13. Total fixed costs are $26,000 for Daz Inc. It has a contribution margin per unit of $15, and a contribution margin ratio of 25%. Compute the break-even sales in dollars.
14. Peggy Turnbull asks your help in constructing a CVP graph. Explain to Peggy (a) how the break-even point is plotted, and (b) how the level of activity and dollar sales at the break-even point are determined.
15. Define the term "margin of safety." If Revere Company expects to sell 1,250 units of its product at $12 per unit, and break-even sales for the product are $13,200, what is the margin of safety ratio?
16. Huang Company's break-even sales are $500,000. Assuming fixed costs are $180,000, what sales volume is needed to achieve a target net income of $90,000?
17. The traditional income statement for Pace Company shows sales $900,000, cost of goods sold $600,000, and operating expenses $200,000. Assuming all costs and expenses are 70% variable and 30% fixed, prepare a CVP income statement through contribution margin.

## BRIEF EXERCISES

**BE5-1** Monthly production costs in Pesavento Company for two levels of production are as follows.

*Classify costs as variable, fixed, or mixed.*

(LO 1, 3), C

| Cost | 2,000 Units | 4,000 Units |
|---|---|---|
| Indirect labor | $10,000 | $20,000 |
| Supervisory salaries | 5,000 | 5,000 |
| Maintenance | 4,000 | 7,000 |

Indicate which costs are variable, fixed, and mixed, and give the reason for each answer.

**BE5-2** For Lodes Company, the relevant range of production is 40–80% of capacity. At 40% of capacity, a variable cost is $4,000 and a fixed cost is $6,000. Diagram the behavior of each cost within the relevant range assuming the behavior is linear.

*Diagram the behavior of costs within the relevant range.*

(LO 2), AN

**BE5-3** For Hunt Company, a mixed cost is $15,000 plus $18 per direct labor hour. Diagram the behavior of the cost using increments of 500 hours up to 2,500 hours on the horizontal axis and increments of $15,000 up to $60,000 on the vertical axis.

*Diagram the behavior of a mixed cost.*

(LO 3), AN

**BE5-4** Bruno Company accumulates the following data concerning a mixed cost, using miles as the activity level.

*Determine variable- and fixed-cost elements using the high-low method.*

(LO 3), AP

| | Miles Driven | Total Cost | | Miles Driven | Total Cost |
|---|---|---|---|---|---|
| January | 8,000 | $14,150 | March | 8,500 | $15,000 |
| February | 7,500 | 13,500 | April | 8,200 | 14,490 |

Compute the variable- and fixed-cost elements using the high-low method.

**BE5-5** Stiever Corp. has collected the following data concerning its maintenance costs for the past 6 months.

*Determine variable- and fixed-cost elements using the high-low method.*

(LO 3), AP

| | Units Produced | Total Cost |
|---|---|---|
| July | 18,000 | $32,000 |
| August | 32,000 | 48,000 |
| September | 36,000 | 55,000 |
| October | 22,000 | 38,000 |
| November | 40,000 | 66,100 |
| December | 38,000 | 62,000 |

Compute the variable- and fixed-cost elements using the high-low method.

**BE5-6** Determine the missing amounts.

*Determine missing amounts for contribution margin.*

(LO 5), AN

| | Unit Selling Price | Unit Variable Costs | Contribution Margin per Unit | Contribution Margin Ratio |
|---|---|---|---|---|
| 1. | $640 | $352 | (a) | (b) |
| 2. | $300 | (c) | $93 | (d) |
| 3. | (e) | (f) | $325 | 25% |

**BE5-7** Radial Inc. had sales of $2,400,000 for the first quarter of 2014. In making the sales, the company incurred the costs and expenses shown on page 222.

*Prepare CVP income statement.*

(LO 5), AP

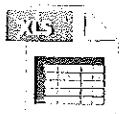
**E6-2** In the month of June, Jose Hebert's Beauty Salon gave 4,000 haircuts, shampoos, and permanents at an average price of $30. During the month, fixed costs were $16,800 and variable costs were 75% of sales.

*Compute contribution margin, break-even point, and margin of safety.*
(LO 2), AP

*Instructions*
(a) Determine the contribution margin in dollars, per unit and as a ratio.
(b) Using the contribution margin technique, compute the break-even point in dollars and in units.
(c) Compute the margin of safety in dollars and as a ratio.

**E6-3** Norton Company reports the following operating results for the month of August: sales $310,000 (units 5,000); variable costs $210,000; and fixed costs $75,000. Management is considering the following independent courses of action to increase net income.

*Compute net income under different alternatives.*
(LO 2), AP



1. Increase selling price by 10% with no change in total variable costs or sales volume.
2. Reduce variable costs to 58% of sales.
3. Reduce fixed costs by $20,000.

*Instructions*
Compute the net income to be earned under each alternative. Which course of action will produce the highest net income?

**E6-4** Comfi Airways, Inc., a small two-plane passenger airline, has asked for your assistance in some basic analysis of its operations. Both planes seat 10 passengers each, and they fly commuters from Comfi's base airport to the major city in the state, Metropolis. Each month, 40 round-trip flights are made. Shown below is a recent month's activity in the form of a cost-volume-profit income statement.

*Compute break-even point and prepare CVP income statement.*
(LO 2), AP

| | | |
|---|---|---|
| Fare revenues (400 fares) | | $48,000 |
| Variable costs | | |
| Fuel | $14,000 | |
| Snacks and drinks | 800 | |
| Landing fees | 2,000 | |
| Supplies and forms | 1,200 | 18,000 |
| Contribution margin | | 30,000 |
| Fixed costs | | |
| Depreciation | 3,000 | |
| Salaries | 15,000 | |
| Advertising | 500 | |
| Airport hangar fees | 1,750 | 20,250 |
| Net income | | $ 9,750 |

*Instructions*
(a) Calculate the break-even point in (1) dollars and (2) number of fares.
(b) Without calculations, determine the contribution margin at the break-even point.
(c) If fares were decreased by 10%, an additional 100 fares could be generated. However, total variable costs would increase by 20%. Should the fare decrease be adopted?

**E6-5** Hall Company had sales in 2014 of $1,560,000 on 60,000 units. Variable costs totaled $720,000, and fixed costs totaled $500,000.

*Prepare a CVP income statement before and after changes in business environment.*
(LO 2), AP

A new raw material is available that will decrease the variable costs per unit by 25% (or $3.00). However, to process the new raw material, fixed operating costs will increase by $150,000. Management feels that one-half of the decline in the variable costs per unit should be passed on to customers in the form of a sales price reduction. The marketing department expects that this sales price reduction will result in a 5% increase in the number of units sold.

*Instructions*
Prepare a projected CVP income statement for 2014 (a) assuming the changes have not been made, and (b) assuming that changes are made as described.

*Compute break-even point in units for a company with more than one product.*

(LO 3), AP

**E6-6** Yard Tools manufactures lawnmowers, weed-trimmers, and chainsaws. Its sales mix and contribution margin per unit are as follows.

| | Sales Mix | Contribution Margin per Unit |
|---|---|---|
| Lawnmowers | 20% | $30 |
| Weed-trimmers | 50% | $20 |
| Chainsaws | 30% | $40 |

Yard Tools has fixed costs of $4,200,000.

***Instructions***

Compute the number of units of each product that Yard Tools must sell in order to break even under this product mix.

*Compute service line break-even point and target net income in dollars for a company with more than one service.*

(LO 3), AN

**E6-7** Qwik Repairs has over 200 auto-maintenance service outlets nationwide. It provides primarily two lines of service: oil changes and brake repair. Oil change–related services represent 70% of its sales and provide a contribution margin ratio of 20%. Brake repair represents 30% of its sales and provides a 60% contribution margin ratio. The company's fixed costs are $16,000,000 (that is, $80,000 per service outlet).

***Instructions***

(a) Calculate the dollar amount of each type of service that the company must provide in order to break even.

(b) The company has a desired net income of $60,000 per service outlet. What is the dollar amount of each type of service that must be provided by each service outlet to meet its target net income per outlet?

*Compute break-even point in dollars for a company with more than one service.*

(LO 3), AN

**E6-8** Express Delivery is a rapidly growing delivery service. Last year, 80% of its revenue came from the delivery of mailing "pouches" and small, standardized delivery boxes (which provides a 20% contribution margin). The other 20% of its revenue came from delivering non-standardized boxes (which provides a 70% contribution margin). With the rapid growth of Internet retail sales, Express believes that there are great opportunities for growth in the delivery of non-standardized boxes. The company has fixed costs of $12,000,000.

***Instructions***

(a) What is the company's break-even point in total sales dollars? At the break-even point, how much of the company's sales are provided by each type of service?

(b) The company's management would like to hold its fixed costs constant but shift its sales mix so that 60% of its revenue comes from the delivery of non-standardized boxes and the remainder from pouches and small boxes. If this were to occur, what would be the company's break-even sales, and what amount of sales would be provided by each service type?

*Compute break-even point in units for a company with multiple products.*

(LO 3), AP

**E6-9** Palmer Golf Accessories sells golf shoes, gloves, and a laser-guided range-finder that measures distance. Shown below are unit cost and sales data.

| | Pairs of Shoes | Pairs of Gloves | Range-Finder |
|---|---|---|---|
| Unit sales price | $100 | $30 | $260 |
| Unit variable costs | 60 | 10 | 200 |
| Unit contribution margin | $ 40 | $20 | $ 60 |
| Sales mix | 30% | 60% | 10% |

Fixed costs are $630,000.

***Instructions***

(a) Compute the break-even point in units for the company.

(b) Determine the number of units to be sold at the break-even point for each product line.

(c) Verify that the mix of sales units determined in (b) will generate a zero net income.