CHAPTER 8

Performance Evaluation

LEARNING OBJECTIVES

After you have mastered the material in this chapter you will be able to:

1. Describe flexible and static budgets.
2. Classify variances as being favorable or unfavorable.
3. Compute and interpret sales and variable cost volume variances.
4. Compute and interpret flexible budget variances.
5. Calculate and interpret fixed cost variances.
6. Explain standard cost systems.
7. Calculate and interpret price and usage variances.

CHAPTER OPENING

Suppose you are a carpenter who builds picnic tables. You normally build 200 tables each year (the planned volume of activity), but because of unexpected customer demand, you are asked to build 225 tables (the actual volume of activity). You work hard and build the tables. Should management chastise you for using more materials, labor, or overhead than you normally use? Should management criticize the sales staff for selling more tables than expected? Of course not. Management must evaluate performance based on the actual volume of activity, not the planned volume of activity. To help management plan and evaluate performance, managerial accountants frequently prepare flexible budgets based on different levels of volume. Flexible budgets flex, or change, when the volume of activity changes.

The Curious Accountant

Gourmet Pizzas is located in an affluent section of a major metropolitan area. Its owner worked at a national-chain pizza restaurant while in college. He knew that even though the national pizza chains had a lot of stores, (in 2010 **Domino's**, **Pizza Hut**, and **Papa John's** had approximately 14,000 stores in the United States), more than half of the country's pizzas were sold by other, mostly independently owned, restaurants. Knowing he could not beat the big guys on price, Gourmet Pizzas focuses on quality. Its pizza dough is made from scratch on the premises from organically grown flour, and it offers a wide variety of unusual toppings, such as pancetta.

In order to determine a proper selling price for his pizzas, the owner estimated the cost of making the crusts, among other things. Knowing how much flour, yeast, and so on was needed to make the dough for one pizza and estimating the cost of these ingredients, he determined that the materials for the dough for each pizza should cost him 25 cents. However, after six months in business, he had spent $10,150 on materials for making his dough and had sold 32,750 pizzas. This resulted in an actual price per pizza of 31 cents.

What are two general reasons that may explain why the materials cost for pizza dough was higher than Gourmet Pizzas' owner estimated? (Answer on page 360.)

Sources: Companies' SEC filings and **PMQ.com**.

PREPARING FLEXIBLE BUDGETS

LO 1

Describe flexible and static budgets.

A **flexible budget** is an extension of the *master budget* discussed previously. The master budget is based solely on the planned volume of activity. The master budget is frequently called a **static budget** because it remains unchanged even if the actual volume of activity differs from the planned volume. Flexible budgets differ from static budgets in that they show expected revenues and costs at a *variety* of volume levels.

To illustrate the differences between static and flexible budgets, consider Melrose Manufacturing Company, a producer of small, high-quality trophies used in award ceremonies. Melrose plans to make and sell 18,000 trophies during 2011. Management's best estimates of the expected sales price and per unit costs for the trophies are called *standard* prices and costs. The standard price and costs for the 18,000 trophies follow.

Per unit sales price and variable costs	
Expected sales price	$ 80.00
Standard materials cost	12.00
Standard labor cost	16.80
Standard overhead cost	5.60
Standard general, selling, and administrative cost	15.00
Total fixed costs	$291,600

The static budget is highlighted with red shading in Exhibit 8.1. Sales revenue is determined by multiplying the expected sales price per unit times the planned volume of activity ($80 × 18,000 = $1,440,000). Similarly, the variable costs are calculated by multiplying the standard cost per unit times the planned volume of activity. For example, the manufacturing materials cost is $216,000 ($12 × 18,000). The same computational procedures apply to the other variable costs. The variable costs are subtracted from the sales revenue to produce a contribution margin of $550,800. The fixed costs are subtracted from the contribution margin to produce a budgeted net income of $259,200.

EXHIBIT 8.1

Static and Flexible Budgets in Excel Spreadsheet

	A	B	C	D	E	F	G	H	I	J	K	L
1												
2				Static								
3				Budget		Flexible Budgets						
4	Number of Units			18,000		16,000	17,000	18,000	19,000	20,000		
5			Per Unit									
6			Standards									
7	Sales Revenue		$80.00	$1,440,000		$1,280,000	$1,360,000	$1,440,000	$1,520,000	$1,600,000		
8												
9	Variable Manuf. Costs											
10	Materials		$12.00	216,000		192,000	204,000	216,000	228,000	240,000		
11	Labor		16.80	302,400		268,800	285,600	302,400	319,200	336,000		
12	Overhead		5.60	100,800		89,600	95,200	100,800	106,400	112,000		
13	Variable G,S,&A		15.00	270,000		240,000	255,000	270,000	285,000	300,000		
14												
15	Contribution Margin			550,800		489,600	520,200	550,800	581,400	612,000		
16												
17	Fixed Costs			291,600		291,600	291,600	291,600	291,600	291,600		
18												
19	Net Income			$ 259,200		$ 198,000	$ 228,600	$ 259,200	$ 289,800	$ 320,400		
20												
21												
22												
23												

Sheet1 / Sheet2 / Sheet3

Ready NUM

What happens if the number of units sold is different from the planned volume? In other words, *what* happens to net income *if* Melrose sells more or less than 18,000 units? Managers frequently use flexible budgets to examine such *what if* scenarios. Flexible budget income statements for Melrose at sales volumes of 16,000, 17,000, 18,000, 19,000, and 20,000 are highlighted with blue shading in Exhibit 8.1.

The flexible budgets are prepared with the same per-unit standard amounts and fixed cost data used to produce the static budget. The only difference is the expected number of units sold. For example, the sales revenue at 16,000 units is $1,280,000 ($80 × 16,000), at 17,000 units it is $1,360,000 ($80 × 17,000), and so on. The variable materials cost at 16,000 units is $192,000 ($12 × 16,000), at 17,000 units it is $204,000 ($12 × 17,000), and so on. The other variable costs are computed in the same manner. Note that the fixed costs are the same at all levels of activity because, by definition, they are not affected by changes in volume.

Other flexible budgets are possible. Indeed, a flexible budget can be prepared for any number of units sold. You have probably noticed that Exhibit 8.1 was prepared using an Excel spreadsheet. Excel offers the opportunity to prepare an unlimited number of flexible budgets with minimal effort. For example, formulas can be created with cell references so that new budgets can be created simply by changing the number of units entered in a single cell.

Managers use flexible budgets for both planning and performance evaluation. For example, managers may assess whether the company's cash position is adequate by assuming different levels of volume. They may judge if the number of employees, amounts of materials, and equipment and storage facilities are appropriate for a variety of different potential levels of volume. In addition to helping plan, flexible budgets are critical to implementing an effective performance evaluation system.

CHECK YOURSELF 8.1

The static (master) budget of Parcel, Inc., called for a production and sales volume of 25,000 units. At that volume, total budgeted fixed costs were $150,000 and total budgeted variable costs were $200,000. Prepare a flexible budget for an expected volume of 26,000 units.

Answer Budgeted fixed costs would remain unchanged at $150,000 because changes in the volume of activity do not affect budgeted fixed costs. Budgeted variable costs would increase to $208,000, computed as follows: Calculate the budgeted variable cost per unit ($200,000 ÷ 25,000 units = $8) and then multiply that variable cost per unit by the expected volume ($8 × 26,000 units = $208,000).

DETERMINING VARIANCES FOR PERFORMANCE EVALUATION

LO 2

Classify variances as being favorable or unfavorable.

One means of evaluating managerial performance is to compare *standard* amounts with *actual* results. The differences between the standard and actual amounts are called **variances;** variances can be either **favorable** or **unfavorable.** When actual sales revenue is greater than expected (planned) revenue, a company has a favorable sales variance because higher sales increase net income. When actual sales are less than expected, an unfavorable sales variance exists. When actual costs are *less* than standard costs, cost variances are favorable because lower costs increase net income. Unfavorable cost variances exist when actual costs are *more* than standard costs. These relationships are summarized below.

- When actual sales exceed expected sales, variances are favorable.
- When actual sales are less than expected sales, variances are unfavorable.
- When actual costs exceed standard costs, variances are unfavorable.
- When actual costs are less than standard costs, variances are favorable.

SALES AND VARIABLE COST VOLUME VARIANCES

LO 3

Compute and interpret sales and variable cost volume variances.

The amount of a **sales volume variance** is the difference between the static budget (which is based on planned volume) and a flexible budget based on actual volume. Likewise, the **variable cost volume variances** are determined by calculating the differences between the static and flexible budget amounts. These variances measure management effectiveness in attaining the planned volume of activity. To illustrate, assume Melrose Manufacturing Company actually makes and sells 19,000 trophies during 2011. The planned volume of activity was 18,000 trophies. Exhibit 8.2 shows Melrose's static budget, flexible budget, and volume variances.

EXHIBIT 8.2

Melrose Manufacturing Company's Volume Variances

	Static Budget	Flexible Budget	Volume Variances	
Number of units	18,000	19,000	1,000	Favorable
Sales revenue	$1,440,000	$1,520,000	$80,000	Favorable
Variable manufacturing costs				
Materials	216,000	228,000	12,000	Unfavorable
Labor	302,400	319,200	16,800	Unfavorable
Overhead	100,800	106,400	5,600	Unfavorable
Variable SG&A	270,000	285,000	15,000	Unfavorable
Contribution margin	550,800	581,400	30,600	Favorable
Fixed costs	291,600	291,600	0	
Net income	$ 259,200	$ 289,800	$30,600	Favorable

Interpreting the Sales and Variable Cost Volume Variances

Because the static and flexible budgets are based on the same standard sales price and per-unit variable costs, the variances are solely attributable to the difference between the planned and actual volume of activity. Marketing managers are usually responsible for the volume variances. Because the sales volume drives production levels, production managers have little control over volume. Exceptions occur; for example, if poor production quality control leads to inferior goods that are difficult to sell, the production manager is responsible. The production manager is responsible for production delays that affect product availability, which may restrict sales volume. Under normal circumstances, however, the marketing campaign determines the volume of sales. Upper-level marketing managers develop the promotional program and create the sales plan; they are in the best position to explain why sales goals are or are not met. When marketing managers refer to **making the numbers,** they usually mean reaching the sales volume in the static (master) budget.

In the case of Melrose Manufacturing Company, the marketing manager not only achieved but also exceeded by 1,000 units the planned volume of sales. Exhibit 8.2 shows the activity variances resulting from the extra volume. At the standard price, the additional volume produces a favorable revenue variance of $80,000 (1,000 units × $80 per unit). The increase in volume also produces unfavorable variable cost variances. The net effect of producing and selling the additional 1,000 units is an increase of $30,600 in the contribution margin, a positive result. These preliminary results suggest that the marketing manager is to be commended. The analysis, however, is incomplete. For example, examining market share could reveal whether the manager won customers from competitors or whether the manager simply reaped the benefit of an unexpected industrywide increase in demand. The increase in sales volume could have been attained

by reducing the sales price; the success of that strategy will be analyzed further in a later section of this chapter.

Since the variable costs in the flexible budget are higher than the variable costs in the static budget, the variable cost volume variances are *unfavorable.* The unfavorable classification may be misleading because it focuses solely on the cost component of the income statement. While costs are higher than expected, so too may be revenue. Indeed, as shown in Exhibit 8.2, the total of the unfavorable variable cost variances is more than offset by the favorable revenue variance, resulting in a higher contribution margin. Frequently, the assessment of variances requires a holistic perspective.

Fixed Cost Considerations

At this point, it is important to note that the reason the fixed cost variance shown in Exhibit 8.2 is zero is because we are comparing two budgets (static versus flexible). Variances occur only because the budgets are created using different volumes of activity. Since total fixed cost is not affected by the level of activity, there will be no fixed cost variances associated with static versus flexible budgets.

FLEXIBLE BUDGET VARIANCES

LO 4

Compute and interpret flexible budget variances.

For performance evaluation, management compares actual results to a flexible budget based on the *actual* volume of activity. Because the actual results and the flexible budget reflect the same volume of activity, any variances in revenues and variable costs result from differences between standard and actual per unit amounts. To illustrate computing and analyzing flexible budget variances, we assume that Melrose's *actual* per unit amounts during 2011 were those shown in the following table. The 2011 per unit *standard* amounts are repeated here for your convenience.

	Standard	Actual
Sales price	$80.00	$78.00
Variable materials cost	12.00	11.78
Variable labor cost	16.80	17.25
Variable overhead cost	5.60	5.75

Actual and budgeted fixed costs are shown in Exhibit 8.3.

Exhibit 8.3 shows Melrose's 2011 flexible budget, actual results, and flexible budget variances. The flexible budget is the same one compared to the static budget in Exhibit 8.2.

EXHIBIT 8.3

Flexible Budget Variances for Melrose Manufacturing Company

	Flexible Budget	Actual Results	Flexible Budget Variances	
Number of units	19,000	19,000	0	
Sales revenue	$1,520,000	$1,482,000	$38,000	Unfavorable
Variable manufacturing costs				
Materials	228,000	223,820	4,180	Favorable
Labor	319,200	327,750	8,550	Unfavorable
Overhead	106,400	109,250	2,850	Unfavorable
Variable SG&A	285,000	283,100	1,900	Favorable
Contribution margin	581,400	538,080	43,320	Unfavorable
Fixed costs	291,600	295,000	3,400	Unfavorable
Net income	$ 289,800	$ 243,080	$46,720	Unfavorable

Recall the flexible budget amounts come from multiplying the standard per-unit amounts by the actual volume of production. For example, the sales revenue in the flexible budget comes from multiplying the standard sales price by the actual volume ($80 × 19,000). The variable costs are similarly computed. The *actual results* are calculated by multiplying the actual per-unit sales price and cost figures from the preceding table by the actual volume of activity. For example, the sales revenue in the Actual Results column comes from multiplying the actual sales price by the actual volume ($78 × 19,000 = $1,482,000). The actual cost figures are similarly computed. The differences between the flexible budget figures and the actual results are the **flexible budget variances.**

Calculating the Sales Price Variance

Because both the flexible budget and actual results are based on the actual volume of activity, the flexible budget variance is attributable to sales price, not sales volume. In this case, the actual sales price of $78 per unit is less than the standard price of $80 per unit. Because Melrose sold its product for less than the standard sales price, the **sales price variance** is *unfavorable.* Even though the price variance is unfavorable, however, sales volume was 1,000 units more than expected. It is possible the marketing manager generated the additional volume by reducing the sales price. Whether the combination of lower sales price and higher sales volume is favorable or unfavorable depends on the amount of the unfavorable sales price variance versus the amount of the favorable sales volume variance. The *total* sales variance (price and volume) follows:

Actual sales (19,000 units × $78 per unit)	$1,482,000	
Expected sales (18,000 units × $80 per unit)	1,440,000	
Total sales variance	$ 42,000	Favorable

Alternatively,

Activity variance (sales volume)	$ 80,000	Favorable
Sales price variance	(38,000)	Unfavorable
Total sales variance	$ 42,000	Favorable

This analysis indicates that reducing the sales price had a favorable impact on *total* contribution margin. Use caution when interpreting variances as good or bad; in this instance, the unfavorable sales price variance was more than offset by the favorable sales volume variance. All unfavorable variances are not bad; all favorable variances are not good. Variances signal the need to investigate.

CHECK YOURSELF 8.2

Scott Company's master budget called for a planned sales volume of 30,000 units. Budgeted direct materials cost was $4 per unit. Scott actually produced and sold 32,000 units with an actual materials cost of $131,000. Determine the materials volume variance and identify the organizational unit most likely responsible for this variance. Determine the flexible budget variance and identify the organizational unit most likely responsible for this variance.

Answer The variable cost volume variance is the difference between the expected materials usage at the planned volume of activity and the expected materials usage at the actual volume of activity [($4 × 30,000 units) − ($4 × 32,000) = $8,000]. The variance is unfavorable because expected direct materials cost at actual volume was higher than budgeted direct materials cost at planned volume. The unfavorable variance might not be a bad thing. The variance is due to increased volume, which could be a good thing. The organizational unit most likely responsible for the volume variance is the marketing department.

The flexible budget variance is the difference between the expected materials cost at the actual volume ($4 × 32,000 units = $128,000) and the actual materials cost of $131,000. The $3,000 ($128,000 − $131,000) variance is unfavorable because it cost more than expected to make the 32,000 units. Either the production department or the purchasing department is most likely responsible for this variance.

The Human Element Associated with Flexible Budget Variances

The flexible budget cost variances offer insight into management efficiency. For example, Melrose Manufacturing Company's favorable materials variance could mean purchasing agents were shrewd in negotiating price concessions, discounts, or delivery terms and therefore reduced the price the company paid for materials. Similarly, production employees may have used materials efficiently, using less than expected. The unfavorable labor variance could mean managers failed to control employee wages or motivate employees to work hard. As with sales variances, cost variances require careful analysis. A favorable variance may, in fact, mask unfavorable conditions. For example, the favorable materials variance might have been caused by paying low prices for inferior goods. Using substandard materials could have required additional labor in the production process, which would explain the unfavorable labor variance. Again, we caution that variances, whether favorable or unfavorable, alert management to investigate further.

FIXED COST VARIANCES

LO 5

Calculate and interpret fixed cost variances.

Because fixed costs do not fluctuate with volume, does not mean that the actual costs will be the same as the budgeted costs. Indeed, there are two fixed cost variances commonly investigated by management. One is called a *fixed cost spending variance;* the other is called a *fixed cost volume variance.*

Fixed Cost Spending Variance

Companies frequently pay more or less than expected for fixed costs. For example, a supervisor may receive an unplanned raise, causing actual salary cost to be more than the amount budgeted. The difference between the *actual fixed cost* and the *budgeted fixed cost* (amount shown in the static budget) is called a **fixed cost spending variance.** The *fixed cost spending variance* for Melrose is $3,400 (295,000 actual fixed cost − $291,600 budgeted fixed cost). Since actual fixed costs are higher than the budgeted fixed cost, the variance is unfavorable. In other words the company had to pay more than it expected for the fixed costs.

In the Melrose case, there is no way to know who is responsible for the $3,400 unfavorable fixed cost spending variance because all of the costs have been pooled together. To promote accountability, fixed costs that are controllable by a specific manager must be disaggregated and tagged for individual analysis. For example, the plant manager may control the assistant manager's salary cost. If a fixed cost spending variance is associated with the salary cost, the plant manager is responsible for explaining why the

variance occurred. Other managers will be held accountable for the specific fixed costs they control.

Uncontrollable fixed costs should also be reported for management oversight. Even if these costs are not controllable in the short term, management should stay abreast of them because they may be controllable in the long term.

Fixed Cost Volume Variance

Companies frequently need to know the cost of something before the actual cost can be determined. For example, a company may base its selling price on the cost of making and selling a product. Even so, the actual cost of making and selling the product may not be known until after the product has been sold. In order to price the product, the company will be required to use estimated costs rather than actual costs. Likewise it may be necessary to use estimated costs to prepare quarterly financial statements because the actual cost will not be known until after the quarterly statements have been published. To solve such problems, accountants frequently estimate the total annual cost and then apply (allocate) a portion of the estimated annual cost to the products as they are made and sold.

To illustrate, assume that Melrose develops an allocation rate based on its budgeted fixed cost and the planned volume of production as shown below:

Budgeted fixed cost	÷	Planned volume of activity	=	Allocation rate
$291,600	÷	18,000 units	=	$16.20 per unit

As production proceeds, Melrose would apply $16.20 to the appropriate accounts each time an actual unit of product (trophy) is made and sold. Since the allocation rate is determined *before* the actual cost and volume are known, it is frequently called the *predetermined* allocation rate. Since fixed costs are frequently classified as overhead costs this rate is more frequently called the predetermined *overhead* rate. In summary the **predetermined overhead rate** is calculated as follows:

$$\text{Predetermined overhead rate} = \frac{\text{Budgeted fixed cost from the static budget}}{\text{Planned volume of activity}}$$

The total cost determined by multiplying the *predetermined overhead rate* times the *actual volume* of production is called the **applied fixed cost.** Given that Melrose produced and sold 19,000 units of product during 2011, the amount of applied fixed cost is $307,800 ($16.20 × 19,000 units).

The difference between the *applied fixed cost based on actual volume* and the *budgeted fixed cost based on planned volume* is called the **fixed cost volume variance.** In this case Melrose has a fixed cost volume variance of $16,200 ($307,800 budgeted fixed cost − $291,600 applied fixed cost).

To interpret the fixed cost volume variance, consider the effect that volume changes have on the behavior of fixed cost per unit. As volume increases, fixed cost per unit decreases. In this case, the planned volume was 18,000 units and the actual volume was 19,000 units. Since the higher than expected volume decreases the fixed cost per unit, the volume variance is *favorable.* An *unfavorable* fixed cost volume variance occurs when actual volume is less than planned volume, a condition that increases fixed costs per unit.

The fixed cost volume variance is a measure of facility utilization. If the fixed cost volume variance is unfavorable, the facilities are considered to be underutilized. This is just another way of saying that the company suffered an unfavorable variance because it did not utilize its facilities to make and sell the number of units of product it had planned to make and sell. A favorable fixed cost volume variance suggests that a company utilized its facilities to make and sell *more* than the planned volume of activity. In summary, a fixed cost volume variance indicates over- or underutilization of facilities, not over- or underspending.

For your convenience, the two fixed cost overhead variances are summarized as follows:

1. **Fixed cost spending variance = Actual fixed cost − Budgeted fixed cost**

   If actual costs are less than the budgeted costs the variance is favorable.
   If actual costs are greater than the budgeted costs the variance is unfavorable.

2. **Fixed cost volume variance = Applied fixed cost based on actual volume − Budgeted fixed cost based on planned volume**

   If actual volume is more than the planned volume the variance is favorable.
   If actual volume is less than the planned volume the variance is unfavorable.

Fixed Cost Volume Variance and Product Pricing

Changes in the fixed cost per unit have important implications for decision making. For example, consider the impact on cost-plus pricing decisions. Because the actual volume is unknown until the end of the accounting period, selling prices must be based on planned volume. Recall that at the planned volume of activity, Melrose's predetermined overhead rate is $16.20 ($291,600 ÷ 18,000 units). Compare this figure with the rate based on actual volume which is $15.35 ($291,600 ÷ 19,000 units). Since the price of the product was based on the predetermined overhead rate ($16.20), instead of the rate based on actual volume ($15.35), the product was overpriced. It follows that if actual volume is less than planned volume, products will be underpriced.

Overpricing can be problematic because it encourages competitors to enter the market. Eventually, these competitors will draw customers away from Melrose by offering lower prices. As Melrose loses customers, its actual fixed cost per unit increases, thereby exacerbating the pricing problem. Underpricing (not encountered by Melrose in this example) can also be detrimental. If planned volume is overstated, the predetermined overhead rate will be understated and prices will be set too low. When the higher amount of actual costs is eventually subtracted from revenues, actual profits will be lower than expected. As this discussion demonstrates, over- or understating the planned volume will cause pricing problems. It is critically important to be as accurate as possible when establishing the planned volume.

Responsibility for the Fixed Cost Volume Variance

Normally upper-level marketing managers are held accountable for the fixed cost volume variance because they control the volume of sales, which in turn dictates the volume of production. Even so, other possibilities must be considered. For example, goods may not sell because they are poorly constructed, which may be the fault of design engineers or production managers. Likewise, buyers may be at fault for purchasing undesirable products that are difficult to resell. In this case the purchasing department rather than the marketing department would be responsible for the fixed cost volume variance. Determining the amount of the variance is the easy part of performance evaluation; determining responsibility is usually more difficult.

STANDARD COST SYSTEMS

LO 6

Explain standard cost systems.

Standard cost systems help managers plan and also establish benchmarks against which actual performance can be judged. By highlighting differences between standard (expected) and actual performance, standard costing focuses management attention on the areas of greatest need. Because management talent is a valuable and expensive resource, businesses cannot afford to have managers spend large amounts of time on operations that are functioning normally. Instead, managers should concentrate on areas not performing as expected. In other words, management should attend to the exceptions; this management philosophy is known as **management by exception.**

Standard costing fosters using the management by exception principle. By reviewing performance reports that show differences between actual and standard costs, management can focus its attention on the items that show significant variances. Areas with only minor variances need little or no review.

Establishing Standards

Establishing standards is probably the most difficult part of using a standard cost system. A **standard** represents the amount that a price, cost, or quantity *should be* under certain anticipated circumstances. Consider the complexity of establishing the standard cost to produce a pair of blue jeans. Among other things, managers need to know where they can get the best price for materials, who will pay transportation costs, if cash or volume discounts are available, whether the suppliers with the lowest price can reliably supply the quantities needed on a timely basis, how the material should be cut to conserve time and labor, in what order to sew pieces of material together, the wage rates of the relevant production employees, whether overtime will be needed, and how many pairs of jeans will be produced. Obtaining this information requires the combined experience, judgment, and forecasting ability of all personnel who have responsibility for price and usage decisions. Even when a multitalented group of experienced persons is involved in standard setting, the process involves much trial and error. Revising standards is common even with established systems.

Historical data provide a good starting point for establishing standards. These data must be updated for changes in technology, plant layout, new methods of production, and worker productivity. Frequently, changes of this nature result from initiating a standard cost system. Remember that a *standard* represents what *should be* rather than what *is* or *was.* Engineers often help establish standards, recommending the most efficient way to perform required tasks. The engineers undertake time and motion studies and review material utilization in the process of developing standards. Established practices and policies are frequently changed in response to engineers' reports.

Management must consider behavioral implications when developing standards. Managers, supervisors, purchasing agents, and other affected employees should be consulted for two reasons: (1) their experience and expertise provide invaluable input to standard development and (2) persons who are involved in standard setting are more likely to accept and be motivated to reach the resulting standards. Management should also consider how difficult it should be to achieve standard performance. Difficulty levels can be described as follows: (1) ideal standards, (2) practical standards, and (3) lax standards.

Ideal standards represent flawless performance; they represent what costs should be under the best possible circumstances. They do not allow for normal materials waste and spoilage or ordinary labor inefficiencies caused by machine downtime, cleanups, breaks, or personal needs. Meeting ideal standards is beyond the capabilities of most, if not all, employees. Ideal standards may motivate some individuals to constantly strive for improvement, but unattainable standards discourage most people. When people consistently fail, they become demotivated and stop trying to succeed. In addition, variances associated with ideal standards lose significance. They reflect deviations that are largely beyond employees' control, and they mask true measures of superior or inferior performance, considerably reducing their usefulness.

Practical standards represent reasonable effort; they are attainable for most employees. Practical standards allow for normal levels of inefficiency in materials and labor usage. An average worker performing diligently would be able to achieve standard performance. Practical standards motivate most employees; the feeling of accomplishment attained through earnest effort encourages employees to do their best. Practical standards also produce meaningful variances. Deviations from practical standards usually result from factors employees control. Positive variances normally represent superior performance, and negative variances indicate inferior performance.

Lax standards represent easily attainable goals. Employees can achieve standard performance with minimal effort. Lax standards do not motivate most people; continual success with minimal effort leads to boredom and lackluster performance. In addition, variances lose meaning. Deviations caused by superior or inferior performance are obscured by the built-in slack.

Management must consider employee ability levels when establishing standards. Standards that seasoned workers can attain may represent ideal standards to inexperienced workers. Management should routinely monitor standards and adjust them when it is appropriate to do so.

Selecting Variances to Investigate

Managerial judgment, developed through experience, plays a significant role in deciding which variances to investigate. Managers consider the *materiality* of a variance, the *frequency* with which it occurs, their *capacity to control* the variance, and the *characteristics* of the items behind the variance.

Standard costs are estimates. They cannot perfectly predict actual costs. Most business experience minor variances as part of normal operations. Investigating minor variances is not likely to produce useful information. Many companies therefore establish *materiality* guidelines for selecting variances to analyze. They set dollar or percentage thresholds and ignore variances that fall below these limits, investigating material variances only. A **material variance** is one that could influence management decisions. Material variances should be investigated whether they are favorable or unfavorable. As mentioned earlier, a favorable price variance can result from purchasing substandard materials; the quality of the company's products, however, will suffer from the inferior materials and sales will fall.

How *frequently* a variance occurs impacts materiality. A variance of $20,000 may be immaterial in a single month, but if the same variance occurs repeatedly throughout the year, it can become a material $240,000 variance. Variance reports should highlight frequent as well as large variations.

Capacity to control refers to whether management action can influence the variance. If utility rates cause differences between actual and standard overhead costs, management has little control over the resulting variances. Conversely, if actual labor costs exceed standard costs because a supervisor fails to motivate employees, management can take some action. To maximize their value to the firm, managers should concentrate on controllable variances.

The *characteristics* of the items behind the variance may invite management abuse. For example, managers can reduce actual costs in the short term by delaying expenditures for maintenance, research and development, and advertising. Although cost reductions in these areas may produce favorable variances in the current period, they will have a long-term detrimental impact on profitability. Managers under stress may be tempted to focus on short-term benefits. Variances associated with these critical items should be closely analyzed.

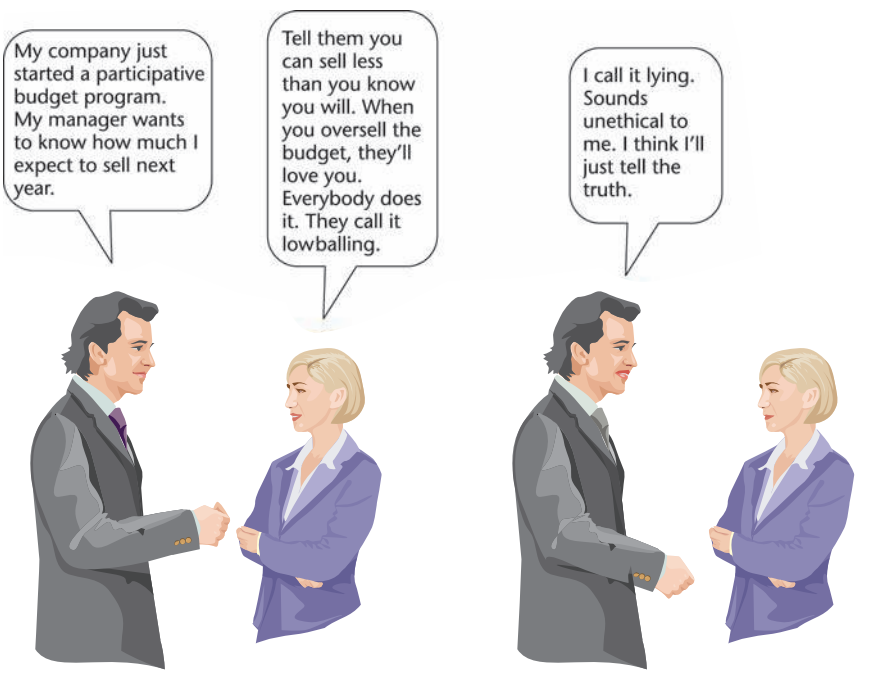
The primary advantage of a standard cost system is efficient use of management talent to control costs. Secondary benefits include the following.

1. Standard cost systems quickly alert management to trouble spots. For example, a standard amount of materials may be issued for a particular job. If requisitions of additional materials require supervisory approval, each time a supervisor must grant such approval, she is immediately aware that excess materials are being used and can act before excessive material usage becomes unmanageable.
2. If established and maintained properly, standard cost systems can boost morale and motivate employees. Reward systems can be linked to accomplishments that exceed the established performance standards. Under such circumstances, employees become extremely conscious of the time and materials they use, minimizing waste and reducing costs.
3. Standard cost systems encourage good planning. The failure to plan well leads to overbuying, excessive inventory, wasted time, and so on. A standard cost system forces managers to plan, resulting in more effective operations with less waste.

Avoiding Gamesmanship

In general, variances should not be used to praise or punish managers. The purpose of identifying variances is to help management improve efficiency and productivity.

If variances are used to assign rewards and blame, managers are likely to respond by withholding or manipulating information. For example, a manager might manipulate the cost standard for a job by deliberately overstating the amount of materials or labor needed to complete it. The manager's performance will later appear positive when the actual cost of materials or labor is less than the inflated standard. This practice is so common it has a name: **budget slack** is the difference between inflated and realistic standards. Sales staff may play a game called *lowballing* in which they deliberately underestimate the amount of expected sales, anticipating a reward when actual sales subsequently exceed the budget.



Answers to The Curious Accountant

As this chapter demonstrates, there are two primary reasons a company spends more or less to produce a product than it estimated it would. First, the company may have paid more or less to purchase the inputs needed to produce the product than it estimated. Second, the company used a greater or lesser quantity of these inputs than expected. In the case of Gourmet Pizzas, it may have had to pay more for flour, yeast, cheese, and so on than the owner estimated. Or, it may have used more of these ingredients than expected. For example, if pizza dough sits around too long before being used, it may have to be thrown out. This waste was not anticipated when computing the cost to make only one pizza. Of course, the higher than expected cost could have been a combination of price and quantity factors.

Gourmet Pizza needs to determine if the difference between its expected costs and actual costs was because the estimates were faulty, or because the production process was inefficient. If the estimates were to blame, the owner would need to revise them so he can charge the proper price to his customers. If the production process is inefficient, he needs to correct it if he is to earn an acceptable level of profit.

Gamesmanship can be reduced if superiors and subordinates participate sincerely in setting mutually agreeable, attainable standards. Once standards are established, the evaluation system that uses them must promote long-term respect among superiors and their subordinates. If standards are used solely for punitive purposes, gamesmanship will rapidly degrade the standard costing system.

PRICE AND USAGE VARIANCES[1]

LO 7

Calculate and interpret price and usage variances.

Under a standard cost system, it is common practice to subdivide the *flexible budget variances* into component parts that more clearly define the cause of these variances. For example, a favorable flexible budget materials cost variance may be the result of paying less than expected for the materials or of using fewer materials than expected, or some combination of *price and usage variances.* To demonstrate, we return to the Melrose Manufacturing Company case that was introduced earlier in the chapter.

We will limit our discussion to the flexible budget variable manufacturing cost variances shown in Exhibit 8.3. Specifically, there are three of these variances including:

1. Flexible budget materials cost variance: $4,180 Favorable.
2. Flexible budget labor cost variance: $8,550 Unfavorable.
3. Flexible budget variable overhead cost variance: $2,850 Unfavorable.

Recall that these variances were calculated by determining the difference between the flexible budget costs (standard cost per unit times the actual volume) and the actual costs (actual cost per unit times the actual volume). The standard and actual per unit costs for Melrose were shown previously and are repeated here for your convenience.

	Standard	Actual
Variable materials cost per unit of product	$12.00	$11.78
Variable labor cost per unit of product	16.80	17.25
Variable overhead cost per unit of product	5.60	5.75

Using the cost per unit data, the flexible budget manufacturing cost variances can be determined algebraically as shown in Exhibit 8.4. We suggest that you compare the variances shown in the two exhibits to confirm that the algebraic approach in Exhibit 8.4 yields the same result as the variances previously computed in Exhibit 8.3.

Note that the difference between the actual and standard cost is expressed as an absolute value. This mathematical notation suggests that the mathematical sign is not useful in interpreting the condition of the variance. To assess the condition of a variance, you must consider the type of variance being analyzed. With respect to cost

EXHIBIT 8.4

Flexible Budget Variances Calculated Algebraically

Variable Mfg. Costs	| Actual Cost *Per Unit* of Product	–	Standard Cost *Per Unit* of Product |	×	Actual Units	=	Flexible Budget Variance
Materials	| $11.78	–	$12.00 |	×	19,000	=	$4,180 Favorable
Labor	| 17.25	–	16.80 |	×	19,000	=	8,550 Unfavorable
Overhead	| 5.75	–	5.60 |	×	19,000	=	2,850 Unfavorable

[1]Businesses use various names for price and usage variances. For example, materials price and usage variances are frequently called materials price and quantity variances; labor price and usage variances are frequently called labor rate and efficiency variances. Regardless of the names, the underlying concepts and computations are the same for all variable price and usage variances.

variances, managers seek to attain actual prices that are lower than standard prices. In this case, the actual price of materials is less than the standard price, so the materials variance is favorable. Since the actual prices for labor and overhead are higher than the standard prices, those variances are unfavorable.

For insight into what caused the flexible budget variances, a separate price and usage variance can be computed for each of the total flexible budget variances. We begin with the $4,180 favorable flexible budget materials cost variance. This variance indicates that Melrose spent less than expected on materials to make 19,000 trophies. Why? The price per unit of material may have been less than expected (price variance), or the company may have used less material than expected (usage variance). To determine what caused the total favorable variance, Melrose must separate the cost per unit of product into two parts, price per unit of material and quantity of material used.

Calculating Materials Price and Usage Variances

Melrose's accounting records indicate the materials cost per unit of product (trophy) is as follows:

	Actual Data	Standard Data
Price ***per pound*** of material	$ 1.90	$ 2.00
Quantity of materials per unit of product	× 6.2 pounds	× 6.0 pounds
Cost ***per unit*** of product	$11.78	$12.00

Based on this detail, the total quantity of materials is:

	Actual Data	Standard Data
Actual production volume	19,000 units	19,000 units
Quantity of materials per unit of product	× 6.2 pounds	× 6.0 pounds
Total quantity of materials	117,800 pounds	114,000 pounds

Confirm the price and usage components that make up the total flexible budget materials variance, as follows:

Actual Cost		Standard Cost	
Actual quantity used	117,800	Standard quantity	114,000
×	×	×	×
Actual price per pound	$1.90	Standard price per pound	$2.00
	$223,820		$228,000
	Total variance: $4,180 Favorable		

To isolate the price and usage variances, insert a Variance Dividing column between the Actual Cost and Standard Cost columns. The Variance Dividing column combines standard and actual data, showing the *standard cost* multiplied by the *actual quantity* of materials purchased and used.[2] Exhibit 8.5 shows the result.

[2]In practice, raw materials are frequently stored in inventory prior to use. Differences may exist between the amount of materials purchased and the amount of materials used. In such cases, the price variance is based on the quantity of materials *purchased,* and the usage variance is based on the quantity of materials *used.* This text makes the simplifying assumption that the amount of materials purchased equals the amount of materials used during the period.

EXHIBIT 8.5

Materials Price and Usage Variances

Actual Cost		Variance Dividing Data		Standard Cost	
Actual quantity used	117,800	Actual quantity used	117,800	Standard quantity	114,000
×	×	×	×	×	×
Actual price per pound	$1.90	Standard price per pound	$2.00	Standard price per pound	$2.00
	$223,820		$235,600		$228,000

Materials price variance $11,780 Favorable

Materials usage variance $7,600 Unfavorable

Total variance: $4,180 Favorable

Algebraic solution. The materials price variance (difference between the Actual Cost column and the Variance Dividing column) can be computed algebraically as follows:

$$\begin{aligned}\text{Price variance} &= |\text{Actual price} - \text{Standard price}| \times \text{Actual quantity}\\ &= |\$1.90 - \$2.00| \times 117{,}800\\ &= \$0.10 \times 117{,}800\\ &= \$11{,}780 \text{ Favorable}\end{aligned}$$

Since the actual price ($1.90) is less than the standard price ($2.00), the materials price variance is favorable.

The materials usage variance (difference between the Variance Dividing column and the Standard Cost column) also can be determined algebraically, as follows:

$$\begin{aligned}\text{Usage variance} &= |\text{Actual quantity} - \text{Standard quantity}| \times \text{Standard price}\\ &= |117{,}800 - 114{,}000| \times \$2.00\\ &= 3{,}800 \times \$2.00\\ &= \$7{,}600 \text{ Unfavorable}\end{aligned}$$

Responsibility for materials variances. A purchasing agent is normally responsible for the **materials price variance.** Management establishes the standard materials cost based on a particular grade of material and assumptions about purchasing terms including volume discounts, cash discounts, transportation costs, and supplier services. A diligent purchasing agent places orders that take advantage of positive trading terms. In such circumstances, the company pays less than standard costs, resulting in a favorable price variance. Investigating the favorable price variance could result in identifying purchasing strategies to share with other purchasing agents. Analyzing favorable as well as unfavorable variances can result in efficiencies that benefit the entire production process.

In spite of a purchasing agent's diligence, unfavorable price variances may still occur. Suppliers may raise prices, poor scheduling by the production department may require more costly rush orders, or a truckers' strike may force the company to use a more expensive delivery system. These conditions are beyond a purchasing agent's control. Management must be careful to identify the real causes of unfavorable variances. False accusations and overreactions lead to resentment that will undermine the productive potential of the standard costing system.

The nature of the **materials usage variance** is readily apparent from the quantity data. Because the actual quantity used was more than the standard quantity, the variance is unfavorable. If management seeks to minimize cost, using more materials than expected is unfavorable. The materials usage variance is largely controlled by the production department. Materials waste caused by inexperienced workers, faulty machinery, negligent processing, or poor planning results in unfavorable usage variances.

REALITY BYTES

Most airlines will allow customers to book a flight approximately one year in advance at a price set on the day the reservation is made. Since the airline does not know what it will actual cost to operate a particular flight a year in advance, the price of the ticket will be based on its estimated costs. This can present a problem if costs rise significantly before the flight occurs.

Imagine that on December 14, 2007, Calvin Haines booked a flight from Boston to Seattle for July 19, 2008, and that the ticket price was $309. Between December 2007 and July 2008 many of the airline's costs would not change unexpectedly; for example the airplane has already been purchased and the salaries of the flight crew have already been set. However, in 2008 approximately 30 percent of the cost of operating an airline was for fuel. In December 2007, the spot price of jet fuel was $2.66 per gallon. The spot price of a commodity is the price it would sell for on a given day to someone who had not placed an advance order at a set price. By July 2008 the spot price for jet fuel had risen to $3.97 per gallon. In standard costing terminology, this would result in an unfavorable price variance. Of course, fuel prices can also rapidly change for the better. By February 2009 the price of jet fuel was down to $1.31 per gallon—one-third of its price just seven months earlier.

How can companies avoid some of the problems of having to set the prices they charge before they know what it will cost them to deliver the promised goods or services? Sometimes they cannot, but jet fuel prices can be hedged. That is, a company can commit to purchase fuel at an agreed-upon price at a future data. As of December 2008 Southwest Airlines had already contracted to buy 10 percent of its fuel needs through 2013, and Delta had hedged 26 percent of its needs through 2010.

Hedging has its own risks. When fuel prices drop the airline will still have had to honor its commitments to buy some of its fuel at a price higher than the spot price.

Sources: Federal government data and the companies' annual reports.

Unfavorable variances may also be caused by factors beyond the control of the production department. If the purchasing agent buys substandard materials the inferior materials may lead to more scrap (waste) during production, which would be reflected in unfavorable usage variances.

Calculating Labor Variances

Labor variances are calculated using the same general formulas as those used to compute materials price and usage variances. To illustrate, assume the labor cost per unit of product (trophy) for Melrose Manufacturing is as follows:

	Actual Data	Standard Data
Price ***per hour***	$11.50	$12.00
Quantity of labor per unit of product	× 1.5 hours	× 1.4 hours
Cost ***per unit*** of product	$17.25	$16.80

Based on this detail, the total quantity of labor is:

	Actual Data	Standard Data
Actual production volume	19,000 units	19,000 units
Quantity of labor per unit of product	× 1.5 hours	× 1.4 hours
Total quantity of labor	28,500 hours	26,600 hours

Using this cost and quantity information, the labor price and usage variances are computed in Exhibit 8.6.

EXHIBIT 8.6

Labor Price and Usage Variances

Actual Cost		Variance Dividing Data		Standard Cost	
Actual hours used	28,500	Actual hours used (AHrs)	28,500	Standard hours (SHrs)	26,600
×	×	×	×	×	×
Actual price per labor hour (AP)	$11.50	Standard price per labor hour (SP)	$12.00	Standard price per labor hour	$12.00
	$327,750		$342,000		$319,200
		Labor price variance $14,250 Favorable		Labor usage variance $22,800 Unfavorable	
		Algebraic solution: |AP − SP| × AHrs |$11.50 − $12.00| × 28,500 = $14,250		Algebraic solution: |AHrs − SHrs| × SP |28,500 − 26,600| × $12.00 = $22,800	
		Total variance: $8,550 Unfavorable			

Responsibility for labor variances. The **labor price variance** is favorable because the actual rate paid for labor is less than the standard rate. The production supervisor is usually responsible for the labor price variance because price variances normally result from labor assignments rather than underpayment or overpayment of the hourly rate. Because labor costs are usually fixed by contracts, paying more or less than established rates is not likely. However, using semiskilled labor to perform highly skilled tasks or vice versa will produce price variances. Similarly, using unanticipated overtime will cause unfavorable variances. Production department supervisors control which workers are assigned to which tasks and are therefore accountable for the resulting labor price variances.

Labor usage variances measure the productivity of the labor force. Because Melrose used more labor than expected, the labor usage variance is unfavorable. Unsatisfactory labor performance has many causes; low morale or poor supervision are possibilities. Furthermore, machine breakdowns, inferior materials, and poor planning can waste workers' time and reduce productivity. Production department supervisors generally control and are responsible for labor usage variances.

Price and usage variances may be interrelated. Using less-skilled employees who earned less but took longer to do the work could have caused both the favorable labor price variance and the unfavorable labor usage variance. As mentioned earlier, management must exercise diligence in determining causes of variances before concluding who should be held responsible for them.

CHECK YOURSELF 8.3

DogHouse, Inc., expected to build 200 doghouses during July. Each doghouse was expected to require 2 hours of direct labor. Labor cost was expected to be $10 per hour. The company actually built 220 doghouses using an average of 2.1 labor hours per doghouse at an actual labor rate averaging $9.80 per hour. Determine the labor rate and usage variances.

Answer

Labor price variance = |Actual rate − Standard rate| × Actual quantity

Labor price variance = |$9.80 − $10.00| × (220 units × 2.1 hours) = $92.40 Favorable

Labor usage variance = |Actual quantity − Standard quantity| × Standard rate

Labor usage variance = |[220 × 2.1] − [220 × 2.0]| × $10 = $220.00 Unfavorable

REALITY BYTES

Does standard costing apply to service companies as well as manufacturers? Absolutely! If you take your car into an auto dealership to be repaired and the service invoice shows that the repair took one hour to perform, you should not assume that was the actual time the repair required. The time for which you were charged was probably based on the standard time a repair of that type should have taken. The mechanic may have gotten this standard time from a reference manual such as the *Chilton Labor Guide* or the *Real-Time Labor Guide,* which are available in either print or CD versions. Some repair jobs can be completed in less time than the guides suggest, and some jobs will take longer. But since customers are charged based on a standard time allowed, two customers having the same repair performed will be charged the same price.

Variable Overhead Variances

Variable overhead variances are based on the same general formulas used to compute the materials and labor price and usage variances. Unique characteristics of variable overhead costs, however, require special attention. First, variable overhead represents many inputs such as supplies, utilities, and indirect labor. The variable overhead cost pool is normally assigned to products based on a predetermined variable overhead allocation rate. Using a single rate to assign a mixture of different costs complicates variance interpretation. Suppose the actual variable overhead rate is higher than the predetermined rate. Did the company pay more than expected for supplies, utilities, maintenance, or some other input variable? The cost of some variable overhead items may have been higher than expected while others were lower than expected. Similarly, a variable overhead usage variance provides no clue about which overhead inputs were over- or underused. Because meaningful interpretation of the results is difficult, many companies do not calculate price and usage variances for variable overhead costs. We therefore limit coverage of this subject to the total flexible budget variances shown in Exhibit 8.3.

Selling, General, and Administrative Cost Variances

Variable selling, general, and administrative (SG&A) costs can have *price and usage* variances. For example, suppose Melrose decides to attach a promotional advertising brochure to each trophy it sells. Melrose may pay more or less than expected for each brochure (a price variance). Melrose also could use more or fewer of the brochures than expected (a usage variance). Businesses frequently compute variances for SG&A costs such as sales commissions, food and entertainment, postage, and supplies. The same algebraic formulas used to compute variances for variable manufacturing costs apply to computing variable SG&A cost variances.

For your convenience the general formulas for determining price and usage variances are shown in Exhibit 8.7.

EXHIBIT 8.7

Algebraic Formulas for Variances

Variable cost variances (materials, labor, and overhead)

a. Price variance

$$|\text{Actual price} - \text{Standard price}| \times \text{Actual quantity}$$

b. Usage variance

$$|\text{Actual quantity} - \text{Standard quantity}| \times \text{Standard price}$$

A Look Back <<

The essential topics of this chapter are the master budget, flexible budgets, and variance analysis. The *master budget* is determined by multiplying the standard sales price and per unit variable costs by the planned volume of activity. The master budget is prepared at the beginning of the accounting period for planning purposes. It is not adjusted to reflect differences between the planned and actual volume of activity. Since this budget remains unchanged regardless of actual volume, it is also called a *static budget. Flexible budgets* differ from static budgets in that they show the estimated amount of revenue and costs expected at different levels of volume. Both static and flexible budgets are based on the same per unit standard amounts and the same fixed costs. The total amounts of revenue and costs in a static budget differ from those in a flexible budget because they are based on different levels of volume. Flexible budgets are used for planning, cost control, and performance evaluation.

The differences between standard (sometimes called *expected* or *estimated*) and actual amounts are called *variances.* Variances are used to evaluate managerial performance and can be either favorable or unfavorable. *Favorable sales variances* occur when actual sales are greater than expected sales. *Unfavorable sales variances* occur when actual sales are less than expected sales. *Favorable cost variances* occur when actual costs are less than expected costs. *Unfavorable cost variances* occur when actual costs are more than expected costs.

Volume variances are caused by the difference between the static and flexible budgets. Since both static and flexible budgets are based on the same standard sales price and costs per unit, the volume variances are attributable solely to differences between the planned and the actual volume of activity. Favorable sales volume variances suggest that the marketing manager has performed well by selling more than was expected. Unfavorable sales volume variances suggest the inverse. Favorable or unfavorable variable cost volume variances are not meaningful for performance evaluation because variable costs are expected to change in proportion to changes in the volume of activity.

Flexible budget variances are computed by taking the difference between the amounts of revenue and variable costs that are expected at the actual volume of activity and the actual amounts of revenue and variable costs incurred at the actual volume of activity. Since the volume of activity is the same for the flexible budget and the actual results, variances are caused by the differences between the standard and actual sales price and per unit costs. Flexible budget variances are used for cost control and performance evaluation.

The total fixed cost variance is composed of the following:

a. Fixed manufacturing overhead cost spending variance

|Actual fixed overhead costs − Budgeted fixed overhead|

b. Fixed manufacturing overhead cost volume variance

|Applied fixed overhead costs − Budgeted fixed overhead costs|

The fixed overhead spending variance occurs because actual costs may be more or less than expected. For example, a production supervisor's salary will remain unchanged regardless of the volume of activity, but the supervisor may receive a raise resulting in higher than expected fixed costs. The fixed overhead volume variance is favorable if the actual volume of production is greater than the expected volume. A higher volume of production results in a lower fixed cost per unit. The volume variance measures how effectively production facilities are being used.

Flexible budget variances can be subdivided into *price and usage variances.* Price and usage variances for materials and labor can be computed with the following formulas. Variable overhead variances are calculated with the same general formulas; interpreting the results is difficult, however, because of the variety of inputs combined in variable overhead.

$$\text{Price variance} = |\text{Actual price} - \text{Standard price}| \times \text{Actual quantity}$$

$$\text{Usage variance} = |\text{Actual quantity} - \text{Standard quantity}| \times \text{Standard price}$$

The purchasing agent is normally accountable for the material price variance. The production department supervisor is usually responsible for the materials usage variance and the labor price and usage variances.

Management must interpret variances with care. For example, a purchasing agent may produce a favorable price variance by buying inferior materials at a low cost. However, an unfavorable labor usage variance may result because employees have difficulty using the substandard materials. The production supervisor is faced with an unfavorable usage variance for which she is not responsible. In addition, the purchasing agent's undesirable choice produced a favorable price variance. Favorable variances do not necessarily reflect good performance and unfavorable variances do not always suggest poor performance. The underlying causes of variances must be investigated before assigning responsibility for them.

>> A Look Forward

Chapter 9 introduces other techniques for evaluating managerial performance. The concept of decentralization and its relationship to responsibility accounting will be covered. You will learn how to calculate and interpret return on investment and residual income. Finally, you will study approaches used to establish the price of products that are transferred between divisions of the same company.

A step-by-step audio-narrated series of slides is provided on the text website at www.mhhe.com/edmonds2011.

SELF-STUDY REVIEW PROBLEM

Bugout Pesticides, Inc., established the following standard price and costs for a termite control product that it sells to exterminators.

Variable price and cost data (per unit)	Standard	Actual
Sales price	$52.00	$49.00
Materials cost	10.00	10.66
Labor cost	12.00	11.90
Overhead cost	7.00	7.05
General, selling, and administrative (GS&A) cost	8.00	7.92
Expected fixed costs (in total)		
Manufacturing overhead	$150,000	$140,000
General, selling, and administrative	60,000	64,000

The 2010 master budget was established at an expected volume of 25,000 units. Actual production and sales volume for the year was 26,000 units.

Required

a. Prepare the pro forma income statement for Bugout's 2010 master budget.

b. Prepare a flexible budget income statement at the actual volume.

c. Determine the sales and variable cost volume variances and indicate whether they are favorable or unfavorable. Comment on how Bugout would use the variances to evaluate performance.

d. Determine the flexible budget variances and indicate whether they are favorable or unfavorable. Provide another name for the fixed cost flexible budget variances.

e. Identify the two variances Bugout is most likely to analyze further. Explain why you chose these two variances. Who is normally responsible for the variances you chose to investigate?

f. Each unit of product was expected to require 4 pounds of material, which has a standard price of $2.50 per pound. Actual materials usage was 4.1 pounds per unit at an actual price of $2.60 per pound. Determine the materials price and usage variances.

Solution to Requirements a, b, and c

Number of units		25,000	26,000	
	Per Unit Standards	Master Budget	Flexible Budget	Volume Variances
Sales revenue	$52	$1,300,000	$1,352,000	$52,000 F
Variable manufacturing costs				
Materials	10	250,000	260,000	10,000 U
Labor	12	300,000	312,000	12,000 U
Overhead	7	175,000	182,000	7,000 U
Variable SG&A	8	200,000	208,000	8,000 U
Contribution margin		375,000	390,000	15,000 F
Fixed costs				
Manufacturing overhead		150,000	150,000	0
SG&A		60,000	60,000	0
Net income		$ 165,000	$ 180,000	$15,000 F

The sales and variable cost volume variances are useful in determining how changes in sales volume affect revenues and costs. Since the flexible budget is based on standard prices and costs, the variances do not provide insight into differences between standard prices and costs versus actual prices and costs.

Solution to Requirement d

Number of units		26,000	26,000	
	Actual Unit Price/Cost	Flexible Budget*	Actual Results	Flexible Budget Variances
Sales revenue	$49.00	$1,352,000	$1,274,000	$78,000 U
Variable manufacturing costs				
Materials	10.66	260,000	277,160	17,160 U
Labor	11.90	312,000	309,400	2,600 F
Overhead	7.05	182,000	183,300	1,300 U
Variable SG&A	7.92	208,000	205,920	2,080 F
Contribution margin		390,000	298,220	91,780 U
Fixed costs				
Manufacturing overhead		150,000	140,000	10,000 F†
SG&A		60,000	64,000	4,000 U†
Net income		$ 180,000	$ 94,220	$85,780 U

*The price and cost data for the flexible budget come from the table shown at the beginning of the problem.

†The flexible budget variances for the fixed costs are also called *spending variances*.

Solution to Requirement e

The management by exception doctrine focuses attention on the sales price variance and the materials variance. The two variances are material in size and are generally under the control of management. Upper-level marketing managers are responsible for the sales price variance.

These managers are normally responsible for establishing the sales price. In this case, the actual sales price is less than the planned sales price, resulting in an unfavorable flexible budget variance. Mid-level production supervisors and purchasing agents are normally responsible for the materials cost variance. This variance could have been caused by waste or by paying more for materials than the standard price. Further analysis of the materials cost variance follows in Requirement *f*.

Solution to Requirement f

(Actual price − Standard price)	×	Actual quantity	=	Price variance
($2.60 − $2.50)	×	(4.1 pounds × 26,000 units)	=	$10,660 U

(Actual quantity − Standard quantity)	×	Standard price	=	Usage variance
[(4.1 × 26,000) − (4.0 × 26,000)]	×	$2.50	=	$6,500 U

The total of the price and usage variances [($10,660 + $6,500) = $17,160] equals the total materials flexible budget variance computed in Requirement *d*.

KEY TERMS

Applied fixed cost 356
Budget slack 360
Fixed cost spending variance 356
Fixed cost volume variance 350
Flexible budget 350
Flexible budget variance 354
Ideal standard 358
Labor price variance 365
Labor usage variance 365
Lax standard 358
Making the numbers 352
Management by exception 357
Material variance 359
Materials price variance 363
Materials usage variance 363
Practical standard 358
Predetermined overhead rate 356
Sales price variance 354
Sales volume variance 352
Standard 358
Static budget 350
Variable cost volume variance 352
Variances 351

QUESTIONS

1. What is the difference between a static budget and a flexible budget? When is each used?
2. When the operating costs for Bill Smith's production department were released, he was sure that he would be getting a raise. His costs were $20,000 less than the planned cost in the master budget. His supervisor informed him that the results look good but that a more in-depth analysis is necessary before raises can be assigned. What other considerations could Mr. Smith's supervisor be interested in before she rates his performance?
3. When are sales and cost variances favorable and unfavorable?
4. Joan Mason, the marketing manager for a large manufacturing company, believes her unfavorable sales volume variance is the responsibility of the production department. What production circumstances that she does not control could have been responsible for her poor performance?
5. When would variable cost volume variances be expected to be unfavorable? How should unfavorable variable cost volume variances be interpreted?
6. What factors could lead to an increase in sales revenues that would not merit congratulations to the marketing manager?
7. With respect to fixed costs, what are the consequences of the actual volume of activity exceeding the planned volume?
8. How are flexible budget variances determined? What causes these variances?
9. Minnie Divers, the manager of the marketing department for one of the industry's leading retail businesses, has been notified by the accounting department that her department experienced an unfavorable sales volume variance in the preceding period but a favorable sales price variance. Based on these contradictory results, how would you interpret her overall performance as suggested by her variances?
10. What three attributes are necessary for establishing the best standards? What information and considerations should be taken into account when establishing standards?

11. What are the three ranges of difficulty in standard setting? What level of difficulty normally results in superior employee motivation?
12. "So many variances," exclaimed Carl, a production manager with Bonnyville Manufacturing. "How do I determine the variances that need investigation? I can't possibly investigate all of them." Which variances will lead to useful information?
13. What is the primary benefit associated with using a standard cost system?
14. A processing department of Carmine Corporation experienced a high unfavorable materials quantity variance. The plant manager initially commented, "The best way to solve this problem is to fire the supervisor of the processing department." Do you agree? Explain.
15. Sara Anderson says that she is a busy woman with no time to look at favorable variances. Instead, she concentrates solely on the unfavorable ones. She says that favorable variances imply that employees are doing better than expected and need only quick congratulations. In contrast, unfavorable variances indicate that change is needed to get the substandard performance up to par. Do you agree? Explain.
16. What two factors affect the total materials and labor variances?
17. Who is normally responsible for a materials price variance? Identify two factors that may be beyond this individual's control that could cause an unfavorable price variance.
18. John Jamail says that he doesn't understand why companies have labor price variances because most union contracts or other binding agreements set wage rates that do not normally change in the short term. How could rate variances occur even when binding commitments hold the dollar per hour rate constant?
19. Which individuals are normally held responsible for labor usage variances?
20. What is the primary cause of an unfavorable fixed cost volume variance?
21. What is the primary cause of a favorable fixed cost spending variance?

MULTIPLE-CHOICE QUESTIONS

Multiple-choice questions are provided on the text website at www.mhhe.com/edmonds2011.

EXERCISES—SERIES A

All applicable Exercises in Series A are available with McGraw-Hill's *Connect Accounting*.

Exercise 8-1A *Classifying variances as favorable or unfavorable*

LO 2

Required

Indicate whether each of the following variances is favorable or unfavorable. The first one has been done as an example.

Item to Classify	Standard	Actual	Type of Variance
Labor cost	$10.00 per hour	$9.60 per hour	Favorable
Labor usage	61,000 hours	61,800 hours	
Fixed cost spending	$400,000	$390,000	
Fixed cost per unit (volume)	$3.20 per unit	$3.16 per unit	
Sales volume	40,000 units	42,000 units	
Sales price	$3.60 per unit	$3.63 per unit	
Materials cost	$2.90 per pound	$3.00 per pound	
Materials usage	91,000 pounds	90,000 pounds	

LO 2

Exercise 8-2A *Determining amount and type (favorable vs. unfavorable) of variance*

Required

Compute variances for the following items and indicate whether each variance is favorable (F) or unfavorable (U).

Item	Budget	Actual	Variance	F or U
Sales price	$650	$525		
Sales revenue	$580,000	$600,000		
Cost of goods sold	$385,000	$360,000		
Material purchases at 5,000 pounds	$275,000	$280,000		
Materials usage	$180,000	$178,000		
Production volume	950 units	900 units		
Wages at 4,000 hours	$60,000	$58,700		
Labor usage at $16 per hour	$96,000	$97,000		
Research and development expense	$22,000	$25,000		
Selling and administrative expenses	$49,000	$40,000		

LO 1

Exercise 8-3A *Preparing master and flexible budgets*

Sexton Manufacturing Company established the following standard price and cost data.

Sales price	$8.00 per unit
Variable manufacturing cost	$4 per unit
Fixed manufacturing cost	$3,000 total
Fixed selling and administrative cost	$1,000 total

Sexton planned to produce and sell 2,000 units. Actual production and sales amounted to 2,200 units.

Required

a. Prepare the pro forma income statement in contribution format that would appear in a master budget.

b. Prepare the pro forma income statement in contribution format that would appear in a flexible budget.

LO 3

Exercise 8-4A *Determining sales and variable cost volume variances*

Required

Use the information provided in Exercise 8-3A.

a. Determine the sales and variable cost volume variances.

b. Classify the variances as favorable (F) or unfavorable (U).

c. Comment on the usefulness of the variances with respect to performance evaluation and identify the member of the management team most likely to be responsible for these variances.

d. Determine the amount of fixed cost that will appear in the flexible budget.

e. Determine the fixed cost per unit based on planned activity and the fixed cost per unit based on actual activity. Assuming Sexton uses information in the master budget to price the company's product, comment on how the fixed cost volume variance could affect the company's profitability.

LO 4

Exercise 8-5A *Determining flexible budget variances*

Use the standard price and cost data provided in Exercise 8-3A. Assume that the actual sales price is $7.65 per unit and that the actual variable cost is $4.25 per unit. The actual fixed manufacturing cost is $2,500, and the actual selling and administrative costs are $1,025.

Required

a. Determine the flexible budget variances.
b. Classify the variances as favorable (F) or unfavorable (U).
c. Provide another name for the fixed cost flexible budget variances.
d. Comment on the usefulness of the variances with respect to performance evaluation and identify the member(s) of the management team who is (are) most likely to be responsible for these variances.

Exercise 8-6A *Using a flexible budget to accommodate market uncertainty*

LO 4

According to its original plan, Darey Consulting Services Company would charge its customers for service at $125 per hour in 2011. The company president expects consulting services provided to customers to reach 45,000 hours at that rate. The marketing manager, however, argues that actual results may range from 40,000 hours to 50,000 hours because of market uncertainty. Darey's standard variable cost is $48 per hour, and its standard fixed cost is $1,500,000.

Required

Develop flexible budgets based on the assumptions of service levels at 40,000 hours, 45,000 hours, and 50,000 hours.

Exercise 8-7A *Evaluating a decision to increase sales volume by lowering sales price*

LO 3, 4

Ender Educational Services had budgeted its training service charge at $75 per hour. The company planned to provide 30,000 hours of training services during 2012. By lowering the service charge to $60 per hour, the company was able to increase the actual number of hours to 31,500.

Required

a. Determine the sales volume variance, and indicate whether it is favorable (F) or unfavorable (U).
b. Determine the flexible budget variance, and indicate whether it is favorable (F) or unfavorable (U).
c. Did lowering the price of training services increase revenue? Explain.

Exercise 8-8A *Responsibility for the fixed cost volume variance*

LO 5

Ragan Company expected to sell 400,000 of its pagers during 2011. It set the standard sales price for the pager at $30 each. During June, it became obvious that the company would be unable to attain the expected volume of sales. Ragan's chief competitor, Selma Corporation, had lowered prices and was pulling market share from Ragan. To be competitive, Ragan matched Selma's price, lowering its sales price to $28 per pager. Selma responded by lowering its price even further to $24 per pager. In an emergency meeting of key personnel, Ragan's accountant, Suzy Kennedy, stated, "Our cost structure simply won't support a sales price in the $24 range." The production manager, Larry Jones, said, "I don't understand why I'm here. The only unfavorable variance on my report is a fixed manufacturing overhead cost volume variance and that one is not my fault. We shouldn't be making the product if the marketing department isn't selling it."

Required

a. Describe a scenario in which the production manager is responsible for the fixed cost volume variance.
b. Describe a scenario in which the marketing manager is responsible for the fixed cost volume variance.
c. Explain how a decline in sales volume would affect Ragan's ability to lower its sales price.

Exercise 8-9A *Responsibility for variable manufacturing cost variance*

LO 4

Goslin Manufacturing Company set its standard variable manufacturing cost at $24 per unit of product. The company planned to make and sell 4,000 units of product during 2012. More specifically, the master budget called for total variable manufacturing cost to be $96,000. Actual production during 2012 was 4,200 units, and actual variable manufacturing costs amounted to

$101,640. The production supervisor was asked to explain the variance between budgeted and actual cost ($101,640 − $96,000 = $5,640). The supervisor responded that she was not responsible for the variance that was caused solely by the increase in sales volume controlled by the marketing department.

Required

Do you agree with the production supervisor? Explain.

LO 7

Exercise 8-10A *Calculating the materials usage variance*

Laura Pierre is the manager of the Roebuck Bagel Shop. The corporate office had budgeted her store to sell 3,000 ham sandwiches during the week beginning July 17. Each sandwich was expected to contain 7 ounces of ham. During the week of July 17, the store actually sold 3,500 sandwiches and used 25,000 ounces of ham. The standard cost of ham is $0.20 per ounce. The variance report from company headquarters showed an unfavorable materials usage variance of $800. Ms. Pierre thought the variance was too high, but she had no accounting background and did not know how to register a proper objection.

Required

a. Is the variance calculated properly? If not, recalculate it.

b. Provide three independent explanations as to what could have caused the materials usage variance that you determined in Requirement *a*.

LO 7

Exercise 8-11A *Determining materials price and usage variances*

Gwen's Florals produced a special Mother's Day arrangement that included six roses. The standard and actual costs of the roses used in each arrangement follow.

	Standard	Actual
Average number of roses per arrangement	6.5	7
Price per rose	× $0.36	× $0.32
Cost of roses per arrangement	$2.34	$2.24

Gwen's Florals planned to make 750 arrangements but actually made 790.

Required

a. Determine the total flexible budget materials variance and indicate whether it is favorable (F) or unfavorable (U).

b. Determine the materials price variance and indicate whether it is favorable (F) or unfavorable (U).

c. Determine the materials usage variance and indicate whether it is favorable (F) or unfavorable (U).

d. Confirm the accuracy of Requirements *a*, *b*, and *c* by showing that the sum of the price and usage variances equals the total variance.

LO 7

Exercise 8-12A *Responsibility for materials usage variance*

Lehman Fruit Basket Company makes baskets of assorted fruit. The standard and actual costs of oranges used in each basket of fruit follow.

	Standard	Actual
Average number of oranges per basket	4.50	6.30
Price per orange	× $0.28	× $0.25
Cost of oranges per basket	$1.26	$1.58

Lehman actually produced 25,000 baskets.

Required

a. Determine the materials price variance and indicate whether it is favorable (F) or unfavorable (U).
b. Determine the materials usage variance and indicate whether it is favorable (F) or unfavorable (U).
c. Explain why the purchasing agent may have been responsible for the usage variance.

Exercise 8-13A *Responsibility for labor price and usage variances* LO 7

Aman Manufacturing Company incurred a favorable labor price variance and an unfavorable labor usage variance.

Required

a. Describe a scenario in which the personnel manager is responsible for the unfavorable usage variance.
b. Describe a scenario in which the production manager is responsible for the unfavorable usage variance.

Exercise 8-14A *Calculating and explaining labor price and usage variances* LO 7

Huber and Sons, a CPA firm, established the following standard labor cost data for completing what the firm referred to as a Class 2 tax return. Huber expected each Class 2 return to require 4.0 hours of labor at a cost of $50 per hour. The firm actually completed 600 returns. Actual labor hours averaged 4.4 hours per return and actual labor cost amounted to $46 per hour.

Required

a. Determine the total labor variance and indicate whether it is favorable (F) or unfavorable (U).
b. Determine the labor price variance and indicate whether it is favorable (F) or unfavorable (U).
c. Determine the labor usage variance and indicate whether it is favorable (F) or unfavorable (U).
d. Explain what could have caused these variances.

Exercise 8-15A *Determining the standard labor price* LO 7

Kerensky Car Wash, Inc., expected to wash 1,000 cars during the month of August. Washing each car was expected to require 0.2 hours of labor. The company actually used 210 hours of labor to wash 940 cars. The labor usage variance was $352 unfavorable.

Required

a. Determine the standard labor price.
b. If the actual labor rate is $14, indicate whether the labor price variance would be favorable (F) or unfavorable (U).

Exercise 8-16A *Calculating the variable overhead variance* LO 5, 6, 7

Pena Company established a predetermined variable overhead cost rate at $9.40 per direct labor hour. The actual variable overhead cost rate was $8.30 per hour. The planned level of labor activity was 73,000 hours of labor. The company actually used 80,000 hours of labor.

Required

a. Determine the total flexible budget variable overhead cost variance.
b. Like many companies, Pena has decided not to separate the total variable overhead cost variance into price and usage components. Explain why Pena made this choice.

Exercise 8-17A *Determining and interpreting fixed cost variances* LO 5, 6, 7

Sloan Company established a predetermined fixed overhead cost rate of $29 per unit of product. The company planned to make 7,000 units of product but actually produced only 6,500 units. Actual fixed overhead costs were $212,000.

Required

a. Determine the fixed cost spending variance and indicate whether it is favorable or unfavorable. Explain what this variance means. Identify the manager(s) who is (are) responsible for the variance.

b. Determine the fixed cost volume variance and indicate whether it is favorable or unfavorable. Explain why this variance is important. Identify the manager(s) who is (are) responsible for the variance.

PROBLEMS—SERIES A

All applicable Problems in Series A are available with McGraw-Hill's *Connect Accounting.*

LO 1, 3

Problem 8-18A *Determining sales and variable cost volume variances*

CHECK FIGURES
a. NI = $81,000
b. NI at 29,000 units: $72,000

Todhunter Publications established the following standard price and costs for a hardcover picture book that the company produces.

Standard price and variable costs	
Sales price	$36.00
Materials cost	9.00
Labor cost	4.50
Overhead cost	6.30
Selling, general, and administrative costs	7.20
Planned fixed costs	
Manufacturing overhead	$135,000
Selling, general, and administrative	54,000

Todhunter planned to make and sell 30,000 copies of the book.

Required

a. Prepare the pro forma income statement that would appear in the master budget.

b. Prepare flexible budget income statements, assuming production volumes of 29,000 and 31,000 units.

c. Determine the sales and variable cost volume variances, assuming volume is actually 31,000 units.

d. Indicate whether the variances are favorable (F) or unfavorable (U).

e. Comment on how Todhunter could use the variances to evaluate performance.

LO 4

Problem 8-19A *Determining and interpreting flexible budget variances*

CHECK FIGURE
Flexible budget variance of NI: $20,450 U

Use the standard price and cost data supplied in Problem 8-18A. Assume that Todhunter actually produced and sold 31,000 books. The actual sales price and costs incurred follow.

Actual price and variable costs	
Sales price	$35.00
Materials cost	9.20
Labor cost	4.40
Overhead cost	6.35
Selling, general, and administrative costs	7.00
Actual fixed costs	
Manufacturing overhead	$120,000
Selling, general, and administrative	60,000

Required

a. Determine the flexible budget variances. Provide another name for the fixed cost flexible budget variances.

b. Indicate whether each variance is favorable (F) or unfavorable (U).

c. Identify the management position responsible for each variance. Explain what could have caused the variance.

Problem 8-20A *Flexible budget planning*

LO 1

Luke Chou, the president of Digitech Computer Services, needs your help. He wonders about the potential effects on the firm's net income if he changes the service rate that the firm charges its customers. The following basic data pertain to fiscal year 2012.

Standard rate and variable costs	
Service rate per hour	$80.00
Labor cost	40.00
Overhead cost	7.20
Selling, general, and administrative cost	4.30
Expected fixed costs	
Facility repair	$525,000.00
Selling, general, and administrative	150,000.00

CHECK FIGURES
a. NI = $180,000
c. NI = $162,500

Required

a. Prepare the pro forma income statement that would appear in the master budget if the firm expects to provide 30,000 hours of services in 2012.

b. A marketing consultant suggests to Mr. Chou that the service rate may affect the number of service hours that the firm can achieve. According to the consultant's analysis, if Digitech charges customers $75 per hour, the firm can achieve 38,000 hours of services. Prepare a flexible budget using the consultant's assumption.

c. The same consultant also suggests that if the firm raises its rate to $85 per hour, the number of service hours will decline to 25,000. Prepare a flexible budget using the new assumption.

d. Evaluate the three possible outcomes you determined in Requirements *a*, *b*, and *c* and recommend a pricing strategy.

Problem 8-21A *Determining materials price and usage variances*

LO 7

Vacher Fruit Drink Company planned to make 200,000 containers of apple juice. It expected to use two cups of frozen apple concentrate to make each container of juice, thus using 400,000 cups (200,000 containers × 2 cups) of frozen concentrate. The standard price of one cup of apple concentrate is $0.25. Vacher actually paid $110,168.10 to purchase 408,030 cups of concentrate, which was used to make 201,000 containers of apple juice.

CHECK FIGURES
b. $0.27/cup
d. $8,160.60 U

Required

a. Are flexible budget materials variances based on the planned volume of activity (200,000 containers) or actual volume of activity (201,000 containers)?

b. Compute the actual price per cup of concentrate.

c. Compute the standard quantity (number of cups of concentrate) required to produce the containers.

d. Compute the materials price variance and indicate whether it is favorable (F) or unfavorable (U).

e. Compute the materials usage variance and indicate whether it is favorable (F) or unfavorable (U).

Problem 8-22A *Determining labor price and usage variances*

LO 7

Lakesha's Doll Company produces handmade dolls. The standard amount of time spent on each doll is 1.5 hours. The standard cost of labor is $7.72 per hour. The company planned to make 8,000 dolls during the year but actually used 12,500 hours of labor to make 9,000 dolls. The payroll amounted to $98,875.

CHECK FIGURES
c. $2,375 U
d. $7,720 F

Required

a. Should labor variances be based on the planned volume of 8,000 dolls or the actual volume of 9,000 dolls?

b. Prepare a table that shows the standard labor price, the actual labor price, the standard labor hours, and the actual labor hours.

c. Compute the labor price variance and indicate whether it is favorable (F) or unfavorable (U).
d. Compute the labor usage variance and indicate whether it is favorable (F) or unfavorable (U).

LO 5

CHECK FIGURE
c. $11,340 F

Problem 8-23A *Computing fixed cost variances*

In addition to other costs, Fenwick Telephone Company planned to incur $441,000 of fixed manufacturing overhead in making 350,000 telephones. Fenwick actually produced 359,000 telephones, incurring actual overhead costs of $447,000. Fenwick establishes its predetermined overhead rate based on the planned volume of production (expected number of telephones).

Required

a. Calculate the predetermined overhead rate.
b. Determine the fixed cost spending variance and indicate whether it is favorable (F) or unfavorable (U).
c. Determine the fixed cost volume variance and indicate whether it is favorable (F) or unfavorable (U).

LO 5, 7

eXcel

CHECK FIGURES
d. Price variance: $3,864 F
g. Fixed cost volume variance $940 F

Problem 8-24A *Computing materials, labor, and cost variances*

The following data were drawn from the records of Inman Corporation.

Planned volume for year (static budget)	4,000 units
Standard direct materials cost per unit	3.1 lbs. @ $1.50 per pound
Standard direct labor cost per unit	2 hours @ $4.00 per hour
Total expected fixed overhead costs	$18,800
Actual volume for the year (flexible budget)	4,200 units
Actual direct materials cost per unit	2.7 lbs. @ $2.00 per pound
Actual direct labor cost per unit	2.3 hrs. @ $3.60 per hour
Total actual fixed overhead costs	$15,000

Required

a. Prepare a materials variance information table showing the standard price, the actual price, the standard quantity, and the actual quantity.
b. Calculate the materials price and usage variances. Indicate whether the variances are favorable (F) or unfavorable (U).
c. Prepare a labor variance information table showing the standard price, the actual price, the standard hours, and the actual hours.
d. Calculate the labor price and usage variances. Indicate whether the variances are favorable (F) or unfavorable (U).
e. Calculate the predetermined overhead rate, assuming that Inman uses the number of units as the allocation base.
f. Calculate the fixed cost spending variance. Indicate whether the variance is favorable (F) or unfavorable (U).
g. Calculate the fixed cost volume variance. Indicate whether the variance is favorable (F) or unfavorable (U).

LO 5, 7

CHECK FIGURES
b. Usage variance: $2,781 U
d. Price variance: $8,916 U

Problem 8-25A *Computing materials, labor, and fixed cost variances*

Lennox Manufacturing Company produces a component part of a top secret military communication device. Standard production and cost data for the part, Product X, follow.

Planned production	30,000 units
Per unit direct materials	2 lbs. @ $1.80 per lb.
Per unit direct labor	3 hrs. @ $8.00 per hr.
Total estimated fixed overhead costs	$702,000

Lennox purchased and used 63,345 pounds of material at an average cost of $1.85 per pound. Labor usage amounted to 89,160 hours at an average of $8.10 per hour. Actual production amounted to 30,900 units. Actual fixed overhead costs amounted to $738,000. The company completed and sold all inventory for $1,800,000.

Required

a. Prepare a materials variance information table showing the standard price, the actual price, the standard quantity, and the actual quantity.
b. Calculate the materials price and usage variances. Indicate whether the variances are favorable (F) or unfavorable (U).
c. Prepare a labor variance information table showing the standard price, the actual price, the standard hours, and the actual hours.
d. Calculate the labor price and usage variances. Indicate whether the variances are favorable (F) or unfavorable (U).
e. Calculate the predetermined overhead rate, assuming that Lennox uses the number of units as the allocation base.
f. Calculate the fixed cost spending and volume variances and indicate whether they are favorable (F) or unfavorable (U).
g. Determine the amount of gross margin Lennox would report on the year-end income statement.

Problem 8-26A *Computing variances*

LO 7

Osmond Manufacturing Company produces a single product. The following data apply to the standard cost of materials and labor associated with making the product.

CHECK FIGURES
a. 1,720 lbs.
d. $8.25

Materials quantity per unit	1 pound
Materials price	$5.00 per pound
Labor quantity per unit	2 hours
Labor price	$9.00 per hour

During the year, the company made 1,800 units of product. At the end of the year, the following variances had been calculated.

Materials usage variance	$400 Favorable
Materials price variance	$352 Unfavorable
Labor usage variance	$1,800 Unfavorable
Labor price variance	$2,850 Favorable

Required

a. Determine the actual amount of materials used.
b. Determine the actual price paid per pound for materials.
c. Determine the actual labor hours used.
d. Determine the actual labor price per hour.

Problem 8-27A *Computing standard cost and analyzing variances*

LO 5, 7

Quilter Company manufactures molded candles that are finished by hand. The company developed the following standards for a new line of drip candles:

Amount of direct materials per candle	1.6 pounds
Price of direct materials per pound	$0.60
Quantity of labor per unit	1 hours
Price of direct labor per hour	$8.00/hour
Total budgeted fixed overhead	$156,000

CHECK FIGURES
e. Usage variance for direct materials: $960 U
f. Volume variance: $31,200 U

During 2010, Quilter planned to produce 30,000 drip candles. Production lagged behind expectations, and it actually produced only 24,000 drip candles. At year-end, direct materials purchased and used amounted to 40,000 pounds at a unit price of $0.54 per pound. Direct labor costs were actually $7.50 per hour and 26,400 actual hours were worked to produce the drip candles. Overhead for the year actually amounted to $132,000. Overhead is applied to products using a predetermined overhead rate based on estimated units.

Required

(Round all computations to two decimal places.)

a. Compute the standard cost per candle for direct materials, direct labor, and overhead.
b. Determine the total standard cost for one drip candle.
c. Compute the actual cost per candle for direct materials, direct labor, and overhead.
d. Compute the total actual cost per candle.
e. Compute the price and usage variances for direct materials and direct labor. Identify any variances that Quilter should investigate. Offer possible cause(s) for the variances.
f. Compute the fixed cost spending and volume variances. Explain your findings.
g. Although the individual variances (price, usage, and overhead) were large, the standard cost per unit and the actual cost per unit differed by only a few cents. Explain why.

LO 1, 2, 3, 4

Problem 8-28A *Analyzing not-for-profit entity variances*

CHECK FIGURE
b. Variance of surplus: $1,134 U

The Midwest Management Association held its annual public relations luncheon in April 2012. Based on the previous year's results, the organization allocated $21,360 of its operating budget to cover the cost of the luncheon. To ensure that costs would be appropriately controlled, Michelle Laird, the treasurer, prepared the following budget for the 2012 luncheon.

The budget for the luncheon was based on the following expectations.

1. The meal cost per person was expected to be $11.80. The cost driver for meals was attendance, which was expected to be 1,400 individuals.
2. Postage was based on $0.44 per invitation and 3,000 invitations were expected to be mailed. The cost driver for postage was number of invitations mailed.
3. The facility charge is $1,000 for a room that will accommodate up to 1,600 people; the charge for one to hold more than 1,600 people is $1,500.
4. A fixed amount was designated for printing, decorations, the speaker's gift, and publicity.

MIDWEST MANAGEMENT ASSOCIATION
Public Relations Luncheon Budget
April 2012

Operating funds allocated	$21,360
Expenses	
Variable costs	
Meals (1,400 × $11.80)	16,520
Postage (3,000 × 0.44)	1,320
Fixed costs	
Facility	1,000
Printing	950
Decorations	840
Speaker's gift	130
Publicity	600
Total expenses	21,360
Budget surplus (deficit)	$ 0

Actual results for the luncheon follow.

MIDWEST MANAGEMENT ASSOCIATION Actual Results for Public Relations Luncheon April 2012	
Operating funds allocated	$21,360
Expenses	
Variable costs	
Meals (1,620 × $12.50)	20,250
Postage (4,000 × 0.44)	1,760
Fixed costs	
Facility	1,500
Printing	950
Decorations	840
Speaker's gift	130
Publicity	600
Total expenses	26,030
Budget deficit	$ (4,670)

Reasons for the differences between the budgeted and actual data follow.

1. The president of the organization, Yvonne Davis, increased the invitation list to include 1,000 former members. As a result, 4,000 invitations were mailed.
2. Attendance was 1,620 individuals. Because of higher-than-expected attendance, the luncheon was moved to a larger room, thereby increasing the facility charge to $1,500.
3. At the last minute, Ms. Laird decided to add a dessert to the menu, which increased the meal cost to $12.50 per person.
4. Printing, decorations, the speaker's gift, and publicity costs were as budgeted.

Required

a. Prepare a flexible budget and compute the sales and variable cost volume variances based on a comparison between the master budget and the flexible budget.

b. Compute flexible budget variances by comparing the flexible budget with the actual results.

c. Ms. Davis was extremely upset with the budget deficit. She immediately called Ms. Laird to complain about the budget variance for the meal cost. She told Ms. Laird that the added dessert caused the meal cost to be $3,730 ($20,250 − $16,520) over budget. She added, "I could expect a couple hundred dollars one way or the other, but several thousand is totally unacceptable. At the next meeting of the budget committee, I want you to explain what happened." Assume that you are Ms. Laird. What would you tell the members of the budget committee?

d. Since this is a not-for-profit organization, why should anyone be concerned with meeting the budget?

EXERCISES—SERIES B

Exercise 8-1B *Classifying variances as favorable or unfavorable* LO 2

Required

Indicate whether each of the following variances is favorable (F) or unfavorable (U). The first one has been done as an example.

Item to Classify	Standard	Actual	Type of Variance
Sales volume	38,000 units	36,750 units	Unfavorable
Sales price	$6.90 per unit	$6.78 per unit	
Materials cost	$2.10 per pound	$2.30 per pound	
Materials usage	102,400 pounds	103,700 pounds	
Labor cost	$8.25 per hour	$8.80 per hour	
Labor usage	56,980 hours	55,790 hours	
Fixed cost spending	$249,000	$244,000	
Fixed cost per unit (volume)	$2.51 per unit	$3.22 per unit	

LO 2

Exercise 8-2B *Recognizing favorable vs. unfavorable variances*

Compute variances for the following items and indicate whether each variance is favorable (F) or unfavorable (U).

Item	Budget	Actual	Variance	F or U
Sales price	$550	$560		
Sales revenue	$690,000	$720,000		
Cost of goods sold	$520,000	$470,000		
Materials purchases at 10,000 pounds	$330,000	$360,000		
Materials usage	$270,000	$260,000		
Production volume	890 units	900 units		
Wages at 7,600 hours	$91,200	$90,800		
Labor usage	7,600 hours	8,000 hours		
Research and development expense	$81,000	$90,000		
Selling and administrative expenses	$75,000	$71,000		

LO 1

Exercise 8-3B *Preparing master and flexible budgets*

Clyde Manufacturing Company established the following standard price and cost data.

Sales price	$20 per unit
Variable manufacturing cost	$12 per unit
Fixed manufacturing cost	$20,000 total
Fixed selling and administrative cost	$18,000 total

Clyde planned to produce and sell 18,000 units. It actually produced and sold 19,000 units.

Required

a. Prepare the pro forma income statement that would appear in a master budget. Use the contribution margin format.

b. Prepare the pro forma income statement that would appear in a flexible budget. Use the contribution margin format.

LO 3

Exercise 8-4B *Determining sales and variable cost volume variances*

Required

Use the information provided in Exercise 8-3B.

a. Determine the sales and variable cost volume variances.

b. Classify the variances as favorable or unfavorable.

c. Comment on the usefulness of the variances with respect to performance evaluation and identify the member of the management team most likely to be responsible for these variances.

d. Determine the amounts of fixed cost that will appear in the flexible budget.

e. Determine the fixed cost per unit based on planned activity and the fixed cost per unit based on actual activity. Assuming Clyde uses information in the master budget to price its product, explain how the fixed cost volume variance could affect the company's profitability.

Exercise 8-5B *Determining flexible budget variances* LO 4

Use the standard price and cost data provided in Exercise 8-3B. Assume the actual sales price was $19.60 per unit and the actual variable cost was $11.80 per unit. The actual fixed manufacturing cost was $21,000, and the actual selling and administrative expenses were $17,300.

Required

a. Determine the flexible budget variances.
b. Classify the variances as favorable or unfavorable.
c. Provide another name for the fixed cost flexible budget variances.
d. Comment on the usefulness of the variances with respect to performance evaluation and identify the member(s) of the management team that is (are) most likely to be responsible for these variances.

Exercise 8-6B *Using a flexible budget to accommodate market uncertainty* LO 4

Flemming Cable Installation Services, Inc., is planning to open a new regional office. Based on a market survey Flemming commissioned, the company expects services demand for the new office to be between 30,000 and 40,000 hours annually. The firm normally charges customers $50 per hour for its installation services. Flemming expects the new office to have a standard variable cost of $30 per hour and standard fixed cost of $660,000 per year.

Required

a. Develop flexible budgets based on 30,000 hours, 35,000 hours, and 40,000 hours of services.
b. Based on the results for Requirement *a*, comment on the likely success of Flemming's new office.

Exercise 8-7B *Evaluating a decision to increase sales volume by reducing sales price* LO 3, 4

At the beginning of its most recent accounting period, Jackora Company had planned to clean 400 house roofs at an average price of $250 per roof. By reducing the service charge to $225 per roof, the company was able to increase the actual number of roofs cleaned to 450.

Required

a. Determine the sales volume variance and indicate whether it is favorable (F) or unfavorable (U).
b. Determine the flexible budget variance and indicate whether it is favorable (F) or unfavorable (U).
c. Did reducing the price charged for cleaning roofs increase revenue? Explain.

Exercise 8-8B *Responsibility for fixed cost volume and spending variances* LO 5

Dill Manufacturing Company had an excellent year. The company hired a new marketing director in January. The new director's great motivational appeal inspired the sales staff, and, as a result, sales were 20 percent higher than expected. In a recent management meeting, the company president, Joe Ezell, congratulated the marketing director and then criticized Gene Hartley, the company's production manager, because of an unfavorable fixed cost spending variance. Mr. Hartley countered that the favorable fixed cost volume variance more than offset the unfavorable fixed cost spending variance. He argued that Mr. Ezell should evaluate the two variances in total and that he should be rewarded rather than criticized.

Required

Do you agree with Mr. Hartley's defense of the unfavorable fixed cost spending variance? Explain.

Exercise 8-9B *Assessing responsibility for a labor cost variance* LO 4

Orlov Technologies Company's 2011 master budget called for using 60,000 hours of labor to produce 180,000 units of software. The standard labor rate for the company's employees is $38 per direct labor hour. Demand exceeded expectations, resulting in production and sales of 210,000 software units. Actual direct labor costs were $2,646,000. The year-end variance report showed a total unfavorable labor variance of $366,000.

Required

Assume you are the vice president of manufacturing. Should you criticize or praise the production supervisor's performance? Explain.

LO 7

Exercise 8-10B *Calculating the materials usage variance*

Stella Minten manages the Sweet Candy Shop, which was expected to sell 4,000 servings of its trademark candy during July. Each serving was expected to contain 6 ounces of candy. The standard cost of the candy was $0.60 per ounce. The shop actually sold 3,800 servings and actually used 22,100 ounces of candy.

Required

a. Compute the materials usage variance.

b. Explain what could have caused the variance that you computed in Requirement *a*.

LO 7

Exercise 8-11B *Determining materials price and usage variances*

Howe Company makes paint that it sells in 1-gallon containers to retail home improvement stores. During 2012, the company planned to make 190,000 gallons of paint. It actually produced 198,000 gallons. The standard and actual quantity and cost of the color pigment for 1 gallon of paint follow.

	Standard	Actual
Quantity of materials per gallon	12 ounces	13 ounces
Price per ounce	× $0.50	× $0.52
Cost per gallon	$6.00	$6.76

Required

a. Determine the total flexible budget materials variance for pigment. Indicate whether the variance is favorable or unfavorable.

b. Determine the materials price variance and indicate whether the variance is favorable (F) or unfavorable (U).

c. Determine the materials usage variance and indicate whether the variance is favorable (F) or unfavorable (U).

d. Confirm your answers to Requirements *a*, *b*, and *c* by showing that the sum of the price and usage variances equals the total variance.

LO 7

Exercise 8-12B *Responsibility for materials price variance*

Sweer Chill, Inc., makes ice cream that it sells in 5-gallon containers to retail ice cream parlors. During 2011, the company planned to make 100,000 containers of ice cream. It actually produced 97,000 containers. The actual and standard quantity and cost of sugar per container follow.

	Standard	Actual
Quantity of materials per container	2 pounds	2.1 pounds
Price per pound	× $0.75	× $0.80
Cost per container	$1.50	$1.68

Required

a. Determine the materials price variance and indicate whether the variance is favorable (F) or unfavorable (U).

b. Determine the materials usage variance and indicate whether the variance is favorable (F) or unfavorable (U).

c. Explain how the production manager could have been responsible for the price variance.

Exercise 8-13B *Responsibility for labor price and usage variance* LO 7

Newhouse Manufacturing Company incurred an unfavorable labor price variance.

Required

a. Describe a scenario in which the personnel manager is responsible for the unfavorable price variance.

b. Describe a scenario in which the production manager is responsible for the unfavorable price variance.

Exercise 8-14B *Calculating and explaining labor price and usage variances* LO 7

Albertson Landscaping Company established the following standard labor cost data to provide complete lawn care service (cutting, edging, trimming, and blowing) for a small lawn. Albertson planned each lawn to require 2 hours of labor at a cost of $30 per hour. The company actually serviced 500 lawns using an average of 1.75 labor hours per lawn. Actual labor costs were $32 per hour.

Required

a. Determine the total labor variance and indicate whether the variance is favorable (F) or unfavorable (U).

b. Determine the labor price variance and indicate whether the variance is favorable (F) or unfavorable (U).

c. Determine the labor usage variance and indicate whether the variance is favorable (F) or unfavorable (U).

d. Explain what could have caused the variances computed in Requirements *b* and *c*.

Exercise 8-15B *Determining standard labor hours* LO 7

Stylish Hair is a hair salon. It planned to provide 240 hair color treatments during December. Each treatment was planned to require 0.5 hours of labor at the standard labor price of $18 per hour. The salon actually provided 250 treatments. The actual labor price averaged $17.76. The labor price variance was $36 favorable.

Required

a. Determine the actual number of labor hours used per treatment.

b. Indicate whether the labor usage variance would be favorable (F) or unfavorable (U).

Exercise 8-16B *Calculating a variable overhead variance* LO 5, 7

Hahn Manufacturing Company established a predetermined variable overhead cost rate of $40 per direct labor hour. The actual variable overhead cost rate was $38 per direct labor hour. Hahn planned to use 150,000 hours of direct labor. It actually used 152,000 hours of direct labor.

Required

a. Determine the total flexible budget variable overhead cost variance.

b. Many companies do not subdivide the total variable overhead cost variance into price and usage components. Under what circumstances would it be appropriate to distinguish between the price and usage components of a variable overhead cost variance? What would be required to accomplish this type of analysis?

Exercise 8-17B *Determining and interpreting fixed cost variances* LO 5, 7

Smitter Manufacturing Company established a predetermined fixed overhead cost rate of $200 per unit of product. The company planned to make 19,000 units of product but actually produced 20,000 units. Actual fixed overhead costs were $4,000,000.

Required

a. Determine the fixed cost spending variance. Indicate whether the variance is favorable (F) or unfavorable (U). Explain what this variance means. Identify the manager(s) who is (are) responsible for the variance.

b. Determine the fixed cost volume variance. Indicate whether the variance is favorable (F) or unfavorable (U). Explain what the designations *favorable* and *unfavorable* mean with respect to the fixed manufacturing overhead cost volume variance.

PROBLEMS—SERIES B

LO 1, 3

Problem 8-18B *Determining sales and variable cost volume variances*

Vlascenko Food Corporation developed the following standard price and costs for a refrigerated TV dinner that the company produces.

Standard price and variable costs	
Sales price	$25.96
Materials cost	9.00
Labor cost	2.60
Overhead cost	0.56
Selling, general, and administrative costs	4.20
Planned fixed costs	
Manufacturing overhead cost	$500,000
Selling, general, and administrative costs	360,000

Vlascenko plans to make and sell 200,000 TV dinners.

Required

a. Prepare the pro forma income statement that would appear in the master budget.

b. Prepare flexible budget income statements, assuming production and sales volumes of 180,000 and 220,000 units.

c. Determine the sales and variable cost volume variances, assuming volume is actually 190,000 units.

d. Indicate whether the variances are favorable (F) or unfavorable (U).

e. Comment on how Vlascenko could use the variances to evaluate performance.

LO 4

Problem 8-19B *Determining and interpreting flexible budget variances*

Use the standard price and cost data supplied in Problem 8-18B. Assume that Vlascenko actually produced and sold 216,000 units. The actual sales price and costs incurred follow.

Actual price and variable costs	
Sales price	$25.80
Materials cost	8.80
Labor cost	2.68
Overhead cost	0.56
Selling, general, and administrative costs	4.40
Actual fixed costs	
Manufacturing overhead	$512,000
Selling, general, and administrative costs	356,000

Required

a. Determine the flexible budget variances. Provide another name for the fixed cost flexible budget variances.

b. Indicate whether each variance is favorable (F) or unfavorable (U).

c. Identify the management position responsible for each variance. Explain what could have caused the variance.

LO 1

Problem 8-20B *Flexible budget planning*

Executive officers of Ortiz Seafood Processing Company are holding a planning session for fiscal year 2012. They have already established the following standard price and costs for their canned seafood product.

Standard price and variable costs	
Price per can	$3.00
Materials cost	1.05
Labor cost	0.64
Overhead cost	0.10
Selling, general, and administrative costs	0.25
Expected fixed costs	
Production facility costs	$215,000
Selling, general, and administrative costs	180,000

Required

a. Prepare the pro forma income statement that would appear in the master budget if the company expects to produce 600,000 cans of seafood in 2012.

b. A marketing consultant suggests to Ortiz's president that the product's price may affect the number of cans the company can sell. According to the consultant's analysis, if the firm sets its price at $2.70, it could sell 810,000 cans of seafood. Prepare a flexible budget based on the consultant's suggestion.

c. The same consultant also suggests that if the company raises its price to $3.25 per can, the volume of sales would decline to 400,000. Prepare a flexible budget based on this suggestion.

d. Evaluate the three possible outcomes developed in Requirements *a*, *b*, and *c* and recommend a pricing strategy.

Problem 8-21B *Determining materials price and usage variances* LO 7

Tiffany Swimsuit Specialties, Inc., makes fashionable women's swimsuits. Its most popular swimsuit, with the Sarong trade name, uses a standard fabric amount of 6 yards of raw material with a standard price of $5.00 per yard. The company planned to produce 100,000 Sarong swimsuits in 2011. At the end of 2011, the company's cost accountant reported that Tiffany had used 636,000 yards of fabric to make 102,000 swimsuits. Actual cost for the raw material was $3,307,200.

Required

a. Are flexible budget material variances based on the planned volume of 100,000 swimsuits or actual volume of 102,000 swimsuits?

b. Compute the actual price per yard of fabric.

c. Compute the standard quantity (yards of fabric) required to produce the swimsuits.

d. Compute the materials price variance and indicate whether it is favorable (F) or unfavorable (U).

e. Compute the materials usage variance and indicate whether it is favorable (F) or unfavorable (U).

Problem 8-22B *Determining labor price and usage variances* LO 7

As noted in Problem 8-21B, Tiffany Swimsuit makes swimsuits. In 2011, Tiffany produced its most popular swimsuit, the Sarong, for a standard labor price of $30 per hour. The standard amount of labor was 1.0 hour per swimsuit. The company had planned to produce 100,000 Sarong swimsuits. At the end of 2011, the company's cost accountant reported that Tiffany had used 107,000 hours of labor to make 102,000 swimsuits. The total labor cost was $3,295,600.

Required

a. Should the labor variances be based on the planned volume of 100,000 swimsuits or on the actual volume of 102,000 swimsuits?

b. Prepare a table that shows the standard labor price, the actual labor price, the standard labor hours, and the actual labor hours.

c. Compute the labor price variance and indicate whether it is favorable (F) or unfavorable (U).

d. Compute the labor usage variance and indicate whether it is favorable (F) or unfavorable (U).

LO 5

Problem 8-23B *Computing fixed cost variances*

Goodwin Sporting Goods Co. manufactures baseballs. According to Goodwin's 2013 budget, the company planned to incur $300,000 of fixed manufacturing overhead costs to make 200,000 baseballs. Goodwin actually produced 187,000 balls, incurring $296,000 of actual fixed manufacturing overhead costs. Goodwin establishes its predetermined overhead rate on the basis of the planned volume of production (expected number of baseballs).

Required

a. Calculate the predetermined overhead rate.

b. Determine the fixed cost spending variance and indicate whether it is favorable (F) or unfavorable (U).

c. Determine the fixed cost volume variance and indicate whether it is favorable (F) or unfavorable (U).

LO 5, 7

Problem 8-24B *Computing materials, labor, and manufacturing overhead cost variances*

Frank Trawick was a new cost accountant at Skoney Plastics Corporation. He was assigned to analyze the following data that his predecessor left him.

Planned volume for year (static budget)	10,000 units
Standard direct materials cost per unit	2 lbs. @ $1.50 per pound
Standard direct labor cost per unit	0.5 hours @ $10.00 per hour
Total planned fixed overhead costs	$12,000
Actual volume for the year (flexible budget)	10,800 units
Actual direct materials cost per unit	1.9 lbs. @ $1.60 per pound
Actual direct labor cost per unit	0.6 hrs. @ $8.00 per hour
Total actual fixed overhead costs	$12,400

Required

a. Prepare a materials variance information table showing the standard price, the actual price, the standard quantity, and the actual quantity.

b. Calculate the materials price and usage variances and indicate whether they are favorable (F) or unfavorable (U).

c. Prepare a labor variance information table showing the standard price, the actual price, the standard hours, and the actual hours.

d. Calculate the labor price and usage variances and indicate whether they are favorable (F) or unfavorable (U).

e. Calculate the predetermined overhead rate, assuming that Skoney Plastics uses the number of units as the allocation base.

f. Calculate the fixed manufacturing overhead cost spending variance and indicate whether it is favorable (F) or unfavorable (U).

g. Calculate the fixed manufacturing overhead cost volume variance and indicate whether it is favorable (F) or unfavorable (U).

LO 5, 7

Problem 8-25B *Computing materials, labor, and fixed cost variances*

Keedy Corporation makes mouse pads for computer users. After the first year of operation, Diane Keedy, the president and chief executive officer, was eager to determine the efficiency of the company's operation. In her analysis, she used the following standards provided by her assistant.

Units of planned production	400,000
Per-unit direct materials	1 square foot @ $0.25 per square foot
Per-unit direct labor	0.2 hrs. @ $7.00 per hr.
Total estimated fixed overhead costs	$200,000

Keedy purchased and used 460,000 square feet of material at an average cost of $0.24 per square foot. Labor usage amounted to 79,200 hours at an average of $6.90 per hour. Actual production amounted to 208,000 units. Actual fixed overhead costs amounted to $204,000. The company completed and sold all inventory for $1,414,400.

Required

a. Prepare a materials variance information table showing the standard price, the actual price, the standard quantity, and the actual quantity.
b. Calculate the materials price and usage variances and indicate whether they are favorable (F) or unfavorable (U).
c. Prepare a labor variance information table showing the standard price, the actual price, the standard hours, and the actual hours.
d. Calculate the labor price and usage variances and indicate whether they are favorable (F) or unfavorable (U).
e. Calculate the predetermined overhead rate, assuming that Keedy uses the number of units as the allocation base.
f. Calculate the fixed cost spending and volume variances and indicate whether they are favorable (F) or unfavorable (U).
g. Determine the amount of gross margin Keedy would report on the year-end income statement.

Problem 8-26B *Computing variances* LO 7

A fire destroyed most of Salazar Products Corporation's records. Rose Penwell, the company's accountant, is trying to piece together the company's operating results from salvaged documents. She discovered the following data.

Standard materials quantity per unit	2.5 pounds
Standard materials price	$2 per pound
Standard labor quantity per unit	0.6 hour
Standard labor price	$12 per hour
Actual number of products produced	8,000 units
Materials price variance	$792 Favorable
Materials quantity variance	$400 Favorable
Labor price variance	$1,952 Unfavorable
Labor usage variance	$960 Unfavorable

Required

a. Determine the actual amount of materials used.
b. Determine the actual price per pound paid for materials.
c. Determine the actual labor hours used.
d. Determine the actual labor price per hour.

Problem 8-27B *Computing standard cost and analyzing variances* LO 5, 7

Scofield Manufacturing Company, which makes aluminum alloy wheels for automobiles, recently introduced a new luxury wheel that fits small sports cars. The company developed the following standards for its new product.

Amount of direct materials per wheel	2 pounds
Price of direct materials per pound	$5.50
Quantity of labor per wheel	2.5 hours
Price of direct labor per hour	$8.00/hour
Total budgeted fixed overhead	$168,000

In its first year of operation, Scofield planned to produce 3,000 sets of wheels (four wheels per set). Because of unexpected demand, it actually produced 3,600 sets of wheels. By year-end

direct materials purchased and used amounted to 30,000 pounds of aluminum at a cost of $175,500. Direct labor costs were actually $8.40 per hour. Actual hours worked were 2.2 hours per wheel. Overhead for the year actually amounted to $180,000. Overhead is applied to products using a predetermined overhead rate based on the total estimated number of wheels to be produced.

Required

(Round all computations to two decimal places.)

a. Compute the standard cost per wheel for direct materials, direct labor, and overhead.
b. Determine the total standard cost per wheel.
c. Compute the actual cost per wheel for direct materials, direct labor, and overhead.
d. Compute the actual cost per wheel.
e. Compute the price and usage variances for direct materials and direct labor. Identify any variances that Scofield should investigate. Based on your results, offer a possible explanation for the labor usage variance.
f. Compute the fixed manufacturing overhead cost spending and volume variances. Explain your findings.

LO 1, 2, 3, 4

Problem 8-28B *Analyzing not-for-profit organization variances*

The Marketing Department of Hammell State University planned to hold its annual distinguished visiting lecturer (DVL) presentation in October 2012. The secretary of the department prepared the following budget based on costs that had been incurred in the past for the DVL presentation.

MARKETING DEPARTMENT
Distinguished Visiting Lecturer Budget
October 2012

Variable costs	
Refreshments	$ 375
Postage	352
Step costs*	
Printing	500
Facility	250
Fixed costs	
Dinner	200
Speaker's gift	100
Publicity	50
Total costs	$1,827

*Step costs are costs that change abruptly after a defined range of volume (attendance). They do not change proportionately with unit volume increases (i.e., the cost is fixed within a range of activity but changes to a different fixed cost when the volume changes to a new range). For instance, the facility charge is $250 for from 1 to 400 attendees. From 401 to 500 attendees, the next larger room is needed, and the charge is $350. If more than 500 attended, the room size and cost would increase again.

The budget for the presentation was based on the following expectations:

1. Attendance was estimated at 50 faculty from Hammell State and neighboring schools, 125 invited guests from the business community, and 200 students. Refreshments charge per attendee would be $1.00. The cost driver for refreshments is the number of attendees.
2. Postage was based on $0.44 per invitation; 800 invitations were expected to be mailed to faculty and finance business executives. The cost driver for postage is the number of invitations mailed.

3. Printing cost was expected to be $500 for 800 invitations and envelopes. Additional invitations and envelopes could be purchased in batches of 100 units with each batch costing $50.
4. The DVL presentation was scheduled at a downtown convention center. The facility charge was $250 for a room that has a capacity of 400 persons; the charge for one to hold more than 400 people was $350.
5. After the presentation, three Hammell State faculty members planned to take the speaker to dinner. The dinner had been prearranged at a local restaurant for $200 for a three-course dinner.
6. A gift for the speaker was budgeted at $100.
7. Publicity would consist of flyers and posters placed at strategic locations around campus and business offices, articles in the business section of the local newspapers, and announcements made in business classes and school newspapers. Printing for the posters and flyers had been prearranged for $50.
8. The speaker lives in the adjoining state and had agreed to drive to the presentation at his own expense.

The actual results of the presentation follow.

1. Attendance consisted of 450 faculty, business executives, and students.
2. An additional 100 invitations were printed and mailed when the Marketing Department decided that selected alumni should also be invited.
3. Based on RSVP responses, the department rented the next size larger room at a cost of $350 for the presentation.
4. The speaker's gift cost was as budgeted.
5. The department chairperson decided to have a four-course dinner, which cost $230.
6. Because of poor planning, the posters and flyers were not distributed as widely as expected. It was decided at the last minute to hire a temporary assistant to make phone calls to alumni. The actual publicity cost was $75.

Required

a. Prepare a flexible budget and compute sales and variable cost variances based on a comparison between the master budget and the flexible budget. Briefly explain the meaning of the activity variances.

b. Compute flexible budget variances by comparing the flexible budget with the actual results. Briefly explain the meaning of the variable cost flexible budget variances. Discuss the fixed cost variances.

c. Calculate the expected and actual fixed cost per attendee. Discuss the significance of the difference in these amounts.

d. Since the department is a not-for-profit entity, why is it important for it to control the cost of sponsoring the distinguished visiting lecturer presentation?

ANALYZE, THINK, COMMUNICATE

ATC 8-1 Business Applications Case *Static versus flexible budget variances*

Dan Ludwig is the manufacturing production supervisor for Atlantic Lighting Systems. Trying to explain why he did not get the year-end bonus that he had expected, he told his wife, "This is the dumbest place I ever worked. Last year the company set up this budget assuming it would sell 150,000 units. Well, it sold only 140,000. The company lost money and gave me a bonus for not using as much materials and labor as was called for in the budget. This year, the company has the same 150,000 units goal and it sells 160,000. The company's making all kinds of money. You'd think I'd get this big fat bonus. Instead, management tells me I used more materials and labor than was budgeted. They said the company would have made a lot more money if I'd stayed within my budget. I guess I gotta wait for another bad year before I get a bonus. Like I said, this is the dumbest place I ever worked."

Atlantic Lighting Systems's master budget and the actual results for the most recent year of operating activity follow.

	Master Budget	Actual Results	Variances	F or U
Number of units	150,000	160,000	10,000	
Sales revenue	$33,000,000	$35,520,000	$2,520,000	F
Variable manufacturing costs				
Materials	(4,800,000)	(5,300,000)	(500,000)	U
Labor	(4,200,000)	(4,400,000)	(200,000)	U
Overhead	(2,100,000)	(2,290,000)	(190,000)	U
Variable selling, general, and admin. costs	(5,250,000)	(5,450,000)	(200,000)	U
Contribution margin	16,650,000	18,080,000	1,430,000	F
Fixed costs				
Manufacturing overhead	(7,830,000)	(7,751,000)	79,000	F
Sellings, general, and admin. costs	(6,980,000)	(7,015,000)	(35,000)	U
Net income	$ 1,840,000	$ 3,314,000	$1,474,000	F

Required

a. Did Atlantic increase unit sales by cutting prices or by using some other strategy?

b. Is Mr. Ludwig correct in his conclusion that something is wrong with the company's performance evaluation process? If so, what do you suggest be done to improve the system?

c. Prepare a flexible budget and recompute the budget variances.

d. Explain what might have caused the fixed costs to be different from the amount budgeted.

e. Assume that the company's material price variance was favorable and its material usage variance was unfavorable. Explain why Mr. Ludwig may not be responsible for these variances. Now, explain why he may have been responsible for the material usage variance.

f. Assume the labor price variance is unfavorable. Was the labor usage variance favorable or unfavorable?

g. Is the fixed cost volume variance favorable or unfavorable? Explain the effect of this variance on the cost of each unit produced.

ATC 8-2 Group Assignment *Variable price and usage variances and fixed manufacturing overhead cost variances*

Kemp Tables, Inc. (KTI), makes picnic tables of 2 × 4 planks of treated pine. It sells the tables to large retail discount stores such as Walmart. After reviewing the following data generated by KTI's chief accountant, the company president, Arianne Darwin, expressed concern that the total manufacturing cost was more than $0.5 million above budget ($7,084,800 − $6,520,000 = $564,800).

	Actual Results	Master Budget
Cost of planks per table	$ 44.10	$ 40.00
Cost of labor per table	26.10	25.50
Total variable manufacturing cost per table (a)	$ 70.20	$ 65.50
Total number of tables produced (b)	82,000	80,000
Total variable manufacturing cost (a × b)	$5,756,400	$5,240,000
Total fixed manufacturing cost	1,328,400	1,280,000
Total manufacturing cost	$7,084,800	$6,520,000

Ms. Darwin asked Conrad Pearson, KTI's chief accountant, to explain what caused the increase in cost. Mr. Pearson responded that things were not as bad as they seemed. He noted that part of the cost variance resulted from making and selling more tables than had been expected. Making more tables naturally causes the cost of materials and labor to be higher. He explained

that the flexible budget cost variance was less than $0.5 million. Specifically, he provided the following comparison.

	Actual Results	Flexible Budget
Cost of planks per table	$ 44.10	$ 40.00
Cost of labor per table	26.10	25.50
Total variable manufacturing cost per table (a)	$ 70.20	$ 65.50
Total number of tables produced (b)	82,000	82,000
Total variable manufacturing cost (a × b)	$5,756,400	$5,371,000
Total fixed manufacturing cost	1,328,400	1,280,000
Total manufacturing cost	$7,084,800	$6,651,000

Based on this information, he argued that the relevant variance for performance evaluation was only $433,800 ($7,084,800 − $6,651,000). Ms. Darwin responded, "*Only* $433,800! I consider that a very significant number. By the end of the day, I want a full explanation as to what is causing our costs to increase."

Required

a. Divide the class into groups of four or five students and divide the groups into three sections. Assign Task 1 to the first section, Task 2 to the second section, and Task 3 to the third section.

Group Tasks

(1) Based on the following information, determine the total materials cost variance and the price and usage variances. Assuming that the variances are an appropriate indicator of cause, explain what could have caused the variances. Identify the management position responsible.

	Actual Data	Standard Data
Number of planks per table	21	20
Price per plank	× $2.10	× $2.00
Material cost per table	$44.10	$40.00

(2) Based on the following information, determine the total labor cost variance and the price and usage variances. Assuming that the variances are an appropriate indicator of cause, explain what could have caused each variance. Identify the management position responsible.

	Actual Data	Standard Data
Number of hours per table	2.9	3.0
Price per hour	× $9.00	× $8.50
Labor cost per table	$26.10	$25.50

(3) Determine the amount of the fixed cost spending and volume variances. Explain what could have caused these variances. Based on the volume variance, indicate whether the actual fixed cost per unit would be higher or lower than the budgeted fixed cost per unit.

b. Select a spokesperson from each section to report the amount of the variances computed by the group. Reconcile any differences in the variances reported by the sections. Reconcile the individual variances with the total variance. Specifically, show that the total of the materials, labor, and overhead variances equals the total flexible budget variance ($433,800).

c. Discuss how Ms. Darwin should react to the variance information.

ATC 8-3 Research Assignment *Using real world data from Papa John's*

Obtain the 2004, 2005, 2006, 2007, and 2008 income statements for Papa John's International, Inc. The 2006–2008 statements are included in Papa John's 2008 annual report and Form 10-Ks. The 2004 and 2005 statements are in its 2005 annual report.

To obtain the Form 10-Ks you can use either the EDGAR system following the instructions in Appendix A, or they can be found under "Investors" link on the company's corporate website; www.papajohns.com. The company's annual reports are also available on its website.

Required

a. Compute the percentage change for each of the following categories of revenues and expenses for 2004 to 2005, 2005 to 2006, and 2006 to 2007:

Domestic revenues:
Company-owned restaurant sales
Domestic company-owned restaurant expenses:
Cost of sales
Salaries and benefits
Advertising and related costs
Occupancy costs
Other operating expenses

Using an Excel spreadsheet will make this task much easier. Once these averages are obtained, (you should have three averages for each of the six revenue and expense items), calculate an average of the changes for each item. The answer for the "Occupancy coats" item is show as an example:

	Percentage Change
2004–2005	1.7%
2005–2006	3.2
2006–2007	17.0
Average of the changes	7.3%

b. Prepare a budgeted income statement for 2008 and compare the budgeted data to the actual results for 2008. To calculate budgeted amounts, multiply the average change in each revenue and expense item, from Requirement *b*, by the dollar amount of the corresponding revenue or expense from 2007. This will represent the budgeted amount for that item for 2008. Don't forget to use decimal data and not percentage data. Subtract the actual 2008 results from the budgeted results. Finally, divide the actual versus budgeted difference by the budgeted amount to determine a percentage variance from the budget. Calculate total for "Total domestic company-owned restaurant expenses" by adding the appropriate items. The answer for the "Occupancy costs" item is show as an example: (Dollar amounts are in thousands.)

	(1) 2007 Actual	(2) Average 3-year Change	(3) (1 × 2) 2008 Budget	(4) 2008 Actual	(5) (3 − 4) Variance	(5 ÷ 3) Percentage Variance from Budget
Occupancy costs	$31,866	1.073	$34,192	$34,973	$(781)	.028 [2.8%]

ATC 8-4 Writing Assignment *Standard costing—The human factor*

Kemp Corporation makes a protein supplement called Power Punch™. Its principal competitor for Power Punch is the protein supplement Superior Strength™, made by Jim Adams Company (JAC). Mr. Adams, a world-renowned weight-lifting champion, founded JAC. The primary market for both products is athletes. Kemp sells Power Punch to wellness stores, which sell it, other supplements, and health foods to the public. In contrast, Superior Strength is advertised in sports magazines and sold through orders generated by the ads.

Mr. Adams's fame is an essential factor in his company's advertising program. He is a dynamic character whose personality motivates people to strive for superior achievement. His demeanor not only stimulates sales but also provides a strong inspirational force for company employees. He is a kind, understanding individual with high expectations who is fond of saying that "mistakes are just opportunities for improvement." Mr. Adams is a strong believer in total quality management.

Mr. Quayle, president of Kemp Corporation, is a stern disciplinarian who believes in teamwork. He takes pride in his company's standard costing system. Managers work as a team to establish standards and then are held accountable for meeting them. Managers who fail to meet expectations are severely chastised, and continued failure leads to dismissal. After several years of rigorous enforcement, managers have fallen in line. Indeed, during the last two years, all managers have met their budget goals.

Even so, costs have risen steadily. These cost increases have been passed on to customers through higher prices. As a result, Power Punch is now priced significantly higher than Superior Strength. In fact, Superior Strength is selling directly to the public at a price that is below the wholesale price that Kemp is charging the wellness stores. The situation has reached a critical juncture. Sales of Power Punch are falling while Superior Strength is experiencing significant growth. Given that industry sales have remained relatively stable, it is obvious that customers are shifting from Power Punch to Superior Strength. Mr. Quayle is perplexed. He wonders how a company with direct marketing expenses can price its products so low.

Required

a. Explain why JAC has been able to gain a pricing advantage over Kemp.

b. Assume that you are a consultant whom Kemp's board of directors has asked to recommend how to halt the decline in sales of Power Punch. Provide appropriate recommendations.

ATC 8-5 Ethical Dilemma *Budget games*

Melody Lovelady is the most highly rewarded sales representative at Swift Corporation. Her secret to success is always to understate her abilities. Ms. Lovelady is assigned to a territory in which her customer base is increasing at approximately 25 percent per year. Each year she estimates that her budgeted sales will be 10 percent higher than her previous year's sales. With little effort, she is able to double her budgeted sales growth. At Swift's annual sales meeting, she receives an award and a large bonus. Of course, Ms. Lovelady does not disclose her secret to her colleagues. Indeed, she always talks about how hard it is to continue to top her previous performance. She tells herself: "If they are dumb enough to fall for this rubbish, I'll milk it for all it's worth."

Required

a. What is the name commonly given to the budget game Ms. Lovelady is playing?

b. Does Ms. Lovelady's behavior violate any of the standards of ethical conduct shown in Exhibit 1.15 of Chapter 1?

c. Recommend how Ms. Lovelady's budget game could be stopped.

ATC 8-6 Spreadsheet Assignment *Using Excel*

Irvine Publications established the following standard price and costs for a hardcover picture book that the company produces.

Standard price and variable costs	
Sales price	$ 48.00
Materials cost	12.00
Labor cost	6.00
Overhead cost	8.40
Selling, general, and administrative costs	9.60
Expected fixed costs	
Manufacturing overhead	$180,000
Selling, general, and administrative	72,000

Irvine planned to make and sell 30,000 copies of the book.

Required

Construct a spreadsheet like the one shown in Exhibit 8.1 to illustrate a static budget and a flexible budget for production volumes of 28,000, 29,000, 30,000, 31,000, and 32,000.

ATC 8-7 Spreadsheet Assignment *Mastering Excel*

Wilkin Fruit Drink Company planned to make 400,000 containers of apple juice. It expected to use two cups of frozen apple concentrate to make each container of juice, thus using 800,000 cups (400,000 containers × 2 cups) of frozen concentrate. The standard price of one cup of apple concentrate is $0.25. Actually, Wilkin produced 404,000 containers of apple juice and purchased and used 820,000 cups of concentrate at $0.26 per cup.

Required

a. Construct a spreadsheet template that could be used to calculate price and usage variances. The template should be constructed so that it could be used for any problem in the chapter that refers to price and usage variances by changing the data in the spreadsheet. The screen capture on this page represents a template for price and usage variances.

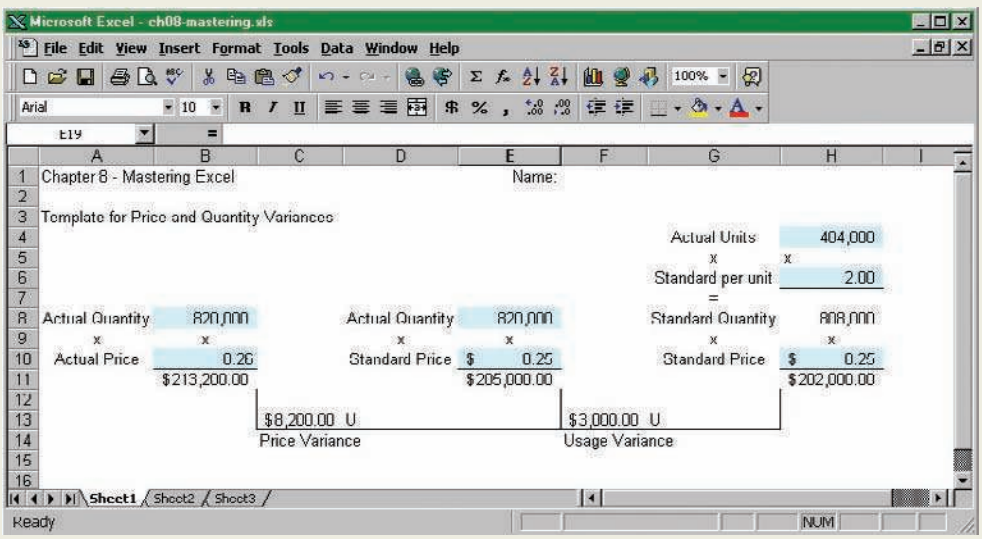
Spreadsheet Tip

(1) The shaded cells can be changed according to the data in each problem. All other cells are formulas based on the numbers in the shaded cells.

(2) The cells that label the variances as F or U (favorable (F) or unfavorable (U)) are based on a function called IF. The IF function is needed because the variance can be either favorable or unfavorable. The formula must determine whether actual expenditures exceed budgeted expenditures to determine whether the variance is unfavorable or favorable. As an example, the formula in cell D13 is =IF(B11>E11,'U','F'). The formula evaluates the expression B11>E11. If this expression is true (B11 is greater than E11), the text U is inserted in cell D13. The IF function can also be used to place formulas or numbers in a cell based on whether an expression is true or false. For example, the formula =IF(B11>E11,B11−E11,E11−B11) would calculate the amount of the variance as a positive number regardless of which amount is larger.

(3) An easier way to make the variance a positive number regardless of whether it is favorable or unfavorable is to use the absolute value function. The format of the formula in cells C13 and F13 would be =ABS(left number − right number).

(4) The lines around the variances are produced by using the borders in Excel (Format, Cells, Border).



COMPREHENSIVE PROBLEM

The management of Magnificent Modems, Inc. (MMI), is uncertain as to the volume of sales that will exist in 2011. The president of the company asked the chief accountant to prepare flexible budget income statements assuming that sales activity amounts to 3,000 and 6,000 units. The static budget is shown in the form below.

Required

a. Complete the following worksheet to prepare the appropriate flexible budgets.

b. Calculate and show the flexible budget variances for the static budget versus the flexible budget at 6,000 units.

c. Indicate whether each variance is favorable or unfavorable.

Flexible Budget Income Statements

		Static Budget	Flexible Budget	Flexible Budget
Number of units		5,000	3,000	6,000
	Cost per Unit			
Sales revenue	$120.00	$600,000		
Variable manuf. costs				
Materials	40.00	200,000		
Labor	25.00	125,000		
Overhead	4.00	20,000		
Variable SG&A	6.00	30,000		
Contribution margin		225,000		
Fixed costs				
Manufacturing rent		50,000		
Dep. on manu. equip.		60,000		
SG&A expenses		71,950		
Dep. on admin. equip.		12,000		
Net income (loss)		$ 31,050	$(58,950)	$76,050