

# Chapter 22

## Pre-Lecture Videos

1. Budgeting involves **establishing specific goals, executing plans to achieve the goals, periodically comparing actual results with the goals.**
2. Budgeting does not affect the following managerial functions: **planning, directing, and controlling.**
3. The responsibility of developing an annual budget is normally assigned to **the budget committee.**
4. The first step in preparing a flexible budget is to **identify the relevant activity levels.**
5. A budget that shows the expected results of a responsibility center for only one activity level is known as a **static budget.**
6. A master budget includes **financial budgets, a sales budget, and an expense budget.**
7. The financial budgets provide information for the budgeted **balance sheet.**
8. All of the following are integrated into the cost of goods sold budget *except* the **selling and administrative expenses** budget.
9. The **sales budget** is often used as the starting point for the selling and administrative expenses budget.
10. Pisa Trophy Co. budgeted production of 50,000 brass trophies for the coming year. Each trophy requires engraving. Assume that 15 minutes are required to engrave each trophy. If engraving labor costs \$15.00 per hour, determine the direct labor cost budget for the year.  
$$50000 * \frac{15}{60} = 187500$$
11. Which of the following formulas determines the budgeted units to be produced?
  - Expected Units to Be Sold + Desired Units in Ending Inventory – Estimated Units in Beginning Inventory
12. All of the following budgets are considered financial budgets *except* the **sales budget.**
13. A budget that estimates the expected receipts (inflows) and payments (outflows) of cash for a period of time is called a **cash budget.**

## Mini Quiz

1. Budgeting supports the planning process by encouraging all of the following activities except **directing the day-to-day activities of the company.**
2. The labor budget in a service business is often called the **staffing budget.**
3. Which of the following is not a benefit of using a computerized budgeting system?
  - Such systems require more employees to be involved in the process.**
4. The balance sheet budgets primarily reflect **financing and investing activities.**
5. A firm's operating budgets usually begin with the **sales budget.**
6. A **static budget** shows the expected results of a responsibility center for only one level of activity.
7. Which of the following statements regarding the production budget is true?
  - It indicates the total units to be produced during the period, based on expected sales and desired inventory levels.**
8. On the cash budget, the amounts entered for estimated cash receipts come from **planned receipts from debt financing, the schedule of collections from sales, planned receipts from the issuance of common stock.**
9. Production and sales estimates for March for Streamline Systems Co. are as follows:

Item	Value
Estimated inventory (units), March 1	17,500
Desired inventory (unit), March 31	20,300
Expected sales volume (units)	35,000
Unit sales price	\$15

What are the total units to be produced in March?

- $35000 + 20300 - 17500 = 37800$

10. As of January 1 of the current year, Phyllis Company had accounts receivable of \$50,000. The sales for January, February, and March were \$120,000, \$140,000, and \$160,000, respectively. 20% of each month's sales are for cash. Of the remaining 80% (the credit sales), 60% are collected in the month of sale, with the remaining 40% collected in the following month. What is the total cash collected (both from accounts receivable and for cash sales) in the month of March?
- $(160000 * 20\%) + (160000 * 80\% * 60\%) + (140000 * 80\% * 40\%) = 153600$
11. The budgetary units of an organization are called **responsibility centers**.
12. A hotel has 200 rooms. The housekeeping staff is able to clean 10 rooms per employee. The average employee is paid \$100 per day. The hotel is expecting to be operating at full capacity for the coming weekend. How many employees will it need per weekend day?
- **20**
13. Which of the following budgets is not part of the cost of goods sold budget?
- **Cash budget**
14. For February, sales revenue is \$900,000; sales commissions are 5% of sales; the sales manager's salary is \$96,000; advertising expenses are \$80,000; shipping expenses total 2% of sales; and miscellaneous selling expenses are \$2,100 plus 1/2 of 1% of sales. Total selling expenses for the month of February are  $(900000 * 5\%) + 96000 + 80000 + (900000 * 2\%) + [2100 + (900000 * .5\%)] = 245600$
15. The budgeted income statement is prepared by integrating all of the following budgets except for the **cash budget**.
16. Which of the following is likely true of a service business as compared to a manufacturing business?
- **Its budgeted income statement is simplified.**
17. The guidelines for setting goals for a budget that will motivate employees and managers include **setting reasonable and attainable goals**.
18. The budget process involves doing all of the following except **not giving raises to all managers who fail to achieve operational goals specified in the budget**.
19. Production budgets are used to prepare which of the following budgets?
- **Direct materials purchases, direct labor cost, factory overhead cost**
20. Soft and Silky, Inc., manufactures bedding sets. The budgeted production is for 53,000 comforters in the coming year. Each comforter requires 6 yards of material. The estimated January 1 beginning inventory is 31,000 yards. The desired ending balance is 30,000 yards of material. If the material costs \$1.50 per yard, what is the materials budget for the coming year?
- $[(53000 * 6) + 30000 - 31000] * 1.50 = 475000$
21. The sales budget might include revisions to prior year's sales quantities for all of the following except **productive capacity**.
22. The **production** budget estimates the number of units to be manufactured to meet budgeted sales and desired inventory levels.
23. The budgeted finished goods inventory and cost of goods sold for a manufacturing company for the year are as follows: January 1 finished goods, \$765,000; December 31 finished goods, \$540,000; cost of goods sold for the year, \$2,560,000. The budgeted cost of goods manufactured for the year is  $2560000 - 765000 + 540000 = 2335000$

## Practice Exercises

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### Cash Budget

1. Pasadena Candle Inc. pays 40% of its purchases on account in the month of the purchase and 60% in the month following the purchase. If purchases are budgeted to be \$40,000 for August and \$36,000 for September.

Prepare a simple cash budget for Pasadena Candle Inc.

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<b>Pasadena Candle Inc. Schedule of Cash Payments for Purchases For the Month Ending September</b>	
Payments for August purchases	$40000 * 60\% = 24000$
Payments for September purchases	$36000 * 40\% = 14400$
Total payments for purchases on account	$24000 + 14400 =$ <b><u>38400</u></b>

## Cost of goods sold budget

2. Pasadena Candle Inc. budgeted production of 785,000 candles for January. Each candle requires molding. Assume that six minutes are required to mold each candle. If molding labor costs \$18 per hour, determine the direct labor cost budget for January. Wax is required to produce a candle. Assume 487,125 pounds of material will be purchased during January. The candle wax costs \$1.24 per pound.

Prepare a cost of goods sold budget for Pasadena Candle Inc. using the information above. Assume the estimated inventories on January 1 for finished goods and work in process were \$200,000 and \$41,250, respectively and direct materials wax inventory of 16,000 pounds. Also assume the desired inventories on January 31 for finished goods and work in process were \$120,000 and \$28,500, respectively and direct materials wax inventory of 12,500 pounds. Factory overhead was budgeted at \$300,000. For those boxes in which you must enter subtracted or negative numbers use a minus sign.

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<b>Pasadena Candle Inc. Cost of Goods Sold Budget For the Month Ending January 31</b>			
Finished goods inventory, January 1			200000
Work in process inventory, January 1		41250	
Direct materials:			
Direct materials inventory, January 1	16000 * 1.24 = 19840		
Direct materials purchases	487125 * 1.24 = <u>604035</u>		
Cost of direct materials available for use	19840 + 604035 = 623875		
Direct materials inventory, January 31	12500 * 1.24- <u>15500</u>		
Cost of direct materials placed in production	623875 - 15500 = 608375		
Direct labor	785000 * 6 * $\frac{18}{60}$ = 1413000		
Factory overhead	<u>300000</u>		
Total manufacturing costs		608375 + 1413000 + 300000 = <u>2321375</u>	
Total work in process during period		41250 + 2321375 = 2362625	
Work in process inventory, January 31		- <u>28500</u>	
Cost of goods manufactured			2362625 - 28500 = <u>2334125</u>
Cost of finished goods available for sale			200000 + 2334125 = 2534125
Finished goods inventory, January 31			- <u>120000</u>
Cost of goods sold			1534125 - 120000 = <u>2414125</u>

## Direct Labor Cost Budget

3. Pasadena Candle Inc. budgeted production of 785,000 candles for January. Each candle requires molding. Assume that six minutes are required to mold each candle. If molding labor costs \$18 per hour, determine the direct labor cost budget for January.

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<b>Pasadena Candle Inc. Direct Labor Cost Budget For the Month Ending January 31</b>		<b>Sign</b>		<b>Unit</b>
Hours required for assembly:				
Candles			4710000	min
Convert minutes to hours		\	<u>60</u>	min
Molding hours			78500	hours
Hourly rate		*	<u>18</u>	\
Total direct labor cost			1413000	\$

## Direct Materials Purchases Budget

4. Pasadena Candle Inc. budgeted production of 785,000 candles for January. Wax is required to produce a candle. Assume 10 ounces of wax is required for each candle. The estimated January 1 wax inventory is 16,000 pounds. The desired January 31 wax inventory is 12,500 pounds. If candle wax costs \$1.24 per pound, determine the direct materials purchases budget for January. (One pound = 16 ounces.) For those boxes in which you must enter subtracted or negative numbers use a minus sign.

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<b>Pasadena Candle Inc. Direct Labor Cost Budget For the Month Ending January 31</b>	
Pounds of wax required for production:	
Candles	$\frac{785000 \times 10}{16} = 490625$
Estimated beginning inventory, January 31	<u>12500</u>
Total units available	$490625 + 12500 = 503125$
Candles	<u>-16000</u>
Total pounds to be purchased	$503125 - 16000 = 487125$
Unit price (per lb.)	<u>1.24</u>
Total direct materials to be purchased in January	$487125 * 1.24 = \underline{\underline{604035}}$

5. Tobin's Frozen Pizza Inc. has determined from its production budget the following estimated production volumes for 12" and 16" frozen pizzas for November:

	<b>12" Pizza</b>	<b>16" Pizza</b>
Budgeted production volume	70,000	50,000

There are three direct materials used in producing the two types of pizza. The quantities of direct materials expected to be used for each pizza are as follows:

<b>12" Pizza</b>	<b>12" Pizza</b>	<b>16" Pizza</b>
Direct materials:		
Dough	0.55	0.80
Tomato	0.25	0.40
Cheese	0.70	1.20

In addition, Tobin's has determined the following information about each material:

	<b>Dough</b>	<b>Tomato</b>	<b>Cheese</b>
Estimated inventory, November 1	2,500	1,000	3,000
Desired inventory, November 30	2,000	1,200	2,800
Price per pound	\$0.50	\$0.60	\$0.85

Prepare November's direct materials purchases budget for Tobin's Frozen Pizza Inc. For those boxes in which you must enter subtracted or negative numbers use a minus sign.

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<b>Tobin's Frozen Pizza Inc. Direct Materials Purchases Budget For the Month Ending November 30</b>	<b>Dough</b>	<b>Tomato</b>	<b>Cheese</b>	<b>Total</b>
Units required for production:				
12" pizza	70000 * .55 = 38500	70000 * .25 = 17500	70000 * .7 = 49000	
16" pizza	50000 * .8 = 40000	50000 * .4 = 20000	50000 * 1.2 = 60000	
Desired inventory, November 30	2000	1200	2800	
Total units available	38500 + 40000 + 2000 = 80500	17500 + 20000 + 1200 = 38700	49000 + 60000 + 2800 = 111800	
Estimated inventory, November 1	-2500	-1000	-3000	
Total units to be purchased	80500 - 2500 = 78000	38700 - 1000 = 37700	111800 - 3000 = 108800	
Unit Price	x \$0.50	x \$0.60	x \$0.85	
Total direct materials to be purchased	78000 * .5 = <b>\$39000</b>	37700 * .6 = <b>\$22620</b>	108800 * .85 = <b>\$92480</b>	39000 + 22620 + 92480 = <b>\$154100</b>

6. Coca-Cola Enterprises (CCE) is the largest bottler of Coca-Cola® in Western Europe. The company purchases Coke® and Sprite® concentrate from The Coca-Cola Company (KO), dilutes and mixes the concentrate with carbonated water, and then fills the blended beverage into cans or plastic two-liter bottles. Assume that the estimated production for Coke and Sprite two-liter bottles at the Wakefield, UK, bottling plant is as follows for the month of May:

Type	Amount
Coke	153,000 two-liter bottles
Sprite	86,500 two-liter bottles

In addition, assume that the concentrate costs \$75 per pound for both Coke and Sprite and is used at a rate of 0.15 pound per 100 liters of carbonated water in blending Coke and 0.10 pound per 100 liters of carbonated water in blending Sprite. Assume that two liters of carbonated water are used for each two-liter bottle of finished product. Assume further that two-liter bottles cost \$0.08 per bottle and carbonated water costs \$0.06 per liter.

Prepare a direct materials purchases budget for May, assuming inventories are ignored, because there are no changes between beginning and ending inventories for concentrate, bottles, and carbonated water.

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Coca-Cola Enterprises-Wakefield Plant Direct Materials Purchases Budget For the Month Ending May 31 (assumed data)	Concentrate	2-Liter Bottles	Carbonated Water
Materials required for production:			
Coke	0.0015 * 153000 * 2 = 459	153000	2 * 153000 = 306000
Sprite	0.0010 * 86500 * 2 = 173	86500	2 * 86500 = 173000
Total Materials	632	239500	479000
Direct Materials unit price	75	0.08	0.06
Total direct materials to be purchased	632 * 75 = 47400	239500 * .08 = 19160	479000 * .06 = 28740

## Flexible Budgeting

7. At the beginning of the period, the Fabricating Department budgeted direct labor of \$72,000 and equipment depreciation of \$18,500 for 2,400 hours of production. The department actually completed 2,350 hours of production.

Determine the budget for the department, assuming that it uses flexible budgeting.

o  $(2350 * \frac{72000}{2400}) + 18500 = 89000$

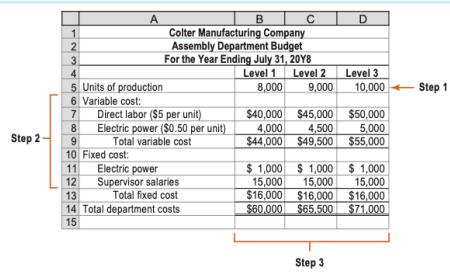
## Flexible Budget for Selling and Administrative Expenses for a Service Company

8. Digital Solutions Inc. uses flexible budgets that are based on the following data:

Item	Value
Sales commissions	8% of sales
Advertising expense	15% of sales
Miscellaneous administrative expense	\$10,000 per month plus 4% of sales
Office salaries expense	\$50,000 per month
Customer support expenses	\$20,000 per month plus 30% of sales
Research and development expense	\$75,000 per month

Prepare a flexible selling and administrative expenses budget for October for sales volumes of 500,000, 750,000, and \$1,000,000. (Use [Exhibit 5](#) as a model.)

**Exhibit 5**  
Flexible Budget



	A	B	C	D
Colter Manufacturing Company				
Assembly Department Budget				
For the Year Ending July 31, 20Y8				
	Level 1	Level 2	Level 3	
5. Units of production	8,000	9,000	10,000	Step 1
6. Variable cost:				
7. Direct labor (\$5 per unit)	\$40,000	\$45,000	\$50,000	
8. Electric power (\$0.50 per unit)	4,000	4,500	5,000	
9. Total variable cost	\$44,000	\$49,500	\$55,000	
10. Fixed cost:				
11. Electric power	\$ 1,000	\$ 1,000	\$ 1,000	
12. Supervisor salaries	15,000	15,000	15,000	
13. Total fixed cost	\$16,000	\$16,000	\$16,000	
14. Total department costs	\$60,000	\$65,500	\$71,000	
15.				

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<b>Flexible Selling and Administrative Expenses Budget For the Month Ending October 31</b>			
Total sales	500000	750000	1000000
Variable cost:			
Sales commissions	$500000 * 8\% = 40000$	$750000 * 8\% = 60000$	$1000000 * 8\% = 80000$
Advertising expense	$500000 * 15\% = 75000$	$750000 * 15\% = 112500$	$1000000 * 15\% = 150000$
Miscellaneous administrative expense	$500000 * 4\% = 20000$	$750000 * 4\% = 30000$	$1000000 * 4\% = 40000$
Customer support expenses	$500000 * 30\% = 150000$	$750000 * 30\% = 225000$	$1000000 * 30\% = 300000$
Total variable cost	$40000 + 75000 + 20000 + 150000 = 285000$	$60000 + 112500 + 30000 + 225000 = 427500$	$80000 + 150000 + 40000 + 300000 = 570000$
Fixed cost:			
Miscellaneous administrative expense	10000	10000	10000
Office salaries expense	50000	50000	50000
Customer support expenses	20000	20000	20000
Research and development expense	75000	75000	75000
Total fixed cost	$10000 + 50000 + 20000 + 75000 = 155000$	$10000 + 50000 + 20000 + 75000 = 155000$	$10000 + 50000 + 20000 + 75000 = 155000$
Total selling and administrative expenses	$285000 + 155000 = 440000$	$427500 + 155000 = 582500$	$570000 + 155000 = 725000$

## Production Budget

9. Pasadena Candle Inc. projected sales of 800,000 candles for January. The estimated January 1 inventory is 35,000 units, and the desired January 31 inventory is 20,000 units.

Prepare a production budget report in units for Pasadena Candle Inc. For those boxes in which you must enter subtracted or negative numbers use a minus sign.

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<b>Pasadena Candle Inc. Production Budget For the Month Ending January 31</b>	
Expected units to be sold	800000
Desired ending inventory, Dec 31	<u>20000</u>
Total units available	$800000 + 20000 = 820000$
Estimated beginning inventory, Jan 1	<u>-35000</u>
Total units to be produced	$820000 - 35000 = \underline{\underline{785000}}$

10. Healthy Measures Inc. produces a Bath and Gym version of its popular electronic scale. The anticipated unit sales for the scales by sales region are as follows:

	<b>Bath Scale</b>	<b>Gym Scale</b>
Northern Region unit sales	40,000	25,000
Southern Region unit sales	75,000	35,000
Total	115,000	60,000

The finished goods inventory estimated for March 1, for the Bath and Gym scale models is 11,800 and 8,100 units, respectively. The desired finished goods inventory for March 31 for the Bath and Gym scale models is 15,000 and 7,500 units, respectively.

Prepare a production budget for the Bath and Gym scales for the month ended March 31. For those boxes in which you must enter subtracted or negative numbers use a minus sign.

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<b>Healthy Measures Inc. Production Budget For the Month Ending March 31</b>	<b>Units Bath Scale</b>	<b>Units Gym Scale</b>
Expected units to be sold	115000	60000
Desired inventory, October 31	<u>15000</u>	<u>7500</u>
Total units available	130000	67500
Estimated inventory, October 1	<u>-11800</u>	<u>-8100</u>
Total units to be produced	<b><u>118200</u></b>	<b><u>59400</u></b>

## **Sales and Production Budgets**

11. Sonic Inc. manufactures two models of speakers, Rumble and Thunder. Based on the following production and sales data for June, prepare (a) a sales budget and (b) a production budget:

	<b>Rumble</b>	<b>Thunder</b>
Estimated inventory (units), June 1	750	300
Desired inventory (units), June 30	500	250
Expected sales volume (units):		
Midwest Region	12,000	3,500
South Region	14,000	4,000
Unit sales price	\$60	\$90

1. Prepare a sales budget.

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<b>Sonic Inc. Sales Budget For the Month Ending June 30</b>			
<b>Product and Area</b>	<b>Unit Sales Volume</b>	<b>Unit Selling Price</b>	<b>Total Sales</b>
Model: Rumble			
Midwest Region	12000	60	$12000 * 60 = 720000$
South Region	<u>14000</u>	60	$14000 * 60 = \underline{840000}$
Total	$12000 + 14000 = \underline{26000}$		$720000 + 840000 = \underline{1560000}$
Model: Thunder			
Midwest Region	3500	90	$3500 * 90 = 315000$
South Region	<u>4000</u>	90	$4000 * 90 = \underline{360000}$
Total	$3500 + 4000 = \underline{7500}$		$315000 + 360000 = \underline{675000}$
Total revenue from sales			$1560000 + 675000 = \underline{2235000}$

2. Prepare a production budget. For those boxes in which you must enter subtracted or negative numbers use a minus sign.

<b>Sonic Inc. Production Budget For the Month Ending June 30</b>	<b>Units Rumble</b>	<b>Units Thunder</b>
Expected units to be sold	26000	7500
Desired inventory, June 30	500	250
Total units available	$26000 + 500 = 26500$	$7500 + 250 = 7750$
Estimated inventory, June 1	-750	-300
Total units to be produced	$26500 - 750 = 25750$	$7750 - 300 = 7450$

### Schedule of Cash Collections of Accounts Receivable

12. Pet Supplies Inc., a pet wholesale supplier, was organized on January 1. Projected sales for each of the first three months of operations are as follows:

<b>Month</b>	<b>Value</b>
January	\$300,000
February	500,000
March	750,000

All sales are on account. Seventy-five percent of sales are expected to be collected in the month of the sale, 20% in the month following the sale, and the remainder in the second month following the sale.

Prepare a schedule indicating cash collections from sales for January, February, and March. Enter all amounts as positive numbers.

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Pet Supplies Inc. Schedule of Cash Collections from Sales For the Three Months Ending March 31	January	February	March
January Sales on Account			
Collected in January	$300000 * 75\% = 225000$		
Collected in February		$300000 * 20\% = 60000$	
Collected in March			$300000 * (100 - 75 - 20)\% = 15000$
February Sales on Account			
Collected in February		$500000 * 75\% = 375000$	
Collected in March			$500000 * 20\% = 100000$
March Sales on Account			
Collected in March			$750000 * 75\% = 562500$
Total Cash Collected	225000	$60000 + 375000 = 435000$	$15000 + 100000 + 562500 = 677500$

13. OfficeMart Inc. has "cash and carry" customers and credit customers. OfficeMart estimates that 25% of monthly sales are to cash customers, while the remaining sales are to credit customers. Of the credit customers, 30% pay their accounts in the month of sale, while the remaining 70% pay their accounts in the month following the month of sale. Projected sales for the next three months are as follows:

Month	Value
October	\$58,000
November	65,000
December	72,000

The Accounts Receivable balance on September 30 was \$35,000.

Prepare a schedule of cash collections from sales for October, November, and December. Enter all amounts as positive numbers.

OfficeMart inc. Schedule of cash Collections from Sales For the Three Months Ending December 31	October	November	December
Receipts from cash sales:			
Cash sales	14500	16250	18000
September sales on account:			
Collected in October	35000		
October sales on account:			
Collected in October	$43500 * 30\% = 13050$		
Collected in November		$43500 * 70\% = 30450$	
November sales on account:			
Collected in November		$48750 * 30\% = 14625$	
Collected in December			$48750 * 70\% = 34125$
December sales on account:			
Collected in December			$54000 * 30\% = 16200$
Total cash collected	$14500 + 35000 + 13050 = 62550$	$16250 + 30450 + 14625 = 61325$	$18000 + 34125 + 16200 = 68325$

## Static Budget versus Flexible Budget

14. The production supervisor of the Machining Department for Hagerstown Company agreed to the following monthly static budget for the upcoming year:

<b>Hagerstown Company Machining Department Monthly Production Budget</b>	
Wages	\$2,250,000
Utilities	72,000
Depreciation	36,000
Total	\$2,358,000

The actual amount spent and the actual units produced in the first three months in the Machining Department were as follows:

	<b>Amount Spent</b>	<b>Units Produced</b>
May	\$1,600,000	40,000
June	1,950,000	48,000
July	2,200,000	52,000

The Machining Department supervisor has been very pleased with this performance because actual expenditures for May–July have been significantly less than the monthly static budget of \$2,358,000. However, the plant manager believes that the budget should not remain fixed for every month but should “flex” or adjust to the volume of work that is produced in the Machining Department. Additional budget information for the Machining Department is as follows:

<b>Item</b>	<b>Value</b>
Wages per hour	\$25.00
Utility cost per direct labor hour	\$0.80
Direct labor hours per unit	1.5
Planned monthly unit production	60,000

1. Prepare a flexible budget for the actual units produced for May, June, and July in the Machining Department. Assume depreciation is a fixed cost. If required, use per unit amounts carried out to two decimal places.

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<b>Hagerstown Company Machining Department Budget For the Three Months Ending July 31</b>	<b>May</b>	<b>June</b>	<b>July</b>
Units of production	40,000	48,000	52,000
Wages	\$1,500,000.00	\$1,800,000.00	\$1,950,000.00
Utilities	\$48,000.00	\$57,600.00	\$62,400.00
Depreciation	\$36,000.00	\$36,000.00	\$36,000.00
Total	\$1,584,000.00	\$1,893,600.00	\$2,048,400.00
Supporting calculations:			
Units of production	40,000	48,000	52,000
Hours per unit	1.5	1.5	1.5
Total hours of production	60000	72000	78000
Wages per hour	\$25.00	\$25.00	\$25.00
Total wages	\$1,500,000.00	\$1,800,000.00	\$1,950,000.00
Total hours of production	60000	72000	78000
Utility costs per hour	\$0.80	\$0.80	\$0.80
Total utilities	\$48,000.00	\$57,600.00	\$62,400.00

2. Compare the flexible budget with the actual expenditures for the first three months.

	<b>May</b>	<b>June</b>	<b>July</b>
Total flexible budget	\$1,584,000.00	\$1,893,600.00	\$2,048,400.00
Actual cost	\$1,600,000.00	\$1,950,000.00	\$2,200,000.00
Excess of actual cost over budget	\$16,000.00	\$56,400.00	\$151,600.00

1. The Machining Department has performed better than originally thought.

■ **No**

2. The department is spending more than would be expected.

■ **Yes**

## Homework Exercises

- Goal conflict can be avoided if budget goals are carefully designed for consistency across all areas of the organization.
  - True**
- A capital expenditures budget is prepared before the operating budgets.
  - False**
- Budgets are prepared in the Accounting Department and monitored by various department managers.
  - False**
- Flexible budgeting builds the effect of changes in level of activity into the budget system.
  - True**
- The first budget to be prepared is usually the sales budget.
  - True**
- Which of the following budgets allows for adjustments in activity levels?
  - flexible budget**
- Miller and Sons' static budget for 10,000 units of production includes \$50,000 for direct materials, \$44,000 for direct labor, variable utilities of \$5,000, and supervisor salaries of \$24,000. A flexible budget for 12,000 units of production would show **direct materials of \$60,000, direct labor of \$52,800, utilities of \$6,000, and supervisor salaries of \$24,000**.

8. At the beginning of the period, the Assembly Department budgeted direct labor of \$110,000, direct materials of \$170,000, and fixed factory overhead of \$28,000 for 8,000 hours of production. The department actually completed 10,000 hours of production. The appropriate total budget for the department, assuming it uses flexible budgeting, is  $(10000 * \frac{110000}{8000}) + (10000 * \frac{170000}{8000}) + 28000 = 378000$
9. Below is budgeted production and sales information for Flushing Company for the month of December.

	<b>Product XXX</b>	<b>Product ZZZ</b>
Estimated beginning inventory	32,000 units	20,000 units
Desired ending inventory	34,000 units	17,000 units
Region I, anticipated sales	320,000 units	260,000 units
Region II, anticipated sales	180,000 units	140,000 units

The unit selling price for product XXX is \$5 and for product ZZZ is \$15.

Budgeted production for product ZZZ during the month is  $260000 + 140000 + 17000 - 20000 = 397000$

10. Which of the following budgets provides the starting point for the preparation of the direct labor cost budget?

- **production budget**

## Direct Labor Cost Budget

11. Pasadena Candle Inc. budgeted production of 42,000 candles for January. Each candle requires molding. Assume that 10 minutes are required to mold each candle. If molding labor costs \$14 per hour, determine the direct labor cost budget for January.

◦

<b>Pasadena Candle Inc. Direct Labor Cost Budget For the Month Ending January 31</b>		<b>Unit</b>
Hours required for assembly:		
Candles	$42000 * 10 = 420000$	min
Convert minutes to hours	<u>60</u>	min
Molding hours	$\frac{420000}{60} = 7000$	hours
Hourly rate	<u>14</u>	\
Total direct labor cost	$7000 * 14 = 98000$	\$

## Direct Materials Purchases Budget

12. Tobin's Frozen Pizza Inc. has determined from its production budget the following estimated production volumes for 12" and 16" frozen pizzas for November:

	<b>12" Pizza</b>	<b>16" Pizza</b>
Budgeted production volume	14,300	24,200

There are three direct materials used in producing the two types of pizza. The quantities of direct materials expected to be used for each pizza are as follows:

	<b>12" Pizza</b>	<b>16" Pizza</b>
Direct materials:		
Dough	0.90	1.50
Tomato	0.60	1.00
Cheese	0.80	1.30

In addition, Tobin's has determined the following information about each material:

	Dough	Tomato	Cheese
Estimated inventory, November 1	630	200	350
Desired inventory, November 30	660	190	380
Price per pound	\$1.30	\$2.20	\$3.00

Prepare November's direct materials purchases budget for Tobin's Frozen Pizza Inc. For those boxes in which you must enter subtracted or negative numbers use a minus sign.

o

Tobin's Frozen Pizza Inc. Direct Materials Purchases Budget For the Month Ending November 30	Dough	Tomato	Cheese	Total
Units required for production:				
12" pizza	14300 * .9 = 12870	14300 *.6 = 8580	14300 *.8 = 11440	
16" pizza	24200 * 1.5 = 36300	24200 * 1 = 24200	24200 * 1.3 = 31460	
Desired inventory, November 30	<u>660</u>	<u>190</u>	<u>380</u>	
Total units available	12870 + 36300 + 660 = 49830	8580 + 24200 + 190 = 32970	11440 + 31460 + 380 = 43280	
Estimated inventory, November 1	<u>-630</u>	<u>-200</u>	<u>-350</u>	
Total units to be purchased	49830 - 630 = 49200	32970 - 200 = 32770	43280 - 350 = 42930	
Unit Price	x \$1.30	x \$2.20	x \$3.00	
Total direct materials to be purchased	49200 * 1.30 = <u>\$63960</u>	32770 * 2.20 = <u>\$72094</u>	42930 * 3.00 = <u>\$128790</u>	63960 + 72094 + 128790 <u>\$264844</u>

13. Pasadena Candle Inc. budgeted production of 755,000 candles for the January. Wax is required to produce a candle. Assume 15 ounces of wax is required for each candle. The estimated January 1 wax inventory is 18,300 pounds. The desired January 31 wax inventory is 12,700 pounds. If candle wax costs \$2.00 per pound, determine the direct materials purchases budget for January. (One pound = 16 ounces.) Round all computed answers to the nearest whole number. For those boxes in which you must enter subtracted or negative numbers use a minus sign.

o

Pasadena Candle Inc. Direct Labor Cost Budget For the Month Ending January 31	
Pounds of wax required for production:	
Candles	$\frac{755000 * 15}{16} = 707813$
Desired ending inventory, January 31	<u>12700</u>
Total units available	707813 + 12700 = 720513
Estimated beginning inventory, January 1	<u>-18300</u>
Total pounds to be purchased	720513 - 18300 = 702213
Unit price	<u>2.00</u>
Total direct materials to be purchased in January	702213 * 2 = <u>1404426</u>

## Flexible Budgeting

14. At the beginning of the period, the Fabricating Department budgeted direct labor of \$77,000 and equipment depreciation of \$36,000 for 7,000 hours of production. The department actually completed 9,400 hours of production.

Determine the budget for the department, assuming that it uses flexible budgeting.

o  $(9400 * \frac{77000}{7000}) + 36000 = 139400$

## Flexible Budget for Selling and Administrative Expenses for a Service Company

15. Digital Solutions Inc. uses flexible budgets that are based on the following data:

Item	Value
Sales commissions	14% of sales
Advertising expense	18% of sales
Miscellaneous administrative expense	\$8,500 per month plus 12% of sales
Office salaries expense	\$30,000 per month
Customer support expenses	\$12,000 per month plus 20% of sales
Research and development expense	\$32,000 per month

Prepare a flexible selling and administrative expenses budget for October for sales volumes of 400,000, 500,000, and \$600,000. (Use [Exhibit 5](#) as a model.)

o

Flexible Selling and Administrative Expenses Budget For the Month Ending October 31			
Total sales	400000	500000	600000
Variable cost:			
Sales commissions	$400000 * 14\% = 56000$	$500000 * 14\% = 70000$	$600000 * 14\% = 84000$
Advertising expense	$400000 * 18\% = 72000$	$500000 * 18\% = 90000$	$600000 * 18\% = 108000$
Miscellaneous administrative expense	$400000 * 12\% = 48000$	$500000 * 12\% = 60000$	$600000 * 12\% = 72000$
Customer support expenses	$400000 * 20\% = 80000$	$500000 * 20\% = 100000$	$600000 * 20\% = 120000$
Total variable cost	$56000 + 72000 + 48000 + 80000 = 256000$	$70000 + 90000 + 60000 + 100000 = 320000$	$84000 + 108000 + 72000 + 120000 = 384000$
Fixed cost:			
Miscellaneous administrative expense	8500	8500	8500
Office salaries expense	30000	30000	30000
Customer support expenses	12000	12000	12000
Research and development expense	32000	32000	32000
Total fixed cost	$8500 + 30000 + 12000 + 32000 = 82500$	$8500 + 30000 + 12000 + 32000 = 82500$	$8500 + 30000 + 12000 + 32000 = 82500$
Total selling and administrative expenses	$2560000 + 82500 = 338500$	$320000 + 82500 = 402500$	$384000 + 82500 = 466500$

## Production Budget

16. Pasadena Candle Inc. projected sales of 35,000 candles for January. The estimated January 1 inventory is 1,800 units, and the desired January 31 inventory is 4,000 units.

Prepare a production budget report in units for Pasadena Candle Inc. For those boxes in which you must enter subtracted or negative numbers use a minus sign.

o

<b>Pasadena Candle Inc. Production Budget For the Month Ending January 31</b>	
Expected units to be sold	35000
Desired ending inventory, January 31	4000
Total units available	$35000 + 4000 = 39000$
Estimated beginning inventory, January 1	-1800
Total units to be produced in January	$39000 - 1800 = 37200$

17. Healthy Measures Inc. produces a Bath and Gym version of its popular electronic scale. The anticipated unit sales for the scales by sales region are as follows:

	<b>Bath Scale</b>	<b>Gym Scale</b>
Northern Region unit sales	26,400	41,200
Southern Region unit sales	28,500	29,900
Total	54,900	71,100

The finished goods inventory estimated for March 1, for the Bath and Gym scale models is 1,300 and 2,700 units, respectively. The desired finished goods inventory for March 31 for the Bath and Gym scale models is 900 and 2,900 units, respectively.

Prepare a production budget for the Bath and Gym scales for the month ended March 31. For those boxes in which you must enter subtracted or negative numbers use a minus sign.

o

<b>Healthy Measures Inc. Production Budget For the Month Ending March 31</b>	<b>Units Bath Scale</b>	<b>Units Gym Scale</b>
Expected units to be sold	54900	71000
Desired inventory, March 31	900	2900
Total units available	$54900 + 900 = 55800$	$71000 + 2900 = 74000$
Estimated inventory, March 1	-1300	-2700
Total units to be produced	$55800 - 1300 = 54500$	$74000 - 2700 = 71300$

### Schedule of Cash Collections of Accounts Receivable

18. OfficeMart Inc. has "cash and carry" customers and credit customers. OfficeMart estimates that 30% of monthly sales are to cash customers, while the remaining sales are to credit customers. Of the credit customers, 20% pay their accounts in the month of sale, while the remaining 80% pay their accounts in the month following the month of sale. Projected sales for the next three months are as follows:

<b>Month</b>	<b>Value</b>
October	\$125,000
November	156,000
December	229,000

The Accounts Receivable balance on September 30 was \$84,000.

Prepare a schedule of cash collections from sales for October, November, and December. Round all calculations to the nearest whole dollar.

o

<b>OfficeMart inc. Schedule of cash Collections from Sales For the Three Months Ending December 31</b>	<b>October</b>	<b>November</b>	<b>December</b>
Receipts from cash sales:			
Cash sales	$125000 * 30\% = 37500$	$156000 * 30\% = 46800$	$229000 * 30\% = 68700$
September sales on account:			
Collected in October	84000		
October sales on account:			
Collected in October	$(125000 - 37500) * 20\% = 17500$		
Collected in November		$(125000 - 37500) * 80\% = 70000$	
November sales on account:			
Collected in November		$(156000 - 46800) * 20\% = 21840$	
Collected in December			$(156000 - 46800) * 80\% = 87360$
December sales on account:			
Collected in December			$(229000 - 68700) * 20\% = 32060$
Total cash collected	$37500 + 84000 + 17500 = 139000$	$46800 + 70000 + 21840 = 138640$	$68700 + 87360 + 32060 = 188120$

## Quiz

1. Next year's sales forecast shows that 20,000 units of Product A and 22,000 units of Product B are going to be sold for prices of \$10 and \$12 per unit, respectively. The desired ending inventory of Product A is 20% higher than its beginning inventory of 2,000 units. The beginning inventory of Product B is 2,500 units. The desired ending inventory of Product B is 3,000 units.

Budgeted production of Product B for the year would be  $22000 - 2500 + 3000 = 22500$

2. For April, sales revenue is \$700,000, sales commissions are 5% of sales, the sales manager's salary is \$98,000, advertising expenses are \$90,000, shipping expenses total 2% of sales, and miscellaneous selling expenses are \$2,100 plus 1/2 of 1% of sales. Total selling expenses for the month of April are  $(700000 * 5\%) + 98000 + 90000 + (700000 * 2\%) + [2100 + (.5\% * 700000)] = 242600$

3. Finch Company began its operations on March 31 of the current year. Finch has the following projected costs:

	<b>April</b>	<b>May</b>	<b>June</b>
Manufacturing costs*	\$156,800	\$195,200	\$217,600
Insurance expense**	1,000	1,000	1,000
Depreciation expense	2,000	2,000	2,000
Property tax expense***	500	500	500

*Of the manufacturing costs, three-fourths is paid for in the month they are incurred; one-fourth is paid in the following month.*

*Insurance expense is \$1,000 a month; however, the insurance is paid four times yearly in the first month of the quarter (i.e., January, April, July, and October).*

*Property tax is paid once a year in November.*

The cash payments expected for Finch Company in the month of April are  $(156800 * 75\%) + (1000 * 3) = 120600$

4. A variant of fiscal-year budgeting whereby a 12-month projection into the future is maintained at all times is termed **continuous** budgeting.
5. Nuthatch Corporation began its operations on September 1 of the current year. Budgeted sales for the first three months of business September, October, and November are \$260,000, \$375,000, and \$400,000, respectively. The company expects to sell 30% of its merchandise for cash. Of sales on account, 80% are expected to be collected in the month of the sale and 20% in the month following the sale.

The cash collections expected in September from accounts receivable are estimated to be  $(260000 * 70\%) * 80\% = 145600$

6. A company is preparing its cash budget. Its cash balance on January 1 is \$290,000, and it has a minimum cash requirement of \$340,000. The following data have been provided:

	<b>January</b>	<b>February</b>	<b>March</b>
Cash receipts	\$1,061,200	\$1,182,400	\$1,091,700
Cash payments	984,500	1,210,000	1,075,000

The amount of cash excess or deficiency (after considering the minimum cash balance required) for March is a(n)  
 $290000 + (1061200 - 984500) + (1182400 - 1210000) + (1091700 - 1075000) - 340000 = 15800 \text{ excess.}$

7. The production budget is used to prepare which of the following budgets?
  - **direct materials purchases, direct labor cost, and factory overhead cost**
8. Production estimates for July for Starling Co. are as follows:

<b>Item</b>	<b>Value</b>
Estimated inventory (units), July 1	8,500
Desired inventory (units), July 31	10,500
Expected sales volume (units), July	76,000

For each unit produced, the direct materials requirements are as follows:

<b>Item</b>	<b>Value</b>
Material A (\$5 per lb.)	3.0 lbs.
Material B (\$18 per lb.)	0.5 lb.

The number of pounds of Materials A and B required for July production is

- $76000 + 10500 - 8500 = 78000$
  - **Material A:**  $78000 * 3 = 234000$
  - **Material B:**  $78000 * .5 = 39000$
9. A formal written statement of management's plans for the future, expressed in financial terms, is a **budget**.
  10. Pelican Roost Hotel has 100 rooms. For a normal February, it averages 60% capacity. However, there are three 3-day events scheduled for February in which the hotel expects to be completely booked. Of the additional guests coming for the events, one-half will likely attach an extra day before or after the event to enjoy the beach and/or other local sights. You have determined that the housekeeping staff requires 30 minutes to clean each occupied room. The housekeeping staff is paid \$14 per hour. The housekeeping labor cost is fully variable to the number of occupied rooms. Assuming it is not a leap year, the total housekeeping budget for February is  

$$[(3 * 3 * 100) + ([28 - (3 * 3)] * [100 * 60\%]) + (40 * .5 * 3)] * .5 * 14 = 14700$$
  11. Mandy Corporation sells a single product. Budgeted sales for the year are anticipated to be 640,000 units, estimated beginning inventory is 98,000 units, and desired ending inventory is 80,000 units. The quantities of direct materials expected to be used for each unit of finished product are given below.  
 Material A: 0.5 lb. per unit @ \$0.60 per pound  
 Material B: 1.0 lb. per unit @ \$1.70 per pound  
 Material C: 1.2 lbs. per unit @ \$1.00 per pound  
 The dollar amount of Material C used in production during the year is  $(640000 + 80000 - 98000) * 1.2 * 1 = 746400$   
 The budgeted units of production for March would be  $210000 + 46000 - 42000 = 214000$   
 The cash collections in November are  $[(320000 * [1 - .25]) * 30\%] + [(410000 * [1 - .25]) * 70\%] + (410000 * 25\%) = 389750$
  12. Cardinal Company has finished goods inventory of 55,000 units on January 1. Its projected sales for the next four months are: January, 200,000 units; February, 180,000 units; March, 210,000 units; and April, 230,000 units. Cardinal Company wishes to maintain a desired ending finished goods inventory of 20% of the following month's sales.
  13. Dove Corporation began its operations on September 1 of the current year. Budgeted sales for the first three months of business are \$250,000, \$320,000, and \$410,000, respectively, for September, October, and November. The company expects to sell 25% of its merchandise for cash. Of sales on account, 70% are expected to be collected in the month of the sale and 30% in the month following the sale.

14. Chelsa Manufacturing Co.'s static budget at 5,000 units of production includes \$40,000 for direct labor and \$5,000 for variable electric power. Total fixed costs are \$23,000. At 8,000 units of production, a flexible budget would show
- **Total fixed costs:** 23000
  - **Total variable costs:**  $(8000 * \frac{40000}{5000}) + (8000 * \frac{5000}{5000}) = 72000$
15. As of January 1 of the current year, Grayson Company had accounts receivable of \$40,000. The sales for January, February, and March were \$120,000, \$140,000, and \$150,000, respectively. Of each month's sales, 20% are for cash. Of the remaining 80% (the credit sales), 60% are collected in the month of sale, with the remaining 40% collected in the following month. The total cash collected (both from accounts receivable and for cash sales) in the month of January is  $40000 + [(120000 * 80\%) * 60\%] + (120000 * 20\%) = 121600$
16. Principal components of a master budget include **capital expenditures budget, production budget, and sales budget.**
17. An October sales forecast projects 7,000 units are going to be sold at a price of \$11.50 per unit. The desired ending inventory in units is 15% higher than the beginning inventory of 1,000 units. Total October sales are anticipated to be  $7000 * 11.5 = 80500$
18. Below is budgeted production and sales information for Flushing Company for the month of December.

	<b>Product XXX</b>	<b>Product ZZZ</b>
Estimated beginning inventory	32,000 units	20,000 units
Desired ending inventory	34,000 units	17,000 units
Region I, anticipated sales	320,000 units	260,000 units
Region II, anticipated sales	180,000 units	140,000 units

The unit selling price for product XXX is \$5 and for product ZZZ is \$15.

Budgeted sales for the month is  $[(320000 + 180000) * 5] + [(260000 + 140000) * 15] = 8500000$

19. If the expected sales volume for the current period is 8,000 units, the desired ending inventory is 1,400 units, and the beginning inventory is 1,200 units, the number of units set forth in the production budget, representing total production for the current period, is  $8000 + 1400 - 1200 = 8200$
20. The budgeting process does *not* involve which of the following activities?
- **increased marketing efforts to boost sales**

## Chapter 23

### Pre-Lecture Video

1. Manufacturers normally establish standard costs for **direct materials, direct labor, factory overhead**.
2. Standards that can be attained with reasonable effort are known as **normal** standards.
3. The differences between actual and standard costs are called **cost** variances.
4. A favorable cost variance results when **actual cost is less than standard cost at actual volumes.**
5. The components of the total direct materials cost variance are the **direct materials price variance** and the **direct materials quantity variance**.
6. The direct labor rate variance and the direct labor time variance make up the **total direct labor cost variance**.
7. Which of the following measures the direct materials quantity variance?
  - **(Actual Quantity – Standard Quantity) × Standard Price**
8. Factory overhead has **both fixed and variable cost elements**.
9. An unfavorable fixed factory overhead volume variance occurs when the **actual units produced is less than 100% of normal capacity**.
10. An unfavorable volume variance occurs due to **machine breakdowns, work stoppages caused by lack of materials or skilled labor, lack of enough sales orders to keep the factory operating at normal capacity**.
11. The journal entry to record an unfavorable direct materials price variance would include a **debit to Direct Materials Price Variance**.
12. Jake Shirt Co. used 5,300 square yards of polyester to produce 3,000 shirts. The standard quantity of material for the 3,000 shirts produced is 6,100 square yards. The standard price for direct materials is \$4.00 per square yard. The entry to record the direct materials quantity variance would include a **credit to Direct Materials Quantity for \$3,200**.

13. In preparing an income statement for external users, the balances of the variance accounts are normally transferred to **cost of Goods Sold**.

## Mini Quiz

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1. Standards that can be attained with reasonable effort are called **normal** standards.
2. A standard is **estimate of acceptable production efficiency**.
3. Given the following information for The Pelican Inn, what is the direct labor time variance?

Item	Value
Actual housekeeping staff hours worked	760
Standard staff hours for rooms cleaned	800
Standard staff pay rate per hour	\$12.50
Actual staff pay rate per hour	\$13.00

- o  $(800 - 760) * 12.5 = (500)$  favorable
4. Blueberry Baking Company produced 5,500 cakes that require 3 standard pounds per unit at a \$3 standard price per pound. The company actually used 16,650 pounds in production. Journalize the entry to record the standard direct materials used in production.
    - o **Debit Work in Process for \$49,500 and Direct Materials Quantity Variance for \$450 and credit Materials for \$49,950**
  5. If a company uses standard costs to record its inventory in the general ledger, what would the journal entry be for a purchase of direct materials with an unfavorable price variance?
    - o **Debit Materials (at standard) and Direct Materials Price Variance and credit Accounts Payable**
  6. Which of the following formulas represents the direct materials price variance?
    - o **(Actual Price – Standard Price) × Actual Quantity**
  7. Which of the following statements regarding standards in nonmanufacturing settings is true?
    - o **Standards may be used in nonmanufacturing settings where the tasks are repetitive in nature.**
  8. Jordan Industries produced 6,000 units of product that required 1.5 standard hours per unit. The standard variable overhead cost per unit is \$2.75 per hour. The actual variable factory overhead was \$29,000. What is the variable factory overhead controllable variance?
    - o  $29000 - (6000 * 1.5 * 2.75) = \$4,250$  unfavorable
  9. At the end of the period, the balance left in the factory overhead account is equal to the **total factory overhead cost variance**.
  10. Given the following information for Albright Company, what was the factory overhead cost variance?

Manufacturing Costs	Actual Costs	Standard Cost at Actual Volume	Budgeted Cost
Direct materials	80300	76000	71250
Direct labor	77000	72500	68400
Factory overhead	<u>44800</u>	<u>48000</u>	<u>45600</u>
Total	<u>202100</u>	<u>196500</u>	<u>185250</u>

- o  $44800 - 48000 = (3200)$  favorable
11. When actual costs are lower than standard costs, it is said to be a(n) **favorable** variance.
  12. Standard amounts budgeted are determined by multiplying the standard costs per unit by **planned** production.
  13. The **variable factory overhead controllable** variance is the difference between the actual variable overhead costs and the budgeted variable overhead for actual production.
  14. Standards are used in which of the following service settings?
    - o **Professional services, automotive services, and software development.**
  15. The difference between the budgeted fixed overhead at 100% of normal capacity and the standard fixed overhead for the actual units produced is the **volume variance**.
  16. Strawberry Mansion Company reported the following:

Item	Value
Standard quantity per unit	3 lbs
Standard price per pound	\$2.75
Actual pounds used	15000 lbs
Actual price per pound	\$3.00
Number of units produced	4900

What is the direct materials quantity variance?

- **825 unfavorable**

17. When actual hours exceed standard hours, the result is a(n) **unfavorable direct labor time variance**.
18. One major objective in setting standards is to **motivate employees to achieve efficient operations**.
19. The differences between standard costs and actual costs are called **cost variances**.
20. The direct materials cost variance is separated into which of the following two components?
  - **Price and quantity**
21. An income statement reporting variances from standard costs is **for internal use only**.
22. At the end of the period, the balance left in the factory overhead account is equal to the **total factory overhead cost variance**.
23. Standard costs may be used as a management tool to control costs by **either including standard costs and variances in the general ledger or controlling these costs separately**.
24. Which of the following statements about the reporting of variances is not true?
  - **Variances are reported to external financial statement users.**

## Practice Questions

### Direct Labor Variances

1. Bellingham Company produces a product that requires 4 standard direct labor hours per unit at a standard hourly rate of \$20 per hour. If 15,000 units used 61,800 hours at an hourly rate of \$19.85 per hour, what is the direct labor (a) rate variance, (b) time variance, and (c) cost variance? Enter a favorable variance as a negative number using a minus sign and an unfavorable variance as a positive number.
  1. Direct labor rate variance
    - $(19.85 - 20) * 61800 = \text{(9270) Favorable}$
  2. Direct labor time variance
    - $(61800 - 60000) * 20 = \text{36000 Unfavorable}$
  3. Direct labor cost variance
    - $(19.85 * 61800) - (20 * 60000) = \text{26730 Unfavorable}$
2. The following data relate to labor cost for production of 20,000 cellular telephones:

Item	Value
Actual:	8,450 hrs. at \$22.50
Standard:	8,400 hrs. at \$23.00

1. Determine the direct labor rate variance, direct labor time variance, and total direct labor cost variance. Enter a favorable variance as a negative number using a minus sign and an unfavorable variance as a positive number.
  - Rate variance:  $(22.5 - 23) * 8450 = \text{(4225) Favorable}$
  - Time variance:  $(8450 - 8400) * 23 = \text{1150 Unfavorable}$
  - Total direct labor cost variance:  $-4224 + 1150 = \text{(3075) Favorable}$
2. The employees may have been less-experienced or poorly trained, thereby resulting in a **lower** labor rate than planned. The lower level of experience or training may have resulted in **less** efficient performance. Thus, the actual time required was **more** than standard.

## Direct Materials Variances

3. Bellingham Company produces a product that requires 2.5 standard pounds per unit. The standard price is \$3.75 per pound. If 15,000 units used 36,000 pounds, which were purchased at \$4.00 per pound, what is the direct materials (a) price variance, (b) quantity variance, and (c) cost variance? Enter a favorable variance as a negative number using a minus sign and an unfavorable variance as a positive number.
1. Direct materials price variance
    - $(4 - 3.75) * 36000 = 9000 \text{ Unfavorable}$
  2. Direct materials quantity variance
    - $(36000 - 37500) * 3.75 = (5625) \text{ Favorable}$
  3. Direct materials cost variance
    - $(4 * 36000) - (3.75 * 37500) = 3375 \text{ Unfavorable}$
4. The following data relate to the direct materials cost for the production of 50,000 automobile tires:

Item	Value
Actual:	725,000 lbs. at \$3.00 per lb.
Standard:	730,000 lbs. at \$2.95 per lb.

1. Determine the direct materials price variance, direct materials quantity variance, and total direct materials cost variance. Enter a favorable variance as a negative number using a minus sign and an unfavorable variance as a positive number.
  - Direct Materials Price Variance:  $(3 - 2.95) * 725000 = 36250 \text{ Unfavorable}$
  - Direct Materials Quantity Variance:  $(725000 - 730000) * 2.95 = (14750) \text{ Favorable}$
  - Direct Materials Cost Variance:  $36250 - 14750 = 21500 \text{ Unfavorable}$
2. The direct materials price variance should normally be reported to the **Purchasing Department**. When lower amounts of direct materials are used because of production efficiencies, the variance would be reported to the **Production Supervisor**. When the favorable use of raw materials is caused by the purchase of higher-quality raw materials, the variance should be reported to the **Purchasing Department**.

## Direct Materials, Direct Labor, and Factory Overhead Cost Variance Analysis

5. Mackinaw Inc. processes a base chemical into plastic. Standard costs and actual costs for direct materials, direct labor, and factory overhead incurred for the manufacture of 40,000 units of product were as follows:

	Standard Costs	Actual Costs	
Direct materials	120,000 lbs. at \$3.20 per lb.	118,500 lbs. at \$3.25 per lb.	
Direct labor	12,000 hrs. at \$24.40 per hr.	11,700 hrs. at \$25.00 per hr.	
Factory overhead	Rates per direct labor hr., based on 100% of normal capacity of 15,000 direct labor hrs.:		
		Variable cost, \$8.00	\$91,200 variable cost
		Fixed cost, \$10.00	\$150,000 fixed cost

Each unit requires 0.3 hour of direct labor.

1. Determine the direct materials price variance, direct materials quantity variance, and total direct materials cost variance. Enter a favorable variance as a negative number using a minus sign and an unfavorable variance as a positive number.
  - Direct Materials Price Variance:  $(3.25 - 3.2) * 118500 = 5925 \text{ Unfavorable}$
  - Direct Materials Quantity Variance:  $(118500 - 120000) * 3.2 = (4800) \text{ Favorable}$
  - Direct Materials Cost Variance:  $5925 - 4800 = 1125 \text{ Unfavorable}$

2. Determine the direct labor rate variance, direct labor time variance, and total direct labor cost variance. Enter a favorable variance as a negative number using a minus sign and an unfavorable variance as a positive number.

- Direct Labor Rate Variance:  $(25 - 24.4) * 11700 = 7020 \text{ Unfavorable}$

Direct Labor Time Variance:  $(11700 - 12000) * 24.4 = (7320) \text{ Favorable}$

Direct Labor Cost Variance:  $-7320 + 7020 = (300) \text{ Favorable}$

3. Determine the variable factory overhead controllable variance, fixed factory overhead volume variance, and total factory overhead cost variance. Enter a favorable variance as a negative number using a minus sign and an unfavorable variance as a positive number.

- Variable factory overhead controllable variance:  $91200 - 96000 = (4800) \text{ Favorable}$

Fixed factory overhead volume variance:  $(15000 - 12000) * 10 = 30000 \text{ Unfavorable}$

Total factory overhead cost variance:  $-4800 + 30000 = 25200 \text{ Unfavorable}$

## Factory Overhead Controllable Variance

6. Bellingham Company produced 15,000 units of product that required 4 standard direct labor hours per unit. The standard variable overhead cost per unit is \$0.90 per direct labor hour. The actual variable factory overhead was \$52,770. Determine the variable factory overhead controllable variance. Enter a favorable variance as a negative number using a minus sign and an unfavorable variance as a positive number.

$$52770 - (.9 * 15000 * 4) = (1230) \text{ Favorable}$$

## Factory Overhead Variance Corrections

7. The data related to Shunda Enterprises Inc.'s factory overhead cost for the production of 100,000 units of product are as follows:

Actual:		
Variable factory overhead		\$458,000
Fixed factory overhead		494,000
Standard: 132,000 hrs. at \$7.30 (\$3.50 for variable factory overhead)		963,600

Productive capacity at 100% of normal was 130,000 hours, and the factory overhead cost budgeted at the level of 132,000 standard hours was \$956,000. Based on these data, the chief cost accountant prepared the following variance analysis:

Variable factory overhead controllable variance:			
Actual variable factory overhead cost incurred	\$458,000		
Budgeted variable factory overhead for 132,000 hours	(462,000)		
Variance—favorable			\$ (4,000)
Fixed factory overhead volume variance:			
Normal productive capacity at 100%	130,000	hrs.	
Standard for amount produced	(132,000)		
Productive capacity not used	2,000	hrs.	
Standard variable factory overhead rate	x \$7.30		
Variance—unfavorable			14,600
Total factory overhead cost variance—unfavorable			\$10,600

Compute the following to assist you in identifying the errors in the factory overhead cost variance analysis. Enter a favorable variance as a negative number using a minus sign and an unfavorable variance as a positive number. *Round your interim computations to the nearest cent, if required.*

◦

Variance	Amount	Favorable/Unfavorable
Variable Factory Overhead Controllable Variance	$458000 - 462000 = (4000)$	Favorable
Fixed Factory Overhead Volume Variance	$(132000 - 130000) * 3.8 = (7600)$	Favorable
Total Factory Overhead Cost Variance	$(458000 + 494000) - 963600 = (11600)$	Favorable

## Factory Overhead Volume Variance

8. Bellingham Company produced 15,000 units of product that required 4 standard direct labor hours per unit. The standard fixed overhead cost per unit is \$1.15 per direct labor hour at 58,000 hours, which is 100% of normal capacity. Determine the fixed factory overhead volume variance. Enter a favorable variance as a negative number using a minus sign and an unfavorable variance as a positive number.
- o  $1.15 * [58000 - (15000 * 4)] = (2300)$  **Favorable**

## Income Statement with Variances

9. Bellingham Company produces a product that requires 2.5 standard pounds per unit at a standard price of \$3.75 per pound. The company used 36,000 pounds to produce 15,000 units, which were purchased at \$4.00 per pound. Each unit requires 4 standard direct labor hours per unit at a standard hourly rate of \$20 per hour. For the 15,000 units produced, 61,800 hours were needed and employees were paid an hourly rate of \$19.85 per hour. The company uses a standard variable overhead cost per unit of \$0.90 per direct labor hour. Actual variable factory overhead was \$52,770. The company uses a standard fixed overhead cost per unit of \$1.15 per direct labor hour at 58,000 hours, which is 100% of normal capacity.

Prepare an income statement through gross profit for Bellingham Company for the month ending March 31. Assume Bellingham sold 15,000 units at \$172 per unit. For those boxes in which you must enter subtractive or negative numbers use a minus sign. If an amount box does not require an entry, leave it blank..

o

Bellingham Company Income Statement Through Gross Profit For the Month Ending March 31	<u>Favorable</u>	<u>Unfavorable</u>	
Sales			$15000 * 172 = 2580000$
Cost of goods sold-at standard			$(15000 * 2.5 * 3.75) + (15000 * 4 * 20) + [15000 * 4 * (.9 + 1.15)] = 1463625$
Gross profit-at standard			$2580000 - 1463625 = 1116375$
Variances from standard cost:			
Direct materials price		$(4 - 3.75) * 36000 = 9000$	
Direct materials quantity	$[36000 - (2.5 * 15000)] = -5625$		
Direct labor rate	$(19.85 - 20) * 61800 = -9270$		
Direct labor time		$[61800 - (15000 * 4)] * 20 = 36000$	
Factory overhead controllable	$52770 - (15000 * 4 * .9) = -1230$		
Factory overhead volume	$(1.15 * 58000) - (1.15 * 15000 * 4) = -2300$		
Net variances from standard cost-favorable			$9000 + 36000 - 5625 - 9270 - 1230 - 2300 = -26575$
Gross profit			\$1116375-26575=1089800

## Standard Cost Journal Entries

10. Bellingham Company produced 15,000 units that require 2.5 standard pounds per unit at a \$3.75 standard price per pound. The company actually used 36,000 pounds in production.

Journalize the entry to record the standard direct materials used in production. If an amount box does not require an entry, leave it blank.

o

Item		
Work in Process	$37500 * 3.75 = 140625$	
Direct Materials Quantity Variance		$(36000 - 37500) * 3.75 = 5625$
Materials		$36000 * 3.75 = 135000$

## Homework Exercises

1. In most businesses, cost standards are established principally by accountants.
  - o **False**
2. Standards are set for only direct labor and direct materials.
  - o **False**
3. Standards are designed to evaluate price and quantity variances separately.
  - o **True**
4. If the standard to produce a given amount of product is 1,000 units of direct materials at \$11 and the actual direct materials used are 800 units at \$12, the direct materials price variance is \$800 favorable.
  - o **False**
5. If the standard to produce a given amount of product is 600 direct labor hours at \$15 and the actual direct labor incurred is 600 hours at \$17, the direct labor rate variance is \$1,200 unfavorable.
  - o **True**
6. The variance from standard for factory overhead cost resulting from operating at a level above or below 100% of normal capacity is termed volume variance.
  - o **True**
7. Although favorable fixed factory overhead volume variances are usually good news, if inventory levels are too high, additional production could be harmful.
  - o **True**
8. At the end of the fiscal year, the variances from standard are usually transferred to the finished goods account.
  - o **False**
9. Standards can be used in nonmanufacturing settings where the tasks are nonrepetitive in nature.
  - o **False**
10. Subtracting actual revenues from planned revenues provides the revenue price variance.
  - o **False**

## Direct Labor Variances

11. Bellingham Company produces a product that requires 4 standard direct labor hours per unit at a standard hourly rate of \$22.00 per hour. If 2,800 units used 11,400 hours at an hourly rate of \$21.34 per hour, what is the direct labor (a) rate variance, (b) time variance, and (c) cost variance? Enter a favorable variance as a negative number using a minus sign and an unfavorable variance as a positive number.
  1. Direct labor rate variance
    - $(21.34 - 22) * 11400 = \text{7524 Favorable}$
  2. Direct labor time variance
    - $[11400 - (2800 * 4)] * 22 = \text{4400 Unfavorable}$
  3. Direct labor cost variance
    - $(21.34 * 11400) - [22 * (2800 * 4)] = \text{3124 Favorable}$
12. The following data relate to labor cost for production of 4,200 cellular telephones:

Item	Value
Actual:	2,870 hrs. at \$15.60
Standard:	2,820 hrs. at \$15.90

1. Determine the direct labor rate variance, direct labor time variance, and total direct labor cost variance. Enter a favorable variance as a negative number using a minus sign and an unfavorable variance as a positive number.
- Rate variance:  $(15.6 - 15.9) * 2870 = \textbf{(861) Favorable}$
  - Time variance:  $(2870 - 2820) * 15.9 = \textbf{795 Unfavorable}$
  - Total direct labor cost variance:  $-861 + 795 = \textbf{(66) Favorable}$

## Direct Materials, Direct Labor, and Factory Overhead Cost Variance Analysis

13. Mackinaw Inc. processes a base chemical into plastic. Standard costs and actual costs for direct materials, direct labor, and factory overhead incurred for the manufacture of 74,000 units of product were as follows:

	Standard Costs	Actual Costs	
Direct materials	244,200 lbs. at \$5.90	241,800 lbs. at \$5.70	
Direct labor	18,500 hrs. at \$17.40	18,930 hrs. at \$17.80	
Factory overhead	Rates per direct labor hr., based on 100% of normal capacity of 19,310 direct labor hrs.:		
		Variable cost, \$4.50	\$82,420 variable cost
		Fixed cost, \$7.10	\$137,101 fixed cost

Each unit requires 0.25 hour of direct labor.

1. Determine the direct materials price variance, direct materials quantity variance, and total direct materials cost variance. Enter a favorable variance as a negative number using a minus sign and an unfavorable variance as a positive number.
- Direct Materials Price Variance:  $(5.7 - 5.9) * 241800 = \textbf{(48360) Favorable}$
  - Direct Materials Quantity Variance:  $(241800 - 244200) * 5.9 = \textbf{(14160) Favorable}$
  - Total Direct Materials Cost Variance:  $-48360 - 14160 = \textbf{(62520) Favorable}$
2. Determine the direct labor rate variance, direct labor time variance, and total direct labor cost variance. Enter a favorable variance as a negative number using a minus sign and an unfavorable variance as a positive number.
- Direct Labor Rate Variance:  $(17.8 - 17.4) * 18930 = \textbf{7572 Unfavorable}$
  - Direct Labor Time Variance:  $(18930 - 18500) * 17.4 = \textbf{7482 Unfavorable}$
  - Total Direct Labor Cost Variance:  $7572 + 7482 = \textbf{15054 Unfavorable}$
3. Determine the variable factory overhead controllable variance, fixed factory overhead volume variance, and total factory overhead cost variance. Enter a favorable variance as a negative number using a minus sign and an unfavorable variance as a positive number.
- Variable factory overhead controllable variance:  $82420 - (18500 * 4.5) = \textbf{(830) Favorable}$
  - Fixed factory overhead volume variance:  $(19310 - 18500) * 7.1 = \textbf{5751 Unfavorable}$
  - Total factory overhead cost variance:  $-830 + 5751 = \textbf{4921 Unfavorable}$

## Direct Materials Variances

14. Bellingham Company produces a product that requires 14 standard pounds per unit. The standard price is \$4.5 per pound. If 4,800 units used 69,200 pounds, which were purchased at \$4.73 per pound, what is the direct materials (a) price variance, (b) quantity variance, and (c) cost variance? Enter a favorable variance as a negative number using a minus sign and an unfavorable variance as a positive number.
1. Direct materials price variance
- $(4.73 - 4.5) * 69200 = \textbf{15916 Unfavorable}$

2. Direct materials quantity variance  
    ■  $[69200 - (14 * 4800)] * 4.5 = 9000 \text{ Unfavorable}$
3. Direct materials cost variance  
    ■  $(4.73 * 69200) - [4.5 * (14 * 4800)] = 24916 \text{ Unfavorable}$
15. The following data relate to the direct materials cost for the production of 2,000 automobile tires:

Item	Value
Actual:	53,400 lbs. at \$2 per lb.
Standard:	52,300 lbs. at \$2.05 per lb.

1. Determine the direct materials price variance, direct materials quantity variance, and total direct materials cost variance. Enter a favorable variance as a negative number using a minus sign and an unfavorable variance as a positive number.
- Direct Materials Price Variance:  $(2 - 2.05) * 53400 = 2670 \text{ Favorable}$
  - Direct Materials Quantity Variance:  $(53400 - 52300) * 2.05 = 2255 \text{ Unfavorable}$
  - Total Direct Materials Cost Variance:  $-2670 + 2255 = 415 \text{ Favorable}$
2. The direct materials price variance should normally be reported to the **Purchasing Department**. When lower amounts of direct materials are used because of production efficiencies, the variance would be reported to the **Production Supervisor**. When the favorable use of raw materials is caused by the purchase of higher-quality raw materials, the variance should be reported to the **Purchasing Department**.

## Factory Overhead Controllable Variance

16. Bellingham Company produced 6,000 units of product that required 6.5 standard direct labor hours per unit. The standard variable overhead cost per unit is \$4.00 per direct labor hour. The actual variable factory overhead was \$158,810. Determine the variable factory overhead controllable variance. Enter a favorable variance as a negative number using a minus sign and an unfavorable variance as a positive number.
- $158810 - (4 * 6000 * 6.5) = 2810 \text{ Unfavorable}$

## Factory Overhead Variance Corrections

17. The data related to Shunda Enterprises Inc.'s factory overhead cost for the production of 40,000 units of product are as follows:

Actual:		
	Variable factory overhead	\$175,100
	Fixed factory overhead	126,300
Standard:	61,000 hrs. at \$5 (\$2.90 for variable factory overhead)	305,000

Productive capacity at 100% of normal was 60,200 hours, and the factory overhead cost budgeted at the level of 61,000 standard hours was \$303,200. Based on these data, the chief cost accountant prepared the following variance analysis:

<b>Variable factory overhead controllable variance:</b>			
Actual variable factory overhead cost incurred	\$175,100		
Budgeted variable factory overhead for 61,000 hours	(176,900)		
Variance—favorable			\$1,800)
Fixed factory overhead volume variance:			
Normal productive capacity at 100%	60,200	hrs.	
Standard for amount produced	(61,000)		
Productive capacity not used	800	hrs.	
Standard variable factory overhead rate	x \$5		
Variance—unfavorable			4,000
Total factory overhead cost variance—unfavorable			\$2,200

Compute the following to assist you in identifying the errors in the factory overhead cost variance analysis. Enter a favorable variance as a negative number using a minus sign and an unfavorable variance as a positive number. *Round your interim computations to the nearest cent, if required.*

o

Variance	Amount	Favorable/Unfavorable
Variable Factory Overhead Controllable Variance	175100 – 176900 = (1800)	Favorable
Fixed Factory Overhead Volume Variance	(61000 – 60200) * (5 – 2.9) = (1680)	Favorable
Total Factory Overhead Cost Variance	–1800 – 1680 = (3480)	Favorable

## Factory Overhead Volume Variance

18. Bellingham Company produced 3,400 units of product that required 1.5 standard direct labor hours per unit. The standard fixed overhead cost per unit is \$2.40 per direct labor hour at 4,600 hours, which is 100% of normal capacity. Determine the fixed factory overhead volume variance. Enter a favorable variance as a negative number using a minus sign and an unfavorable variance as a positive number.
- o  $2.4 * [4600 - (3400 * 1.5)] = (1200)$  **Favorable**

## Standard Cost Journal Entries

19. Bellingham Company produced 4,900 units that require nine standard pounds per unit at a \$5.5 standard price per pound. The company actually used 45,000 pounds in production.

Journalize the entry to record the standard direct materials used in production. If an amount box does not require an entry, leave it blank.

o

Item	Debit	Credit
Work in Process	$(4900 * 9) * 5.5 = 242550$	
Direct Materials Quantity Variance	$[(4900 * 9) - 45000] * 5.5 = 4950$	
Materials		$45000 * 5.5 = 247500$

## Quiz

1. The standard costs and actual costs for factory overhead for the manufacture of 2,500 units of actual production are as follows:

	<b>Standard Costs</b>
Fixed overhead (based on 10,000 hours)	3 hours per unit at \$0.80 per hour
Variable overhead	3 hours per unit at \$2.00 per hour
Actual Costs	
Total variable cost, \$18,000	
Total fixed cost, \$8,000	

The variable factory overhead controllable variance is  $18000 - 15000 = \text{3000 unfavorable}$ .

2. Assuming that the standard fixed overhead rate is based on full capacity, the cost of available but unused productive capacity is indicated by the **fixed factory overhead volume variance**.
3. The standard costs and actual costs for direct labor in the manufacture of 2,500 units of product are as follows:

<b>Standard Costs</b>	
Direct labor	7,500 hours at \$11.80
Actual Costs	
Direct labor	7,400 hours at \$11.40

The direct labor time variance is  $(7400 - 7500) * 11.8 = \text{1180 favorable}$ .

4. Jaxson Corporation has the following data related to direct labor costs for September: actual costs for 10,200 hours at \$15.75 per hour and standard costs for 10,800 hours at \$15.50 per hour.
- The direct labor time variance is  $(10200 - 10800) * 15.5 = \text{9300 favorable}$ .
5. If the actual quantity of direct materials used in producing a commodity differs from the standard quantity, the variance is a **quantity variance**.
6. The following data are given for Stringer Company:

Item	Value
Budgeted production	26,000 units
Actual production	27,500 units
Materials:	
Standard price per ounce	\$6.50
Standard ounces per completed unit	8
Actual ounces purchased and used in production	228,000
Actual price paid for materials	\$1,504,800
Labor:	
Standard hourly labor rate	\$22 per hour
Standard hours allowed per completed unit	6.6
Actual labor hours worked	183,000
Actual total labor costs	\$4,020,000
Overhead:	
Actual and budgeted fixed overhead	\$1,029,600
Standard variable overhead rate	\$24.50 per standard labor hour
Actual variable overhead costs	\$4,520,000

Overhead is applied on standard labor hours. (Round interim calculations to the nearest cent.)

The direct materials quantity variance is  $[228000 - (27500 * 8)] * 6.5 = 52000 \text{ unfavorable}$ .

7. Standard costs are divided into which of the following components?

- **standard price and standard quantity**

8. The following data relate to direct labor costs for the current period:

Item	Value
Standard costs	6,000 hours at \$12.00
Actual costs	7,500 hours at \$11.40

The direct labor rate variance is  $(11.4 - 12) * 7500 = 4500 \text{ favorable}$ .

9. The principle of exceptions allows managers to focus on correcting variances between **standard costs and actual costs**.

10. Accounting systems that use standards for product costs are called variable cost systems.

- **False**

11. The following data relate to direct labor costs for March:

Rate: standard, \$12.00; actual, \$12.25

Hours: standard, 18,500; actual, 17,955

Units of production: 9,450

The total direct labor variance is  $[(17955 - 18500) * 12] + [(12.25 - 12) * 17955] = 2051.25 \text{ favorable}$ .

12. The following data relate to direct materials costs for February:

Materials cost per yard: standard, \$2.00; actual, \$2.10

Yards per unit: standard, 4.5 yards; actual, 4.75 yards

Units of production: 9,500

The direct materials price variance is  $(2.1 - 2) * (4.75 * 9500) = 4512.5 \text{ unfavorable}$ .

13. The direct materials price variance is the difference between the **actual costs and the actual quantity at the standard price**.
14. Which of the following is *not* a reason for a direct materials quantity variance?
  - **increased material cost per unit**
15. The total manufacturing cost variance is **the difference between total actual costs and total standard costs for the units produced**.
16. The unfavorable volume variance may be due to all of the following factors *except* **unexpected increases in the cost of utilities**.
17. The following data are given for Harry Company:

Item	Value
Budgeted production	26,000 units
Actual production	27,500 units
Materials:	
Standard price per ounce	\$6.50
Standard ounces per completed unit	8
Actual ounces purchased and used in production	228,000
Actual price paid for materials	\$1,504,800
Labor:	
Standard hourly labor rate	\$22.00 per hour
Standard hours allowed per completed unit	6.6
Actual labor hours worked	183,000
Actual total labor costs	\$4,020,000
Overhead:	
Actual and budgeted fixed overhead	\$1,029,600
Standard variable overhead rate	\$24.50 per standard labor hour
Actual variable overhead costs	\$4,520,000

Overhead is applied on standard labor hours. (Round interim calculations to the nearest cent.)

The direct labor time variance is  $[183000 - (6.6 * 27500)] * 22 = \textbf{33000 unfavorable}$ .

18. The following data relate to direct labor costs for August: actual costs for 5,500 hours at \$24.00 per hour and standard costs for 5,000 hours at \$23.70 per hour.

The direct labor rate variance is  $(24 - 23.7) * 5500 = \textbf{1650 unfavorable}$ .

19. St. Augustine Corporation originally budgeted for \$360,000 of fixed overhead at 100% of normal production capacity. Production was budgeted to be 12,000 units. The standard hours for production were 5 hours per unit. The variable overhead rate was \$3 per hour. Actual fixed overhead was \$360,000, and actual variable overhead was \$170,000. Actual production was 11,700 units.

The fixed factory overhead volume variance is  $[(12000 * 5) - (11700 * 5)] * \frac{360000}{5*12000} = \textbf{9000 unfavorable}$ .

20. Which of the following conditions normally would *not* indicate that standard costs should be revised?

- **Actual costs differed from standard costs for the preceding week.**

## Chapter 24

### Pre-Lecture Video

1. In a centralized company, all major planning and operating decisions are made by **top management**.
2. All of the following are considered advantages of decentralized operations *except* that it **duplicates assets and expenses**.
3. All of the following are types of responsibility centers *except* **fulfillment centers**.

4. Investment centers have the responsibility for **costs, revenues, investments in assets**.
5. The total direct materials cost variance is equal to the **direct materials price variance** and the **direct materials quantity variance**.
6. Service department charges are computed by **service usage multiplied by the service department charge rate**.
7. Operations of individual profit centers should be evaluated across **time and against its budget**.
8. The return on investment (ROI) is computed as **operating income divided by invested assets**.
9. When comparing Return on Investment (ROI) over time, a favorable trend would be **an increase in ROI**.
10. The excess of operating income over a minimum acceptable Operating Income is called **residual income**.
11. The three common approaches to setting transfer prices include all of the following *except* the **preferred price** approach.
12. Using the **market price** approach, the transfer price will be the price at which the product or service transferred could be sold to outside buyers.
13. The **negotiated price** approach allows the managers to agree among themselves on a transfer price.

## Mini Quiz

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1. The following information is for Blueberry Pie Company. What is the residual income if the minimum acceptable operating income as a percent of assets is 12%?

Item	Value
Sales	\$4,300,000
Costs and expenses	2,700,000
Invested assets	10,000,000

- $(4300000 - 2700000) - (10000000 * 12\%) = 400000$
2. The ratio of operating income to sales is referred to as **profit margin**.
3. The transfer price approach that would be used by two related companies if the supplying company is currently using all its capacity and can sell to outside customers is the **market price** approach.
4. According to the DuPont formula, the two factors that affect the rate earned on total assets are **profit margin and investment turnover**.
5. Transfer prices **may be used for cost, profit, and investment centers, are used to motivate managers, and can be set as low as variable costs**.
6. Bright Times Company manufactures table lamps. It purchases 50,000 light bulbs from an outside supplier for \$0.60 per unit. Neon Company, a sister company, makes the same light bulb. Currently, Neon has excess production of 70,000 units. Each light bulb is sold for \$0.60 per unit and has a variable cost of \$0.25. Using the negotiated approach, what is the increase in income for Neon Company if the negotiated price between Bright Times and Neon is \$0.45?
  - $(.45 * 50000) - (.25 * 50000) = 10000$
7. Which of the following is a disadvantage of decentralization?
  - **Decisions made by one manager may not be the best decision for the entire company.**
8. A manager of a cost center has responsibility for **costs only**.
9. Kahle Company has two support departments: Purchasing and Payroll. The Purchasing Department expense is \$500,000 to process 50,000 purchase requisitions, which are the cost driver for the department. The Payroll Department expense is \$300,000 to process 25,000 payroll checks, which are the cost driver for the department. The Purchasing Department allocation rate is  $\frac{500000}{50000} = 10$
10. The centralized Purchasing Department for Ridgewood, Inc., has monthly expenses of \$42,000. The department has prepared 3,500 purchase requisitions this month. Division L initiated 700 purchases, and Division G initiated 500 purchases. How much should Division G be charged for purchases?
  - $\frac{42000}{3500} * 500 = 6000$
11. Divisional operating income should be compared **over time to a budget**.
12. Which of the following would not be considered a service department?
  - **A production department**
13. Which of the following is considered a responsibility center?
  - **Cost, profit, and investment**
14. Responsibility accounting reports for higher-level managers are **more summarized than those** for lower-level managers.

## Practice Exercises

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## Budgetary Performance for Cost Center

1. Vinton Company's costs were under budget by \$36,000. The company is divided into North and South regions. The North Region's costs were over budget by \$45,000.

Determine the amount that the South Region's costs were over or under budget.

- $36000 + 45000 = 81000 \text{ under budget}$

## Divisional Performance Analysis and Evaluation

2. The vice president of operations of Recycling Industries is evaluating the performance of two divisions organized as investment centers. Invested assets and condensed income statement data for the past year for each division are as follows:

	<b>Business Division</b>	<b>Consumer Division</b>
Sales	\$42,800,000	\$56,000,000
Cost of goods sold	23,500,000	30,500,000
Operating expenses	11,424,800	14,300,000
Invested assets	34,240,000	70,000,000

*Required:*

1. Prepare condensed divisional income statements for the year ended December 31, 20Y8, assuming that there were no support department allocations.

<b>Recycling Industries Divisional Income Statements For the Year Ended December 31, 20Y8</b>	<b>Business Division</b>	<b>Consumer Division</b>
Sales	42800000	56000000
Cost of goods sold	-23500000	-30500000
Gross profit	$42800000 - 23500000 = 19300000$	$56000000 - 30500000 = 25500000$
Operating expenses	-11424800	-14300000
Operating income	$19300000 - 11424800 = 7875200$	$25500000 - 14300000 = 11200000$

2. Using the DuPont formula for return on investment, determine the profit margin, investment turnover, and return on investment for each division. *Round percentages to one decimal place and the investment turnover to two decimal places.*

<b>Division</b>	<b>Profit Margin</b>	<b>Investment Turnover</b>	<b>ROI</b>
Business Division	$\frac{7875200}{42800000} = 18.4\%$	$\frac{42800000}{34240000} = 1.25$	$\frac{7875200}{42800000} * \frac{42800000}{34240000} = 23\%$
Consumer Division	$\frac{11200000}{56000000} = 18.4\%$	$\frac{56000000}{70000000} = .8$	$\frac{11200000}{56000000} * \frac{56000000}{70000000} = 16\%$

3. If management desires a minimum acceptable return on investment of 10%, determine the residual income for each division.

	<b>Residual Income</b>
Business Division	$7875200 - (34240000 * 10\%) = 4451200$
Consumer Division	$11200000 - (70000000 * 10\%) = 4200000$

4. On the basis of operating income, the **Consumer** Division is the more profitable of the two divisions. However, operating income **does not** consider the amount of invested assets in each division. On the basis of residual income, the **Business** Division is the more profitable of the two divisions.
3. The vice president of operations of Free Ride Bike Company is evaluating the performance of two divisions organized as investment centers. Invested assets and condensed income statement data for the past year for each division are as follows:

	<b>Road Bike Division</b>	<b>Mountain Bike Division</b>
Sales	\$1,728,000	\$1,760,000
Cost of goods sold	1,380,000	1,400,000
Operating expenses	175,200	236,800
Invested assets	1,440,000	800,000

*Required:*

1. Prepare condensed divisional income statements for the year ended December 31, 20Y7, assuming that there were no support department allocations.

<b>Free Ride Bike Company Divisional Income Statements For the Year Ended December 31, 20Y7</b>	<b>Road Bike Division</b>	<b>Mountain Bike Division</b>
Sales	1728000	1760000
Cost of goods sold	-1380000	-1400000
Gross profit	1728000 - 1380000 = 348000	1760000 - 1400000 = 360000
Operating expenses	-175200	-236800
Operating income	348000 - 175200 = 172800	360000 - 236800 = 123200

2. Using the DuPont formula for return on investment, determine the profit margin, investment turnover, and rate of return on investment for each division. *If required, round your answers to one decimal place.*

<b>Division</b>	<b>Profit Margin</b>	<b>Investment Turnover</b>	<b>ROI</b>
Road Bike Division	$\frac{172800}{1728000} = 10\%$	$\frac{1728000}{1440000} = 1.2$	$\frac{172800}{1728000} * \frac{1728000}{1440000} = 12\%$
Mountain Bike Division	$\frac{123200}{1760000} = 7\%$	$\frac{1760000}{800000} = 2.2$	$\frac{123200}{1760000} * \frac{1760000}{800000} = 15.4\%$

3. If management's minimum acceptable return on investment is 10%, determine the residual income for each division.

	<b>Residual Income</b>
Road Bike Division	$172800 - (1440000 * 10\%) = 28800$
Mountain Bike Division	$123200 - (800000 * 10\%) = 43200$

4. On the basis of operating income, the **Road Bike** Division is the more profitable of the two divisions. However, operating income **does not** consider the amount of invested assets in each division. On the basis of residual income, the **Mountain Bike** Division is the more profitable of the two divisions.

## Operating Income for Profit Center

4. The centralized computer technology department of Hardy Company has expenses of \$320,000. The department has provided a total of 4,000 hours of service for the period. The Retail Division has used 2,750 hours of computer technology service during the period, and the Commercial Division has used 1,250 hours of computer technology service. Additional data for the two divisions is following below:

	<b>Retail Division</b>	<b>Commercial Division</b>
Sales	\$2,150,000	\$1,200,000
Cost of goods sold	1,300,000	800,000
Selling expenses	150,000	175,000

Determine the divisional operating income for the Retail Division and the Commercial Division. Do not round interim calculations.

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Hardy Company Divisional Operating Income	Retail Division	Commercial Division
Sales	2150000	1200000
Cost of goods sold	-1300000	-800000
Gross profit	$215000 - 1300000 = 850000$	$1200000 - 800000 = 400000$
Selling expenses	-150000	-175000
Operating income before service department charges	$850000 - 150000 = 700000$	$400000 - 175000 = 225000$
Service department charges	$-\frac{2750}{4000} * 320000 = -220000$	$-\frac{1250}{4000} * 320000 = -100000$
Operating income	$700000 - 220000 = 480000$	$225000 - 100000 = 125000$

## Profit Margin, Investment Turnover, and ROI

5. Briggs Company has operating income of \$36,000, invested assets of \$180,000, and sales of \$720,000. Use the DuPont formula to compute the return on investment.
1. Profit margin
    - $\frac{36000}{720000} = 5\%$
  2. Investment turnover
    - $\frac{720000}{180000} = 4$
  3. Return on investment
    - $5\% * 4 = 20\%$

## Residual Income

6. The Commercial Division of Galena Company has operating income of \$12,680,000 and assets of \$74,500,000. The minimum acceptable return on assets is 12%.
- What is the residual income for the division?
- $12680000 - (74500000 * 12\%) = 3740000$

## Support Department Allocations

7. The centralized computer technology department of Hardy Company has expenses of \$320,000. The department has provided a total of 4,000 hours of service for the period. The Retail Division has used 2,750 hours of computer technology service during the period, and the Commercial Division has used 1,250 hours of computer technology service.
- How much should each division be allocated for computer technology department services? Do not round interim calculations.
- Retail Division:  $\frac{2750}{4000} * 320000 = 220000$
  - Commercial Division:  $\frac{1250}{4000} * 320000 = 100000$

## Transfer Pricing

8. The materials used by the Multnomah Division of Isbister Company are currently purchased from outside suppliers at \$90 per unit. These same materials are produced by the Pembroke Division. The Pembroke Division can produce the materials needed by the Multnomah Division at a variable cost of \$75 per unit. The division is currently producing 120,000 units and has capacity of 150,000 units. The two divisions have recently negotiated a transfer price of \$82 per unit for 15,000 units.
- By how much will each division's income increase as a result of this transfer?
- Pembroke Division:  $(82 - 75) * 15000 = 105000$
  - Multnomah Division:  $(90 - 82) * 15000 = 120000$

## Homework Exercises

1. The primary disadvantage of decentralized operations is that decisions made by one manager may affect other managers in such a way that the profitability of the entire company may suffer.
  - True
2. A responsibility center in which the department manager has responsibility for and authority over costs, revenues, and assets invested in the department is termed a cost center.

- **False**
3. Operating expenses directly traceable to or incurred for the sole benefit of a specific department and usually subject to the control of the department manager are termed direct operating expenses.
- **True**
4. The rates at which centralized services are charged to each division are called support department allocation rates.
- **True**
5. The return on investment may be computed by multiplying investment turnover by the profit margin.
- **True**
6. A manager is responsible for costs only in a(n) **cost center**.
7. Which of the following is a measure of a cost center manager's performance?
- **budget performance report**
8. Division A reported operating income of \$975,000 and total support department allocations of \$675,000. As a result, **operating income before support department allocations was \$1,650,000**.
9. ABC Corporation has three support departments with the following costs and cost drivers:

<b>Support Department</b>	<b>Cost</b>	<b>Cost Driver</b>
Graphics Production	\$200,000	number of copies made
Accounting	500,000	number of invoices processed
Personnel	400,000	number of employees

ABC has three operating divisions, Micro, Macro, and Super. Their revenue, cost, and activity information are as follows:

	<b>Micro</b>	<b>Macro</b>	<b>Super</b>
Revenues	\$700,000	\$850,000	\$650,000
Direct operating expenses	50,000	70,000	100,000
Number of copies made	20,000	30,000	50,000
Number of invoices processed	700	800	500
Number of employees	130	145	125

The operating income of the Micro Division after all support department allocations will be 305000

10. A responsibility center in which the department manager is responsible for costs, revenues, and assets for a department is called a(n) **investment center**.

## Budgetary Performance for Cost Center

11. Cumming Company's costs were over budget by \$24,000. The company is divided into North and South regions. The North Region's costs were under budget by \$1,900.

Determine the amount that the South Region's costs were over or under budget.

- $24000 + 1900 = \text{25900 over budget}$

## Profit Margin, Investment Turnover, and ROI

12. Briggs Company has operating income of \$16,170, invested assets of \$70,000, and sales of \$147,000. Use the DuPont formula to compute the return on investment. If required, round your answers to two decimal places.

1. Profit margin:  $\frac{16170}{147000} = 11\%$

2. Investment turnover:  $\frac{147000}{70000} = 2.1$

3. Return on investment:  $11\% * 2.1 = 23.1\%$

## Residual Income

13. The Commercial Division of Galena Company has operating income of \$138,500 and assets of \$541,000. The minimum acceptable return on assets is 8%.

What is the residual income for the division?

- $138500 - (541000 * 8\%) = 95220$

## Support Department Allocations

14. The centralized computer technology department of Hardy Company has expenses of \$183,400. The department has provided a total of 13,100 hours of service for the period. The Retail Division has used 5,371 hours of computer technology service during the period, and the Commercial Division has used 7,729 hours of computer technology service.

How much should each division be allocated for computer technology department services? Do not round interim calculations.

- Retail Division:  $\frac{5371}{13100} * 183400 = 75194$

- Commercial Division:  $\frac{7729}{13100} * 183400 = 108206$

## Quiz

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1. Responsibility accounting reports for profit centers will include **revenues, expenses, and operating income or loss**.

2. All of the following are advantages of decentralization:

- **expertise in all areas of the business is difficult; decentralization makes it better to delegate certain responsibilities managers make better decisions when closer to the operations of the company decentralized managers can respond quickly to customer needs**

3. Blaser Corporation had \$275,000 in invested assets, sales of \$330,000, operating income amounting to \$33,000, and a desired minimum return on investment of 7.5%. The return on investment for Blaser Corporation is

Round the percentage to one decimal place.

- $\frac{33000}{275000} = 12\%$

4. In an investment center, the manager has responsibility and authority for making decisions that affect **costs, revenues, and assets**.

5. The best measure of managerial efficiency in the use of investments in assets is **investment turnover**.

6. Mason Corporation had \$650,000 in invested assets, sales of \$700,000, operating income amounting to \$99,000, and a desired minimum return on investment of 15%.

The residual income for Mason Corporation is  $99000 - (650000 * 15\%) = 1500$

7. A manager is responsible for costs only in a(n) **cost center**.

8. Chicks Corporation had \$1,100,000 in invested assets, sales of \$1,210,000, operating income amounting to \$302,500, and a desired minimum return on investment of 15%.

The investment turnover for Chicks Corporation is  $\frac{1210000}{1100000} = 1.1$

9. The costs of services charged to a profit center on the basis of its use of those services are **support department allocations**.

10. Businesses that are separated into two or more manageable units in which managers have authority and responsibility for operations are said to be **decentralized**.

11. Assume that divisional operating income amounts to \$215,000 and top management has established 15% as the minimum return on divisional assets totaling \$1,000,000. The residual income for the division is  $215000 - (1000000 * 15\%) = 65000$

12. The formula for the return on investment (ROI) is  $\frac{\text{operating income}}{\text{invested assets}}$

13. ABC Corporation has three support departments with the following costs and cost drivers:

Support Department	Cost	Cost Driver
Graphics Production	\$200,000	number of copies made
Accounting	500,000	number of invoices processed
Personnel	400,000	number of employees

ABC has three operating divisions, Micro, Macro, and Super. Their revenue, cost, and activity information are as follows:

	<b>Micro</b>	<b>Macro</b>	<b>Super</b>
Revenues	\$700,000	\$850,000	\$650,000
Direct operating expenses	50,000	70,000	100,000
Number of copies made	20,000	30,000	50,000
Number of invoices processed	700	800	500
Number of employees	130	145	125

The support department allocation rate for Graphics Production is  $\frac{200000}{20000+30000+50000} = 2$

14. Managers of what type of decentralized units have authority and responsibility for revenues, costs, and assets invested in the unit?
  - o **investment center**
15. For higher levels of management, responsibility accounting reports **are more summarized than for lower levels of management.**
16. Separation of businesses into more manageable operating units is termed decentralization.
  - o **True**
17. In a profit center, the manager has responsibility and authority for making decisions that affect **revenues**.
18. Clydesdale Company has sales of \$4,500,000, invested assets of \$2,000,000, and operating expenses of \$3,600,000. The company has established a minimum return on investment of 7%.
 

Clydesdale Company's investment turnover is  $\frac{4500000}{2000000} = 2.25$
19. The Central Division of Nebraska Company has a return on investment of 28% and a profit margin of 14%. The investment turnover is  $\frac{.28}{.14} = 2$
20. Division D of Saunders Company has sales of \$350,000, cost of goods sold of \$120,000, operating expenses of \$58,000, and invested assets of \$150,000.
 

The return on investment (ROI) for Division D is  $\frac{350000 - 120000 - 58000}{150000} = 114.7\%$

## Chapters 22-24 Exam

### Review

1. The standard costs and actual costs for direct materials for the manufacture of 3,000 actual units of product are as follows:

<b>Standard Costs</b>	
Direct materials	1,040 kilograms at \$8.75
<b>Actual Costs</b>	
Direct materials	2,000 kilograms at \$8.00

The direct materials price variance is  $(8 - 8.75) * 2000 = \mathbf{1500 \text{ favorable}}$

2. If the actual direct labor hours spent producing a commodity differ from the standard hours, the variance is a **time** variance.
3. The following data relate to direct labor costs for February:

<b>Item</b>	<b>Value</b>
Actual costs	7,700 hours at \$14.00
Standard costs	7,000 hours at \$16.00

The direct labor rate variance is  $(14 - 16) * 7700 = \mathbf{15400 \text{ favorable.}}$

4. The standard factory overhead rate is  $7.50 \text{ per machine hour}$  ( $6.20$  for variable factory overhead and  $\$1.30$  for fixed factory overhead) based on 100% of normal capacity of 80,000 machine hours. The standard cost and the actual cost of factory overhead for the production of 15,000 units during August were as follows:

Actual:		
	Variable factory overhead	\$360,000
	Fixed factory overhead	104,000
Standard hours allowed for units produced:	60,000 hours	

The fixed factory overhead volume variance is  $(80000 - 60000) * 1.3 = 26000$

5. The term used to describe expenses that are incurred by a specific department is **direct operating** expenses.  
 6. ABC Corporation has three support departments with the following costs and cost drivers:

Support Department	Cost	Cost Driver
Graphics Production	\$200,000	number of copies made
Accounting	500,000	number of invoices processed
Personnel	400,000	number of employees

ABC has three operating divisions, Micro, Macro, and Super. Their revenue, cost, and activity information are as follows:

	Micro	Macro	Super
Revenues	\$700,000	\$850,000	\$650,000
Direct operating expenses	50,000	70,000	100,000
Number of copies made	20,000	30,000	50,000
Number of invoices processed	700	800	500
Number of employees	130	145	125

The support department allocation rate for Graphics Production is  $\frac{200000}{20000+30000+50000} = 2.00$

7. Clydesdale Company has sales of \$4,500,000, invested assets of \$2,000,000, and operating expenses of \$3,600,000. The company has established a minimum return on investment of 7%.  
 Clydesdale Company's residual income is  $4500000 - 3600000 - (2000000 * 7\%) = 760000$   
 8. The excess of divisional operating income over a minimum acceptable amount of divisional operating income is **residual income**.  
 9. Investment centers differ from profit centers in that they **are able to invest in assets**.  
 10. Motorcycle Manufacturers, Inc., projected sales of 78,000 machines for the year. The estimated January 1 inventory is 6,500 units, and the desired December 31 inventory is 6,000 units. The budgeted production for the year is  $78000 + 6000 - 6500 = 77500$

## Direct Materials, Direct Labor, and Factory Overhead Cost Variance Analysis

11. Mackinaw Inc. processes a base chemical into plastic. Standard costs and actual costs for direct materials, direct labor, and factory overhead incurred for the manufacture of 40,000 units of product were as follows:

	<b>Standard Costs</b>	<b>Actual Costs</b>	
Direct materials	238,000 lbs. at \$4.80 per lb.	235,600 lbs. at \$4.60 per lb.	
Direct labor	17,500 hrs. at \$17.90 per hr.	17,900 hrs. at \$18.20 per hr.	
Factory overhead	Rates per direct labor hr., based on 100% of normal capacity of 18,260 direct labor hrs.:		
	Variable cost, \$2.90	\$50,240 variable cost	
	Fixed cost, \$4.60	\$83,996 fixed cost	

Each unit requires 0.25 hour of direct labor.

- Determine the direct materials price variance, direct materials quantity variance, and total direct materials cost variance. Enter a favorable variance as a negative number using a minus sign and an unfavorable variance as a positive number.
  - Direct Materials Price Variance:  $(4.6 - 4.8) * 235600 = \textbf{(47120) Favorable}$
  - Direct Materials Quantity Variance:  $(235600 - 238000) * 4.8 = \textbf{(11520) Favorable}$
  - Direct Materials Cost Variance:  $-47120 - 11520 = \textbf{(58640) Favorable}$
- Determine the direct labor rate variance, direct labor time variance, and total direct labor cost variance. Enter a favorable variance as a negative number using a minus sign and an unfavorable variance as a positive number.
  - Direct Labor Rate Variance:  $(18.2 - 17.9) * 17900 = \textbf{5370 Unfavorable}$
  - Direct Labor Time Variance:  $(17900 - 17500) * 17.9 = \textbf{7160 Unfavorable}$
  - Direct Labor Cost Variance:  $7160 + 5370 = \textbf{12530 Unfavorable}$
- Determine the variable factory overhead controllable variance, fixed factory overhead volume variance, and total factory overhead cost variance. Enter a favorable variance as a negative number using a minus sign and an unfavorable variance as a positive number.
  - Variable factory overhead controllable variance:  $50240 - (70000 * .25) = \textbf{(510) Favorable}$
  - Fixed factory overhead volume variance:  $(18260 - [70000 * .25]) * 4.6 = \textbf{3496 Unfavorable}$
  - Total factory overhead cost variance:  $-510 + 3496 = \textbf{2986 Unfavorable}$

## Divisional Performance Analysis and Evaluation

- The vice president of operations of Free Ride Bike Company is evaluating the performance of two divisions organized as investment centers. Invested assets and condensed income statement data for the past year for each division are as follows:

	<b>Road Bike Division</b>	<b>Mountain Bike Division</b>
Sales	\$5,880,000	\$6,300,000
Cost of goods sold	2,587,000	2,961,000
Operating expenses	2,234,600	2,331,000
Invested assets	4,900,000	4,500,000

*Required:*

- Prepare condensed divisional income statements for the year ended December 31, 20Y7, assuming that there were no support department allocations.

<b>Free Ride Bike Company Divisional Income Statements For the Year Ended December 31, 20Y7</b>	<b>Road Bike Division</b>	<b>Mountain Bike Division</b>
Sales	5880000	6300000
Cost of goods sold	-2587000	-2961000
Gross profit	$5880000 - 2587000 = 3293000$	$6300000 - 2961000 = 3339000$
Operating expenses	-2234600	-2331000
Operating income	$3293000 - 2234600 = 1058400$	$3339000 - 2331000 = 1008000$

2. Using the DuPont formula for return on investment, determine the profit margin, investment turnover, and rate of return on investment for each division. *If required, round your answers to one decimal place.*

Division	Profit Margin	Investment Turnover	ROI
Road Bike Division	$\frac{1058400}{5880000} = 18\%$	$\frac{5880000}{4900000} = 1.2$	$\frac{1058400}{5880000} * \frac{5880000}{4900000} = 21.6\%$
Mountain Bike Division	$\frac{1008000}{6300000} = 16\%$	$\frac{6300000}{4500000} = 1.4$	$\frac{1008000}{6300000} * \frac{6300000}{4500000} = 22.4\%$

3. If management desires a minimum acceptable rate of return of 14%, determine the residual income for each division.

	Residual Income
Road Bike Division	$1058400 - (4900000 * 14\%) = 372400$
Mountain Bike Division	$1008000 - (4500000 * 14\%) = 378000$

4. On the basis of operating income, the **Road Bike** Division is the more profitable of the two divisions. However, operating income **does not** consider the amount of invested assets in each division. On the basis of residual income, the **Mountain Bike** Division is the more profitable of the two divisions.

## Production Budget

13. Healthy Measures Inc. produces a Bath and Gym version of its popular electronic scale. The anticipated unit sales for the scales by sales region are as follows:

	Bath Scale	Gym Scale
Northern Region unit sales	25,200	37,700
Southern Region unit sales	27,200	28,600
Total	52,400	66,300

The finished goods inventory estimated for March 1, for the Bath and Gym scale models is 1,300 and 2,500 units, respectively. The desired finished goods inventory for March 31 for the Bath and Gym scale models is 900 and 2,700 units, respectively.

Prepare a production budget for the Bath and Gym scales for the month ended March 31. For those boxes in which you must enter subtracted or negative numbers use a minus sign.

Healthy Measures Inc. Production Budget For the Month Ending March 31	Units Bath Scale	Units Gym Scale
Expected units to be sold	52400	66300
Desired inventory, March 31	900	2700
Total units available	$52400 + 900 = 53300$	$66300 + 2700 = 69000$
Estimated inventory, March 1	-1300	-2500
Total units to be produced	$53300 - 1300 = 52000$	$69000 - 2500 = 66500$

## Schedule of Cash Collections of Accounts Receivable

14. Pet Supplies Inc., a pet wholesale supplier, was organized on January 1. Projected sales for each of the first three months of operations are as follows:

<b>Month</b>	<b>Value</b>
January	\$300,000
February	500,000
March	750,000

All sales are on account. Seventy-five percent of sales are expected to be collected in the month of the sale, 20% in the month following the sale, and the remainder in the second month following the sale.

Prepare a schedule indicating cash collections from sales for January, February, and March. Enter all amounts as positive numbers.

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<b>Pet Supplies Inc. Schedule of Cash Collections from Sales For the Three Months Ending March 31</b>	<b>January</b>	<b>February</b>	<b>March</b>
January sales on account:			
Collected in January	$300000 * 75\% = 225000$		
Collected in February		$300000 * 20\% = 60000$	
Collected in March			$300000 * 5\% = 15000$
February sales on account:			
Collected in February		$500000 * 75\% = 375000$	
Collected in March			$500000 * 20\% = 100000$
March sales on account:			
Collected in March			$750000 * 75\% = 562500$
Total cash collected	225000	$60000 + 375000 = 435000$	$15000 + 100000 + 562500 = 677500$