Securities and Exchange Commission, and the company was taken over by another company in the computer software industry.

Based on the authors' research of Securities and Exchange Commission files and court testimony.

In manufacturing companies, a product's cost is made up of three cost elements: direct material costs, direct labor costs, and manufacturing overhead costs.

Direct materials **Materials** are unprocessed items used in the manufacturing process. **Direct materials** are those materials used only in making the product and are clearly and easily traceable to a particular product. For example, iron ore is a direct material to a steel company because the iron ore is clearly traceable to the finished product, steel. In turn, steel becomes a direct material to an automobile manufacturer.

Some materials (such as glue and thread used in manufacturing furniture) may become part of the finished product, but tracing those materials to a particular product would require more effort than is sensible. Such materials, called indirect materials or supplies, are included in manufacturing overhead. **Indirect materials** are materials used in the manufacture of a product that cannot, or will not for practical reasons, be traced directly to the product being manufactured. Indirect materials are part of overhead, which we will discuss later.

Direct labor **Direct labor** costs include the labor costs of all employees actually working on materials to convert them into finished goods. As with direct material costs, direct labor costs of a product include only those labor costs clearly traceable to, or readily identifiable with, the finished product. The wages paid to a construction worker, a pizza delivery driver, and an assembler in an electronics company are examples of direct labor.

Many employees receive fringe benefits—employers pay for payroll taxes, pension costs, and paid vacations. These fringe benefit costs can significantly increase the direct labor hourly wage rate. Some companies treat fringe benefit costs as direct labor. Other companies include fringe benefit costs in overhead if they can be traced to the product only with great difficulty and effort.

Firms account for some labor costs (for example, wages of materials handlers, custodial workers, and supervisors) as indirect labor because the expense of tracing these costs to products would be too great. These indirect labor costs are part of overhead. **Indirect labor** consists of the cost of labor that cannot, or will not for practical reasons, be traced to the products being manufactured.

Overhead In a manufacturing company, overhead is generally called manufacturing overhead. (You may also see other names for manufacturing overhead, such as factory overhead, factory indirect costs, or factory burden.) Service companies use service overhead, and construction companies use construction overhead. Any of these companies may just use the term overhead rather than specifying it as manufacturing overhead, service overhead, or construction overhead. Some people confuse overhead with selling and administrative costs. Overhead is part of making the good or providing the service, whereas selling costs result from sales activity and administrative costs result from running the business.

In general, **overhead** refers to all costs of making the product or providing the service except those classified as direct materials or direct labor. (Some service organizations have direct labor but not direct materials.) In manufacturing companies, **manufacturing overhead** includes all manufacturing costs except those accounted for as direct materials and direct labor. Manufacturing overhead costs are manufacturing costs that must be incurred but that cannot or will not be traced directly to specific units produced. In addition to indirect materials and indirect labor, manufacturing overhead includes depreciation and maintenance on machines and factory utility costs. Look at Exhibit 1 for more manufacturing overhead costs.

Selling costs **Selling costs** are costs incurred to obtain customer orders and get the finished product in the customers' possession. Advertising, market research, sales salaries and commissions, and delivery and storage of finished goods are selling costs. The costs of delivery and storage of finished goods are selling costs because they are incurred after production has been completed. Therefore, the costs of storing materials are part of manufacturing overhead, whereas the costs of storing finished goods are a part of selling costs. Remember that retailers, wholesalers, manufacturers, and service organizations all have selling costs.

Administrative costs **Administrative costs** are nonmanufacturing costs that include the costs of top administrative functions and various staff departments such as accounting, data processing, and personnel. Executive salaries, clerical salaries, office expenses, office rent, donations, research and development costs, and legal costs are administrative costs. As with selling costs, all organizations have administrative costs.

Companies also classify costs as product costs and period costs. **Product costs** are the costs incurred in making products. These costs include the costs of direct materials, direct labor, and manufacturing overhead.

Period costs are closely related to periods of time rather than units of products. For this reason, firms expense (deduct from revenues) period costs in the period in which they are incurred. Accountants treat all selling and administrative costs as period costs for external financial reporting.

Indirect labor:	Repairs and maintenance on factory buildings and equipment
Janitors in factory buildings	Payroll taxes and fringe benefits for manufacturing employees
Supervisors in factory buildings	Depreciation on factory buildings and equipment
Materials storeroom personnel	Insurance and taxes on factory property and inventories
Cost accountant	Utilities for factory buildings
Indirect materials:	
Oil	
Nails	

Exhibit 1: Manufacturing overhead costs

To illustrate, assume a company pays its sales manager a fixed salary. Even though the manager may be working on projects to benefit the company in future accounting periods, it expenses the sales manager's salary in the period incurred because the expense cannot be traced to the production of a specific product.

An accounting perspective:

Business insight

Many service organizations have inventories. For example, consulting firms, public accounting firms, and law firms have inventories of work not yet billed to clients. The inventories in service companies are less tangible than the inventories in manufacturing companies. Inventories represent the time and talent that have gone into the job. In service companies, this includes working papers and documents or simply the ideas of the people doing the work.

Financial reporting by manufacturing companies

Many of you will work in manufacturing companies or provide services for them. Others will work in retail or service organizations that do business with manufacturers. This section will help you understand how manufacturing companies work and how to read both their internal and external financial statements.

Assume you own a bicycle store and purchase bicycles and accessories to sell to customers. To determine your profitability, you would subtract the cost of bicycles and accessories from your gross sales as cost of goods sold. However, if you owned the manufacturing company that made the bicycles, you would base your cost of goods sold on the cost of manufacturing those bicycles. Accounting for manufacturing costs is more complex than accounting for costs of merchandise purchased that is ready for sale.

Perhaps the most important accounting difference between merchandisers and manufacturers relates to the differences in the nature of their activities. A merchandiser purchases finished goods ready to be sold. On the other hand, a manufacturer must purchase raw materials and use production equipment and employee labor to transform the raw materials into finished products.

Thus, while a merchandiser has only one type of inventory—merchandise available for sale—a manufacturer has three types—unprocessed materials, partially complete work in process, and ready-for-sale finished goods. Instead of one inventory account, three different inventory accounts are necessary to show the cost of inventory in various stages of production. Looking at Exhibit 2, you can see how the inventory cost flows differ between manufacturing and merchandising companies.

We compare a manufacturer's cost of goods sold section of the income statement to that same section of the merchandiser's income statement in Exhibit 3. There are two major differences in these cost of goods sold sections: (1) goods ready to be sold are referred to as merchandise inventory by a merchandiser and finished goods inventory by a manufacturer, and (2) the net cost of purchases for a merchandiser is equivalent to the cost of goods manufactured by a manufacturer.

Exhibit 2: Comparison of inventory cost flows

Merchandiser		Manufacturer	
Cost of goods sold:		Cost of goods sold:	
Merchandise inventory, January 1	\$ 25,000	Finished goods inventory, January 1	\$ 50,000
Net cost of purchases	165,000	Cost of goods manufactured (from statement of cost of goods manufactured)	1,100,000
Cost of goods available for sale	\$ 190,000	Cost of goods available for sale	\$1,150,000
Merchandise inventory, December 31	30,000	Finished goods inventory, December 31	60,000
Cost of goods sold	\$ 160,000	Cost of goods sold	\$1,090,000

Exhibit 3: Cost of goods sold comparison

The **statement of cost of goods manufactured** supports the cost of goods sold figure on the income statement. (See the USD 1,100,000 cost of goods manufactured in Exhibit 3.) The two most important numbers on this statement are the cost to manufacture and the cost of goods manufactured. Be careful not to confuse the terms cost to manufacture and cost of goods manufactured with each other or with the cost of goods sold. We depict the relationship among these terms in Exhibit 4.

Cost to manufacture includes the costs of all resources put into production during the period. **Cost of goods manufactured** consists of the cost of all goods completed during the period. It includes cost to manufacture plus the beginning work in process inventory minus the ending work in process inventory. **Cost of goods sold** includes the cost of goods manufactured plus the beginning finished goods inventory minus the ending finished goods inventory.

Look at Exhibit 5, the statement of cost of goods manufactured for Farside Manufacturing Company for 2010. Farside Manufacturing makes calendars and books.

Note how the statement shows the costs incurred for direct materials, direct labor, and manufacturing overhead. The statement totals these three costs as cost to manufacture during the period. When adding beginning work in process inventory and deducting ending work in process inventory from the cost to manufacture, we obtain cost of goods manufactured or completed. Cost of goods sold does not appear on the cost of goods manufactured statement but on the income statement.

To make the manufacturer's income statement more understandable to readers of the financial statements, accountants do not show all of the details that appear in the cost of goods manufactured statement. In Exhibit 6 on

the next page, we show the income statement for Farside Manufacturing Company. Notice in Exhibit 6 the relationship of the statement of cost of goods manufactured to the income statement.

Exhibit 4: Relationship of cost to manufacture, cost of goods manufactured, and cost of goods sold

Farside manufactured company		
Statement of cost of goods		
manufactured		
For the year ended 2010 December 31		
Direct materials		
Materials inventory, January 1	\$ 40,000	
Materials purchases	480,000	
Materials available for use	\$520,000	
Less: Materials inventory, December 31	30,000	
Materials used		\$490,000
Direct labor		380,000
Manufacturing overhead		
Indirect labor	\$ 120,000	
Maintenance and repairs expense	60,000	
Factory utilities expense	10,000	
Depreciation expense – factory building	20,000	
Depreciation expense – factory equipment	30,000	
Other expense – factory	20,000	
Total manufacturing overhead		260,000
Cost to manufacture		\$1,130,000
Add: Work in process inventory, January 1		30,000
		\$1,160,000
Less: Work in process inventory, December 31		60,000
Cost of goods manufactured		\$1,100,000

Exhibit 5: Statement of cost of goods manufactured

The cost of goods manufactured appears in the cost of goods sold section of the income statement. The cost of goods manufactured is in the same place that purchases would be presented on a merchandiser's income statement. We add cost of goods manufactured to beginning finished goods inventory to derive cost of goods available for sale. This is similar to the merchandiser who presents purchases added to beginning merchandise to derive goods available for sale.

Farside manufacturing company		
Income statement		
For the year ended 2010 December 31		
Sales		\$1,800,000
Cost of goods sold:		
Finished goods inventory, January 1	\$ 50,000	
Cost of goods manufactured (see statement of cost of goods manufactured in Exhibit 5)	1,100,000	
Cost of goods available for sale	\$1,150,000	
Less: Finished goods inventory, December 31	160,000	
Cost of goods sold		1,090,000
Gross margin		\$ 710,000
Operating expenses:		
Selling expenses	\$ 300,000	
Administrative expenses	200,000	
Total operating expenses		500,000
Income from operations		\$ 210,000

Note: Income statements presented in external financial statements also include nonoperating revenues and expenses and income taxes.

Exhibit 6: Income statement of a manufacturer

When financial statements are released to the public, it is common to further simplify the income statement. These simplified statements show only the items and amounts in the right column of Exhibit 6, not the details in the left column.

Unlike a merchandiser's balance sheet that reports a single inventory amount, the balance sheet for a manufacturer typically shows materials, work in process, and finished goods inventories separately. A manufacturer's balance sheet may also show greater detail in the property, plant, and equipment section because of the significant investment in plant assets.

The general cost accumulation model

In general, companies match the flow of costs to the physical flow of products through the production process, as shown in Exhibit 7. They place materials received from suppliers in the materials storeroom. They also record the cost of those materials when purchasing them. As they are needed for production, the materials move from the materials storeroom to the production departments, and their cost is assigned to those production departments, as shown in Exhibit 7.

During production, the materials processed by workers and machines become partially manufactured products. At any time during production, these partially manufactured products are collectively known as **work in process**. For example, if accountants compute the inventory when the company has partially finished products at the end of the year, this inventory is work in process inventory.

Completed products are **finished goods**. When the products are completed and transferred to the finished goods storeroom, the company removes their costs from Work in Process Inventory and assigns them to Finished Goods Inventory. As the goods are sold, the company transfers related costs from Finished Goods Inventory to Cost of Goods Sold.

Exhibit 7: Product and cost flows

Type of production	Accounting system	Type of product
Job shop Hospital, custom home builder, consulting firm	Job costing	Customized
Batch production Furniture manufacturer, winery	Mostly job costing	Several different products
Repetitive manufacturing Computer manufacturer, bicycle manufacturer	Mostly process costing (operations)	Few new products
Continuous flow processing Oil refinery, paint manufacturer	Process costing	Standardized

Exhibit 8: Production activities and types of accounting systems

The accounting flow of costs follows the physical flow of the manufacturing process in most companies.

In discussing product costing, we described how accountants and managers assign costs to products. Recall that products can be either goods or services, so this discussion applies to service and merchandising companies as well as to manufacturing companies.

In Exhibit 8, we show how various companies choose different accounting systems, depending on their products. First, companies producing individual, unique products known as jobs use job costing (also called job order costing). Companies such as construction companies and consulting firms, produce jobs and use job costing.

Second, some companies, like furniture manufacturers, produce batches of products. They produce all of the components of a single product (e.g. coffee tables) in one batch. They would then produce the components of another product (e.g. dining room sets) in a new batch. (Some university food service companies prepare meals this way.) Companies such as these use job costing methods to accumulate the cost of each batch.

Repetitive manufacturing lends itself to the use of automated equipment that minimizes the amount of manual material handling. Automobile assembly plants, bicycle assembly plants, and computer assembly plants use repetitive manufacturing.

Continuous flow processing is the opposite of job shops. Companies using this process continuously mass-produce a single, homogeneous product. Companies use process cost systems in manufacturing paint, grinding flour, and refining oil.

An accounting perspective:

Business insight

Engineers for automobile companies in the United States believe that Japanese manufacturers can build cars for considerably less than their US counterparts. Many hospitals that thrived when health care costs were reimbursed faced troubled financial times when they had to compete with health maintenance organizations. These organizations required a better understanding of their costs. It is simple. Companies with competitors have to know and control their costs to be competitive.

Job costing

A **job cost system (job costing)** accumulates costs incurred according to the individual jobs. Companies generally use job cost systems when they can identify separate products or when they produce goods to meet a customer's particular needs.

Who uses job costing? Examples include home builders who design specific houses for each customer and accumulate the costs separately for each job, and caterers who accumulate the costs of each banquet separately. Consulting, law, and public accounting firms use job costing to measure the costs of serving each client. Motion pictures, printing, and other industries where unique jobs are produced use job costing. Hospitals also use job costing to determine the cost of each patient's care.

Assume Creative Printers is a company run by a group of students who use desktop publishing to produce specialty books and instruction manuals. Creative Printers uses job costing. Creative Printers keeps track of the time and materials (mostly paper) used on each job.

The company compares the cost of each job with the revenue received to be sure the jobs are profitable. Sometimes the company learns that certain jobs are too costly considering the prices they can charge. For example, Creative Printers recently learned that cookbooks were not profitable. On the other hand, printing instruction manuals was quite profitable, so the company has focused more on the instruction manual market. To illustrate a job costing system, this section describes the transactions for the month of July for Creative Printers.

On July 1, Creative Printers had these beginning inventories:

Materials inventory	\$20,000
Work in process inventory (Job No. 106: direct materials, \$4,200; direct labor, \$5,000; and overhead, \$4,000)	13,200
Finished goods inventory (Job No. 105)	5,500

Creative Printing had completed Job No. 105, a set of gardening books, but had not shipped them to the customer as of June 30. They had Job No. 106, a set of instruction manuals for computer software, in process at the beginning of July and completed it in July. They started Job No. 107, a travel guide for visitors to Southeast Asia, in July but had not completed it.

The transactions and the journal entries to record these transactions follow. In Exhibit 9, we show the flow of costs through accounts and the beginning balances just presented.

from the storeroom to jobs.

See Exhibit 9, for the flow of materials from Materials Inventory to the Work in Process and Overhead accounts.

- Production workers keep track of the time spent on each job at Creative Printers. Based on that information, the company assigned production-related labor costs to jobs and to Overhead as follows: USD 4,000 to Job No. 106, USD 16,000 to Job No. 107, and indirect labor of USD 5,000 to Overhead.

Work in process inventory – Job No. 106	4,000	
Work in process inventory – Job No. 107	16,000	
Overhead	5,000	
Payroll summary		25,000
To distribute labor costs to jobs and overhead		

The entry to record payroll incurred during the accounting period (not shown) includes a debit to Payroll Summary and a credit to liability accounts to show payables for fringe benefits, such as health insurance, payroll taxes, and employee wages. In entry (3) the payroll summary is distributed to the jobs and overhead. Look at Exhibit 9, to see the assignment of labor costs to the Work in Process and Overhead accounts.

- The company assigns overhead to each job in the following manner: Creative Printers charges indirect materials to jobs based on each job's usage of materials; it charges indirect labor to jobs based on each job's usage of labor; and it charges all other overhead to jobs on the basis of the machine-hours each job uses.

By definition, overhead cannot be traced directly to jobs. Instead, we use cost drivers to assign overhead to jobs. A **cost driver** is a measure of activities, such as machine-hours, that is the cause of costs. To assign overhead to jobs, the cost driver should be the cause of the overhead costs, or at least be reasonably associated with the overhead costs. Just as automobile mileage is a good cost driver for measuring the cause of gasoline consumption, machine-hours is a measure of what causes energy costs. By assigning energy costs to jobs based on the number of machine-minutes or hours the job uses, we have a pretty good idea of the energy costs required to produce the job.

Creative Printers assigns overhead (such as machine maintenance) to jobs on a machine-hour basis. This makes good sense if machine maintenance is based on hours of usage, similar to having car maintenance done every 6,000 miles.

Creative Printers also assigns overhead (such as building depreciation) to jobs on a machine-hour basis, which is less logical. However, Creative Printers' management does not believe the time and trouble of developing a more sophisticated method of assigning building depreciation to jobs is justified. For example, management did not believe better overhead allocation would sufficiently improve company profits to justify hiring another accountant to improve its overhead allocation method.

Creative Printers allocates overhead to each job as follows:

Materials basis: Overhead is assigned to a job at the rate of 5 per cent of the cost of materials used on the job.

Labor basis: Overhead is assigned at the rate of 25 per cent of the cost of labor used on the job.

Machine-hours basis: Overhead is assigned to a job at the rate of USD 2 per machine-hour used on the job.

For now, assume these overhead rates are correct. Later in the chapter we discuss how companies derive these overhead rates. Creative Printers assigned overhead to Jobs 106 and 107 as follows:

Job 106		Overhead assigned to Job 106:	
Materials	\$9,000	5% x \$9,000	\$ 450
Labor cost	\$4,000	25% x \$4,000	1,000
Machine-hours	875 hours	\$2 x 875 hours	1,750
		Total overhead assigned to Job 106	\$3,200
Job 107		Overhead assigned to Job 107:	
Materials	\$14,000	5% x \$14,000	\$ 700
Labor cost	\$16,000	25% x \$16,000	4,000

Machine-hours	4,050 hours	\$2 x 4,050 hours	8,100
		Total overhead assigned to Job 107	\$12,800

Here is the journal entry to assign overhead to jobs:

Work in process inventory – Job No. 106	3,200	
Work in process inventory – Job No. 107	12,800	
Overhead		16,000

To record application of overhead to jobs.

See Exhibit 9 for the application of overhead to jobs.

- Job No. 106 was completed. Job 106 cost USD 29,400 for the total work done on the job, including costs in beginning Work in Process Inventory on July 1 and costs added during July. This entry records the completion of Job 106:

Finished goods inventory (+A)	29,400	
Work in process inventory – Job No. 106 (-A)		29,400

To record completed production for July.

See Exhibit 9 for the flow of costs from Work in Process Inventory to Finished Goods Inventory.

- Job No. 105 was sold on account in July for USD 9,000. These entries record the sale and the related cost of goods sold:

Accounts receivable (+A)	9,000	
Sales (+SE)		9,000

To record sales on account for July.

Cost of goods sold (-SE)	5,500	
Finished goods inventory (-A)		5,500

To record cost of goods sold in July (Job 105).

- The company applied overhead to the jobs in entry (4) based on a predetermined overhead rate. Many of the actual overhead costs are not known until the end of the month or later. For example, the company would not receive its utility bill for July until sometime in August. In addition to the indirect materials and indirect labor recorded in entries (2) and (3), Creative Printers incurred these other overhead costs for July:

Machinery repairs and maintenance	\$4,500
Utilities, including energy costs to run machines	1,000
Depreciation of building and machines	2,500
Other overhead	1,800
Total overhead incurred in July other than indirect materials and indirect labor	\$9,800

To prepare the journal entry, we debit the Overhead account for the actual costs. Then we credit Accounts Payable for the machinery repairs and maintenance, utilities, and other overhead. (We assume an outside contractor does the maintenance and repairs.) The amount is USD 7,300 (USD 4,500 + USD 1,000 + USD 1,800). And, finally we credit Accumulated Depreciation for USD 2,500. Here is the journal entry:

Overhead	9,800	
Accounts payable		7,300
Accumulated depreciation		2,500

To record actual overhead costs for July.

Overhead		Cost of goods Sold	
1,000*	16,000*	5,500*	
5,000*			
9,800*			Transfer from overhead (8)
	Overapplied balance 200*	Cost of goods sold for July 5,300	200
Transfer to cost of goods sold (8) 200			
-0-			

*These amounts are from Exhibit 9

Exhibit 10: Transfer overapplied overhead to cost of goods sold

At this point, you may want to review the flow of costs through the inventory accounts in Exhibit 9. Note that Exhibit 9, shows only the inventory accounts, Payroll Summary, Overhead, and Cost of Goods Sold, not all of the accounts in the preceding entries.

- At the end of the month, the Overhead account contains **overapplied overhead** of USD 200 as shown in Exhibit 9. Companies generally transfer the balance of the Overhead account to Cost of Goods Sold at the end of the accounting period. Some companies do this monthly; others do it quarterly or annually. The journal entry to transfer Creative Printers' overhead balance to Cost of Goods Sold for the month of July is as follows:

Overhead (-SE)	200	
Cost of goods sold (+SE)		200
To transfer the overhead balance to Cost of goods sold.		

See the adjusted Cost of Goods Sold and the Overhead accounts in Exhibit 10.

Why does the previous entry reduce the Cost of Goods Sold by USD 200? The overhead applied to the jobs was too high—it was overapplied. Thus, the cost of jobs was overstated. Although those jobs are still in Work in Process or Finished Goods Inventory, companies usually adjust the Cost of Goods Sold account instead of each inventory account. Adjusting each inventory account for a small overhead adjustment is usually not a good use of managerial and accounting time and effort. All jobs appear in Cost of Goods Sold sooner or later, so companies simply adjust Cost of Goods Sold instead of the inventory accounts.

In this book, we assume companies transfer overhead balances to Cost of Goods Sold. We leave the more complicated procedure of allocating overhead balances to inventory accounts to textbooks on cost accounting.

Although Creative Printers had overapplied overhead, it could just as easily have had **underapplied overhead**. If overhead had been underapplied, the company would have debited Cost of Goods Sold and credited Overhead to transfer the overhead balance.

**Creative Printers
Income statement
For the month ended 2010 July 31**

Sales	\$9,000
Cost of goods sold:	
Finished goods inventory, July 1	\$ 5,500
Cost of goods manufactured	29,400
Cost of goods available for sale	\$34,900
Less: Finished goods inventory, July 31	29,400
Cost of goods sold before transfer of overapplied overhead	\$ 5,500
Less: Overapplied overhead	200
Cost of goods sold	5,300
Gross margin	\$3,700
Selling and administrative expenses	3,000
Net income	\$ 700

Exhibit 11: Creative Printers-Income statement

Sometime in July or August, Creative Printers would collect its receivables in cash and pay its payables. The accounts payable for July amount to USD 32,300 (USD 25,000 for the materials purchase + USD 7,300 payables for overhead costs). The payroll liabilities amount to USD 25,000. Here are the entries recording Creative Printers' payment of payables and payroll liabilities, and the collection of its receivables of USD 9,000:

Accounts payable (-L)	32,300	
Cash (-A)		32,300
Payroll liabilities (-L)	25,000	
Cash (-A)		25,000
Cash (+A)	9,000	
Accounts receivable (-A)		9,000

Note that in Exhibit 11 we present the income statement for Creative Printers. Assume the selling and administrative expenses for July are USD 3,000.

Managers would use the preceding cost information for several purposes: First, they would compare the actual costs of the job with expected costs, both as the work is being done and after the job has been completed. Later chapters discuss the role of managerial accounting in performance evaluation. Second, managers would assess the profitability of jobs. For example, Job 105 had revenue of USD 9,000 and costs of USD 5,500.

Third, managers would compare actual overhead on the left side of the Overhead account, with the overhead applied to jobs on the right side. If the actual overhead exceeds the applied overhead, they may wish to learn why the actual overhead is so high. Also, they may ask the accountants to increase the overhead applied to jobs to give them a better idea of the cost of jobs. If the actual is less than the applied overhead, they may ask the accountants to reduce the overhead applied to jobs.

Predetermined overhead rates

Creative Printers used predetermined rates to apply overhead to jobs. For example, they determined the 5 per cent rate used to apply materials-related overhead to jobs before the month of July. Most manufacturing and service organizations use predetermined rates.

To calculate a **predetermined overhead rate**, a company divides the estimated total overhead costs for a period by an expected level of activity. This activity could be total expected machine-hours, total expected direct labor-hours, or total expected direct labor cost for the period. Companies set predetermined overhead rates at the beginning of the year in which they will use them. Thus, the rates for July may have been computed in November or December of the previous year. This formula computes a predetermined rate:

$$\text{Predetermined overhead rate} = \frac{\text{Estimated overhead costs}}{\text{Expected level of activity (such as machine-hours)}}$$

To demonstrate, assume the accountants at Creative Printers estimated overhead related to machine usage to be USD 120,000 for the year and estimated the machine usage for the year to be 60,000 machine-hours. Thus, the predetermined overhead rate would be USD 2 per hour, calculated as follows:

$$\text{Predetermined overhead rate} = \frac{\text{Estimated overhead costs}}{\text{Expected machine-hours}}$$

$$\text{Predetermined overhead rate} = \frac{\text{USD } 120,000}{60,000} = \text{USD } 2 \text{ per machine-hour}$$

Some companies compute the overhead rate after the fact; that is, after the jobs are done and the overhead costs are known. The formula to calculate an **actual overhead rate** is:

$$\text{Actual overhead rate} = \frac{\text{Total actual overhead costs}}{\text{Total actual manufacturing activity}}$$

Recall that we measure manufacturing activity using machine-hours, labor-hours, labor costs, materials costs, or some other cost driver.

Reasons for using predetermined rates Most companies use predetermined overhead rates instead of actual overhead rates for the following reasons:

- A company usually does not incur overhead costs uniformly throughout the year. For example, heating costs are greater during winter months. However, allocating more overhead costs to a job produced in the winter compared to one produced in the summer may serve no useful purpose.
- Some overhead costs, like factory building depreciation, are fixed costs. If the volume of goods produced varies from month to month, the actual rate varies from month to month, even though the total cost is constant from month to month. The predetermined rate, on the other hand, is constant from month to month.
- Predetermined rates make it possible for companies to estimate job costs sooner. Using a predetermined rate, companies can assign overhead costs to production when they assign direct materials and direct labor costs. Without a predetermined rate, companies do not know the costs of production until the end of the month or even later when bills arrive. For example, the electric bill for July will probably not arrive until August. If Creative Printers had used actual overhead, the company would not have determined the costs of its July work until August. It is better to have a good estimate of costs when doing the work instead of waiting a long time for only a slightly more accurate number.

An accounting perspective:

Uses of technology

Recently, many high-tech companies have installed computer-assisted methods of manufacturing, merchandising, or providing services. These new technologies have had a major impact on managerial accounting. For example, where robots and computer-assisted manufacturing methods have replaced people, labor costs have shrunk from 20 per cent to 40 per cent of product costs to less than 5 per cent. Accounting in traditional settings required much more work to keep track of labor costs than is necessary in current systems. On the other hand, in highly automated

environments, accountants have had to become more sophisticated in finding the sources of overhead costs, which have become a larger part of total product cost.

Understanding the learning objectives

- Financial accounting refers to providing financial information primarily for external use. Managerial accounting information is intended for internal use to provide more detailed information to managers.
- In manufacturing companies, a product's cost is made up of three cost elements: direct materials costs, direct labor costs, and manufacturing overhead costs.
 - Direct materials costs are clearly and easily traceable to the product.
 - Direct labor costs include only those labor costs clearly traceable to, or readily identifiable with, the finished product.
 - Overhead costs (1) include all costs of making the product except direct materials and direct labor costs; (2) are costs that must be incurred in making the product but cannot or will not be traced directly to specific units produced; and (3) include a number of costs related to the production process, such as depreciation and maintenance on machines, supervisors' salaries, and utility costs for production facilities.
- Product costs are costs incurred in making products. These costs include costs of direct materials, direct labor, and overhead.
- Period costs are not assigned to units of a product but are related more closely to periods of time. For this reason, period costs are expensed (deducted from revenues) in the period in which they are incurred.
 - The major difference between a merchandiser and a manufacturer is in the types of inventories carried.
 - The statement of cost of goods manufactured supports the cost of goods sold figure on the income statement and has two important calculations: (1) Cost to manufacture, which includes the costs of all resources put into production during the period and (2) Cost of goods manufactured, which consists of the cost of all goods completed during the period.
- The manufacturer's balance sheet shows materials, work in process, and finished goods inventories separately.
 - The accounting flow of costs follows the physical flow of the manufacturing process.
 - Accountants record the flow of direct materials costs from Materials Inventory into Work in Process Inventory. They add the costs of direct labor and overhead to Work in Process Inventory. When the products are completed and transferred to the finished goods storeroom, accountants transfer their costs from Work in Process Inventory to Finished Goods Inventory. As the goods are sold, the related costs are transferred from Finished Goods Inventory to Cost of Goods Sold.
- Companies producing individual, unique products known as jobs use job costing (also called job order costing).
 - Companies such as furniture manufacturers produce batches of products and use job costing methods to accumulate the cost of each batch.
 - Repetitive manufacturing companies (automobile assembly plants) and companies producing in a continuous flow (oil refineries) use process costing, discussed in the next chapter.

- A job cost system (job costing) is a cost system that accumulates costs incurred according to the individual jobs. Each job has its own Work in Process Inventory account.
- The formula for the predetermined overhead rate is:

$$\text{Predetermined overhead rate} = \frac{\text{Estimated overhead costs}}{\text{Expected level of activity (such as machine-hours)}}$$

- Under variable costing, all the fixed manufacturing overhead costs are charged off (as period costs) during the period rather than being deferred and carried forward (as product costs) to the next period as part of inventory cost.
- Under absorption costing, all manufacturing costs are treated as product costs, including fixed manufacturing overhead.

Appendix: Variable versus absorption costing

Under **absorption costing**, companies treat all manufacturing costs, including both fixed and variable manufacturing costs, as product costs. Under variable costing, companies treat only variable manufacturing costs as product costs. Total variable costs change proportionately with changes in total activity, while fixed costs do not change as activity levels change. These variable manufacturing costs are usually made up of direct materials, variable manufacturing overhead, and direct labor. (Direct labor can be a fixed cost if the company chooses not to decrease or increase its direct labor force as volume changes. Unless otherwise stated, we treat direct labor as a variable cost.)

Variable costing (also known as direct costing) treats all fixed manufacturing costs as period costs to be charged to expense in the period received. The logic behind this expensing of fixed manufacturing costs is that the company would incur such costs whether a plant was in production or idle. Therefore, these fixed costs do not specifically relate to the manufacture of products.

Look at Exhibit 12, Bradley Company's income statements for May 2010 using absorption costing on top and variable costing on the bottom. Notice that Bradley's variable costing income statement carries the goods in inventory at USD 3.30 per unit rather than at the USD 3.90 full cost. The statement shows all variable costs as deductions from sales to disclose the contribution margin for the month. It classifies all fixed costs as period costs no matter what the source of the cost (manufacturing, selling, or administrative).

Income statement under Absorption costing

Bradley Company		
Income statement		
For the period ending 2010 May 31		
Sales (9,000 units at \$8)		\$72,000
Cost of goods sold:		
Variable costs of production (10,000 units at \$3.30)	\$33,000	
Fixed overhead costs	6,000	
Total costs of producing 10,000 units	\$39,000	
Less: Ending inventory (1,000 units at \$3.90)	3,900	35,100
Gross margin on sales		\$36,900
Operating expenses:		
Selling expenses (\$15,000 fixed plus 9,000 at \$0.20 each)	\$16,800	
Administrative expenses	12,000	28,800
Income before income taxes		\$ 8,100

Contribution margin income statement under variable costing
Bradley Company
Income statement
For the period ending 2010 May 31

Sales (9,000 units at \$8)		\$72,000
Variable costs:		
Variable production costs incurred (10,000 units at \$3.30)	\$33,000	
Less: Ending inventory (1,000 units at \$3.30)	3,300	29,700
Manufacturing margin		\$42,300
Variable selling expenses (9,000 units at \$0.20)		1,800
Contribution margin		\$40,500
Fixed costs:		
Manufacturing overhead	\$ 6,000	
Selling expenses	15,000	
Administrative expenses	12,000	33,000
Income before income taxes		\$ 7,500

Exhibit 12: Comparative income statements

In comparing the two income statements in Exhibit 12, notice the USD 600 difference in net income for the month and a USD 600 difference in ending inventory valuation, as shown in Exhibit 13, on the next page. These differences are due to the treatment of fixed manufacturing costs. Under absorption costing, each unit in ending inventory carries USD 0.60 of fixed overhead cost as part of product cost. At the end of the month, Bradley has 1,000 units in inventory. Therefore, ending inventory under absorption costing includes USD 600 of fixed manufacturing overhead costs (USD 0.60 X 1,000 units) and is valued at USD 600 more than under variable costing.

Under variable costing, companies charge off, or expense, all the fixed manufacturing costs during the period rather than deferring their expense and carrying them forward to the next period as part of inventory cost. Therefore, USD 6,000 of fixed manufacturing costs appear on the variable costing income statement as an expense, rather than USD 5,400 (USD 6,000 fixed overhead costs - USD 600 fixed manufacturing included in inventory) under absorption costing. Consequently, income before income taxes under variable costing is USD 600 less than under absorption costing because more costs are expensed during the period.

Exhibit 13: Comparison of results under absorption and variable costing

Finally, remember that the difference between the absorption costing and variable costing methods is solely in the treatment of fixed manufacturing overhead costs and income statement presentation. Both methods treat selling and administrative expenses as period costs. Regarding selling and administrative expenses, the only

difference is their placement on the income statement and the segregation of variable and fixed selling and administrative expenses. Variable selling and administrative expenses are not part of product cost under either method.

As a general rule, relate the difference in net income under absorption costing and variable costing to the change in inventories. Assuming a relatively constant level of production, if inventories increase during the year, production exceeded sales and reported income before federal income taxes is less under variable costing than under absorption costing. Conversely, if inventories decreased, then sales exceeded production, and income before income taxes is larger under variable costing than under absorption costing.

Variable costing is not currently acceptable for income measurement or inventory valuation in external financial statements that must comply with generally accepted accounting principles (GAAP) in the United States. However, managers often use variable costing for internal company reports.

Demonstration problem

Demonstration problem A Good Earth Construction Company uses a job cost system to account for the houses it builds. Each house is a separate job. As of 2010 January 1, its records showed:

Inventories:

Materials and supplies	\$ 48,000
Work in process (Job No. 212 and 213)	103,200
Finished goods (Job No. 211)	120,000

The work in process inventory consists of two jobs:

Job No.	Direct materials	Direct Labor	Construction Overhead*	Total
212	\$18,000	\$24,000	\$12,000	\$ 54,000
213	20,400	19,200	9,600	49,200
	\$38,400	\$43,200	\$21,600	\$103,200

*Construction overhead is treated just like overhead in the text examples.

Cost and sales data for 2010:

- Materials purchased on account, USD 198,000.
- Labor costs: Direct labor assigned to jobs—Job No. 212, USD 48,000; Job No. 213, USD 96,000; Job No. 214 (started in 2010), USD 144,000; supervision and other indirect labor, USD 120,000.
- Materials used: Job No. 212, USD 31,200; Job No. 213, USD 57,600; Job No. 214, USD 96,000; and indirect materials, USD 4,800.
- Overhead is assigned to jobs at the rate of 50 per cent of the actual direct labor costs incurred on each job.
- Job No. 212 and 213 were completed.
- Jobs 211 and 212 were sold for USD 540,000.
- Construction overhead costs incurred, other than indirect materials and indirect labor: depreciation, USD 12,000; heat, light, power, and miscellaneous, USD 12,000.

Prepare journal entries to record the preceding data and close any underapplied or overapplied overhead to Cost of Goods Sold.

Demonstration problem B Companies use different bases in computing their predetermined overhead rates. From the following estimated data, compute the predetermined rate used by each company.

	Company		
	A	B	C
Machine-hours	103,000	212,000	125,000
Direct labor-hours	52,000	48,000	39,000

Direct labor cost	\$650,000	\$735,000	\$420,000
Overhead costs	\$845,000	\$864,000	\$750,000

Basis for predetermined overhead rate:

Company	Basis
A	Direct labor cost
B	Direct labor-hours
C	Machine-hours

Solution to demonstration problem

Solution to demonstration problem A

Good Earth Construction Company General Journal

1.	Materials inventory	198,000	
	Accounts payable		198,000
	To record materials purchased on account.		
2.	Work in process inventory – Job No. 212	48,000	
	Work in process inventory – Job No. 213	96,000	
	Work in process inventory – Job No. 214	144,000	
	Construction overhead	120,000	
	Payroll summary		408,000
	To distribute labor costs to jobs and overhead.		
3.	Work in process inventory – Job No. 212	31,200	
	Work in process inventory – Job No. 213	57,600	
	Work in process inventory – Job No. 214	96,000	
	Construction overhead	4,800	
	Materials inventory		189,600
	To record direct and indirect materials sent from storeroom to jobs.		
4.	Work in process inventory – Job No. 212	24,000	
	Work in process inventory – Job No. 213	48,000	
	Work in process inventory – Job No. 214	72,000	
	Construction overhead		144,000
	To record overhead applied to jobs using the predetermined rate 50% of direct labor cost: Job No. 212, \$24,000 (50% x \$48,000); Job No. 213, \$48,000 (50% x \$96,000); and Job No. 214, \$72,000 (50% x \$144,000).		
5.	Finished goods inventory	408,000	
	Work in process inventory – Job No. 212		157,200
	Work in process inventory – Job No. 213		250,800
	To record completion of Jobs 212 and 213.		

The following amounts were computed by adding beginning Work in Process balances to the current month's debits to Work in Process for direct materials, direct labor, and construction overhead:

Job No. 212: USD 157,200 (USD 54,000 + USD 31,200 + USD 48,000 + USD 24,000)

Job No. 213: USD 250,800 (USD 49,200 + USD 57,600 + USD 96,000 + USD 48,000)

USD 408,000

6.	Accounts receivable	540,000	
	Sales		540,000
	To record sales on account.		
	Cost of goods sold	277,200	
	Finished goods inventory		277,200
	To record cost of goods sold (\$120,000 + \$157,200 = \$277,200).		
7.	Construction overhead	24,000	
	Accumulated depreciation		12,000
	Various accounts (Accounts payable, accrued liabilities payable, cash, etc)		12,000
	To record various construction overhead costs incurred.		

8. Cost of goods sold 4,800
 Construction overhead 4,800
 To close underapplied construction overhead (actual = \$148,800, applied = \$144,000).

Solution to demonstration problem B Company A:

Predetermined overhead rate = $\frac{\text{USD } 845,000}{\text{USD } 650,000} = 130$ per cent of direct labor cost

Company B:

Predetermined overhead rate = $\frac{\text{USD } 864,000}{48,000 \text{ hours}} = \text{USD } 18$ per direct labor – hour

Company C:

Predetermined overhead rate = $\frac{\text{USD } 750,000}{125,000 \text{ hours}} = \text{USD } 6$ per machine – hour

Key terms

Absorption costing (Appendix) A concept of costing under which all manufacturing costs, including both fixed and variable manufacturing costs, are accounted for as product costs.

Actual overhead rate Total actual manufacturing overhead divided by total actual manufacturing activity.

Administrative costs Costs of managing the organization, including the costs of top administrative functions and various staff departments such as accounting, data processing, and personnel.

Cost A financial measure of the resources used or given up to achieve a stated purpose.

Cost driver Activity or transaction that causes costs to be incurred. Machine-hours can be a cost driver for costs of energy to run machines, for example.

Cost of goods manufactured Consists of the total costs of all goods completed during the period; includes cost to manufacture plus beginning work in process inventory minus ending work in process inventory

Cost of goods sold Cost of goods manufactured plus the beginning finished goods inventory minus the ending finished goods inventory.

Cost to manufacture Includes the direct materials, direct labor, and manufacturing overhead incurred during the period.

Direct labor Labor costs of all employees actually working on materials to convert them to finished goods. Direct labor costs are directly traced to particular products in contrast to indirect labor costs.

Direct materials Materials that are used only in making the product and are clearly and easily traceable to a particular product.

Finished goods Completed manufactured products ready to be sold. Finished Goods Inventory is the title of an inventory account maintained for such products.

Indirect labor The cost of labor that cannot, or will not for practical reasons, be traced to the goods being produced or the services being provided.

Indirect materials Materials used in making a product that cannot, or will not for practical reasons, be traced directly to particular products.

Job cost system (job costing) A manufacturing cost system that accumulates costs incurred to produce a product according to individual jobs, such as a building, a consulting job, or a batch of 100 computer desks.

Managerial accounting Managerial accounting information is intended for internal use. The purpose is to generate information managers can use to make good decisions.

Manufacturing overhead All manufacturing costs except for those costs accounted for as direct materials and direct labor.

Materials Unprocessed items used in the manufacturing process.

Overapplied (overabsorbed) overhead The amount by which the overhead applied to production exceeds the actual overhead costs incurred in that same period.

Overhead All costs of making goods or providing services except for those costs classified as direct materials and direct labor. See manufacturing overhead for overhead in manufacturing companies.

Period costs Costs related more closely to periods of time than to products produced. Period costs cannot be traced directly to the manufacture of a specific product; they are expensed in the period in which they are incurred.

Predetermined overhead rate Calculated by dividing estimated total overhead costs for a period by the expected level of activity, such as total expected machine-hours or total expected direct labor-hours for the period.

Product costs Costs a company assigns to units produced. In manufacturing companies, these costs are direct materials, direct labor, and manufacturing overhead. In service companies that have no materials, these costs are direct labor and overhead.

Selling costs Costs incurred to obtain customer orders and distribute the finished product to the customer.

Statement of cost of goods manufactured An accounting report showing the cost to manufacture and the cost of goods manufactured.

Underapplied (underabsorbed) overhead The amount by which actual overhead costs incurred in a period exceed the overhead applied to production in that period.

Variable costing (also called direct costing) (Appendix) A concept of costing under which only variable manufacturing costs are accounted for as product costs and charged to the units produced during a period. All fixed manufacturing costs are charged to expense in the period in which they are incurred.

Work in process Partially manufactured products; a Work in Process Inventory account is maintained for such products.

Self-test

True-false

Indicate whether each of the following statements is true or false.

Managerial accounting is for external use and gives less detailed information than financial accounting.

A manufacturer produces speedboats, and each one requires a motor. The motors are considered direct materials and are product costs.

A Pepsi-Cola bottling plant is an example of a company that would use a job cost system.

A predetermined overhead rate is calculated by dividing the expected level of activity by the estimated total overhead cost.

Overhead cannot be entered in Work in Process Inventory when using a predetermined overhead rate. Only when the actual overhead costs are determined is the overhead entered.

Selling and administrative expenses are part of period costs under both absorption and variable costing methods.

Multiple-choice

Select the best answer for each of the following questions.

Under which cost category are indirect material costs included?

- Direct materials.
- Overhead.
- Direct labor.
- None of the above.

For financial accounting and external reporting purposes, all selling and administrative expenses are treated as:

- Period costs.
- Selling costs.
- Manufacturing overhead costs.
- Product costs.

What are the differences between the cost of goods sold sections in a manufacturer's and a merchandiser's income statements?

- a. A merchandiser uses Merchandise Inventory and Direct Labor, whereas a manufacturer uses Finished Goods Inventory and Cost of Goods Manufactured.
- b. A merchandiser uses Merchandise Inventory and Cost of Goods Available for Sale, whereas a manufacturer uses Finished Goods Inventory and Cost of Goods Available for Sale.
- c. A merchandiser uses Work in Process Inventory and Cost of Goods Sold, whereas a manufacturer uses Finished Goods Inventory and Cost of Goods Sold.
- d. None of the above.

A job cost system is used:

- a. When there are dissimilar products.
- b. By manufacturers and service companies.
- c. When goods are produced to meet a customer's particular needs.
- d. All of the above.

Which of the following best describes the advantages of using a predetermined overhead rate?.

- a. Overhead costs are applied evenly throughout the year rather than fluctuating from month to month.
- b. Predetermined rates require managers to wait until long after the accounting period to get an estimate of product costs.
- c. Total unit costs of production are known sooner than using actual overhead rates, and overhead costs are evenly distributed throughout the year.
- d. Both (a) and (c) above.

The expected level of activity in a production center is 30,000 machine-hours. Estimated overhead costs are indirect materials and indirect labor, USD 360,000; other overhead, USD 90,000. Which of the following is the predetermined overhead rate per machine-hour?

- a. USD 3.
- b. USD 12.
- c. USD 15.
- d. USD 20.

You are given the following data relating to a company:

Estimated manufacturing overhead per year	USD 24,000
Expected level of activity per year	40,000 machine-hours
Predetermined overhead rate	USD 0.60 per machine-hour
Actual overhead costs incurred during year	USD 22,500
Actual machine-hours	35,000

Which of the following are the correct journal entries for the preceding data?

- a.

Manufacturing overhead	22,500	
Various accounts		22,500
Work in process inventory	21,000	
Manufacturing overhead		21,000
- b.

Manufacturing overhead	22,500	
Various accounts		22,500
Work in process inventory	15,428	
Manufacturing overhead		15,428

c. Manufacturing overhead	24,000	
Various accounts		24,000
Work in process inventory	15,428	
Manufacturing overhead		15,428
d. Various accounts	22,500	
Manufacturing overhead		22,500
Manufacturing overhead	15,428	
Work in process inventory		15,428

Now turn to “Answers to self-test” at the end of the chapter to check your answers.

Questions

- What are the major differences between managerial and financial accounting?
- Identify the three elements of cost incurred in manufacturing a product and indicate the distinguishing characteristics of each.
- Why might a company claim that the total cost of employing a person is USD 15.30 per hour when the employee's wage rate is USD 10.50 per hour? How should this difference be classified and why?
- Why are certain costs referred to as period costs? What are the major types of period costs incurred by a manufacturer?
- Explain why the income statement of a manufacturing company differs from the income statement of a merchandising company.
- What is the general content of a statement of cost of goods manufactured? What is its relationship to the income statement?
- What is the relationship between cost flows in the accounts and the flow of physical products through a factory?
- Define a job cost system and give an example of a situation in which it can be used.
- What are the major reasons for using predetermined manufacturing overhead rates?
- What is the formula for computing a predetermined overhead rate? If the expected level of activity in a production center is 50,000 machine-hours and the estimated overhead costs are USD 750,000, what is the predetermined overhead rate? Show the calculation.
- What is underapplied and overapplied overhead? What type of balance does each have in the Overhead account?
- Direct materials were issued to the following jobs: Material A was issued to Job No. 101, USD 2,000; Job No. 102, USD 1,000; and Job No. 103, USD 5,000. Material B was issued to Job No. 101, USD 5,000; Job No. 102, USD 2,000; and Job No. 103, USD 3,000. A total of USD 3,000 in indirect materials was issued to all jobs.
- Record the direct and indirect materials issued in journal entry form.
- **Real world question** Assume Domino's Pizza is considering offering a new product—a 6-inch (15.24 cm) pizza. Why would it matter if Domino's Pizza knows how much it costs to produce and deliver this 6-inch (15.24 cm) pizza?
- **Real world question** Why is it becoming more important that the managers of hospitals understand their product costs?

- **Real world question** Besides law firms and public accounting firms, name three service organizations that produce individual jobs and would use job costing.
- (Appendix) Under what specific circumstances would you expect net income to be larger under variable costing than under absorption costing? What is the reason for this difference?

Exercises

Exercise A The following costs are incurred by an electrical appliance manufacturer. Classify these costs as direct materials, direct labor, manufacturing overhead, selling, or administrative.

- a. President's salary.
- b. Cost of electrical wire used in making appliances.
- c. Cost of janitorial supplies (the janitors work in the factory).
- d. Wages of assembly-line workers.
- e. Cost of promotional displays.
- f. Assembly-line supervisor's salary.
- g. Cost accountant's salary (the accountant works in the factory).
- h. Cost of cleaner used to clean appliances when they are completed.
- i. Cost of aluminum used for toasters.
- j. Cost of market research survey.

Exercise B Classify the costs listed in the previous exercise as either product costs or period costs.

Exercise C Gore Company makes products for sporting events. The following data are for the year ended 2010 December 31:

Materials inventory, 2010 January 1	\$ 45,000
Materials inventory, 2010 December 31	65,000
Materials purchases	175,000
Direct labor	225,000
Work in process inventory, 2010 January 1	30,000
Work in process inventory, 2010 December 31	40,000
Manufacturing overhead	130,000
Finished goods inventory, 2010 January 1	80,000
Finished goods inventory, 2010 December 31	140,000

Prepare a Cost of Goods Manufactured Statement and compute the cost of goods sold.

Exercise D In June, Sierra Company worked only on Job No. 100 and completed it on June 30. There were no prior costs accumulated on Job No. 100 before June 1. During the month, the company purchased and used USD 10,800 of direct materials, used 2,000 machine-hours, and incurred USD 19,200 of direct labor costs. Assuming manufacturing overhead is applied at the rate of USD 12 per machine-hour, what is the total cost of Job No. 100? Prepare journal entries to assign the materials, labor, and manufacturing overhead costs to production and to record the transfer of Job No. 100 to Finished Goods Inventory.

Exercise E At the end of the second week in March, Job No. 710 has an accumulated total cost of USD 37,800. In the third week, USD 9,000 of direct materials were used on Job 710, 300 hours of direct labor were charged to the job at USD 40 per hour, and manufacturing overhead was applied on the basis of USD 40 per machine-hour for overhead. Job No. 710 was the only job worked on in the third week. It was also completed in the third week. Job No. 710 used 160 machine-hours during the third week in March. Compute the cost of Job No. 710, and give the journal entry required to record its completion and transfer to Finished Goods Inventory.

Exercise F Different companies use different bases in computing their predetermined overhead rates. From the following estimated data, compute the predetermined rate to be used by each company:

	Company		
	Paper	Rock	Scissors
Machine-hours	100,000	210,000	125,000
Direct labor-hours	50,000	48,000	39,000
Direct labor cost	\$800,000	\$735,000	\$410,000
Manufacturing overhead cost	\$400,000	\$432,000	\$375,000

Basis for determining predetermined overhead rate:

Company	Basis
Paper	Direct labor cost
Rock	Direct labor-hours
Scissors	Machine-hours

Exercise G Refer to the previous exercise. Assume the actual hours and cost data were:

Actual	Paper	Rock	Scissors
Manufacturing overhead	\$450,000	\$400,000	\$375,000
Direct labor cost	\$850,000	\$700,000	\$400,000
Direct labor-hours	45,000	46,000	38,000
Machine-hours	105,000	200,000	130,000

- Compute overapplied or underapplied overhead for each company.
- Prepare journal entries to transfer overapplied or underapplied overhead to Cost of Goods Sold for each company.

Exercise H Ernest Peat Consultants uses a job cost system and had the following activity during December:

There were no jobs in beginning Work in Process or Finished Goods Inventory.

Three jobs were started: No. 222, 223, and 224. Job No. 222 was completed and the customer was billed for USD 10,000 on account. Job No. 223 was completed and in Finished Goods Inventory awaiting billing to the client at the end of the month. Job No. 224 was still in process at month-end.

Direct labor costs incurred for:

Job No. 222	200 hours @ \$21/hour
Job No. 223	300 hours @ \$18/hour
Job No. 224	120 hours @ \$17/hour

Assume overhead is applied at the rate of USD 10 per labor-hour.

Actual overhead was USD 6,400. (The credit part of the journal entry is to Accounts Payable.)

Prepare journal entries to record the preceding data, as well as the transfer of underapplied or overapplied overhead to Cost of Goods Sold.

Exercise I The following data relate to Socks Company for the year ended 2010 December 31:

Cost of production:	
Direct materials (variable)	\$360,000
Direct labor (variable)	504,000
Manufacturing overhead:	
Variable	180,000
Fixed	360,000
Sales commissions (variable)	108,000
Sales salaries (fixed)	72,000
Administrative expenses (fixed)	144,000
Units produced	150,000
Units sold (at \$18 each)	120,000
Beginning inventory, 2010 January 1	-0-

There were no beginning inventories. Assume direct materials and direct labor are variable costs. Prepare two income statements—a variable costing income statement and an absorption costing income statement.

Problems

Problem A Total Block, Inc., is considering a new sunscreen packet that contains a skin wipe with sunscreen on it. These would be particularly useful for people who do not want to carry a bottle of sunscreen, according to Sunspot's marketing manager. Classify the following costs of this new product as direct materials, direct labor, manufacturing overhead, selling, or administrative.

- a. President's salary.
- b. Packages used to hold the skin wipes.
- c. Cleaning materials used to clean the skin wipe packages.
- d. Wages of workers who package the product.
- e. Cost of advertising the product.
- f. The salary of the supervisor of the workers who package the product.
- g. Cost accountant's salary (the accountant works in the factory).
- h. Cost of a market research survey.
- i. Sales commissions paid as a percent of sales.
- j. Depreciation of administrative office building.

Problem B Classify the costs listed in the previous problem as either product costs or period costs.

Problem C Good Vibrations, Inc., produces videotapes of musical performances. A newly hired executive of the company has asked you to sort through the records and prepare a statement of the company's cost of goods manufactured. You find the following data from records prepared by Good Vibrations, Inc., for the year ended 2009 December 31:

Inventories:	
Beginning direct materials inventory, 2009 January 1	\$ 6,000
Ending direct materials inventory, 2009 December 31	10,500
Beginning work in process inventory, 2009 January 1	10,000
Ending work in process inventory, 2009 December 31	9,500
Materials purchases	50,000
Direct labor	40,000
Indirect labor	15,000
Factory utilities expense	7,000
Factory supplies expense	5,000
Depreciation expense – factory building	14,000
Depreciation expense – Factory Equipment	10,500
Other manufacturing overhead	25,000

You also learn that beginning Finished Goods Inventory on 2009 January 1, was USD 20,000 and ending Finished Goods Inventory on 2009 December 31, was USD 5,000. Sales for the year were USD 400,000. Selling expenses were USD 50,000 and administrative expenses were USD 75,000.

- a. Prepare a statement of cost of goods manufactured for Good Vibrations, Inc., for the year ended 2009 December 31.
- b. Prepare an income statement for Good Vibrations, Inc., for the year ended 2009 December 31.

Problem D Log Cabin Homes, Inc., uses a job cost system to account for its jobs, which are prefabricated houses. As of 2010 January 1, its records showed inventories as follows:

Materials and supplies	\$100,000
Work in process (Job Nos. 22 and 23)	180,000

Finished goods (Job No. 21) 140,000

The work in process inventory consisted of two jobs:

Job No.	Direct materials	Direct labor	Manufacturing overhead	Total
22	\$36,000	\$40,000	\$20,000	\$ 96,000
23	40,000	28,000	16,000	84,000
		\$76,000	\$68,000	\$180,000

Cost and sales data for 2010:

Materials purchased on account, USD 400,000.

Direct materials used: Job No. 22, USD 60,000; Job No. 23, USD 120,000; Job No. 24, USD 180,000.

Indirect materials used, USD 10,000.

Direct labor costs: Job No. 22, USD 100,000; Job No. 23, USD 200,000; and Job No. 24, USD 80,000.

Indirect labor costs, USD 80,000.

Overhead is assigned to jobs at USD 100 per machine-hour. Job No. 22 used 500 machine-hours, Job No. 23 used 1,000 machine-hours, and Job No. 24 used 300 machine-hours in January.

Job No. 22 and 23 were completed and transferred to Finished Goods Inventory.

Job No. 21 and 22 were sold on account for USD 1,200,000, total.

Manufacturing overhead costs incurred, other than indirect materials and indirect labor, were depreciation, USD 80,000, and heat, light, power, miscellaneous, USD 40,000.

a. Prepare journal entries to assign the preceding costs to jobs. Show the appropriate entries debiting Finished Goods Inventory and Cost of Goods Sold. Transfer overapplied or underapplied overhead to Cost of Goods Sold.

b. Assuming selling and administrative expenses were USD 100,000, prepare an income statement for 2010.

Problem E Green Thumb Landscaping Company uses a job cost system. As of 2010 January 1, its records showed the following inventory balances:

Materials (shrubs, trees, etc.)	\$ 13,500
Work in process	25,800
Finished goods (Job No. 211)	30,000

The work in process inventory consisted of two jobs:

Job No.	Direct Materials	Direct Labor	Manufacturing Overhead	Total
212 10 Downing St.	\$4,500	\$ 6,000	\$2,400	\$12,900
213 1010 Wilshire Blvd.	5,100	4,800	3,000	12,900
	\$9,600	\$10,800	\$5,400	\$25,800

Here are data for the company for January:

Materials purchased, USD 48,000.

Landscaping direct labor costs: direct labor to Job No. 212, USD 12,000; to Job No. 213, USD 24,000; and to Job No. 214, USD 36,000. Indirect labor, USD 30,000.

Direct materials used: direct materials for Job No. 212, USD 7,800; for Job No. 213, USD 14,400; and for Job No. 214, USD 24,000. Supplies (indirect materials) used amounted to USD 1,200.

Overhead is assigned to jobs at USD 3 per labor-hour, with 8,000 labor-hours to Job 212 and 2,000 labor-hours each to Jobs 213 and 214.

Jobs 212 and 213 were completed and in Finished Goods Inventory at the end of January.

Sales revenues for January were USD 45,000; cost of goods sold was USD 30,000 for Job No. 211 that was in Finished Goods Inventory on 2010 January 1.

Overhead costs incurred other than indirect labor and indirect materials were depreciation, USD 3,000, and utilities, fuel, and miscellaneous, USD 3,000.

a. Prepare journal entries to record the preceding transactions, including the transfer of underapplied or overapplied overhead to Cost of Goods Sold.

b. Assuming selling and administrative expenses were USD 10,000, prepare an income statement for January.

Problem F Speedy Delivery, Inc., transports computer equipment for various computer manufacturers. Speedy applies overhead to jobs using a predetermined overhead rate based on truck miles. Estimated data for 2010 are:

Estimated truck miles	20 million
Estimated overhead for hauling operations (equivalent to manufacturing overhead)	\$12 million

a. Compute the predetermined overhead rate per mile.

b. Assume that in 2010, actual manufacturing overhead for hauling operations amounted to USD 15 million, and 24 million truck miles were driven. Compute the amount of underapplied or overapplied manufacturing overhead for 2010.

c. Prepare the journal entry to transfer underapplied or overapplied overhead to Cost of Goods Sold.

Problem G Costner Company uses an absorption costing system in accounting for the single product it manufactures. The following selected data are for the year 2009:

Sales (10,000 units)	\$360,000
Direct materials used (variable cost)	129,600
Direct labor costs (variable cost)	43,200
Variable manufacturing overhead	12,960
Fixed manufacturing overhead	17,280
Variable selling and administrative expenses	21,600
Fixed selling and administrative expenses	72,000

The company produced 12,000 units and sold 10,000 units. Direct materials and direct labor are variable costs. One unit of direct material goes into each unit of finished goods. Overhead rates are based on a volume of 12,000 units and are USD 1.08 and USD 1.44 per unit for variable and fixed overhead, respectively. The ending inventory is the 2,000 units of finished goods on hand at the end of 2009. There was no inventory at the beginning of 2009.

a. Prepare an income statement for 2009 under variable costing.

b. Prepare an income statement for 2009 under absorption costing.

c. Explain the reason for the difference in net income between a and b.

Alternate problems

Alternate problem A Pocket Umbrella, Inc., is considering producing a new type of umbrella. This new pocket-sized umbrella would fit into a coat pocket or purse. Classify the following costs of this new product as direct materials, direct labor, manufacturing overhead, selling, or administrative.

a. Cost of advertising the product.

b. Fabric used to make the umbrellas.

c. Maintenance of cutting machines used to cut the umbrella fabric so it will fit the umbrella frame.

d. Wages of workers who assemble the product.

- e. President's salary.
- f. The salary of the supervisor of the people who assemble the product.
- g. Wages of the product tester who stands in a shower to make sure the umbrellas do not leak.
- h. Cost of market research survey.
- i. Salary of the company's sales managers.
- j. Depreciation of administrative office building.

Alternate problem B Classify the costs listed in Alternate problem A as either product costs or period costs.

Alternate problem C Presley Manufacturing Company is a producer of music compact discs (CDs) and tapes.

The following account balances are for the year ended 2009 December 31

Administrative expenses	\$ 60,000
Depreciation expense – Manufacturing equipment	50,000
Direct labor	468,000
Manufacturing supplies expense	40,000
Indirect labor	36,000
Beginning inventories, 2009 January 1:	
Direct materials	14,000
Work in process	20,000
Finished goods	128,000
Ending inventories, 2009 December 31	
Direct materials	44,000
Work in process	56,000
Finished goods	92,000
Direct materials purchases	216,000
Rent expense – Factory	28,000
Sales	1,400,000
Selling expense	72,000
Other manufacturing overhead	126,000

- a. Prepare a statement of cost of goods manufactured for Presley Manufacturing Company for 2009.
- b. Prepare an income statement for the year ended 2009 December 31.

Alternate problem D Cathy's Catering Company uses a job cost system. Its activities in November 2010, the first month of operations, were as follows:

	Job		
	First-rate	Active life	Precocious
	University	home	School
Direct materials cost (food)	\$54,000	\$36,000	\$81,000
Direct labor cost	\$45,000	\$40,500	\$54,000
Labor-hours	2,900	3,500	3,800

The company applies overhead at a rate of USD 16 per labor-hour. It completed all jobs in November. The total revenue for the three jobs was USD 400,000. The actual overhead for the month was USD 160,000, of which USD 120,000 should be credited to Accounts Payable and USD 40,000 should be credited to Accumulated Depreciation.

Prepare journal entries to record the costs of jobs and to record the transfer of completed jobs to Finished Goods Inventory and to Cost of Goods Sold. Transfer any underapplied or overapplied overhead to Cost of Goods Sold. The company had no beginning or ending inventories.

Alternate problem E Sullivan Company applied overhead to production using a predetermined overhead rate based on machine-hours. Budgeted data for 2010 are:

Budgeted machine-hours	75,000
Budgeted manufacturing overhead	\$870,000

- a. Compute the predetermined overhead rate.
- b. Assume that in 2010, actual manufacturing overhead amounted to USD 997,500, and 86,000 machine-hours were used. Compute the amount of underapplied or overapplied manufacturing overhead for 2010.

c. Prepare the journal entry to transfer underapplied or overapplied overhead to Cost of Goods Sold.

Beyond the numbers—Critical thinking

Business decision case A Companies often do work on a cost-reimbursement basis. That is, Company B reimburses Company A for the cost of doing work for Company B. Suppose your company has a contract that calls for reimbursement of direct materials and direct labor, but not overhead. Following are costs that various organizations incur; they fall into three categories: direct materials (DM), direct labor (DL), or overhead (OH).

Glue used to attach labels to bottles containing a patented medicine.

Compressed air used in operating paint sprayers for Student Painters, a company that paints houses and apartments.

Insurance on a factory building and equipment.

A production department supervisor's salary.

Rent on factory machinery.

Iron ore in a steel mill.

Oil, gasoline, and grease for forklift trucks in a manufacturing company's warehouse.

Services of painters in building construction.

Cutting oils used in machining operations.

Cost of paper towels in a factory employees' washroom.

Payroll taxes and fringe benefits related to direct labor.

The plant electricians' salaries.

Crude oil to an oil refinery.

Copy editor's salary in a book publishing company.

a. Classify each of these items as direct materials, direct labor, or overhead.

b. Assume your classifications could be challenged in a court case. Indicate to your attorneys which of your answers for part a might be successfully disputed by the opposing attorneys. In which answers are you completely confident?

Business decision case B Quality Painters, Inc., uses a job cost system. As of 2010 January 1, its records showed the following inventory balances:

Materials	\$ 7,000
Work in process	50,000
Finished goods	0

The work in process inventory consisted of two jobs:

Job No.	Direct Materials	Direct Labor	Overhead	Total
100 Community housing	\$ 9,000	\$12,000	\$ 4,000	\$25,000
101 Regal apartments	10,000	9,000	6,000	25,000
	\$19,000	\$21,000	\$10,00	\$50,000

Here are data for the company for January:

Materials purchased, USD 90,000.

Direct labor costs: direct labor to Job No. 100, USD 20,000; to Job No. 101, USD 48,000; and to Job No. 102 (a new job), USD 50,000. Indirect labor, USD 10,000.

Direct materials used: direct materials for Job No. 100, USD 15,600; for Job No. 101, USD 28,800; and for Job No. 102, USD 48,000. Supplies (indirect materials) used amounted to USD 4,000.

Overhead is assigned to jobs at USD 5 per labor-hour, with 1,000 labor-hours to Job 100 and 2,000 labor-hours each to Jobs 101 and 102.

All three jobs were completed in January.

Sales revenues for January were USD 350,000 for the three jobs.

Overhead costs incurred other than indirect labor and indirect materials were depreciation, USD 6,000, and utilities, fuel, and miscellaneous, USD 6,000.

Management is concerned about the relationship between costs incurred on jobs and the costs expected to be incurred, and has asked for your help. Here are the expected total costs (direct materials, direct labor, and overhead) for the three jobs:

Job 100	\$ 60,000
Job 101	120,000
Job 102	130,000

These cost estimates cover the entire job, including both costs in beginning Work in Process Inventory and costs incurred during January.

a. Compare the costs incurred on each job, including the costs in beginning Work in Process Inventory and costs incurred during January with the expected costs. Is the company keeping its costs below the expected costs for each job?

b. Prepare an income statement for January 2010 assuming selling and administrative expenses for January were USD 50,000. Don't forget to transfer any underapplied or overapplied overhead balance to Cost of Goods Sold.

c. Is the company profitable (that is, showing net income greater than zero)? What suggestions can you make for management to help increase the company's net income?

Writing assignment C Refer to Presley Manufacturing company, Problem C. Assume the newly hired executive is a whiz at marketing, but a person whose eyes glaze over at the sight of a number. The executive wants you to explain the financial results for the year in words. Essentially, assume the executive has not seen the financial statements prepared. What would you say to convey the message in the financial statements? Keep it short—less than 100 words.

Ethics case – Writing experience D Refer to the Ethical Perspective discussion of Comserv's activities entitled "High pressure sales tactics and creative accounting". As a salesperson, how would you respond if your boss asked you to backdate contracts from 2010 January 3, to 2009 December 28? What if you were asked to backdate the contracts from 2010 February 1, to 2009 December 28? Assume December 31 is the company's fiscal year-end.

Ethics case E Suzie Garcia, an accountant for a consulting firm, had just received the monthly cost reports for the two jobs she supervises: one for Arrow Space, Inc., and one for the US government. She immediately called her boss after reading the figures for the Arrow Space job.

"We are going to be way over budget on the Arrow Space contract," she informed her boss. "The job is only about three-fourths complete, but we have spent all the money that we had budgeted for the entire job."

"You had better watch these job costs more carefully in the future," her boss advised. "Meanwhile, charge the rest of the costs needed to complete the Arrow Space job to your US government job. The government will not notice the extra costs. Besides, we get reimbursed for costs on the government job, so we will not lose any money on this problem you have with the Arrow Space contract."

What should Suzie do? Does it matter that Suzie's company is reimbursed for costs on the US government contract? Explain.

Group project – Ethical perspective F Refer to the “An ethical perspective” discussion of Comserv's activities. As a salesperson, suppose your boss asked you to write a side agreement that allowed a customer to back out of a contract, and insisted that you not reveal the side contract to anyone else in your organization. You like your job a lot, and you will probably lose it if you do not comply with your boss's wish. In groups of three, discuss how you would respond to your boss. Try to develop a creative way to handle this situation. Choose a group spokesperson to report to the class.

Group project G In teams of two or three students, interview in person or by speakerphone, a businessperson in your community who uses job costing (for example, businesses that produce custom products such as homes, signs, or landscape design, or business consultants). Ask how this person assigns costs to products and how this information affects business decisions. Keep in mind that many businesspeople use terms other than job costing and manufacturing overhead. Be flexible with your use of accounting terminology in this interview. Each team should write a memorandum to the instructor summarizing the results of the interview. Information contained in the memo should include:

Date:

To:

From:

Subject:

Content of the memo must include the name and title of the person interviewed, name of the company, date of the interview, examples of the use of accounting information for decision making, and any other pertinent information.

Group project H In teams of two or three students, interview the manager of a campus print shop or a print shop in the area about how the company bids on prospective jobs. Does it use cost information from former jobs that are similar to prospective ones, for example? Does it have a specialist in cost estimation who estimates the costs of prospective jobs? Each team should write a memorandum to the instructor summarizing the results of the interview. Information contained in the memo should include:

Date:

To:

From:

Subject:

Content of the memo must include the name and title of the person interviewed, name of the company, date of the interview, and information responding to the questions above.

Using the Internet—A view of the real world

Visit the website for a high technology company, such as HP, Intel Corporation, or IBM, and locate its annual report. Review the annual report to gain a general understanding of the company's primary business segments and products. Write a report addressing the following questions based on your research. What products or services are provided by the company? How does the financial information provided in the annual report (focus on the income statement) differ from financial information used for managerial accounting purposes? As a manager making

business decisions within the company, what additional information would you need? (Remember that the income statement may be referred to using different terminology such as statement of earnings or statement of operations.)

Company	Website
Hewlett Packard	Http://www.hp.com
Intel Corporation	Http://www.intel.com
IBM	Http://www.ibm.com

Visit the following website for Wells Fargo (a financial institution) and locate its annual report:

<http://www.wellsfargo.com>

Review the annual report to gain a general understanding of the company's primary business segments and products. Write a report addressing the following questions based on your research. What products or services are provided by the company? How does the financial information provided in the annual report (focus on the income statement) differ from financial information used for managerial accounting purposes? As a manager making business decisions within the company, what additional information would you need? (Remember that the income statement may be referred to using different terminology such as statement of earnings or statement of operations.)

Visit the following website for Home Depot (a retail organization) and locate its annual report:

<http://www.homedepot.com>

Review the annual report to gain a general understanding of the company's primary business segments and products. Write a report addressing the following questions based on your research. What products or services are provided by the company? How does the financial information provided in the annual report (focus on the income statement) differ from financial information used for managerial accounting purposes? As a manager making business decisions within the company, what additional information would you need? (Remember that the income statement may be referred to using different terminology such as statement of earnings or statement of operations.)

[Answers to self-test](#)

True-false

False. Managerial accounting is for internal use by managers, not external use, and gives more detailed information than financial accounting.

True. The motors are direct materials, and they are product costs.

False. Because bottling soft drinks is a process, the plant would not use job costing.

False. The answer is the opposite. The estimated total overhead is the numerator, and the expected level of activity is the denominator.

False. Overhead can be applied to jobs during the period.

True. Selling and administrative expenses are part of period costs under both absorption and variable costing methods.

Multiple-choice

b. Indirect materials are included under overhead.

a. Selling and administrative expenses are period costs for financial accounting purposes.

b. A merchandiser uses Merchandise Inventory and Cost of Goods Available for Sale, whereas a manufacturer uses Finished Goods Inventory and Cost of Goods Available for Sale.

d. All of the answers are true.

d. Both (a) and (c) are advantages of using a predetermined overhead rate.

c.
$$\text{USD } 15 = \frac{(\text{USD } 360,000 + \text{USD } 90,000)}{30,000 \text{ machine-hours}}$$

a.

Manufacturing overhead	22,500	
Various accounts		22,500
Work in process inventory	21,000	
Manufacturing overhead		21,000

Note the predetermined overhead rate times the actual activity is $\text{USD } 0.60 \times 35,000 \text{ machine-hours} = \text{USD } 21,000$.

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