

Because the new antenna is unique in design, management is anxious to see how profitable it will be and has asked that an income statement be prepared for the month.

Required:

1. Assume that the company uses absorption costing.
 - a. Determine the unit product cost.
 - b. Prepare an income statement for the month.
2. Assume that the company uses variable costing.
 - a. Determine the unit product cost.
 - b. Prepare a contribution format income statement for the month.
3. Explain the reason for any difference in the ending inventory balances under the two costing methods and the impact of this difference on reported net operating income.

PROBLEM 5-17 Variable and Absorption Costing Unit Product Costs and Income Statements

[LO 5-1, LO 5-2]

Nickelson Company manufactures and sells one product. The following information pertains to each of the company's first three years of operations:

Variable costs per unit:	
Manufacturing:	
Direct materials	\$25
Direct labor	\$16
Variable manufacturing overhead	\$5
Variable selling and administrative	\$2
Fixed costs per year:	
Fixed manufacturing overhead	\$300,000
Fixed selling and administrative expenses	\$180,000

During its first year of operations Nickelson produced 60,000 units and sold 60,000 units. During its second year of operations it produced 75,000 units and sold 50,000 units. In its third year, Nickelson produced 40,000 units and sold 65,000 units. The selling price of the company's product is \$56 per unit.

Required:

1. Compute the company's break-even point in units sold.
2. Assume the company uses variable costing:
 - a. Compute the unit product cost for year 1, year 2, and year 3.
 - b. Prepare an income statement for year 1, year 2, and year 3.
3. Assume the company uses absorption costing:
 - a. Compute the unit product cost for year 1, year 2, and year 3.
 - b. Prepare an income statement for year 1, year 2, and year 3.
4. Compare the net operating income figures that you computed in requirements 2 and 3 to the break-even point that you computed in requirement 1. Which net operating income figures seem counterintuitive? Why?

PROBLEM 5-18 Variable Costing Income Statement; Reconciliation [LO 5-2, LO 5-3]

During Denton Company's first two years of operations, the company reported absorption costing net operating income as follows:

	Year 1	Year 2
Sales (@ \$50 per unit)	\$1,000,000	\$1,500,000
Cost of goods sold (@ \$34 per unit)	680,000	1,020,000
Gross margin	320,000	480,000
Selling and administrative expenses*	310,000	340,000
Net operating income	\$ 10,000	\$ 140,000

*\$3 per unit variable; \$250,000 fixed each year.



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2. Look at the statement you have prepared showing the total company segmented by sales territory. What points revealed by this statement should be brought to management's attention?
3. Look at the statement you have prepared showing the Central Territory segmented by product lines. What points revealed by this statement should be brought to management's attention?

PROBLEM 5-20 Comprehensive Problem with Labor Fixed [LO 5-1, LO 5-2, LO 5-3]

Advance Products, Inc., has just organized a new division to manufacture and sell specially designed tables using select hardwoods for personal computers. The division's monthly costs are shown in the schedule below:

Manufacturing costs:	
Variable costs per unit:	
Direct materials	\$86
Variable manufacturing overhead	\$4
Fixed manufacturing overhead costs per month	\$240,000
Selling and administrative costs:	
Variable	15% of sales
Fixed per month	\$160,000

Advance Products regards all of its workers as full-time employees and the company has a long-standing no-layoff policy. Furthermore, production is highly automated. Accordingly, the company includes its labor costs in its fixed manufacturing overhead. The tables sell for \$250 each.

During the first month of operations, the following activity was recorded:

Units produced	4,000
Units sold	3,200

Required:

1. Compute the unit product cost under:
 - a. Absorption costing.
 - b. Variable costing.
2. Prepare an income statement for the month using absorption costing.
3. Prepare a contribution format income statement for the month using variable costing.
4. Assume that the company must obtain additional financing. As a member of top management, which of the statements that you have prepared in (2) and (3) above would you prefer to take with you to negotiate with the bank? Why?
5. Reconcile the absorption costing and variable costing net operating incomes in (2) and (3) above.

PROBLEM 5-21 Prepare and Reconcile Variable Costing Statements [LO 5-1, LO 5-2, LO 5-3]

Linden Company manufactures and sells a single product. Cost data for the product follow:

Variable costs per unit:	
Direct materials	\$ 6
Direct labor	12
Variable factory overhead	4
Variable selling and administrative	3
Total variable costs per unit	\$25
Fixed costs per month:	
Fixed manufacturing overhead	\$240,000
Fixed selling and administrative	180,000
Total fixed cost per month	\$420,000



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The product sells for \$40 per unit. Production and sales data for May and June, the first two months of operations, are as follows:

	Units Produced	Units Sold
May	30,000	26,000
June	30,000	34,000

Income statements prepared by the accounting department, using absorption costing, are presented below:

	May	June
Sales	\$1,040,000	\$1,360,000
Cost of goods sold	780,000	1,020,000
Gross margin	260,000	340,000
Selling and administrative expenses	258,000	282,000
Net operating income	\$ 2,000	\$ 58,000

Required:

- Determine the unit product cost under:
 - Absorption costing.
 - Variable costing.
- Prepare contribution format variable costing income statements for May and June.
- Reconcile the variable costing and absorption costing net operating incomes.
- The company's Accounting Department has determined the break-even point to be 28,000 units per month, computed as follows:

$$\frac{\text{Fixed cost per month}}{\text{Unit contribution margin}} = \frac{\$420,000}{\$15 \text{ per unit}} = 28,000 \text{ units}$$

Upon receiving this figure, the president commented, "There's something peculiar here. The controller says that the break-even point is 28,000 units per month. Yet we sold only 26,000 units in May, and the income statement we received showed a \$2,000 profit. Which figure do we believe?" Prepare a brief explanation of what happened on the May income statement.



PROBLEM 5-22 Absorption and Variable Costing; Production Constant, Sales Fluctuate
[LO 5-1, LO 5-2, LO 5-3]

Sandi Scott obtained a patent on a small electronic device and organized Scott Products, Inc., to produce and sell the device. During the first month of operations, the device was very well received on the market, so Ms. Scott looked forward to a healthy profit. For this reason, she was surprised to see a loss for the month on her income statement. This statement was prepared by her accounting service, which takes great pride in providing its clients with timely financial data. The statement follows:

Scott Products, Inc. Income Statement			
Sales (40,000 units)			\$200,000
Variable expenses:			
Variable cost of goods sold	\$80,000		
Variable selling and administrative expenses ...	30,000	110,000	
Contribution margin			90,000
Fixed expenses:			
Fixed manufacturing overhead	75,000		
Fixed selling and administrative expenses	20,000	95,000	
Net operating loss			\$ (5,000)

Ms. Scott is discouraged over the loss shown for the month, particularly because she had planned to use the statement to encourage investors to purchase stock in the new company. A friend, who is a CPA, insists that the company should be using absorption costing rather than variable costing. He argues that if absorption costing had been used, the company would probably have reported a profit for the month.

Selected cost data relating to the product and to the first month of operations follow:

Units produced	50,000
Units sold	40,000
Variable costs per unit:	
Direct materials	\$1.00
Direct labor	\$0.80
Variable manufacturing overhead	\$0.20
Variable selling and administrative expenses	\$0.75

Required:

- Complete the following:
 - Compute the unit product cost under absorption costing.
 - Redo the company's income statement for the month using absorption costing.
 - Reconcile the variable and absorption costing net operating income (loss) figures.
- Was the CPA correct in suggesting that the company really earned a "profit" for the month? Explain.
- During the second month of operations, the company again produced 50,000 units but sold 60,000 units. (Assume no change in total fixed costs.)
 - Prepare a contribution format income statement for the month using variable costing.
 - Prepare an income statement for the month using absorption costing.
 - Reconcile the variable costing and absorption costing net operating incomes.

PROBLEM 5-23 Restructuring a Segmented Income Statement [LO 5-4]

Brabant NV of the Netherlands is a wholesale distributor of Dutch cheeses that it sells throughout the European Community. Unfortunately, the company's profits have been declining, which has caused considerable concern. To help understand the condition of the company, the managing director of the company has requested that the monthly income statement be segmented by sales territory. Accordingly, the company's accounting department has prepared the following statement for March, the most recent month. (The Dutch currency is the euro, which is designated by €.)



	Sales territory		
	Southern Europe	Middle Europe	Northern Europe
Sales	€300,000	€800,000	€700,000
Territorial expenses (traceable):			
Cost of goods sold	93,000	240,000	315,000
Salaries	54,000	56,000	112,000
Insurance	9,000	16,000	14,000
Advertising	105,000	240,000	245,000
Depreciation	21,000	32,000	28,000
Shipping	15,000	32,000	42,000
Total territorial expenses	297,000	616,000	756,000
Territorial income (loss)			
before corporate expenses	3,000	184,000	(56,000)
Corporate expenses:			
Advertising (general)	15,000	40,000	35,000
General administrative	20,000	20,000	20,000
Total corporate expenses	35,000	60,000	55,000
Net operating income (loss)	€(32,000)	€124,000	€(111,000)

2. Convert the total costs you computed in (1) above to costs per diner. In other words, what is the average cost per diner for serving each of the following parties?
 - a. A party of four diners who order three drinks in total.
 - b. A party of two diners who do not order any drinks.
 - c. A lone diner who orders two drinks.
3. Why do the costs per diner for the three different parties differ from each other and from the overall average cost of \$15.00 per diner?

Problems



All applicable problems are available with McGraw-Hill's Connect™ Accounting.



PROBLEM 6-16 Second-Stage Allocations and Product Margins [LO 6-4, LO 6-5]

AnimPix, Inc., is a small company that creates computer-generated animations for films and television. Much of the company's work consists of short commercials for television, but the company also does realistic computer animations for special effects in movies.

The young founders of the company have become increasingly concerned with the economics of the business—particularly because many competitors have sprung up recently in the local area. To help understand the company's cost structure, an activity-based costing system has been designed. Three major activities are carried out in the company: animation concept, animation production, and contract administration. The animation concept activity is carried out at the contract proposal stage when the company bids on projects. This is an intensive activity that involves individuals from all parts of the company in creating storyboards and prototype stills to be shown to the prospective client. After the client has accepted a project, the animation goes into production and contract administration begins. Technical staff do almost all of the work involved in animation production, whereas the administrative staff is largely responsible for contract administration. The activity cost pools and their activity measures and rates are listed below:

Activity Cost Pool	Activity Measure	Activity Rate
Animation concept	Number of proposals	\$6,000 per proposal
Animation production	Minutes of animation	\$7,700 per minute of animation
Contract administration	Number of contracts	\$6,600 per contract

These activity rates include all of the costs of the company, except for the costs of idle capacity and organization-sustaining costs. There are no direct labor or direct materials costs.

Preliminary analysis using these activity rates has indicated that the local commercials segment of the market may be unprofitable. This segment is highly competitive. Producers of local commercials may ask several companies like AnimPix to bid, which results in an unusually low ratio of accepted contracts to bids. Furthermore, the animation sequences tend to be much shorter for local commercials than for other work. Because animation work is billed at standard rates according to the running time of the completed animation, the revenues from these short projects tend to be below average. Data concerning activity in the local commercials market appear below:

Activity Measure	Local Commercials
Number of proposals	20
Minutes of animation	12
Number of contracts	8

The total sales for local commercials amounted to \$240,000.

Required:

1. Determine the cost of serving the local commercials market.

2. Prepare a report showing the margin earned serving the local commercials market. (Remember, this company has no direct materials or direct labor costs.)
3. What would you recommend to management concerning the local commercials market?

PROBLEM 6-17 Comparing Traditional and Activity-Based Product Margins [LO 6-1, LO 6-3, LO 6-4, LO 6-5]

Precision Manufacturing Inc. (PMI) makes two types of industrial component parts—the EX300 and the TX500. An absorption costing income statement for the most recent period is shown below:

Precision Manufacturing Inc. Income Statement	
Sales	\$1,700,000
Cost of goods sold	1,200,000
Gross margin	500,000
Selling and administrative expenses	550,000
Net operating loss	\$ (50,000)

PMI produced and sold 60,000 units of EX300 at a price of \$20 per unit and 12,500 units of TX500 at a price of \$40 per unit. The company's traditional cost system allocates manufacturing overhead to products using a plantwide overhead rate and direct labor dollars as the allocation base. Additional information relating to the company's two product lines is shown below:

	EX300	TX500	Total
Direct materials	\$366,325	\$162,550	\$ 528,875
Direct labor	\$120,000	\$42,500	162,500
Manufacturing overhead			508,625
Cost of goods sold			\$1,200,000

The company has created an activity-based costing system to evaluate the profitability of its products. PMI's ABC implementation team concluded that \$50,000 and \$100,000 of the company's advertising expenses could be directly traced to EX300 and TX500, respectively. The remainder of the selling and administrative expenses was organization-sustaining in nature. The ABC team also distributed the company's manufacturing overhead to four activities as shown below:

Activity Cost Pool (and Activity Measure)	Manufacturing Overhead		Activity	
		EX300	TX500	Total
Machining (machine-hours)	\$198,250	90,000	62,500	152,500
Setups (setup hours)	150,000	75	300	375
Product-sustaining (number of products)	100,000	1	1	2
Other (organization-sustaining costs)	60,375	NA	NA	NA
Total manufacturing overhead cost	\$508,625			

Required:

1. Using Exhibit 6-12 as a guide, compute the product margins for the EX300 and TX500 under the company's traditional costing system.
2. Using Exhibit 6-10 as a guide, compute the product margins for EX300 and TX500 under the activity-based costing system.
3. Using Exhibit 6-13 as a guide, prepare a quantitative comparison of the traditional and activity-based cost assignments. Explain why the traditional and activity-based cost assignments differ.

PROBLEM 6-18 Comparing Traditional and Activity-Based Product Margins [LO 6-1, LO 6-3, LO 6-4, LO 6-5]

Rocky Mountain Corporation makes two types of hiking boots—Xactive and the Pathbreaker. Data concerning these two product lines appear below:

	Xactive	Pathbreaker
Selling price per unit	\$127.00	\$89.00
Direct materials per unit	\$64.80	\$51.00
Direct labor per unit	\$18.20	\$13.00
Direct labor-hours per unit	1.4 DLHs	1.0 DLHs
Estimated annual production and sales	25,000 units	75,000 units

The company has a traditional costing system in which manufacturing overhead is applied to units based on direct labor-hours. Data concerning manufacturing overhead and direct labor-hours for the upcoming year appear below:

Estimated total manufacturing overhead	\$2,200,000
Estimated total direct labor-hours	110,000 DLHs

Required:

- Using Exhibit 6-12 as a guide, compute the product margins for the Xactive and the Pathbreaker products under the company's traditional costing system.
- The company is considering replacing its traditional costing system with an activity-based costing system that would assign its manufacturing overhead to the following four activity cost pools (the Other cost pool includes organization-sustaining costs and idle capacity costs):

Activities and Activity Measures	Estimated Overhead Cost	Expected Activity		
		Xactive	Pathbreaker	Total
Supporting direct labor (direct labor-hours) ..	\$ 797,500	35,000	75,000	110,000
Batch setups (setups)	680,000	250	150	400
Product sustaining (number of products)	650,000	1	1	2
Other	72,500	NA	NA	NA
Total manufacturing overhead cost	<u>\$2,200,000</u>			

Using Exhibit 6-10 as a guide, compute the product margins for the Xactive and the Pathbreaker products under the activity-based costing system.

- Using Exhibit 6-13 as a guide, prepare a quantitative comparison of the traditional and activity-based cost assignments. Explain why the traditional and activity-based cost assignments differ.



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PROBLEM 6-19 Activity-Based Costing and Bidding on Jobs [LO 6-2, LO 6-3, LO 6-4]

Denny Asbestos Removal Company removes potentially toxic asbestos insulation and related products from buildings. The company's estimator has been involved in a long-simmering dispute with the on-site work supervisors. The on-site supervisors claim that the estimator does not adequately distinguish between routine work such as removal of asbestos insulation around heating pipes in older homes and nonroutine work such as removing asbestos-contaminated ceiling plaster in industrial buildings. The on-site supervisors believe that nonroutine work is far more expensive than routine work and should bear higher customer charges. The estimator sums up his position in this way: "My job is to measure the area to be cleared of asbestos. As directed by top management, I simply multiply the square footage by \$4,000 per thousand square feet to determine the bid price. Since our average cost is only \$3,000 per thousand square feet, that leaves enough cushion to take