

CHAPTER 7

FLEXIBLE BUDGETS, DIRECT-COST VARIANCES, AND MANAGEMENT CONTROL

7-1 *Management by exception* is the practice of concentrating on areas not operating as expected and giving less attention to areas operating as expected. Variance analysis helps managers identify areas not operating as expected. The larger the variance, the more likely an area is not operating as expected.

7-2 Two sources of information about budgeted amounts are (a) past amounts and (b) detailed engineering studies.

7-3 An unfavorable variance would most likely suggest that a company should consider making a change in its strategy. An unfavorable variance is a variance that has the effect of decreasing operating income relative to the budgeted amount.

7-4 The key difference is the output level used to set the budget. A *static budget* is based on the level of output planned at the *start of the budget period*. A *flexible budget* is developed using budgeted revenues or cost amounts based on the actual output level in the budget period. The actual level of output is not known until the *end of the budget period*.

7-5 A flexible-budget analysis enables a manager to distinguish how much of the difference between an actual result and a budgeted amount is due to (a) the difference between actual and budgeted output levels, and (b) the difference between actual and budgeted selling prices, variable costs, and fixed costs.

7-6 The steps in developing a flexible budget are:
Step 1: Identify the actual quantity of output.
Step 2: Calculate the flexible budget for revenues based on budgeted selling price and actual quantity of output.
Step 3: Calculate the flexible budget for costs based on budgeted variable cost per output unit, actual quantity of output, and budgeted fixed costs.

7-7 Four reasons for using standard costs are:
(i) cost management,
(ii) pricing decisions,
(iii) budgetary planning and control, and
(iv) financial statement preparation.

7-8 A manager should subdivide the flexible-budget variance for direct materials into a price variance (that reflects the difference between actual and budgeted prices of direct materials) and an efficiency variance (that reflects the difference between the actual and budgeted quantities of direct materials used to produce actual output). The individual causes of these variances can then be investigated, recognizing possible interdependencies across these individual causes.

- 7-9** Possible causes of a favorable direct materials price variance are:
- purchasing officer negotiated more skillfully than was planned in the budget,
 - purchasing manager bought in larger lot sizes than budgeted, thus obtaining quantity discounts,
 - materials prices decreased unexpectedly due to, say, industry oversupply,
 - budgeted purchase prices were set without careful analysis of the market, and
 - purchasing manager received unfavorable terms on nonpurchase price factors (such as lower quality materials).

7-10 Some possible reasons for an unfavorable direct manufacturing labor efficiency variance are the hiring and use of underskilled workers; inefficient scheduling of work so that the workforce was not optimally occupied; poor maintenance of machines resulting in a high proportion of non-value-added labor; unrealistic time standards. Each of these factors would result in actual direct manufacturing labor-hours being higher than indicated by the standard work rate.

7-11 Variance analysis, by providing information about actual performance relative to standards, can form the basis of continuous operational improvement. The underlying causes of unfavorable variances are identified, and corrective action taken where possible. Favorable variances can also provide information if the organization can identify why a favorable variance occurred. Steps can often be taken to replicate those conditions more often. As the easier changes are made, and perhaps some standards tightened, the harder issues will be revealed for the organization to act on—this is continuous improvement.

7-12 An individual business function, such as production, is interdependent with other business functions. Factors outside of production can explain why variances arise in the production area. For example:

- poor design of products or processes can lead to a sizable number of defects,
- marketing personnel making promises for delivery times that require a large number of rush orders can create production-scheduling difficulties, and
- purchase of poor-quality materials by the purchasing manager can result in defects and waste.

7-13 The plant supervisor likely has good grounds for complaint if the plant accountant puts excessive emphasis on using variances to pin blame. The key value of variances is to help understand why actual results differ from budgeted amounts and then to use that knowledge to promote learning and continuous improvement.

7-14 Variances can be calculated at the activity level as well as at the company level. For example, a price variance and an efficiency variance can be computed for an activity area.

7-15 Evidence on the costs of other companies is one input managers can use in setting the performance measure for next year. However, caution should be taken before choosing such an amount as next year's performance measure. It is important to understand why cost differences across companies exist and whether these differences can be eliminated. It is also important to examine when planned changes (in, say, technology) next year make even the current low-cost producer not a demanding enough hurdle.

7-16 (20–30 min.) **Flexible budget.**

Variance Analysis for Brabham Enterprises for August 2009

	Actual Results (1)	Flexible- Budget Variances (2) = (1) – (3)	Flexible Budget (3)	Sales-Volume Variances (4) = (3) – (5)	Static Budget (5)
Units (tires) sold	2,800 ^g	0	2,800	200 U	3,000 ^g
Revenues	\$313,600 ^a	\$ 5,600 F	\$308,000 ^b	\$22,000 U	\$330,000 ^c
Variable costs	229,600 ^d	22,400 U	207,200 ^e	14,800 F	222,000 ^f
Contribution margin	84,000	16,800 U	100,800	7,200 U	108,000
Fixed costs	50,000 ^g	4,000 F	54,000 ^g	0	54,000 ^g
Operating income	<u>\$ 34,000</u>	<u>\$12,800 U</u>	<u>\$ 46,800</u>	<u>\$ 7,200 U</u>	<u>\$ 54,000</u>
		\$12,800 U		\$ 7,200 U	
		Total flexible-budget variance		Total sales-volume variance	
		\$20,000 U			
		Total static-budget variance			

^a $\$112 \times 2,800 = \$313,600$

^b $\$110 \times 2,800 = \$308,000$

^c $\$110 \times 3,000 = \$330,000$

^d Given. Unit variable cost = $\$229,600 \div 2,800 = \82 per tire

^e $\$74 \times 2,800 = \$207,200$

^f $\$74 \times 3,000 = \$222,000$

^g Given

2. The key information items are:

	Actual	Budgeted
Units	2,800	3,000
Unit selling price	\$ 112	\$ 110
Unit variable cost	\$ 82	\$ 74
Fixed costs	\$50,000	\$54,000

The total static-budget variance in operating income is \$20,000 U. There is both an unfavorable total flexible-budget variance (\$12,800) and an unfavorable sales-volume variance (\$7,200).

The unfavorable sales-volume variance arises solely because actual units manufactured and sold were 200 less than the budgeted 3,000 units. The unfavorable flexible-budget variance of \$12,800 in operating income is due primarily to the \$8 increase in unit variable costs. This increase in unit variable costs is only partially offset by the \$2 increase in unit selling price and the \$4,000 decrease in fixed costs.

7-17 (15 min.) Flexible budget.

Note: This solution is based off of the problem update listed on the errata sheet in the front matter of this solution manual.

The existing performance report is a Level 1 analysis, based on a static budget. It makes no adjustment for changes in output levels. The budgeted output level is 8,100 units—direct materials of \$405,000 in the static budget ÷ budgeted direct materials cost per attaché case of \$50.

The following is a Level 2 analysis that presents a flexible-budget variance and a sales-volume variance of each direct cost category.

Variance Analysis for Connor Company

	Actual Results (1)	Flexible- Budget Variances (2) = (1) – (3)	Flexible Budget (3)	Sales- Volume Variances (4) = (3) – (5)	Static Budget (5)
Output units	6,500	0	6,500	1,600 U	8,100
Direct materials	\$369,000	\$44,000 U	\$325,000	\$80,000 F	\$405,000
Direct manufacturing labor	76,000	11,000 U	65,000	16,000 F	81,000
Direct marketing labor	112,500	15,000 U	97,500	24,000 F	121,500
Total direct costs	<u>\$557,500</u>	<u>\$70,000 U</u>	<u>\$487,500</u>	<u>\$120,000 F</u>	<u>\$607,500</u>

$\$70,000 \text{ U}$ $\$120,000 \text{ F}$
 Flexible-budget variance Sales-volume variance
 $\$50,000 \text{ F}$
 Static-budget variance

The Level 1 analysis shows total direct costs have a \$50,000 favorable variance. However, the Level 2 analysis reveals that this favorable variance is due to the reduction in output of 1,600 units from the budgeted 8,100 units. Once this reduction in output is taken into account (via a flexible budget), the flexible-budget variance shows each direct cost category to have an unfavorable variance indicating less efficient use of each direct cost item than was budgeted, or the use of more costly direct cost items than was budgeted, or both.

Each direct cost category has an actual unit variable cost that exceeds its budgeted unit cost:

	<u>Actual</u>	<u>Budgeted</u>
Units	6,500	8,100
Direct materials	\$ 56.77	\$ 50.00
Direct manufacturing labor	\$ 11.69	\$ 10.00
Direct marketing labor	\$ 17.31	\$ 15.00

Analysis of price and efficiency variances for each cost category could assist in further the identifying causes of these more aggregated (Level 2) variances.

7-18 (25–30 min.) **Flexible-budget preparation and analysis.**

1. Variance Analysis for Bank Management Printers for September 2009

Level 1 Analysis

	Actual Results (1)	Static-Budget Variances (2) = (1) – (3)	Static Budget (3)
Units sold	<u>12,000</u>	<u>3,000 U</u>	<u>15,000</u>
Revenue	\$252,000 ^a	\$ 48,000 U	\$300,000 ^c
Variable costs	<u>84,000^d</u>	<u>36,000 F</u>	<u>120,000^f</u>
Contribution margin	168,000	12,000 U	180,000
Fixed costs	<u>150,000</u>	<u>5,000 U</u>	<u>145,000</u>
Operating income	<u>\$ 18,000</u>	<u>\$ 17,000 U</u>	<u>\$ 35,000</u>

2. *Level 2 Analysis*

	Actual Results (1)	Flexible- Budget Variances (2) = (1) – (3)	Flexible Budget (3)	Sales Volume Variances (4) = (3) – (5)	Static Budget (5)
Units sold	<u>12,000</u>	<u>0</u>	<u>12,000</u>	<u>3,000 U</u>	<u>15,000</u>
Revenue	\$252,000 ^a	\$12,000 F	\$240,000 ^b	\$60,000 U	\$300,000 ^c
Variable costs	<u>84,000^d</u>	<u>12,000 F</u>	<u>96,000^e</u>	<u>24,000 F</u>	<u>120,000^f</u>
Contribution margin	168,000	24,000 F	144,000	36,000 U	180,000
Fixed costs	<u>150,000</u>	<u>5,000 U</u>	<u>145,000</u>	<u>0</u>	<u>145,000</u>
Operating income	<u>\$ 18,000</u>	<u>\$19,000 F</u>	<u>\$ (1,000)</u>	<u>\$36,000 U</u>	<u>\$ 35,000</u>

^a 12,000 × \$21 = \$252,000 ^d 12,000 × \$7 = \$ 84,000
^b 12,000 × \$20 = \$240,000 ^e 12,000 × \$8 = \$ 96,000
^c 15,000 × \$20 = \$300,000 ^f 15,000 × \$8 = \$120,000

3. Level 2 analysis breaks down the static-budget variance into a flexible-budget variance and a sales-volume variance. The primary reason for the static-budget variance being unfavorable (\$17,000 U) is the reduction in unit volume from the budgeted 15,000 to an actual 12,000. One explanation for this reduction is the increase in selling price from a budgeted \$20 to an actual \$21. Operating management was able to reduce variable costs by \$12,000 relative to the flexible budget. This reduction could be a sign of efficient management. Alternatively, it could be due to using lower quality materials (which in turn adversely affected unit volume).

7-19 (30 min.) Flexible budget, working backward.

1. Variance Analysis for The Warren Company for the year ended December 31, 2009

	Actual Results	Flexible- Budget Variances	Flexible Budget	Sales-Volume Variances	Static Budget
	(1)	(2)=(1)-(3)	(3)	(4)=(3)-(5)	(5)
Units sold	<u>250,000</u>	<u>0</u>	<u>250,000</u>	<u>10,000 F</u>	<u>240,000</u>
Revenues	\$835,000	\$272,500 F	\$562,500 ^a	\$22,500 F	\$540,000
Variable costs	<u>635,000</u>	<u>260,000 U</u>	<u>375,000^b</u>	<u>15,000 U</u>	<u>360,000</u>
Contribution margin	200,000	12,500 F	187,500	7,500 F	180,000
Fixed costs	<u>160,000</u>	<u>20,000 U</u>	<u>140,000</u>	<u>0</u>	<u>140,000</u>
Operating income	<u>\$ 40,000</u>	<u>\$ 7,500 U</u>	<u>\$ 47,500</u>	<u>\$ 7,500 F</u>	<u>\$ 40,000</u>
		\$ 7,500 U		\$ 7,500 F	
		Total flexible-budget variance		Total sales volume variance	
		\$0			
		Total static-budget variance			

^a 250,000 × \$2.25 = \$562,500; \$540,000 ÷ 240,000 = \$2.25

^b 250,000 × \$1.50 = \$375,000; \$360,000 ÷ 240,000 = \$1.50

2. Actual selling price: $\$835,000 \div 250,000 = \3.34
 Budgeted selling price: $\$540,000 \div 240,000 = \2.25
 Actual variable cost per unit: $\$635,000 \div 250,000 = \2.54
 Budgeted variable cost per unit: $\$360,000 \div 240,000 = \1.50

3. A zero total static-budget variance may be due to offsetting total flexible-budget and total sales-volume variances. In this case, these two variances exactly offset each other:

Total flexible-budget variance	\$7,500 Unfavorable
Total sales-volume variance	\$7,500 Favorable

A closer look at the variance components reveals some major deviations from plan. Actual variable costs increased from \$1.50 to \$2.54, causing an unfavorable flexible-budget variable cost variance of \$260,000. Such an increase could be a result of, for example, a jump in direct material prices. Warren was able to pass most of the increase in costs onto their customers—actual selling price increased by 48% [$(\$3.34 - \$2.25) \div \$2.25$], bringing about an offsetting favorable flexible-budget revenue variance in the amount of \$272,500. An increase in the actual number of units sold also contributed to more favorable results. The company should examine why the units sold increased despite an increase in direct material prices. For example, Warren’s customers may have stocked up, anticipating future increases in direct material prices. Alternatively, Warren’s selling price increases may have been lower than competitors’ price increases. Understanding the reasons why actual results differ from budgeted amounts can help Warren better manage its costs and pricing decisions in the future. The important lesson learned here is that a superficial examination of summary level data (Levels 0 and 1) may be insufficient. It is imperative to scrutinize data at a more detailed level (Level 2). Had Warren not been able to pass costs on to customers, losses would have been considerable.

3. The selling price variance, caused solely by the difference in actual and budgeted selling price, is the flexible-budget variance in revenues = \$52,500 U.
4. The flexible-budget variances show that for the actual sales volume of 525,000 pounds, selling prices were lower and costs per pound were higher. The favorable sales volume variance in revenues (because more pounds of ice cream were sold than budgeted) helped offset the unfavorable variable cost variance and shored up the results in June 2009. Levine should be more concerned because the small static-budget variance in contribution margin of \$30,000 U is actually made up of a favorable sales-volume variance in contribution margin of \$75,000, an unfavorable selling-price variance of \$52,500 and an unfavorable variable manufacturing costs variance of \$52,500. Levine should analyze why each of these variances occurred and the relationships among them. Could the efficiency of variable manufacturing costs be improved? Did the sales volume increase because of a decrease in selling price or because of growth in the overall market? Analysis of these questions would help Levine decide what actions he should take.

7-21 (20–30 min.) Price and efficiency variances.

1. The key information items are:

	<u>Actual</u>	<u>Budgeted</u>
Output units (fritters)	80,800	80,000
Input units (pounds of apple)	21,000	20,000
Cost per input unit	\$ 0.93	\$ 0.99

Warnock budgets to obtain 4 apple fritters from each pound of apple.
The flexible-budget variance is \$468 F.

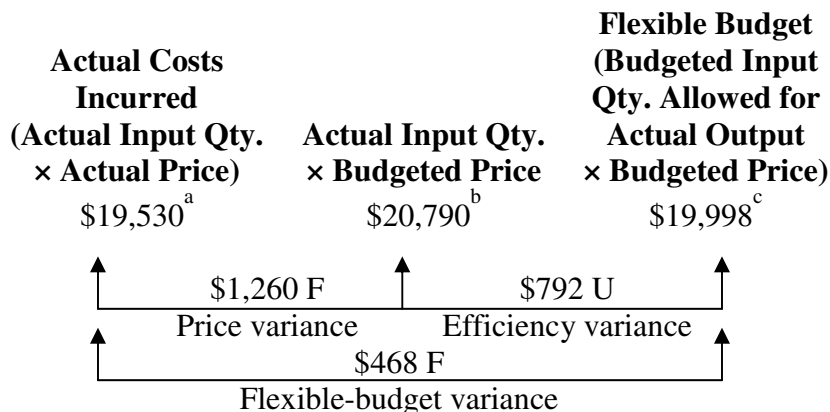
	Actual Results (1)	Flexible- Budget Variance (2) = (1) – (3)	Flexible Budget (3)	Sales-Volume Variance (4) = (3) – (5)	Static Budget (5)
Apple costs	\$19,530 ^a	\$468 F	\$19,998 ^b	\$198 U	\$19,800 ^c

^a 21,000 × \$0.93 = \$19,530

^b 80,800 × 0.25 × \$0.99 = \$19,998

^c 80,000 × 0.25 × \$0.99 = \$19,800

2.



^a 21,000 × \$0.93 = \$19,530

^b 21,000 × \$0.99 = \$20,790

^c 80,800 × 0.25 × \$0.99 = \$19,998

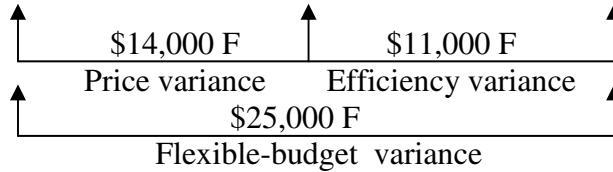
3. The favorable flexible-budget variance of \$468 has two offsetting components:

- (a) favorable price variance of \$1,260—reflects the \$0.93 actual purchase cost being lower than the \$0.99 budgeted purchase cost per pound.
- (b) unfavorable efficiency variance of \$792—reflects the actual materials yield of 3.85 fritters per pound of apple ($80,800 \div 21,000 = 3.85$) being less than the budgeted yield of 4.00 ($80,000 \div 20,000 = 4.00$). The company used more apples (materials) to make the fritters than was budgeted.

One explanation may be that Warnock purchased lower quality apples at a lower cost per pound.

7-22 (15 min.) Materials and manufacturing labor variances.

	Actual Costs Incurred (Actual Input Qty. × Actual Price)	Actual Input Qty. × Budgeted Price	Flexible Budget (Budgeted Input Qty. Allowed for Actual Output × Budgeted Price)
Direct Materials	\$200,000	\$214,000	\$225,000



Direct Mfg. Labor	\$90,000	\$86,000	\$80,000
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7-23 (30 min.) Direct materials and direct manufacturing labor variances.

Note: This solution is based off of the problem update listed on the errata sheet in the front matter of this solution manual.

1.

May 2009	Actual Results (1)	Price Variance (2) = (1)–(3)	Actual Quantity × Budgeted Price (3)	Efficiency Variance (4) = (3) – (5)	Flexible Budget (5)
Units	650				650
Direct materials	\$21,000.00	\$2,625.00 U	\$18,375.00 ^a	\$1312.50 U	\$17,062.50 ^b
Direct labor	\$13,588.00	<u>\$ 158.00</u> U	\$13,430.00 ^c	<u>\$382.50</u> F	\$13,812.50 ^d
Total price variance		\$2,783.00 U			
Total efficiency variance				<u>\$930.00</u> U	

^a 10,500 meters × \$1.75 per meter = \$18,375

^b 650 lots × 15 meters per lot × \$1.75 per meter = \$17,062.50

^c 1,580 hours × \$8.50 per hour = \$13,430

^d 650 lots × 2.5 hours per lot × \$8.50 per hour = \$13,812.50

Total flexible-budget variance for both inputs = \$2,783 U + \$930 U = \$3,713 U

Total flexible-budget cost of direct materials and direct labor = \$17,062.50 + \$13,812.50 = \$30,875

Total flexible-budget variance as % of total flexible-budget costs = \$3,713 ÷ \$30,875 = 12.03%

2.

May 2010	Actual Results (1)	Price Variance (2) = (1) – (3)		Actual Quantity × Budgeted Price (3)	Efficiency Variance (4) = (3) – (5)		Flexible Budget (5)
Units	650						650
Direct materials	\$19,147.80 ^a	\$1,324.05 U		\$17,823.75 ^b	\$761.25 U		\$17,062.50 ^c
Direct manuf. labor	\$13,180.36 ^d	<u>\$ 153.26</u> U		\$13,027.10 ^e	<u>\$785.40</u> F		\$13,812.50 ^c
Total price variance		<u>\$1,477.31</u> U					
Total efficiency variance					<u>\$24.15</u> F		

^a Actual dir. mat. cost, May 2010 = Actual dir. mat. cost, May 2009 × 0.97 × 0.94 = \$21,000 × 0.97 × 0.94 = \$19,147.80
Alternatively, actual dir. mat. cost, May 2010

= (Actual dir. mat. quantity used in May 2009 × 0.97) × (Actual dir. mat. price in May 2009 × 0.94)
= (10,500 meters × 0.97) × (\$2.00/meter × 0.94)
= \$19,147.80

^b (10,500 meters × 0.97) × \$1.75 per meter = \$17,823.75

^c Unchanged from 2009.

^d Actual dir. labor cost, May 2010 = Actual dir. manuf. cost May 2009 × 0.97 = \$13,588 × 0.97 = \$13,180.36
Alternatively, actual dir. labor cost, May 2010

= (Actual dir. manuf. labor quantity used in May 2009 × 0.97) × Actual dir. labor price in 2009
= (1,580 hours × 0.97) × \$8.60 per hour
= 1,532.6 hours × \$8.60 per hour = \$13,180.36

^e (1,580 hours × 0.97) × \$850 per hour = \$13,027.10

Total flexible-budget variance for both inputs = \$1,477.31U – \$24.15F = \$1,453.16U

Total flexible-budget cost of direct materials and direct labor = \$17,062.50 + \$13,812.50 = \$30,875

Total flexible-budget variance as % of total flexible-budget costs = \$1,453.16 ÷ \$30,875 = 4.71%

3. Efficiencies have improved in the direction indicated by the production manager—but, it is unclear whether they are a trend or a one-time occurrence. Also, overall, variances are still 4.71% of flexible input budget. StyleIt should continue to use the new material, especially in light of its superior quality and feel, but it may want to keep the following points in mind:

- The new material costs substantially more than the old (\$2.00 in 2009 and \$1.88 in 2010 vs. \$1.75 per meter). Its price is unlikely to come down even more within the coming year. Standard material price should be re-examined and possibly changed.
- StyleIt should continue to work to reduce direct materials and direct manufacturing labor content. The reductions from May 2009 to May 2010 are a good development and should be encouraged.

7-24 (30 min.) Price and efficiency variances, journal entries.

1. Direct materials and direct manufacturing labor are analyzed in turn:

	Actual Costs Incurred (Actual Input Qty. × Actual Price)	Actual Input Qty. × Budgeted Price		Flexible Budget (Budgeted Input Qty. Allowed for Actual Output × Budgeted Price)
		Purchases	Usage	
Direct Materials	(100,000 × \$4.65 ^a) \$465,000	(100,000 × \$4.50) \$450,000	(98,055 × \$4.50) \$441,248	(9,850 × 10 × \$4.50) \$443,250
		↑	↑	↑
		\$15,000 U Price variance		\$2,002 F Efficiency variance
Direct Manufacturing Labor	(4,900 × \$31.5 ^b) \$154,350	(4,900 × \$30) \$147,000		(9,850 × 0.5 × \$30) or (4,925 × \$30) \$147,750
		↑	↑	↑
		\$7,350 U Price variance		\$750 F Efficiency variance

^a \$465,000 ÷ 100,000 = \$4.65

^b \$154,350 ÷ 4,900 = \$31.5

2.	Direct Materials Control	450,000	
	Direct Materials Price Variance	15,000	
	Accounts Payable or Cash Control		465,000
	Work-in-Process Control	443,250	
	Direct Materials Control		441,248
	Direct Materials Efficiency Variance		2,002
	Work-in-Process Control	147,750	
	Direct Manuf. Labor Price Variance	7,350	
	Wages Payable Control		154,350
	Direct Manuf. Labor Efficiency Variance		750

3. Some students' comments will be immersed in conjecture about higher prices for materials, better quality materials, higher grade labor, better efficiency in use of materials, and so forth. A possibility is that approximately the same labor force, paid somewhat more, is taking slightly less time with better materials and causing less waste and spoilage.

A key point in this problem is that all of these efficiency variances are likely to be insignificant. They are so small as to be nearly meaningless. Fluctuations about standards are bound to occur in a random fashion. Practically, from a control viewpoint, a standard is a band or range of acceptable performance rather than a single-figure measure.

4. The purchasing point is where responsibility for price variances is found most often. The production point is where responsibility for efficiency variances is found most often. The Monroe Corporation may calculate variances at different points in time to tie in with these different responsibility areas.

7-25 (20 min.) **Continuous improvement (continuation of 7-24).**

1. Standard quantity input amounts per output unit are:

	Direct Materials (pounds)	Direct Manufacturing Labor (hours)
January	10.000	0.500
February (Jan. × 0.988)	9.880	0.494
March (Feb. × 0.988)	9.761	0.488

2. The answer is the same as that for requirement 1 of Question 7-24, except for the flexible-budget amount.

	Actual Costs Incurred (Actual Input Qty. × Actual Price)	Actual Input Qty. × Budgeted Price		Flexible Budget (Budgeted Input Qty. Allowed for Actual Output × Budgeted Price)
		<u>Purchases</u>	<u>Usage</u>	
Direct Materials	(100,000 × \$4.65 ^a) \$465,000	(100,000 × \$4.50) \$450,000	(98,055 × \$4.50) \$441,248	(9,850 × 9.761 × \$4.50) \$432,656
	↑	↑	↑	↑
	\$15,000 U Price variance		\$8,592 U Efficiency variance	
Direct Manuf. Labor	(4,900 × \$31.5 ^b) \$154,350	(4,900 × \$30) \$147,000		(9,850 × 0.488 × \$30) \$144,204
	↑	↑		↑
	\$7,350 U Price variance		\$2,796 U Efficiency variance	

^a \$465,000 ÷ 100,000 = \$4.65

^b \$154,350 ÷ 4,900 = \$31.5

Using continuous improvement standards sets a tougher benchmark. The efficiency variances for January (from Exercise 7-24) and March (from Exercise 7-25) are:

	January	March
Direct materials	\$ 2,002 F	\$8,592 U
Direct manufacturing labor	\$750 F	\$ 2,796 U

Note that the question assumes the continuous improvement applies only to quantity inputs. An alternative approach is to have continuous improvement apply to the total budgeted input cost per output unit (\$45 for direct materials in January and \$15 for direct manufacturing labor in January).

7-26 (20–30 min.) Materials and manufacturing labor variances, standard costs.

1. Direct Materials

Actual Costs Incurred (Actual Input Qty. × Actual Price)	Actual Input Qty. × Budgeted Price	Flexible Budget (Budgeted Input Qty. Allowed for Actual Output × Budgeted Price)
(3,700 sq. yds. × \$5.10) \$18,870	(3,700 sq. yds. × \$5.00) \$18,500	(2,000 × 2 × \$5.00) (4,000 sq. yds. × \$5.00) \$20,000

The unfavorable materials price variance may be unrelated to the favorable materials efficiency variance. For example, (a) the purchasing officer may be less skillful than assumed in the budget, or (b) there was an unexpected increase in materials price per square yard due to reduced competition. Similarly, the favorable materials efficiency variance may be unrelated to the unfavorable materials price variance. For example, (a) the production manager may have been able to employ higher-skilled workers, or (b) the budgeted materials standards were set too loosely. It is also possible that the two variances are interrelated. The higher materials input price may be due to higher quality materials being purchased. Less material was used than budgeted due to the high quality of the materials.

Direct Manufacturing Labor

Actual Costs Incurred (Actual Input Qty. × Actual Price)	Actual Input Qty. × Budgeted Price	Flexible Budget (Budgeted Input Qty. Allowed for Actual Output × Budgeted Price)
(900 hrs. × \$9.80) \$8,820	(900 hrs. × \$10.00) \$9,000	(2000 × 0.5 × \$10.00) (1,000 hrs. × \$10.00) \$10,000

The favorable labor price variance may be due to, say, (a) a reduction in labor rates due to a recession, or (b) the standard being set without detailed analysis of labor compensation. The favorable labor efficiency variance may be due to, say, (a) more efficient workers being employed, (b) a redesign in the plant enabling labor to be more productive, or (c) the use of higher quality materials.

2.

<u>Control Point</u>	Actual Costs Incurred (Actual Input Qty. × Actual Price)	Actual Input Qty. × Budgeted Price	Flexible Budget (Budgeted Input Qty. Allowed for Actual Output × Budgeted Price)
Purchasing	(6,000 sq. yds. × \$5.10) \$30,600	(6,000 sq. yds. × \$5.00) \$30,000	
	 \$600 U Price variance		
Production		(3,700 sq. yds. × \$5.00) \$18,500	(2,000 × 2 × \$5.00) \$20,000
		 \$1,500 F Efficiency variance	

Direct manufacturing labor variances are the same as in requirement 1.

7-27 (15–25 min.) Journal entries and T-accounts (continuation of 7-26).

1.
 - a.

Direct Materials Control	18,500	
Direct Materials Price Variance	370	
Accounts Payable Control		18,870
To record purchase of direct materials.		
 - b.

Work-in-Process Control	20,000	
Direct Materials Efficiency Variance		1,500
Direct Materials Control		18,500
To record direct materials used.		
 - c.

Work-in-Process Control	10,000	
Direct Manufacturing Labor Price Variance		180
Direct Manufacturing Labor Efficiency Variance		1,000
Wages Payable Control		8,820
To record liability for and allocation of direct labor costs.		

Direct Materials Control	Direct Materials Price Variance	Direct Materials Efficiency Variance
(a) 18,500	(a) 370	(b) 1,500
(b) 18,500		(b) 1,500
Work-in-Process Control	Direct Manufacturing Labor Price Variance	Direct Manuf. Labor Efficiency Variance
(b) 20,000	(c) 180	(c) 1,000
(c) 10,000		(c) 1,000
Wages Payable Control	Accounts Payable Control	
(c) 8,820	18,870 (a)	

2. The following journal entries pertain to the measurement of price and efficiency variances when 6,000 sq. yds. of direct materials are purchased:

- a1.

Direct Materials Control	30,000	
Direct Materials Price Variance	600	
Accounts Payable Control		30,600
To record direct materials purchased.		

7-28 (25 min.) **Flexible budget (Refer to data in Exercise 7-26).**

A more detailed analysis underscores the fact that the world of variances may be divided into three general parts: price, efficiency, and what is labeled here as a sales-volume variance. Failure to pinpoint these three categories muddies the analytical task. The clearer analysis follows (in dollars):

	Actual Costs Incurred (Actual Input Qty. × Actual Price)	Actual Input Qty. × Budgeted Price	Flexible Budget (Budgeted Input Qty. Allowed for Actual Output × Budgeted Price)	Static Budget
Direct Materials	\$18,870	\$18,500	\$20,000	\$25,000
	↑ (a) \$370 U	↑ (b) \$1,500 F	↑ (c) \$5,000 F	↑
Direct Manuf. Labor	\$8,820	\$9,000	\$10,000	\$12,500
	↑ (a) \$180 F	↑ (b) \$1,000 F	↑ (c) \$2,500 F	↑

- (a) Price variance
- (b) Efficiency variance
- (c) Sales-volume variance

The sales-volume variances are favorable here in the sense that less cost would be expected solely because the output level is less than budgeted. However, this is an example of how variances must be interpreted cautiously. Managers may be incensed at the failure to reach scheduled production (it may mean fewer sales) even though the 2,000 units were turned out with supreme efficiency. Sometimes this phenomenon is called being efficient but ineffective, where effectiveness is defined as the ability to reach original targets and efficiency is the optimal relationship of inputs to any given outputs. Note that a target can be reached in an efficient or inefficient way; similarly, as this problem illustrates, a target can be missed but the given output can be attained efficiently.

7-29 (45–50 min.) **Activity-based costing, flexible-budget variances for finance-function activities.**

1. *Receivables*

Receivables is an output unit level activity. Its flexible-budget variance can be calculated as follows:

$$\begin{aligned}
 \text{Flexible-budget variance} &= \text{Actual costs} - \text{Flexible-budget costs} \\
 &= (\$0.95 \times 1,440,000) - (\$0.815 \times 1,440,000) \\
 &= \$1,368,000 - \$1,173,600 \\
 &= \$194,400 \text{ U}
 \end{aligned}$$

Payables

Payables is a batch level activity.

	Static-budget Amounts	Actual Amounts
a. Number of deliveries	1,500,000	1,440,000
b. Batch size (units per batch)	6	5.293
c. Number of batches (a ÷ b)	250,000	272,057
d. Cost per batch	\$3.20	\$3.10
e. Total payables activity cost (c × d)	\$800,000	\$843,377

Step 1: The number of batches in which payables should have been processed
 = 1,440,000 actual units ÷ 6 budgeted units per batch
 = 240,000 batches

Step 2: The flexible-budget amount for payables
 = 240,000 batches × \$3.20 budgeted cost per batch
 = \$768,100

The flexible-budget variance can be computed as follows:

$$\begin{aligned}
 \text{Flexible-budget variance} &= \text{Actual costs} - \text{Flexible-budget costs} \\
 &= (272,057 \times \$3.10) - (240,000 \times \$3.20) \\
 &= \$843,377 - \$768,000 = \$75,377 \text{ U}
 \end{aligned}$$

Travel expenses

Travel expenses is a batch level activity.

	Static-Budget Amounts	Actual Amounts
a. Number of deliveries	1,500,000	1,440,000
b. Batch size (units per batch)	600	602.356
c. Number of batches (a ÷ b)	2,500	2,391
d. Cost per batch	\$7.80	\$7.65
e. Total travel expenses activity cost (c × d)	\$19,500	\$18,291

Step 1: The number of batches in which the travel expense should have been processed
 = 1,440,000 actual units ÷ 600 budgeted units per batch
 = 2,400 batches

Step 2: The flexible-budget amount for travel expenses
 = 2,400 batches × \$7.80 budgeted cost per batch
 = \$18,720

The flexible budget variance can be calculated as follows:

$$\begin{aligned} \text{Flexible budget variance} &= \text{Actual costs} - \text{Flexible-budget costs} \\ &= (2,391 \times \$7.65) - (2,400 \times \$7.80) \\ &= \$18,291 - \$18,720 = \$429 \text{ F} \end{aligned}$$

2. The flexible budget variances can be subdivided into price and efficiency variances.

$$\text{Price variance} = \left[\begin{array}{c} \text{Actual price} \\ \text{of input} \end{array} - \begin{array}{c} \text{Budgeted price} \\ \text{of input} \end{array} \right] \times \begin{array}{c} \text{Actual quantity} \\ \text{of input} \end{array}$$

$$\text{Efficiency variance} = \left[\begin{array}{c} \text{Actual quantity} \\ \text{of input used} \end{array} - \begin{array}{c} \text{Budgeted quantity of} \\ \text{input allowed for} \\ \text{actual output} \end{array} \right] \times \begin{array}{c} \text{Budgeted price} \\ \text{of input} \end{array}$$

Receivables

$$\begin{aligned} \text{Price Variance} &= (\$0.95 - \$0.815) \times 1,440,000 \\ &= \$194,400 \text{ U} \end{aligned}$$

$$\begin{aligned} \text{Efficiency variance} &= (1,440,000 - 1,440,000) \times \$0.815 \\ &= \$0 \end{aligned}$$

Payables

$$\begin{aligned} \text{Price variance} &= (\$3.10 - \$3.20) \times 272,057 \\ &= \$27,206 \text{ F} \end{aligned}$$

$$\begin{aligned} \text{Efficiency variance} &= (272,057 - 240,000) \times \$3.20 \\ &= \$102,582 \text{ U} \end{aligned}$$

Travel expenses

$$\begin{aligned} \text{Price variance} &= (\$4.65 - \$7.80) \times 2,391 \\ &= \$359 \text{ F} \end{aligned}$$

$$\begin{aligned} \text{Efficiency variance} &= (2,391 - 2,400) \times \$7.80 \\ &= \$70 \text{ F} \end{aligned}$$

7-30 (30 min.) Flexible budget, direct materials and direct manufacturing labor variances.

1. Variance Analysis for Tuscany Statuary for 2009

	Actual Results (1)	Flexible- Budget Variances (2) = (1) – (3)	Flexible Budget (3)	Sales- Volume Variances (4) = (3) – (5)	Static Budget (5)
Units sold	<u>6,000^a</u>	<u>0</u>	<u>6,000</u>	<u>1,000 F</u>	<u>5,000^a</u>
Direct materials	\$ 594,000	\$ 6,000 F	\$600,000 ^b	\$100,000 U	\$ 500,000 ^c
Direct manufacturing labor	950,000 ^a	10,000 F	960,000 ^d	160,000 U	800,000 ^e
Fixed costs	<u>1,005,000^a</u>	<u>5,000 U</u>	<u>1,000,000^a</u>	<u>0</u>	<u>1,000,000^a</u>
Total costs	<u>\$2,549,000</u>	<u>\$11,000 F</u>	<u>\$2,560,000</u>	<u>\$260,000 U</u>	<u>\$2,300,000</u>

↑	\$11,000 F	↑	\$260,000 U	↑
↑	Flexible-budget variance		Sales-volume variance	
↑	\$249,000 U			
↑	Static-budget variance			

^a Given

^b \$100 × 6,000 = \$600,000

^c \$100 × 5,000 = \$500,000

^d \$160 × 6,000 = \$960,000

^e \$160 × 5,000 = \$800,000

2.

	<u>Actual Incurred (Actual Input Qty. × Actual Price)</u>	<u>Actual Input Qty. × Budgeted Price</u>	<u>Flexible Budget (Budgeted Input Qty. Allowed for Actual Output × Budgeted Price)</u>
Direct materials	\$594,000 ^a	\$540,000 ^b	\$600,000 ^c
	↑	↑	↑
	\$54,000 U		\$60,000 F
	Price variance		Efficiency variance
	↑		↑
	\$6,000 F		
	Flexible-budget variance		
Direct manufacturing labor	\$950,000 ^d	\$1,000,000 ^e	\$960,000 ^f
	↑	↑	↑
	\$50,000 F		\$40,000 U
	Price variance		Efficiency variance
	↑		↑
	\$10,000 F		
	Flexible-budget variance		

^a 54,000 pounds × \$11/pound = \$594,000

^b 54,000 pounds × \$10/pound = \$540,000

^c 6,000 statues × 10 pounds/statue × \$10/pound = 60,000 pounds × \$10/pound = \$600,000

^d 25,000 pounds × \$38/pound = \$950,000

^e 25,000 pounds × \$40/pound = \$1,000,000

^f 6,000 statues × 4 hours/statue × \$40/hour = 24,000 hours × \$40/hour = \$960,000

7-31 (30 min.) Variance analysis, nonmanufacturing setting

1.

Speedy Details
Income Statement Variances
For the month ended August 31, 2011

	Budget	Actual	Static Budget Variance
Vehicles Detailed	<u>300</u>	<u>338</u>	<u>38 F</u>
Revenue	<u>\$ 45,000</u>	<u>\$ 59,000</u>	<u>\$ 14,000 F</u>
Variable Costs			
Costs of supplies	2,250	3,350	1,100 U
Labor	<u>12,600</u>	<u>13,500</u>	<u>900 U</u>
Total Variable Costs	<u>14,850</u>	<u>16,850</u>	<u>2,000 U</u>
Contribution Margin	30,150	42,150	12,000 F
Fixed Costs	<u>11,500</u>	<u>11,500</u>	<u>-</u>
Operating Income	<u>\$ 18,650</u>	<u>\$ 30,650</u>	<u>\$ 12,000 F</u>

2. To compute flexible budget variances for revenues and the variable costs, first calculate the budgeted cost or revenue per vehicle, and then multiply that by the actual number of vehicles detailed. Subtract the actual revenue or cost, and the result is the flexible budget variance.

$$\begin{aligned}
 \text{FBV(Revenue)} &= \text{Actual Revenue} - \text{Actual number of vehicles} \times (\text{Budgeted revenue/budgeted} \\
 &\hspace{15em} \text{\# vehicles}) \\
 &= \$59,000 - 338 \times (\$45,000/300) \\
 &= \$59,000 - \$50,700 \\
 &= \$8,300 \text{ Favorable}
 \end{aligned}$$

$$\begin{aligned}
 \text{FBV(Supplies)} &= \text{Actual Supplies expense} - \text{Actual number of vehicles} \times (\text{Budgeted cost of} \\
 &\hspace{15em} \text{supplies/budgeted \# vehicles}) \\
 &= \$3,350 - 338 \times (\$2,250/300) \\
 &= \$3,350 - \$2,535 \\
 &= \$815 \text{ Unfavorable}
 \end{aligned}$$

$$\begin{aligned}
 \text{FBV(Labor)} &= \text{Actual Labor expense} - \text{Actual number of vehicles} \times (\text{Budgeted cost of} \\
 &\hspace{15em} \text{labor/budgeted \# vehicles}) \\
 &= \$13,500 - 338 \times (\$12,600/300) \\
 &= \$13,500 - \$14,196 \\
 &= \$696 \text{ Favorable}
 \end{aligned}$$

The flexible budget variance for fixed costs is the same as the static budget variance, and equals \$0 in this case. Therefore, the overall flexible budget variance in income is given by aggregating the variances computed earlier, adjusting for whether they are favorable or unfavorable. This yields:

$$\text{FBV(Operating Income)} = \$8,300\text{F} (-) \$815\text{U} (+) \$696\text{F} = \$8,181.$$

3. In addition to understanding the variances computed above, Johnny should attempt to keep track of the number of vehicles worked on by each employee, as well as the number of hours actually spent on each vehicle. In addition, Johnny should look at the prices charged for detailing, in relation to the hours spent on each job.
4. This is just a simple problem of two equations & two unknowns. The two equations relate to the number of vehicles detailed and the labor costs (the wages paid to the employees).

X = number of vehicles detailed by long-term employee

Y = number of vehicles detailed by both short-term employees (combined)

$$\begin{array}{l} \text{Budget: } X + Y = 300 \\ 60X + 30Y = 12,600 \end{array}$$

$$\begin{array}{l} \text{Actual: } X + Y = 338 \\ 60X + 30Y = 13,500 \end{array}$$

$$\begin{array}{l} \text{Substitution:} \\ 60X + 30(300 - X) = 12,600 \\ 30X = 3,600 \\ X = 120 \\ Y = 180 \end{array}$$

$$\begin{array}{l} \text{Substitution:} \\ 60X + 30(338 - X) = 13,500 \\ 30X = 3,360 \\ X = 112 \\ Y = 226 \end{array}$$

Therefore the long term employee is budgeted to detail 120 vehicles, and the new employees are budgeted to detail 90 vehicles each.

Actually the long term employee details 60 vehicles (and grosses \$6,720 for the month), and the other two wash 113 each and gross \$3,360 apiece.

5. The two short-term employees are budgeted to earn gross wages of \$32,400 per year (if August is typical, and less if it is a high volume month). If this is a part-time job for them, then that is fine. If it is full-time, and they only get paid for what they wash, the excess capacity may be causing motivation problems. Johnny needs to determine a better way to compensate employees to encourage retention. This should increase customer satisfaction, and potentially revenue, because longer-term employees do a more thorough job. In addition, rather than paying the same wage per car, Johnny might consider setting quality standards and improvement goals for all of the employees.

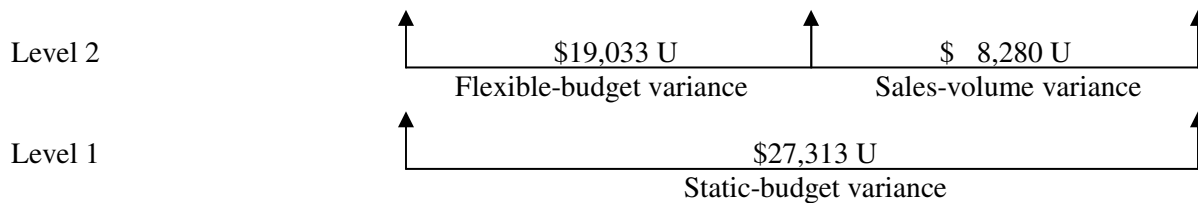
7-32 (60 min.) Comprehensive variance analysis, responsibility issues.

- 1a. Actual selling price = \$82.00
 Budgeted selling price = \$80.00
 Actual sales volume = 7,275 units
 Selling price variance = (Actual sales price – Budgeted sales price) × Actual sales volume
 = (\$82 – \$80) × 7,275 = \$14,550 Favorable
- 1b. Development of Flexible Budget

	Budgeted Unit Amounts	Actual Volume	Flexible Budget Amount
Revenues	\$80.00	7,275	<u>\$582,000</u>
Variable costs			
DM–Frames	\$2.20/oz. × 3.00 oz. 6.60 ^a	7,275	48,015
DM–Lenses	\$3.10/oz. × 6.00 oz. 18.60 ^b	7,275	135,315
Direct manuf. labor	\$15.00/hr. × 1.20 hrs. 18.00 ^c	7,275	<u>130,950</u>
Total variable manufacturing costs			314,280
Fixed manufacturing costs			<u>112,500</u>
Total manufacturing costs			<u>426,780</u>
Gross margin			<u><u>\$155,220</u></u>

^a\$49,500 ÷ 7,500 units; ^b\$139,500 ÷ 7,500 units; ^c\$135,000 ÷ 7,500 units

	Actual Results (1)	Flexible- Budget Variances (2)=(1)-(3)	Flexible Budget (3)	Sales - Volume Variance (4)=(3)-(5)	Static Budget (5)
Units sold	<u>7,275</u>		<u>7,275</u>		<u>7,500</u>
Revenues	<u>\$596,550</u>	<u>\$ 14,550 F</u>	<u>\$582,000</u>	<u>\$ 18,000 U</u>	<u>\$600,000</u>
Variable costs					
DM–Frames	55,872	7,857 U	48,015	1,485 F	49,500
DM–Lenses	150,738	15,423 U	135,315	4,185 F	139,500
Direct manuf. labor	<u>145,355</u>	<u>14,405 U</u>	<u>130,950</u>	<u>4,050 F</u>	<u>135,000</u>
Total variable costs	351,965	37,685 U	314,280	9,720 F	324,000
Fixed manuf. costs	<u>108,398</u>	<u>4,102 F</u>	<u>112,500</u>	<u>0</u>	<u>112,500</u>
Total costs	<u>460,363</u>	<u>33,583 U</u>	<u>426,780</u>	<u>9,720 F</u>	<u>436,500</u>
Gross margin	<u>\$ 136,187</u>	<u>\$19,033 U</u>	<u>\$155,220</u>	<u>\$ 8,280 U</u>	<u>\$163,500</u>



1c. **Price and Efficiency Variances**

DM–Frames–Actual ounces used = 3.20 per unit × 7,275 units = 23,280 oz.

Price per oz. = \$55,872 ÷ 23,280 = \$2.40

DM–Lenses–Actual ounces used = 7.00 per unit × 7,275 units = 50,925 oz.

Price per oz. = \$150,738 ÷ 50,925 = \$2.96

Direct Labor–Actual labor hours = \$145,355 ÷ 14.80 = 9,821.3 hours

Labor hours per unit = 9,821.3 ÷ 7,275 units = 1.35 hours per unit

	Actual Costs Incurred (Actual Input Qty. × Actual Price) (1)	Actual Input Qty. × Budgeted Price (2)	Flexible Budget (Budgeted Input Qty. Allowed for Actual Output × Budgeted Price) (3)	
Direct Materials: Frames	(7,275 × 3.2 × \$2.40) \$55,872	(7,275 × 3.2 × \$2.20) \$51,216	(7,275 × 3.00 × \$2.20) \$48,015	
Direct Materials: Lenses	(7,275 × 7.0 × \$2.96) \$150,738	(7,275 × 7.0 × \$3.10) \$157,868	(7,275 × 6.00 × \$3.10) \$135,315	
Direct Manuf. Labor	(7,275 × 1.35 × \$14.80) \$145,355	(7,275 × 1.35 × \$15.00) \$147,319	(7,275 × 1.20 × \$15.00) \$130,950	

2. Possible explanations for the price variances are:

- (a) Unexpected outcomes from purchasing and labor negotiations during the year.
- (b) Higher quality of frames and/or lower quality of lenses purchased.
- (c) Standards set incorrectly at the start of the year.

Possible explanations for the uniformly unfavorable efficiency variances are:

- (a) Substantially higher usage of lenses due to poor quality lenses purchased at lower price.
- (b) Lesser trained workers hired at lower rates result in higher materials usage (for both frames and lenses), as well as lower levels of labor efficiency.
- (c) Standards set incorrectly at the start of the year.

7-33 (20 min.) Possible causes for price and efficiency variances

Note: This solution is based off of the problem update listed on the errata sheet in the front matter of this solution manual.

All currency amounts in pesos (represented by the \$ symbol).

1.

	Actual Costs Incurred (Actual Input Qty. × Actual Price) (1)	Actual Input Qty. × Budgeted Price (2)	Flexible Budget (Budgeted Input Qty. Allowed for Actual Output × Budgeted Price) (3)
Direct Materials: Bottles	\$2,625,000	(6,500,000 × \$0.40) \$2,600,000	(400,000 × 15 × \$0.40) \$2,400,000
	↑	↑	↑
	\$25,000 U Price variance		\$200,000 U Efficiency variance
Direct Manufacturing Labor	\$760,000	(24,200 × \$30.50) \$738,100	(400,000 × (.041667 hrs/bottle) × \$30.50) \$508,337
	↑	↑	↑
	\$21,900 U Price variance		\$229,763 U Efficiency variance

2. If union organizers are targeting our plant, it could suggest employee dissatisfaction with our wage and benefits policies. During this time of targeting, we might expect employees to work more slowly and they may be less careful with the materials that they are using. These tactics might be seen as helpful in either organizing the union or in receiving increases in wages and/or benefits. We should expect unfavorable efficiency variances for both wages and materials. We may see an unfavorable wage variance, if we need to pay overtime due to work slowdowns. We do, in fact, see a substantial unfavorable materials quantity variance, representing a serious overuse of materials. While we may not expect each bottle to use exactly 15 oz. of glass, we do expect the shrinkage to be much less than this. Similarly, we see over 45% more hours used than we expect to make this number of bottles. They are able to make just over 16 bottles per hour, instead of the standard 24 bottles per hour. It is plausible that this waste & inefficiency are either caused by, or are reflective of the reasons behind the attempt to organize the union at this plant.

7-34 (35 min.) Material cost variances, use of variances for performance evaluation

1. Materials Variances

	Actual Costs Incurred (Actual Input Qty. × Actual Price)	Actual Input Qty. × Budgeted Price	Flexible Budget (Budgeted Input Qty. Allowed for Actual Output × Budgeted Price)
Direct Materials	(6,000 × \$18 ^a) \$108,000	Purchases (6,000 × \$20) \$120,000	Usage (5,000 × \$20) \$100,000
		(500 × 8 × \$20) (4,000 × \$20) \$80,000	
	↑	↑	↑
	\$12,000 F Price variance		\$20,000 U Efficiency variance

^a \$108,000 ÷ 6,000 = \$18

2. The favorable price variance is due to the \$2 difference (\$20 - \$18) between the standard price based on the previous suppliers and the actual price paid through the on-line marketplace. The unfavorable efficiency variance could be due to several factors including inexperienced workers and machine malfunctions. But the likely cause here is that the lower-priced titanium was lower quality or less refined, which led to more waste. The labor efficiency variance could be affected if the lower quality titanium caused the workers to use more time.

3. Switching suppliers was not a good idea. The \$12,000 savings in the cost of titanium was outweighed by the \$20,000 extra material usage. In addition, the \$20,000U efficiency variance does not recognize the total impact of the lower quality titanium because, of the 6,000 pounds purchased, only 5,000 pounds were used. If the quantity of materials used in production is relatively the same, Better Bikes could expect the remaining 1,000 lbs to produce 100 more units. At standard, 100 more units should take 100 × 8 = 800 lbs. There could be an additional unfavorable efficiency variance of

(1000 × \$20) \$20,000		(100 × 8 × \$20) \$16,000
↑		↑
\$4,000U		

4. The purchasing manager's performance evaluation should not be based solely on the price variance. The short-run reduction in purchase costs was more than offset by higher usage rates. His evaluation should be based on the total costs of the company as a whole. In addition, the production manager's performance evaluation should not be based solely on the efficiency variances. In this case, the production manager was not responsible for the purchase of the lower-quality titanium, which led to the unfavorable efficiency scores. In general, it is important for Stanley to understand that not all favorable material price variances are "good news," because of the negative effects that can arise in the production process from the purchase of inferior inputs. They can lead to unfavorable efficiency variances for both materials and labor. Stanley should also understand that efficiency variances may arise for many different reasons and she needs to know these reasons before evaluating performance.
5. Variances should be used to help Better Bikes understand what led to the current set of financial results, as well as how to perform better in the future. They are a way to facilitate the continuous improvement efforts of the company. Rather than focusing solely on the price of titanium, Scott can balance price and quality in future purchase decisions.
6. Future problems can arise in the supply chain. Scott may need to go back to the previous suppliers. But Better Bikes' relationship with them may have been damaged and they may now be selling all their available titanium to other manufacturers. Lower quality bicycles could also affect Better Bikes' reputation with the distributors, the bike shops and customers, leading to higher warranty claims and customer dissatisfaction, and decreased sales in the future.

7-35 (30 min.) Direct manufacturing labor and direct materials variances, missing data.

1.

	Actual Costs Incurred (Actual Input Qty. × Actual Price)	Actual Input Qty. × Budgeted Price	Flexible Budget (Budgeted Input Qty. Allowed for Actual Output × Budgeted Price)
Direct mfg. labor	\$928,000 ^a	\$960,000 ^b	\$900,000 ^c
	↑	↑	↑
	\$32,000 F Price variance		\$60,000 U Efficiency variance
	↑ \$28,000 U Flexible-budget variance		

^a Given (or 64,000 hours × \$14.50/hour)

^b 64,000 hours × \$15/hour = \$960,000

^c 12,000 units × 5 hours/unit × \$15/hour = \$900,000

2. Unfavorable direct materials efficiency variance of \$25,000 indicates that more pounds of direct materials were actually used than the budgeted quantity allowed for actual output.

$$= \frac{\$25,000 \text{ efficiency variance}}{\$4 \text{ per pound budgeted price}}$$

$$= 6,250 \text{ pounds}$$

Budgeted pounds allowed for the output achieved = 12,000 × 20 = 240,000 pounds

Actual pounds of direct materials used = 240,000 + 6,250 = 246,250 pounds

3. Actual price paid per pound = $\frac{\$585,000}{180,000}$
= \$3.25 per pound

Actual Costs Incurred (Actual Input × Actual Price)	Actual Input × Budgeted Price
\$585,000 ^a	\$720,000 ^b
↑	↑
\$135,000 F Price variance	

^a Given

^b 180,000 pounds × \$4/pound = \$720,000

7-36 (20–30 min.) **Direct materials and manufacturing labor variances, solving unknowns.**

All given items are designated by an asterisk.

	Actual Costs Incurred (Actual Input Qty. × Actual Price)	Actual Input Qty. × Budgeted Price	Flexible Budget (Budgeted Input Qty. Allowed for Actual Output × Budgeted Price)
Direct Manufacturing Labor	(1,900 × \$21) \$39,900	(1,900 × \$20*) \$38,000	(4,000* × 0.5* × \$20*) \$40,000
	↑	↑	↑
	\$1,900 U* Price variance		\$2,000 F* Efficiency variance
Direct Materials	(13,000 × \$5.25) \$68,250*	<u>Purchases</u> (13,000 × \$5*) \$65,000	<u>Usage</u> (12,500 × \$5*) \$62,500
	↑	↑	↑
	\$3,250 U* Price variance		\$2,500 U* Efficiency variance

1. $4,000 \text{ units} \times 0.5 \text{ hours/unit} = 2,000 \text{ hours}$
2. Flexible budget – Efficiency variance = $\$40,000 - \$2,000 = \$38,000$
Actual dir. manuf. labor hours = $\$38,000 \div \text{Budgeted price of } \$20/\text{hour} = 1,900 \text{ hours}$
3. $\$38,000 + \text{Price variance, } \$1,900 = \$39,900$, the actual direct manuf. labor cost
Actual rate = $\text{Actual cost} \div \text{Actual hours} = \$39,900 \div 1,900 \text{ hours} = \$21/\text{hour}$ (rounded)
4. Standard qty. of direct materials = $4,000 \text{ units} \times 3 \text{ pounds/unit} = 12,000 \text{ pounds}$
5. Flexible budget + Dir. matls. effcy. var. = $\$60,000 + \$2,500 = \$62,500$
Actual quantity of dir. matls. used = $\$62,500 \div \text{Budgeted price per lb}$
 $= \$62,500 \div \$5/\text{lb} = 12,500 \text{ lbs}$
6. Actual cost of direct materials, $\$68,250 - \text{Price variance, } \$3,250 = \$65,000$
Actual qty. of direct materials purchased = $\$65,000 \div \text{Budgeted price, } \$5/\text{lb} = 13,000 \text{ lbs.}$
7. Actual direct materials price = $\$68,250 \div 13,000 \text{ lbs} = \5.25 per lb.

7-37 (20 min.) Direct materials and manufacturing labor variances, journal entries.

1.

Direct Materials:

	Actual Costs Incurred (Actual Input Qty. × Actual Price) (given)	Actual Input Qty. × Budgeted Price	Flexible Budget (Budgeted Input Qty. Allowed for Actual Output × Budgeted Price)
Wool		$2,040 \times \$3.00$	$280 \times 8 \times \$3.00$
	\$6,426	\$6,120	\$6,720
	↑	↑	↑
	\$306 U		\$600 F
	Price variance		Efficiency variance
	↑		↑
	\$294 F		
	Flexible-budget variance		

Direct Manufacturing Labor:

	Actual Costs Incurred (Actual Input Qty. × Actual Price) (given)	Actual Input Qty. × Budgeted Price	Flexible Budget (Budgeted Input Qty. Allowed for Actual Output × Budgeted Price)
		$840 \times \$8.00$	$280 \times 3 \times \$8.00$
	\$6,020	\$6,720	\$6,720
	↑	↑	↑
	\$700 F		0
	Price variance		Efficiency variance
	↑		↑
	\$700 F		
	Flexible-budget variance		

2.

Direct Materials Price Variance (time of purchase = time of use)		
Direct Materials Control	\$6,120	
Direct Materials Price Variance	\$306	
Accounts Payable Control or Cash		\$6,426
Direct Materials Efficiency Variance		
Work in Process Control	\$6,720	
Direct Materials Efficiency Variance		\$600
Direct Materials Control		\$6,120
Direct Manufacturing Labor Variances		
Work in Process Control	\$6,720	
Direct Mfg. Labor Price Variance		\$700
Wages Payable or Cash		\$6,020

3. Plausible explanations for the above variances include:

Christy paid a little bit extra for the wool, but the wool was thicker and allowed the workers to use less of it. Christy used more inexperienced workers in January than she usually does. This resulted in payment of lower wages per hour. Overall, the lower wage rates resulted in Christy's total wage bill being significantly lower than expected.

7-38 (30 min.) Use of materials and manufacturing labor variances for benchmarking.

1. Unit variable cost (dollars) and component percentages for each firm:

	<u>Firm A</u>		<u>Firm B</u>		<u>Firm C</u>		<u>Firm D</u>	
DM	\$10.00	35.7%	\$10.73	25.2%	\$10.75	36.4%	\$11.25	32.3%
DL	11.25	40.2%	17.05	40.0%	12.80	43.3%	14.03	40.3%
VOH	6.75	24.1%	14.85	34.8%	6.00	20.3%	9.56	27.4%
Total	<u>\$28.00</u>	<u>100%</u>	<u>\$42.63</u>	<u>100%</u>	<u>\$29.55</u>	<u>100%</u>	<u>\$34.84</u>	<u>100%</u>

2. Variances and percentage over/under standard for each firm relative to Firm A:

	<u>Firm B</u>			<u>Firm C</u>			<u>Firm D</u>		
	<u>Variance</u>	<u>% over standard</u>		<u>Variance</u>	<u>% over standard</u>		<u>Variance</u>	<u>% over standard</u>	
DM Price Variance	0.98 U	10.0%		- -	0.0%		1.25 F	-10.0%	
DM Efficiency Variance	0.25 F	-2.5%		0.75 U	7.5%		2.50 U	25.0%	
DL Price Variance	0.55 U	3.3%		0.80 U	6.7%		1.28 U	10.0%	
DL Efficiency Variance	5.25 U	46.7%		0.75 U	6.7%		1.50 U	13.3%	

To illustrate these calculations, consider the DM Price Variance for Firm B. This is computed as:

$$\begin{aligned}
 & \text{Actual Input Quantity} \times (\text{Actual Input Price} - \text{Price paid by Firm A}) \\
 &= 1.95 \text{ oz.} \times (\$5.50 - \$5.00) \\
 &= \$0.98 \text{ U}
 \end{aligned}$$

The % over standard is just the percentage difference in prices relative to Firm A. Again using the DM Price Variance calculation for Firm B, the % over standard is given by:

$$\begin{aligned}
 & (\text{Actual Input Price} - \text{Price paid by Firm A}) / \text{Price paid by Firm A} \\
 &= (\$5.50 - \$5.00) / \$5.00 \\
 &= 10\% \text{ over standard.}
 \end{aligned}$$

3.

To: Boss
From: Junior Accountant
Re: Benchmarking & productivity improvements
Date: October 15, 2010

Benchmarking advantages

- we can see how productive we are relative to our competition
- we can see the specific areas in which there may be opportunities for us to reduce costs

Benchmarking disadvantages

- some of our competitors are targeting the market for high-end and custom-made lenses. I'm not sure that looking at their costs helps with understanding ours better
- we may focus too much on cost differentials and not enough on differentiating ourselves, maintaining our competitive advantages, and growing our margins

Areas to discuss

- we may want to find out whether we can get the same lower price for glass as Firm D
- can we use Firm B's materials efficiency and Firm C's variable overhead consumption levels as our standards for the coming year?

7-39 (60 min.) Comprehensive variance analysis review.

Actual Results

Units sold ($85\% \times 1,000,000$)	850,000
Selling price per unit	\$7.20
Revenues ($850,000 \times \$7.20$)	\$6,120,000
Direct materials purchased and used:	
Direct materials per unit	\$1.75
Total direct materials cost ($850,000 \times \$1.75$)	\$1,487,500
Direct manufacturing labor:	
Actual manufacturing rate per hour	\$20
Labor productivity per hour in units	200
Manufacturing labor-hours of input ($850,000 \div 200$)	4,250
Total direct manufacturing labor costs ($4,250 \times \$20$)	\$85,000
Direct marketing costs:	
Direct marketing cost per unit	\$0.25
Total direct marketing costs ($850,000 \times \$0.25$)	\$212,500
Fixed costs ($\$1,125,000 - \$75,000$)	\$1,050,000

Static Budgeted Amounts

Units sold	1,000,000
Selling price per unit	\$8.00
Revenues ($1,000,000 \times \$8.00$)	\$8,000,000
Direct materials purchased and used:	
Direct materials per unit	\$2.00
Total direct materials costs ($1,000,000 \times \$2.00$)	\$2,000,000
Direct manufacturing labor:	
Direct manufacturing rate per hour	\$20.00
Labor productivity per hour in units	250
Manufacturing labor-hours of input ($1,000,000 \div 250$)	4,000
Total direct manufacturing labor cost ($4,000 \times \$20.00$)	\$80,000
Direct marketing costs:	
Direct marketing cost per unit	\$0.25
Total direct marketing cost ($1,000,000 \times \$0.25$)	\$250,000
Fixed costs	\$1,125,000

1.	Actual Results	Static-Budget Amounts
Revenues	<u>\$6,120,000</u>	<u>\$8,000,000</u>
Variable costs		
Direct materials	1,487,500	2,000,000
Direct manufacturing labor	85,000	80,000
Direct marketing costs	<u>212,500</u>	<u>250,000</u>
Total variable costs	<u>1,785,000</u>	<u>2,330,000</u>
Contribution margin	4,335,000	5,670,000
Fixed costs	<u>1,050,000</u>	<u>1,125,000</u>
Operating income	<u>\$3,285,000</u>	<u>\$4,545,000</u>
2. Actual operating income	\$3,285,000	
Static-budget operating income	<u>4,545,000</u>	
Total static-budget variance	<u>\$1,260,000</u> U	

Flexible-budget-based variance analysis for the Wilson Wrench Company for July 2010

	Actual Results	Flexible-Budget Variances	Flexible Budget	Sales-Volume Variances	Static Budget
Units (diskettes) sold	<u>850,000</u>	<u>0</u>	<u>850,000</u>	<u>150,000</u>	<u>1,000,000</u>
Revenues	<u>\$6,120,000</u>	<u>\$680,000 U</u>	<u>\$6,800,000</u>	<u>\$1,200,000 U</u>	<u>\$8,000,000</u>
Variable costs					
Direct materials	1,487,500	212,500 F	1,700,000	300,000 F	2,000,000
Direct manuf. labor	85,000	17,000 U	68,000	12,000 F	80,000
Direct marketing costs	<u>212,500</u>	<u>0</u>	<u>212,500</u>	<u>37,500 F</u>	<u>250,000</u>
Total variable costs	<u>1,785,000</u>	<u>195,500 F</u>	<u>1,980,500</u>	<u>349,500 F</u>	<u>2,330,000</u>
Contribution margin	4,335,000	484,500 U	4,819,500	850,500 U	5,670,000
Fixed costs	<u>1,050,000</u>	<u>75,000 F</u>	<u>1,125,000</u>	<u>0</u>	<u>1,125,000</u>
Operating income	<u>\$3,285,000</u>	<u>\$409,500 U</u>	<u>\$3,694,500</u>	<u>\$ 850,500 U</u>	<u>\$4,545,000</u>

Total flexible-budget variance: \$409,500 U
 Total sales-volume variance: \$850,500 U
 Total static-budget variance: \$1,260,000 U

3. Flexible-budget operating income = \$3,694,500.
4. Flexible-budget variance for operating income = \$409,500U.
5. Sales-volume variance for operating income = \$850,500U.

Analysis of direct mfg. labor flexible-budget variance for the Wilson Wrench Company for July 2010

	Actual Costs Incurred (Actual Input Qty. × Actual Price)	Actual Input Qty. × Budgeted Price	Flexible Budget (Budgeted Input Qty. Allowed for Actual Output × Budgeted Price)
Direct. Mfg. Labor	(4,250 × \$20.00) \$85,000	(4,250 × \$20.00) \$85,000	(*3,400 × \$20.00) \$68,000

Price variance: \$0
 Efficiency variance: \$17,000 U
 Flexible-budget variance: \$17,000 U

* 850,000 units ÷ 250 direct manufacturing labor standard productivity rate per hour.

6. DML price variance = \$0; DML efficiency variance = \$17,000U
7. DML flexible-budget variance = \$17,000U

7-40 (25 min.) **Comprehensive variance analysis.**

1. Variance Analysis for Sol Electronics for the second quarter of 2009

	Second- Quarter 2009 Actuals	Flexible Budget Variance		Flexible Budget for Second Quarter	Sales Volume Variance		Static Budget
	(1)	(2) = (1) – (3)		(3)	(4) = (3) – (5)		(5)
Units	4,800	0		4,800	800 F		4,000
Selling price	\$ 71.50			\$ 70.00			\$ 70.00
Sales	\$343,200	\$7,200 F		\$336,000	\$56,000 F		\$280,000
Variable costs							
Direct materials	57,600	2,592 F		60,192 ^a	10,032 U		50,160
Direct manuf. labor	30,240	1,440 U		28,800 ^b	4,800 U		24,000
Other variable costs	47,280	720 F		48,000 ^c	8,000 U		40,000
Total variable costs	<u>135,120</u>	<u>1,872 F</u>		<u>136,992</u>	<u>22,832 U</u>		<u>114,160</u>
Contribution margin	208,080	9,072 F		199,008	33,168 F		165,840
Fixed costs	68,400	400 U		68,000	0		68,000
Operating income	<u>\$139,680</u>	<u>\$8,672 F</u>		<u>\$131,008</u>	<u>\$33,168 F</u>		<u>\$97,840</u>

^a 4,800 units × 2.2 lbs. per unit × \$5.70 per lb. = \$60,192

^b 4,800 units × 0.5 hrs. per unit × \$12 per hr. = \$28,800

^c 4,800 units × \$10 per unit = \$48,000

	Second- Quarter 2009 Actuals	Price Variance		Actual Input Qty. × Budgeted Price	Efficiency Variance		Flexible Budget for Second Quarter
Direct materials	\$57,600	\$2,880 U		\$54,720 ^a	\$5,472 F		\$60,192
Direct manuf. labor (DML)	30,240	4,320 U		25,920 ^b	2,880 F		28,800

^a 4,800 units × 2 lbs. per unit × \$5.70 per lb. = \$54,720

^b 4,800 units × 0.45 DML hours per unit × \$12 per DML hour = \$25,920

2. The following details, revealed in the variance analysis, should be used to rebut the union if it focuses on the favorable operating income variance:
- Most of the static budget operating income variance of \$41,840F (\$139,680 – \$97,840) comes from a favorable sales volume variance, which only arose because Sol sold more units than planned.
 - Of the \$8,672 F flexible-budget variance in operating income, most of it comes from the \$7,200F flexible-budget variance in sales.
 - The net flexible-budget variance in total variable costs of \$1,872 F is small, and it arises from direct materials and other variable costs, not from labor. Direct manufacturing labor flexible-budget variance is \$1,440 U.
 - The direct manufacturing labor price variance, \$4,320U, which is large and unfavorable, is indeed offset by direct manufacturing labor’s favorable efficiency variance—but the efficiency variance is driven by the fact that Sol is using new, more expensive materials. Shaw may have to “prove” this to the union which will insist that it’s because workers are working smarter. Even if workers are working smarter, the favorable direct manufacturing labor efficiency variance of \$2,880 does not offset the unfavorable direct manufacturing labor price variance of \$4,320.
3. Changing the standards may make them more realistic, making it easier to negotiate with the union. But the union will resist any tightening of labor standards, and it may be too early (is one quarter’s experience enough to change on?); a change of standards at this point may be viewed as opportunistic by the union. Perhaps a continuous improvement program to change the standards will be more palatable to the union and will achieve the same result over a somewhat longer period of time.

7-41 (30 min.) **Comprehensive variance analysis.**

1. Computing unit selling prices and unit costs of inputs:

$$\begin{aligned} \text{Actual selling price} &= \$1,950,000 \div 170,000 \\ &= \$11.47 \end{aligned}$$

$$\begin{aligned} \text{Budgeting selling price} &= \$1,800,000 \div 150,000 \\ &= \$12.00 \end{aligned}$$

$$\begin{aligned} \text{Selling-price variance} &= \left(\begin{array}{c} \text{Actual} \\ \text{selling price} \end{array} - \begin{array}{c} \text{Budgeted} \\ \text{selling price} \end{array} \right) \times \text{Actual units sold} \\ &= (\$11.47/\text{unit} - \$12.00/\text{unit}) \times 170,000 \text{ units} \\ &= \$90,100 \text{ U} \end{aligned}$$

2., 3., and 4.

The actual and budgeted unit costs are:

	<u>Actual</u>	<u>Budgeted</u>
Direct materials		
Sugar	\$0.05 (\$96,000 ÷ 1,950,000)	\$0.05
Chocolate	0.19 (\$148,000 ÷ 800,000)	0.15
Pistachio	1.00 (\$190,000 ÷ 190,000)	0.75
Direct manufacturing labor		
Preparing	15.00 (\$42,500 ÷ 170,000) × 60	15.00
Stirring	17.50 (\$79,000 ÷ 240,000) × 60	18.00

The actual output achieved is 170,000 pounds of Pistachio Perfection.

The direct cost price and efficiency variances are:

	Actual Costs Incurred (Actual Input Qty. × Actual Price) (1)	Price Variance (2)=(1)–(3)	Actual Input Qty. × Budgeted Price (3)	Efficiency Variance (4)=(3)–(5)	Flex. Budget (Budgeted Input Qty. Allowed for Actual Output × Budgeted Price) (5)
Direct materials					
Sugar	\$ 96,000	\$ 1,500 F	\$ 97,500 ^a	\$ 4,000 U	\$ 93,500 ^f
Chocolate	148,000	28,000 U	120,000 ^b	18,000 U	102,000 ^g
Pistachio	<u>190,000</u>	<u>47,500 U</u>	<u>142,500^c</u>	<u>15,000 U</u>	<u>127,500^h</u>
	<u>\$434,000</u>	<u>\$74,000 U</u>	<u>\$360,000</u>	<u>\$37,000 U</u>	<u>\$323,000</u>
Direct manuf. labor costs					
Preparing	\$42,500	\$ 0	\$ 42,500 ^d	\$ 0	\$ 42,500 ⁱ
Stirring	<u>70,000</u>	<u>2,000 F</u>	<u>72,000^e</u>	<u>30,000 F</u>	<u>102,000^j</u>
	<u>\$112,500</u>	<u>\$ 2,000 F</u>	<u>\$114,500</u>	<u>\$30,000 F</u>	<u>\$144,500</u>

^a \$0.05 × 1,950,000 = \$97,500

^b \$0.15 × 800,000 = \$120,000

^c \$0.75 × 190,000 = \$142,500

^d \$15.00/hr. × (170,000 min. ÷ 60 min./hr.) = \$42,500

^e \$18.00/hr. × (240,000 min. ÷ 60 min./hr.) = \$72,000

^f \$0.05 × 11 × 170,000 = \$93,500

^g \$0.15 × 4 × 170,000 = \$102,000

^h \$0.75 × 1 × 170,000 = \$127,500

ⁱ \$15.00 × (170,000 ÷ 60) = \$42,500

^j \$18.00 × (170,000 ÷ 30) = \$102,000

Comments on the variances include

- Selling price variance. This may arise from a proactive decision to reduce price to expand market share or from a reaction to a price reduction by a competitor. It could also arise from unplanned price discounting by salespeople.
- Material price variance. The \$0.035 increase in the price per ounce of chocolate could arise from uncontrollable market factors or from poor contract negotiations by Fabulous Fudge.
- Material efficiency variance. For all three material inputs, usage is greater than budgeted. Possible reasons include lower quality inputs, use of lower quality workers, and the preparing and stirring equipment not being maintained in a fully operational mode. The higher price per ounce of chocolate (and perhaps higher quality of chocolate) did not reduce the quantity of chocolate used to produce actual output.
- Labor efficiency variance. The favorable efficiency variance for stirring could be due to workers eliminating nonvalue-added steps in production.

7-42 (20 min.) Variance analysis with activity-based costing and batch-level direct costs

Flexible budget variances for batch activities

	Actual Costs Incurred (Actual Input Qty. × Actual Price)	Actual Input Qty. × Budgeted Price	Flexible Budget (Budgeted Input Qty. Allowed for Actual Output × Budgeted Price)
Setup	$\left(\frac{15,000}{75} \times 7 \times \$12.00\right)$	$\left(\frac{15,000}{75} \times 7 \times \$10.75\right)$	$\left(\frac{15,000}{100} \times 8 \times \$10.75\right)$
	\$16,800	\$15,050	\$12,900
	$\xrightarrow{\$1,750 \text{ U}}$ Price variance		$\xrightarrow{\$2,150 \text{ U}}$ Efficiency variance
	$\xrightarrow{\$3,900 \text{ U}}$ Flexible-budget variance		

	Actual Costs Incurred (Actual Input Qty. × Actual Price)	Actual Input Qty. × Budgeted Price	Flexible Budget (Budgeted Input Qty. Allowed for Actual Output × Budgeted Price)
Quality Inspection	$\left(\frac{15,000}{100} \times 9 \times \$15.50\right)$	$\left(\frac{15,000}{100} \times 9 \times \$17.50\right)$	$\left(\frac{15,000}{120} \times 10 \times \$17.50\right)$
	\$20,925	\$23,625	\$21,875
	$\xrightarrow{\$2,700 \text{ F}}$ Price variance		$\xrightarrow{\$1,750 \text{ U}}$ Efficiency variance
	$\xrightarrow{\$950 \text{ F}}$ Flexible-budget variance		

Re: Explanation of Variances

Below I explain the implications of the variances that I calculated. I would enjoy meeting with you to discuss whether we are following the most efficient policies, given these calculations. Please let me know if there is any way to improve my work or my presentation to you.

1. Our batch sizes for both setups and quality inspection were smaller than planned. Even though we were able to reduce the setup and quality inspection time needed for each batch (because of the smaller batch sizes), these gains were more than offset by the increased number of batches. Overall, we ended up substantially below the level of efficiency at which we wished to operate.
2. The hourly wage for the setup workers went over budget due to the tight labor market in our area for such employees. However, we saved a considerable amount of money because we were able to negotiate reduced wage rates for the quality inspection labor after the expiration of their previous contract.

Overall, given our output level of 15,000 eels, we had a moderately favorable variance for quality inspection costs, and a significant unfavorable variance on setups, for the reasons outlined above.

Thank you.

Collaborative Learning Problem

7-43 (30 min.) Price and efficiency variances, problems in standard-setting, benchmarking.

Note: This solution is based off of the problem update listed on the errata sheet in the front matter of this solution manual.

- Budgeted direct materials input per jacket = $42 \text{ rolls} \div 3,500 \text{ jackets} = .012 \text{ roll of cloth}$
 Budgeted direct manufacturing labor-hours per jacket
 $(2,100 \text{ hours} \div 3,500 \text{ shirts}) = 0.6 \text{ hours}$
 Budgeted direct materials cost $(\$55,000 \div 42) = \$1309.524 \text{ per roll}$
 Budgeted direct manufacturing labor cost per hour $(\$40,000 \div 2,100) = \19.0476 per hour
 Actual output achieved = 4,000 shirts

	Actual Costs Incurred (Actual Input Qty. × Actual Price)	Actual Input Qty. × Budgeted Price	Flexible Budget (Budgeted Input Qty. Allowed for Actual Output × Budgeted Price)
Direct Materials	\$57,000	(44 × \$1309.524) \$57,619	(4,000 × .012 × \$1309.524) \$62,857
	↑	↑	↑
		\$619 F	\$5,238 F
		Price variance	Efficiency variance
Direct Manufacturing Labor	\$42,000	(2,165 × \$19.0476) \$41,238	(4,000 × 0.6 × \$19.0476) \$45,714
	↑	↑	↑
		\$762 U	\$4,476 F
		Price variance	Efficiency variance

- Actions employees may have taken include:
 - Adding steps that are not necessary in working on a jacket.
 - Taking more time on each step than is necessary.
 - Creating problem situations so that the budgeted amount of average downtime will be overstated.
 - Creating defects in jackets so that the budgeted amount of average rework will be overstated.

Employees may take these actions for several possible reasons.

- They may be paid on a piece-rate basis with incentives for production levels above budget.
- They may want to create a relaxed work atmosphere, and a less demanding standard can reduce stress.
- They have a “them vs. us” mentality rather than a partnership perspective.
- They may want to gain all the benefits that ensue from superior performance (job security, wage rate increases) without putting in the extra effort required.

This behavior is unethical if it is deliberately designed to undermine the credibility of the standards used at Snuggle Bug.

3. If Weber does nothing about standard costs, his behavior will violate the “Standards of Ethical Conduct for Practitioners of Management Accounting.” In particular, he would violate the
 - (a) standards of competence, by not performing professional duties in accordance with relevant standards;
 - (b) standards of integrity, by passively subverting the attainment of the organization’s objective to control costs; and
 - (c) standards of credibility, by not communicating information fairly and not disclosing all relevant cost information.
4. Weber should discuss the situation with Holcomb and point out that the standards are lax and that this practice is unethical. If Holcomb does not agree to change, Weber should escalate the issue up the hierarchy in order to effect change. If organizational change is not forthcoming, Weber should be prepared to resign rather than compromise his professional ethics.
5. Main pros of using Comparison Clearing House information to compute variances are:
 - (a) Highlights to Snuggle Bug in a direct way how it may or may not be cost-competitive.
 - (b) Provides a “reality check” to many internal positions about efficiency or effectiveness.

Main cons are:

- (a) Snuggle Bug may not be comparable to companies in the database.
- (b) Cost data about other companies may not be reliable.
- (c) Cost of Comparison Clearing House reports.

