

PROBLEM 3-22 Sales Mix; Multiproduct Break-Even Analysis [LO 3-9]

Marlin Company, a wholesale distributor, has been operating for only a few months. The company sells three products—sinks, mirrors, and vanities. Budgeted sales by product and in total for the coming month are shown below:



	Sinks	Mirrors	Vanities	Total
Percentage of total sales	48%	20%	32%	100%
Sales	\$240,000	\$100,000	\$160,000	\$500,000
Variable expenses	72,000	80,000	88,000	240,000
Contribution margin	\$168,000	\$20,000	\$72,000	260,000
Fixed expenses				223,600
Net operating income				\$36,400

$$\text{Dollar sales to break-even} = \frac{\text{Fixed expenses}}{\text{CM ratio}} = \frac{\$223,600}{0.52} = \$430,000$$

As shown by these data, net operating income is budgeted at \$36,400 for the month, and break-even sales at \$430,000.

Assume that actual sales for the month total \$500,000 as planned. Actual sales by product are: sinks, \$160,000; mirrors, \$200,000; and vanities, \$140,000.

Required:

- Prepare a contribution format income statement for the month based on actual sales data. Present the income statement in the format shown above.
- Compute the break-even point in sales dollars for the month, based on your actual data.
- Considering the fact that the company met its \$500,000 sales budget for the month, the president is shocked at the results shown on your income statement in (1) above. Prepare a brief memo for the president explaining why both the operating results and the break-even point in sales dollars are different from what was budgeted.

PROBLEM 3-23 Sales Mix; Break-Even Analysis; Margin of Safety [LO 3-7, LO 3-9]

Puleva Milenario SA, a company located in Toledo, Spain, manufactures and sells two models of luxuriously finished cutlery—Alvaro and Bazan. Present revenue, cost, and unit sales data for the two products appear below. All currency amounts are stated in terms of euros, which are indicated by the symbol €.



	Alvaro	Bazan
Selling price per unit	€4.00	€6.00
Variable expenses per unit	€2.40	€1.20
Number of units sold monthly	200 units	80 units

Fixed expenses are €660 per month.

Required:

- Assuming the sales mix above, do the following:
 - Prepare a contribution format income statement showing both euro and percent columns for each product and for the company as a whole.
 - Compute the break-even point in euros for the company as a whole and the margin of safety in both euros and percent of sales.
- The company has developed another product, Cano, that the company plans to sell for €8 each. At this price, the company expects to sell 40 units per month of the product. The variable expense would be €6 per unit. The company's fixed expenses would not change.

5. Assume that sales of the Standard racket increase by \$20,000. What would be the effect on net operating income? What would be the effect if Pro racket sales increased by \$20,000? Do not prepare income statements; use the incremental analysis approach in determining your answer.

PROBLEM 3-25 Break-Even Analysis; Pricing [LO 3-1, LO 3-4, LO 3-6]

Detmer Holdings AG of Zurich, Switzerland, has just introduced a new fashion watch for which the company is trying to find an optimal selling price. Marketing studies suggest that the company can increase sales by 5,000 units for each SFr2 per unit reduction in the selling price. (SFr2 denotes 2 Swiss francs.) The company's present selling price is SFr90 per unit, and variable expenses are SFr60 per unit. Fixed expenses are SFr840,000 per year. The present annual sales volume (at the SFr90 selling price) is 25,000 units.

Required:

1. What is the present yearly net operating income or loss?
2. What is the present break-even point in units and in Swiss franc sales?
3. Assuming that the marketing studies are correct, what is the *maximum* profit that the company can earn yearly? At how many units and at what selling price per unit would the company generate this profit?
4. What would be the break-even point in units and in Swiss franc sales using the selling price you determined in (3) above (i.e., the selling price at the level of maximum profits)? Why is this break-even point different from the break-even point you computed in (2) above?

PROBLEM 3-26 Changes in Cost Structure; Break-Even Analysis; Operating Leverage; Margin of Safety [LO 3-4, LO 3-6, LO 3-7, LO 3-8]

Frieden Company's contribution format income statement for the most recent month is given below:

Sales (40,000 units)	\$800,000
Variable expenses	560,000
Contribution margin	240,000
Fixed expenses	192,000
Net operating income	\$ 48,000

The industry in which Frieden Company operates is quite sensitive to cyclical movements in the economy. Thus, profits vary considerably from year to year according to general economic conditions. The company has a large amount of unused capacity and is studying ways of improving profits.

Required:

1. New equipment has come on the market that would allow Frieden Company to automate a portion of its operations. Variable expenses would be reduced by \$6 per unit. However, fixed expenses would increase to a total of \$432,000 each month. Prepare two contribution format income statements, one showing present operations and one showing how operations would appear if the new equipment is purchased. Show an Amount column, a Per Unit column, and a Percent column on each statement. Do not show percentages for the fixed expenses.
2. Refer to the income statements in (1) above. For both present operations and the proposed new operations, compute (a) the degree of operating leverage, (b) the break-even point in dollars, and (c) the margin of safety in both dollar and percentage terms.
3. Refer again to the data in (1) above. As a manager, what factor would be paramount in your mind in deciding whether to purchase the new equipment? (Assume that ample funds are available to make the purchase.)
4. Refer to the original data. Rather than purchase new equipment, the marketing manager argues that the company's marketing strategy should be changed. Instead of paying sales commissions, which are included in variable expenses, the marketing manager suggests that salespersons be paid fixed salaries and that the company invest heavily in advertising. The marketing manager claims that this new approach would increase unit sales by 50% without any change in selling price; the company's new monthly fixed expenses would be \$240,000; and its net operating income would increase by 25%. Compute the break-even point in dollar sales for the company under the new marketing strategy. Do you agree with the marketing manager's proposal?

- g. Advertising costs are increased by \$50,000 per period, resulting in a 10% increase in the number of units sold.
- h. Due to paying salespersons a commission rather than a flat salary, fixed costs are reduced by \$21,000 per period, and unit variable costs are increased by \$6.

PROBLEM 3-28 Graphing; Incremental Analysis; Operating Leverage [LO 3-2, LO 3-4, LO 3-5, LO 3-6, LO 3-8]

Teri Hall has recently opened Sheer Elegance, Inc., a store specializing in fashionable stockings. Ms. Hall has just completed a course in managerial accounting, and she believes that she can apply certain aspects of the course to her business. She is particularly interested in adopting the cost-volume-profit (CVP) approach to decision making. Thus, she has prepared the following analysis:



Sales price per pair of stockings	\$2.00
Variable expense per pair of stockings	0.80
Contribution margin per pair of stockings	<u>\$1.20</u>
Fixed expense per year:	
Building rental	\$12,000
Equipment depreciation	3,000
Selling	30,000
Administrative	15,000
Total fixed expense	<u>\$60,000</u>

Required:

- How many pairs of stockings must be sold to break even? What does this represent in total dollar sales?
- Prepare a CVP graph or a profit graph for the store from zero pairs up to 70,000 pairs of stockings sold each year. Indicate the break-even point on the graph.
- How many pairs of stockings must be sold to earn a \$9,000 target profit for the first year?
- Ms. Hall now has one full-time and one part-time salesperson working in the store. It will cost her an additional \$8,000 per year to convert the part-time position to a full-time position. Ms. Hall believes that the change would bring in an additional \$20,000 in sales each year. Should she convert the position? Use the incremental approach. (Do not prepare an income statement.)
- Refer to the original data. Actual operating results for the first year are as follows:

Sales	\$125,000
Variable expenses	50,000
Contribution margin	<u>75,000</u>
Fixed expenses	60,000
Net operating income	<u>\$ 15,000</u>

- a. What is the store's degree of operating leverage?
- b. Ms. Hall is confident that with some effort she can increase sales by 20% next year. What would be the expected percentage increase in net operating income? Use the degree of operating leverage concept to compute your answer.

PROBLEM 3-29 Various CVP Questions: Break-Even Point; Cost Structure; Target Sales [LO 3-1, LO 3-3, LO 3-4, LO 3-5, LO 3-6, LO 3-8]

Tyrene Products manufactures recreational equipment. One of the company's products, a skateboard, sells for \$37.50. The skateboards are manufactured in an antiquated plant that relies heavily on direct labor workers. Thus, variable costs are high, totaling \$22.50 per skateboard of which 60% is direct labor cost.



Smithson had no overapplied or underapplied manufacturing overhead during the year.

Required:

1. Assume Smithson uses a plantwide overhead rate based on machine-hours.
 - a. Compute the predetermined plantwide overhead rate.
 - b. Compute the total manufacturing costs assigned to Job D-75 and Job C-100.
 - c. If Smithson establishes bid prices that are 150% of total manufacturing costs, what bid price would it have established for Job D-75 and Job C-100?
 - d. What is Smithson's cost of goods sold for the year?
2. Assume Smithson uses departmental overhead rates based on machine-hours.
 - a. Compute the predetermined departmental overhead rates.
 - b. Compute the total manufacturing costs assigned to Job D-75 and Job C-100.
 - c. If Smithson establishes bid prices that are 150% of total manufacturing costs, what bid price would it have established for Job D-75 and Job C-100?
 - d. What is Smithson's cost of goods sold for the year?
3. What managerial insights are revealed by the computations that you performed in this problem? (Hint: Do the cost of goods sold amounts that you computed in requirements 1 and 2 differ from one another? Do the bid prices that you computed in requirements 1 and 2 differ from one another? Why?)

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



Problems

PROBLEM 4-16 Applying Overhead in a Service Company [LO 4-1, LO 4-2, LO 4-3]

Pearson Architectural Design uses a job-order costing system and applies studio overhead to jobs on the basis of direct staff costs. Because Pearson Architectural Design is a service firm, the names of the accounts it uses are different from the names used in manufacturing companies. The following costs were recorded in January:



Cost of subcontracted work (comparable to direct materials)	\$90,000
Direct staff costs (comparable to direct labor)	\$200,000
Studio overhead (comparable to manufacturing overhead cost applied)	\$320,000
Cost of work completed (comparable to cost of goods manufactured)	\$570,000

There were no beginning inventories in January.

At the end of January, only job was still in process. This job (the Krimmer Corporation Headquarters project) had been charged with \$13,500 in direct staff costs.

Required:

1. Compute the predetermined overhead rate that was used during January.
2. Complete the following job cost sheet for the partially completed Krimmer Corporation Headquarters project. (Hint: Cost of goods manufactured equals beginning work in process inventory plus manufacturing costs incurred less ending work in process inventory.)

Job Cost Sheet	
Krimmer Corporation Headquarters Project	
Costs of subcontracted work	\$?
Direct staff costs	?
Studio overhead	?
Total cost to January 31	\$?

PROBLEM 4-17 Applying Overhead; Underapplied or Overapplied Overhead;

Income Statement [LO 4-2, LO 4-4, LO 4-5]

Durham Company uses a job-order costing system. The following transactions took place last year:

- a. Raw materials requisitioned for use in production, \$40,000 (80% direct and 20% indirect).

- b. Factory utility costs incurred, \$14,600.
- c. Depreciation recorded on plant and equipment, \$28,000. Three-fourths of the depreciation relates to factory equipment, and the remainder relates to selling and administrative equipment.
- d. Costs for salaries and wages were incurred as follows:

Direct labor	\$40,000
Indirect labor	\$18,000
Sales commissions	\$10,000
Administrative salaries	\$25,000

- e. Insurance costs incurred, \$3,000 (80% relates to factory operations, and 20% relates to selling and administrative activities).
- f. Miscellaneous selling and administrative expenses incurred, \$18,000.
- g. Manufacturing overhead was applied to production. The company applies overhead on the basis of 150% of direct labor cost.
- h. Goods that cost \$130,000 to manufacture according to their job cost sheets were transferred to the finished goods warehouse.
- i. Goods that had cost \$120,000 to manufacture according to their job cost sheets were sold for \$200,000.

Required:

- Determine the underapplied or overapplied overhead for the year.
- Prepare an income statement for the year. (Hint: No calculations are required to determine the cost of goods sold before any adjustment for underapplied or overapplied overhead.)



PROBLEM 4-18 Applying Overhead in a Service Company [LO 4-2, LO 4-4, LO 4-5]

Heritage Gardens provides complete garden design and landscaping services. The company uses a job-order costing system to track the costs of its landscaping projects. The table below provides data concerning the three landscaping projects that were in progress during May. There was no work in process at the beginning of May.

	Project		
	Williams	Chandler	Nguyen
Designer-hours	200	80	120
Direct materials	\$4,800	\$1,800	\$3,600
Direct labor	\$2,400	\$1,000	\$1,500

Actual overhead costs were \$16,000 for May. Overhead costs are applied to projects on the basis of designer-hours because most of the overhead is related to the costs of the garden design studio. The predetermined overhead rate is \$45 per designer-hour. The Williams and Chandler projects were completed in May; the Nguyen project was not completed by the end of the month. No other jobs were in process during May.

Required:

- Compute the amount of overhead cost that would have been applied to each project during May.
- Determine the cost of goods manufactured for May.
- What is the accumulated cost of the work in process at the end of the month?
- Determine the underapplied or overapplied overhead for May.

PROBLEM 4-19 Predetermined Overhead Rate; Applying Overhead; Underapplied or Overapplied Overhead [LO 4-2, LO 4-4, LO 4-5]

Ravsten Company uses a job-order costing system.


PROBLEM 4-21 Multiple Departments; Applying Overhead [LO 4-1, LO 4-2, LO 4-3, LO 4-4]

WoodGrain Technology makes home office furniture from fine hardwoods. The company uses a job-order costing system and predetermined overhead rates to apply manufacturing overhead cost to jobs. The predetermined overhead rate in the Preparation Department is based on machine-hours, and the rate in the Fabrication Department is based on direct labor-hours. At the beginning of the year, the company's management made the following estimates for the year:

	Department	
	Preparation	Fabrication
Machine-hours	80,000	21,000
Direct labor-hours	35,000	50,000
Direct materials cost	\$190,000	\$400,000
Direct labor cost	\$280,000	\$530,000
Fixed manufacturing overhead cost	\$256,000	\$520,000
Variable manufacturing overhead per machine-hour	\$2.00	—
Variable manufacturing overhead per direct labor-hour	—	\$4.00

Job 127 was started on April 1 and completed on May 12. The company's cost records show the following information concerning the job:

	Department	
	Preparation	Fabrication
Machine-hours	350	70
Direct labor-hours	80	130
Direct materials cost	\$940	\$1,200
Direct labor cost	\$710	\$980

Required:

1. Compute the predetermined overhead rate used during the year in the Preparation Department. Compute the rate used in the Fabrication Department.
2. Compute the total overhead cost applied to Job 127.
3. What would be the total cost recorded for Job 127? If the job contained 25 units, what would be the unit product cost?
4. At the end of the year, the records of WoodGrain Technology revealed the following *actual* cost and operating data for all jobs worked on during the year:

	Department	
	Preparation	Fabrication
Machine-hours	73,000	24,000
Direct labor-hours	30,000	54,000
Direct materials cost	\$165,000	\$420,000
Manufacturing overhead cost	\$390,000	\$740,000

What was the amount of underapplied or overapplied overhead in each department at the end of the year?


PROBLEM 4-22 Multiple Departments; Overhead Rates; Underapplied or Overapplied Overhead [LO 4-1, LO 4-2, LO 4-3, LO 4-4]

Winkle, Kotter, and Zale is a small law firm that contains 10 partners and 10 support persons. The firm employs a job-order costing system to accumulate costs chargeable to each client, and it is organized into two departments—the Research and Documents Department and the Litigation

Department. The firm uses predetermined overhead rates to charge the costs of these departments to its clients. At the beginning of the current year, the firm's management made the following estimates for the year:

Department		
Research and Documents		
Research-hours	20,000	—
Direct attorney-hours	9,000	16,000
Materials and supplies	\$18,000	\$5,000
Direct attorney cost	\$430,000	\$800,000
Departmental overhead cost	\$700,000	\$320,000

The predetermined overhead rate in the Research and Documents Department is based on research-hours, and the rate in the Litigation Department is based on direct attorney cost.

The costs charged to each client are made up of three elements: materials and supplies used, direct attorney costs incurred, and an applied amount of overhead from each department in which work is performed on the case.

Case 618-3 was initiated on February 10 and completed on June 30. During this period, the following costs and time were recorded on the case:

Department		
Research and Documents		
Research-hours	18	—
Direct attorney-hours	9	42
Materials and supplies	\$50	\$30
Direct attorney cost	\$410	\$2,100

Required:

1. Compute the predetermined overhead rates used during the year in the Research and Documents Department and the Litigation Department.
2. Using the rates you computed in (1) above, compute the total overhead cost applied to Case 618-3.
3. What would be the total cost charged to Case 618-3? Show computations by department and in total for the case.
4. At the end of the year, the firm's records revealed the following *actual* cost and operating data for all cases handled during the year:

Department		
Research and Documents		
Research-hours	23,000	—
Direct attorney-hours	8,000	15,000
Materials and supplies	\$19,000	\$6,000
Direct attorney cost	\$400,000	\$775,000
Departmental overhead cost	\$770,000	\$300,000

Determine the amount of underapplied or overapplied overhead cost in each department for the year.