

8

ABSORPTION AND VARIABLE COSTING, AND INVENTORY MANAGEMENT

DISCUSSION QUESTIONS

1. The only difference between absorption costing and variable costing is the way in which fixed overhead costs are assigned. Under variable costing, fixed overhead is a period cost; under absorption costing, it is a product cost.
2. Absorption-costing income is greater because some of the period's fixed overhead is placed in inventory and not recognized as part of Cost of Goods Sold on the absorption-costing income statement.
3. A segment is any subunit of sufficient importance to warrant production of performance reports.
4. Contribution margin is the amount available to cover fixed expenses and provide for profit. Segment margin is the amount available to cover common fixed expenses and provide for profit. Contribution margin is the difference between revenues and variable expenses. Segment margin is contribution margin less direct fixed expenses.
5. Ordering costs are the costs of placing and receiving an order. Examples include clerical costs, documents, insurance, and unloading. Carrying costs are the costs of carrying inventory. Examples include insurance, taxes, handling costs, and the opportunity cost of capital tied up in inventory.
6. Stockout costs are the costs of insufficient inventory (e.g., lost sales and interrupted production).
7. No, the purchase price is not part of the fundamental EOQ formula. However, the potential for quantity discounts may be considered by management in deciding whether or not to order the EOQ amount. For example, the company may order more than the EOQ amount if the quantity discount is larger than the additional carrying cost.
8. Reasons for carrying inventory include the following:
 - (a) to balance setup and carrying costs
 - (b) to satisfy customer demand
 - (c) to avoid shutting down manufacturing facilities
 - (d) to take advantage of discounts
 - (e) to hedge against future price increases
9. If carrying costs increase, that implies that fewer orders are placed. However, the company still needs the annual demand for the part. So fewer orders imply a larger number of parts ordered. This increases carrying costs.

10. The economic order quantity is the amount that should be ordered to minimize the sum of ordering and carrying costs.
11. Safety stock is the difference between maximum demand and average demand, multiplied by the lead time. By reordering whenever the inventory level hits the safety stock point, a company is ensured of always having sufficient inventory on hand to meet demand.
12. JIT minimizes carrying costs by driving inventories to insignificant levels. Ordering costs are minimized by entering into long-term contracts with suppliers (or driving setup times to zero).

MULTIPLE-CHOICE EXERCISES

- 8-1. b**
- 8-2. e**
- 8-3. d**
- 8-4. e**
- 8-5. d**
- 8-6. c**
- 8-7. d**
- 8-8. c**
- 8-9. a**
- 8-10. c**
- 8-11. b**
- 8-12. c**

CORNERSTONE EXERCISES**CE 8-13**

1. Units ending inventory = Units beginning inventory + Units produced – Units sold
 = 300 + 15,000 – 12,700
 = 2,600 units
2. Direct materials \$ 20
 Direct labor 60
 Variable overhead 12
 Fixed overhead 30
 Unit product cost \$122
3. Value of ending inventory = 2,600 units × \$122 = \$317,200

CE 8-14

1. Units ending inventory = Units beginning inventory + Units produced – Units sold
 = 300 + 15,000 – 12,700
 = 2,600 units
2. Direct materials \$20
 Direct labor 60
 Variable overhead 12
 Unit product cost \$92
3. Value of ending inventory = 2,600 units × \$92 = \$239,200

CE 8-15

1. Direct materials \$ 9
 Direct labor 6
 Variable overhead 4
 Fixed overhead 5
 Unit product cost \$24
- Total cost of goods sold = \$24 × 9,300 units = \$223,200

CE 8-15 (Continued)

| | | |
|----|--|-------------------------|
| 2. | Osterman Company Income Statement Under Absorption Costing For the Most Recent Year | |
| | Sales (\$47 × 9,300)..... | \$437,100 |
| | Less: Cost of goods sold..... | <u>223,200</u> |
| | Gross margin..... | \$213,900 |
| | Less: Selling and administrative expense..... | <u>138,000</u> |
| | Operating income..... | <u><u>\$ 75,900</u></u> |

CE 8-16

| | | |
|----|---|--------------------|
| 1. | Direct materials | \$ 9 |
| | Direct labor | 6 |
| | Variable overhead | 4 |
| | Unit product cost | <u><u>\$19</u></u> |
| | Total cost of goods sold = \$19 × 9,300 units = \$176,700 | |

| | | |
|----|--|-------------------------|
| 2. | Osterman Company Income Statement Under Variable Costing For the Most Recent Year | |
| | Sales (\$47 × 9,300)..... | \$437,100 |
| | Less: Variable costs..... | <u>176,700</u> |
| | Contribution margin..... | \$260,400 |
| | Less fixed expense: | |
| | Fixed overhead..... | \$ 50,000 |
| | Fixed selling and administrative expenses..... | <u>138,000</u> |
| | Operating income..... | <u><u>188,000</u></u> |
| | | <u><u>\$ 72,400</u></u> |

CE 8-17

| Gorman Nurseries Inc. Segmented Income Statement For the Coming Year | | | |
|--|-------------|--------------|--------------|
| | Poinsettias | Fruit Trees | Total |
| Sales | \$ 970,000 | \$ 3,100,000 | \$ 4,070,000 |
| Less variable expenses: | | | |
| Variable cost of goods sold | (460,000) | (1,630,000) | (2,090,000) |
| Variable selling expense | (38,800) | (124,000) | (162,800) |
| Contribution margin | \$ 471,200 | \$ 1,346,000 | \$ 1,817,200 |
| Less direct fixed expenses: | | | |
| Direct fixed overhead | (160,000) | (200,000) | (360,000) |
| Direct selling and administrative | (146,000) | (87,000) | (233,000) |
| Segment margin | \$ 165,200 | \$ 1,059,000 | \$ 1,224,200 |
| Less common fixed expenses: | | | |
| Common fixed overhead | | | (800,000) |
| Common selling and administrative | | | (450,000) |
| Operating income | | | \$ (25,800) |

CE 8-18

- Number of orders = $\frac{\text{Annual number of pounds used}}{\text{Number of pounds in an order}}$
 $= \frac{8,000 \text{ pounds}}{500 \text{ pounds}}$
 $= 16 \text{ orders per year}$
- Total ordering cost = Number of orders \times Cost per order
 $= 16 \text{ orders} \times \5
 $= \$80$
- Total carrying cost = Average number of pounds in inventory \times Cost of carrying one pound in inventory
 $= \frac{500}{2} \times \$2$
 $= \$500$
- Total inventory-related cost = Total ordering cost + Total carrying cost
 $= \$80 + \500
 $= \$580$

CE 8-19

$$1. \text{EOQ} = \sqrt{\frac{2 \times D \times CO}{CC}}$$

$$\text{EOQ} = \sqrt{(2 \times 8,000 \times \$5)/\$2}$$

$$= 200 \text{ pounds}$$

$$2. \text{Number of orders} = \frac{\text{Annual number of pounds used}}{\text{Number of pounds in an order}}$$

$$= \frac{8,000 \text{ pounds}}{200 \text{ pounds}}$$

$$= 40 \text{ orders per year}$$

$$3. \text{Total ordering cost} = \text{Number of orders} \times \text{Cost per order}$$

$$= 40 \text{ orders} \times \$5$$

$$= \$200$$

$$4. \text{Total annual carrying cost under the EOQ policy} = (200/2) \times \$2$$

$$= \$200$$

$$5. \text{Total inventory-related cost} = \text{Total ordering cost} + \text{Total carrying cost}$$

$$= \$200 + \$200$$

$$= \$400$$

CE 8-20

$$\text{Reorder point} = \text{Daily usage} \times \text{Lead time}$$

$$\text{Reorder point} = 30 \times 5 \text{ days} = 150$$

CE 8-21

$$1. \text{Safety stock} = (\text{Maximum daily usage} - \text{Average daily usage}) \times \text{Lead time}$$

$$= (35 \text{ pounds} - 30 \text{ pounds}) \times 5 \text{ days}$$

$$= 25 \text{ pounds}$$

$$2. \text{Reorder point} = \text{Maximum daily usage} \times \text{Lead time}$$

$$\text{Reorder point} = 35 \text{ pounds} \times 5 \text{ days} = 175 \text{ pounds}$$

or

$$\text{Reorder point} = (\text{Average daily usage} \times \text{Lead time}) + \text{Safety stock}$$

$$\text{Reorder point} = (30 \text{ pounds} \times 5 \text{ days}) + 25 \text{ pounds} = 175 \text{ pounds}$$

EXERCISES**E 8-22**

1. Unit direct materials cost = $\$79,950/39,000$ units = $\$2.05$

Unit direct labor cost = $\$101,400/39,000$ units = $\$2.60$

Unit variable overhead cost = $\$15,600/39,000$ units = $\$0.40$

Unit fixed overhead cost = $\$50,700/39,000$ units = $\$1.30$

| | |
|-------------------------------|---------------|
| 2. Unit direct materials cost | \$2.05 |
| Unit direct labor cost | 2.60 |
| Unit variable overhead cost | 0.40 |
| Unit fixed overhead cost | 1.30 |
| Absorption cost per unit | <u>\$6.35</u> |

3. Ending inventory in units = $39,000 - 38,900 = 100$ units

4. Absorption-costing ending inventory = $\$6.35 \times 100$ units = $\$635$

E 8-23

| | |
|---|---------------|
| 1. Unit direct materials cost ($\$118,500/50,000$ units) | \$2.37 |
| Unit direct labor cost ($\$93,000/50,000$ units) | 1.86 |
| Unit variable overhead cost ($\$65,000/50,000$ units) | 1.30 |
| Variable-costing cost per unit | <u>\$5.53</u> |

2. Variable-costing ending inventory = $\$5.53 \times (50,000 - 48,900) = \$6,083$

E 8-24

| | |
|---|----------------|
| 1. Unit direct materials cost ($\$612,500/70,000$ units) | \$ 8.75 |
| Unit direct labor cost ($\$105,000/70,000$ units) | 1.50 |
| Unit variable overhead cost ($\$79,100/70,000$ units) | 1.13 |
| Unit fixed overhead cost ($\$269,500/70,000$ units) | 3.85 |
| Absorption cost per unit | <u>\$15.23</u> |

| | |
|---|----------------|
| 2. Unit direct materials cost ($\$612,500/70,000$ units) | \$ 8.75 |
| Unit direct labor cost ($\$105,000/70,000$ units) | 1.50 |
| Unit variable overhead cost ($\$79,100/70,000$ units) | 1.13 |
| Variable cost per unit | <u>\$11.38</u> |

3. Absorption-costing ending inventory = $\$15.23 \times 2,400$ units* = $\$36,552$

*(70,000 – 67,600 units)

4. Variable-costing ending inventory = $\$11.38 \times 2,400$ units = $\$27,312$

E 8-25

| | | | |
|--|-----------------------|-------------------|--|
| 1. Unit direct materials cost | \$ 9.30 | | |
| Unit direct labor cost | 2.75 | | |
| Unit variable overhead cost | 1.65 | | |
| Unit fixed overhead cost | 2.50 | | |
| Absorption cost per unit | <u>\$16.20</u> | | |
| 2. Unit direct materials cost | \$ 9.30 | | |
| Unit direct labor cost | 2.75 | | |
| Unit variable overhead cost | 1.65 | | |
| Variable cost per unit | <u>\$13.70</u> | | |
| 3. Absorption-costing income: | | | |
| Sales (\$26 × 56,900)..... | \$1,479,400 | | |
| Less: Cost of goods sold (\$16.20 × 56,900)..... | <u>921,780</u> | | |
| Gross margin..... | | \$ 557,620 | |
| Less: | | | |
| Variable selling expense (\$2 × 56,900)..... | \$ 113,800 | | |
| Fixed selling expense..... | 65,500 | | |
| Fixed administrative expense..... | <u>244,000</u> | <u>423,300</u> | |
| Operating income..... | | <u>\$ 134,320</u> | |
| 4. Variable-costing income: | | | |
| Sales (\$26 × 56,900)..... | | \$1,479,400 | |
| Less variable expenses: | | | |
| Cost of goods sold (\$13.70 × 56,900)..... | \$ 779,530 | | |
| Selling expense (\$2 × 56,900)..... | <u>113,800</u> | <u>893,330</u> | |
| Contribution margin..... | | \$ 586,070 | |
| Less fixed expenses: | | | |
| Fixed overhead (\$2.50 × 60,000)..... | \$ 150,000 | | |
| Selling and administrative expenses..... | <u>309,500</u> | <u>459,500</u> | |
| Operating income..... | | <u>\$ 126,570</u> | |

E 8-26

- | | |
|-------------------------------|----------------|
| 1. Unit direct materials cost | \$ 8.00 |
| Unit direct labor cost | 4.00 |
| Unit variable overhead cost | 1.50 |
| Unit fixed overhead cost | 4.15 |
| Absorption cost per unit | <u>\$17.65</u> |
-
- | | |
|-------------------------------|----------------|
| 2. Unit direct materials cost | \$ 8.00 |
| Unit direct labor cost | 4.00 |
| Unit variable overhead cost | 1.50 |
| Variable cost per unit | <u>\$13.50</u> |
-
3. Ending inventory = Beginning inventory + Units produced – Units sold
 = 5,000 + 20,000 – 23,700
 = 1,300 units
4. Absorption-costing ending inventory = \$17.65 × 1,300 units = \$22,945
5. Variable-costing ending inventory = \$13.50 × 1,300 units = \$17,550

E 8-27

1. Absorption-costing income:
- | | | |
|--|----------------|------------------|
| Sales (\$27 × 23,700)..... | \$639,900 | |
| Less: Cost of goods sold (\$17.65 × 23,700)..... | <u>418,305</u> | |
| Gross margin..... | | \$221,595 |
| Less: | | |
| Variable selling expenses (\$3 × 23,700)..... | \$ 71,100 | |
| Selling and administrative expenses..... | <u>24,300</u> | <u>95,400</u> |
| Operating income..... | | <u>\$126,195</u> |
-
2. Variable-costing income:
- | | | |
|--|---------------|------------------|
| Sales (\$27 × 23,700)..... | | \$639,900 |
| Less variable expenses: | | |
| Cost of goods sold (\$13.50 × 23,700)..... | \$319,950 | |
| Selling expenses (\$3 × 23,700)..... | <u>71,100</u> | <u>391,050</u> |
| Contribution margin..... | | \$248,850 |
| Less fixed expenses: | | |
| Fixed overhead (\$4.15 × 20,000)..... | \$ 83,000 | |
| Selling and administrative expenses..... | <u>24,300</u> | <u>107,300</u> |
| Operating income..... | | <u>\$141,550</u> |

E 8-28

1. **Number of units in ending inventory = Units produced – Units sold**
 = 16,000 units – 15,200 units
 = 800 units

$$\begin{aligned}\text{Fixed overhead in ending inventory} &= \text{Absorption-costing inventory} - \\ &\quad \text{Variable-costing inventory} \\ &= \$5,000 - \$3,400 \\ &= \$1,600\end{aligned}$$

$$\text{Fixed overhead cost per unit} = \$1,600 / 800 \text{ units} = \$2.00$$

$$\text{Total fixed overhead} = \$2.00 \times 16,000 \text{ units} = \$32,000$$

2. **Fixed overhead rate = Total fixed overhead/Units normal production**
 = \$23,000/20,000 units
 = \$1.15

$$\text{Unit absorption cost} = \text{Prime cost} + \text{Variable overhead cost} + \text{Fixed overhead cost}$$

$$\$8.00 = \$6.00 + \text{Variable overhead cost} + \$1.15$$

$$\begin{aligned}\text{Variable overhead cost per units} &= \$8.00 - \$6.00 - \$1.15 \\ &= \$0.85\end{aligned}$$

| | |
|------------------------------|-----------------|
| 3. Absorption-costing income | \$ 45,000 |
| Variable-costing income | 42,500 |
| Difference | <u>\$ 2,500</u> |

The difference between absorption-costing income and variable-costing income is fixed overhead multiplied by the difference between units produced and units sold. Beginning inventory was zero, so ending inventory consists of the units that went into ending inventory during the year.

$$\begin{aligned}\text{Fixed overhead going into} &= \text{Fixed overhead rate} \times \text{Units} \\ \text{ending inventory} &\quad \text{into inventory}\end{aligned}$$

$$\$2,500 = \$2.50 \times \text{Units into inventory}$$

$$\text{Units into inventory} = \$2,500 / \$2.50 = 1,000 \text{ units}$$

E 8-29

| 1. Trendy Inc. Segmented Income Statement For the Coming Year | | | |
|--|-------------------|-------------------|-------------------|
| | Sweaters | Jackets | Total |
| Sales | \$ 190,000 | \$ 420,000 | \$ 610,000 |
| Less variable expenses: | | | |
| Variable cost of goods sold | (125,000) | (180,000) | (305,000) |
| Variable selling expense | (9,500) | (21,000) | (30,500) |
| Contribution margin | \$ 55,500 | \$ 219,000 | \$ 274,500 |
| Less direct fixed expenses: | | | |
| Direct fixed overhead | (25,000) | (35,000) | (60,000) |
| Direct selling and administrative | (20,000) | (50,000) | (70,000) |
| Segment margin | \$ 10,500 | \$ 134,000 | \$ 144,500 |
| Less common fixed expenses: | | | |
| Common fixed overhead | | | (45,000) |
| Common selling and administrative | | | (15,000) |
| Operating income | | | \$ 84,500 |

2. For the company as a whole, an increase of \$12,000 in fixed expense will result in a decrease in operating income to \$72,500 (\$84,500 – \$12,000). If the equipment is for the sweater line, then that line's segment margin will be \$(1,500), and management will need to consider whether the line should be dropped. If profitability is not expected to improve (either by increasing price or decreasing other costs), then the sweater line should be dropped. If the equipment is for the jacket line, while segment margin will decrease to \$122,000 (\$134,000 – \$12,000), it remains profitable and there will be no need to drop it.

E 8-30

| 1. | | |
|---------------------------------|-------------------------------|-------------------------------------|
| | Consumer Computers | Small Business Computers |
| Direct materials | \$490 | \$1,180 |
| Direct labor | 90 | 310 |
| Variable overhead | 23 | 50 |
| Variable selling expense | 35 | 65 |
| Total unit variable cost | \$638 | \$1,605 |

No, the unit variable cost does not equal the unit variable product cost. The unit variable product cost includes direct materials, direct labor, and variable overhead. The unit variable cost also includes variable selling and administrative expense.

E 8-30 (Continuedd)

| 2. Paulson Computers Inc. Segmented Income Statement For the Coming Year | | | |
|---|-------------------------------|---|-----------------------|
| | Consumer Computers | Small Business Computers | Total |
| Sales | \$ 40,960,000 | \$ 134,000,000 | \$ 174,960,000 |
| Less variable expenses: | | | |
| Variable cost of goods sold | (38,592,000) | (123,200,000) | (161,792,000) |
| Variable selling expense | (2,240,000) | (5,200,000) | (7,440,000) |
| Contribution margin | \$ 128,000 | \$ 5,600,000 | \$ 5,728,000 |
| Less direct fixed expenses: | | | |
| Direct fixed overhead | (120,000) | (350,000) | (470,000) |
| Segment margin | \$ 8,000 | \$ 5,250,000 | \$ 5,258,000 |
| Less common fixed expenses: | | | |
| Common fixed overhead | | | (1,700,000) |
| Common selling and administrative | | | (2,960,000) |
| Operating income | | | \$ 598,000 |

E 8-31

1. Orders per year = 9,000 units/600 units per order = 15 orders
2. Total ordering cost = \$5 × 15 orders = \$75
3. Average amount in inventory = (600 + 0)/2 = 300 units
Total carrying cost = \$1 × 300 units = \$300
4. Total inventory-related cost = Total ordering cost + Total carrying cost
= \$75 + \$300 = \$375
5. No, Zellen's order size of 600 units is not the economic order quantity.
We can tell this because the ordering costs of \$75 do not equal the carrying costs of \$300. Zellen could get closer to the EOQ amount by ordering more frequently (increasing order cost) in smaller amounts per order (decreasing carrying costs).

E 8-32

$$\begin{aligned}
 1. \text{ EOQ} &= \sqrt{\frac{2 \times 9,000 \times \$5}{\$1}} \\
 &= \sqrt{\frac{90,000}{1}} \\
 &= 300 \text{ units}
 \end{aligned}$$

$$\begin{aligned}
 2. \text{ Number of orders} &= \frac{\text{Annual number of units used}}{\text{Number of units in an order}} \\
 &= \frac{9,000 \text{ units}}{300 \text{ units}} \\
 &= 30 \text{ orders per year}
 \end{aligned}$$

$$\begin{aligned}
 3. \text{ Total ordering cost} &= \text{Number of orders} \times \text{Cost per order} \\
 &= 30 \text{ orders} \times \$5 \\
 &= \$150
 \end{aligned}$$

$$\begin{aligned}
 4. \text{ Total carrying cost} &= \text{Average number of units in inventory} \times \text{Cost of carrying one unit in inventory} \\
 &= (300/2) \times \$1 \\
 &= \$150
 \end{aligned}$$

$$\begin{aligned}
 5. \text{ Total inventory-related cost} &= \text{Total ordering cost} + \text{Total carrying cost} \\
 &= \$150 + \$150 \\
 &= \$300
 \end{aligned}$$

E 8-33

$$\begin{aligned}
 1. \text{ Reorder point without safety stock} &= \text{Average daily rate} \times \text{Lead time} \\
 &= 75 \text{ motors} \times 4 \text{ days} \\
 &= 300 \text{ units}
 \end{aligned}$$

$$\begin{aligned}
 2. \text{ Safety stock} &= (\text{Maximum daily usage} - \text{Average daily usage}) \times \text{Lead time} \\
 &= (85 \text{ motors} - 75 \text{ motors}) \times 4 \text{ days} \\
 &= 40 \text{ units}
 \end{aligned}$$

$$\begin{aligned}
 3. \text{ Reorder point with safety stock} &= \text{Reorder point without safety stock} + \text{Safety stock} \\
 &= 300 + 40 \\
 &= 340 \text{ motors}
 \end{aligned}$$

E 8-33 (Continued)

or

$$\begin{aligned}
 \text{Reorder point with safety stock} &= \text{Maximum daily usage} \times \text{Lead time} \\
 &= 85 \text{ motors} \times 4 \text{ days} \\
 &= 340 \text{ motors}
 \end{aligned}$$

E 8-34

1. $\text{Reorder point without safety stock} = \text{Average daily rate} \times \text{Lead time}$
 $= 20 \text{ units} \times 6 \text{ days}$
 $= 120 \text{ units}$
 2. $\text{Safety stock} = (\text{Maximum daily usage} - \text{Average daily usage}) \times \text{Lead time}$
 $= (65 \text{ units} - 20 \text{ units}) \times 6 \text{ days}$
 $= 270 \text{ units}$
 3. $\text{Reorder point with safety stock} = \text{Reorder point without safety stock} + \text{Safety stock}$
 $= 120 \text{ units} + 270 \text{ units}$
 $= 390 \text{ units}$
- or
- $$\begin{aligned}
 \text{Reorder point with safety stock} &= \text{Maximum daily usage} \times \text{Lead time} \\
 &= 65 \text{ units} \times 6 \text{ days} \\
 &= 390 \text{ units}
 \end{aligned}$$
4. There are many more weddings during the summer than in most other seasons of the year. This could explain why sometimes the maximum number of boas used (65) is so much higher than the daily average of 20. Armed with this knowledge, the manager could carry more safety stock during the summer months, and less during the other months of the year.

PROBLEMS

P 8-35

| | |
|--|---------------|
| 1. Direct materials | \$3.35 |
| Direct labor | 1.78 |
| Variable overhead | 1.60 |
| Fixed overhead (\$180,000/300,000 units) | 0.60 |
| Total | <u>\$7.33</u> |

Per-unit inventory cost on the balance sheet is \$7.33.

Units in ending inventory = 11,300 units + 300,000 units – 306,500 units
= 4,800 units

Total ending inventory = \$7.33 × 4,800 units = \$35,184

2. Absorption-costing income:

| | |
|--|-------------------|
| Sales (306,500 units × \$9)..... | \$2,758,500 |
| Less: Cost of goods sold (306,500 units × \$7.33)..... | <u>2,246,645</u> |
| Gross margin..... | \$ 511,855 |
| Less: Selling and administrative expenses..... | <u>371,850</u> |
| Operating income..... | <u>\$ 140,005</u> |

| | |
|---------------------|---------------|
| 3. Direct materials | \$3.35 |
| Direct labor | 1.78 |
| Variable overhead | 1.60 |
| Total | <u>\$6.73</u> |

Per-unit inventory cost under variable costing equals \$6.73.

This differs from the per-unit inventory cost in Requirement 1 because the balance sheet is for external use and reflects absorption costing. Variable costing does not include per-unit fixed overhead.

4. Variable-costing income:

| | |
|---|-------------------|
| Sales (306,500 units × \$9)..... | \$ 2,758,500 |
| Less variable expenses: | |
| Variable cost of goods sold (306,500 units × \$6.73)..... | (2,062,745) |
| Variable selling and administrative (306,500 units × \$0.90)..... | <u>(275,850)</u> |
| Contribution margin..... | \$ 419,905 |
| Less fixed expenses: | |
| Fixed overhead..... | (180,000) |
| Fixed selling and administrative..... | <u>(96,000)</u> |
| Operating income | <u>\$ 143,905</u> |

P 8-35 (Continued)**5. Absorption-costing income:**

| | |
|--|--------------------------|
| Sales (296,700 units × \$9)..... | \$2,670,300 |
| Less: Cost of goods sold (296,700 units × \$7.33)..... | <u>2,174,811</u> |
| Gross margin..... | \$ 495,489 |
| Less: Selling and administrative expenses..... | <u>363,030</u> |
| Operating income..... | <u><u>\$ 132,459</u></u> |

Variable-costing income:

| | |
|---|--------------------------|
| Sales (296,700 units × \$9)..... | \$2,670,300 |
| Less variable expenses: | |
| Variable cost of goods sold (296,700 units × \$6.73)..... | (1,996,791) |
| Variable selling and administrative (296,700 units × \$0.90)..... | <u>(267,030)</u> |
| Contribution margin..... | \$ 406,479 |
| Less fixed expenses: | |
| Fixed overhead..... | (180,000) |
| Fixed selling and administrative..... | <u>(96,000)</u> |
| Operating income..... | <u><u>\$ 130,479</u></u> |

P 8-36**1. Unit cost = \$222,275/52,300 units = \$4.25**

Absorption-costing ending inventory = 2,700 units × \$4.25 = \$11,475

2. Variable-costing ending inventory:

\$4.25 per unit – \$0.50 per unit = \$3.75 per unit

Ending inventory = 2,700 units × \$3.75 = \$10,125

| | |
|--|-------------------------|
| Sales..... | \$ 455,010 |
| Less: Variable cost of goods sold (\$3.75 × 52,300 units)..... | <u>196,125</u> |
| Contribution margin..... | \$ 258,885 |
| Less fixed expenses: | |
| Fixed overhead..... | (27,500) |
| Fixed selling and administrative..... | <u>(145,000)</u> |
| Operating income..... | <u><u>\$ 86,385</u></u> |

P 8-36 (Continued)

| 3. Sugarsmooth Inc. Variable-Costing Income Statement For the Coming Year | | | | |
|--|--|----------------------------|-------------------------|-------------------|
| | Drugstores & Supermarkets | Discount Stores | Beauty Shops | Total |
| Sales | \$ 455,010 | \$116,000 | \$ 90,000 | \$ 661,010 |
| Less variable expenses: | | | | |
| Cost of goods sold | (196,125) | (75,000) | (37,500) | (308,625) |
| Commissions | - | - | (9,000) | (9,000) |
| Return penalties | - | (4,640) | - | (4,640) |
| Packing expense | - | - | (5,000) | (5,000) |
| Contribution margin | \$ 258,885 | \$ 36,360 | \$ 38,500 | \$ 333,745 |
| Less fixed expenses: | | | | |
| Shipping | - | (8,500) | - | (8,500) |
| Additional clerk | - | (28,000) | - | (28,000) |
| Segment margin | \$ 258,885 | \$ (140) | \$ 38,500 | \$ 297,245 |
| Less common expenses: | | | | |
| Overhead | | | | (27,500) |
| Selling and administrative | | | | (145,000) |
| Operating income | | | | \$ 124,745 |

4. Only two segments are profitable, the drugstores & supermarkets and the beauty shops. The discount stores are unprofitable. Sugarsmooth might consider raising the price to the discount stores. Alternatively, perhaps costs could be lowered. If neither of these is a possibility, then the discount stores should be dropped.

P 8-37

| 1. Bismarck Company Segmented Income Statement | | | |
|---|--------------------|--------------------------|--------------------|
| | Blenders | Coffee Makers | Total |
| Sales | \$1,920,000 | \$2,175,000 | \$4,095,000 |
| Less: Variable cost of goods sold | 1,600,000 | 2,025,000 | 3,625,000 |
| Contribution margin | \$ 320,000 | \$ 150,000 | \$ 470,000 |
| Less: Direct fixed expenses | 92,400 | 145,000 | 237,400 |
| Segment margin | \$ 227,600 | \$ 5,000 | \$ 232,600 |
| Less: Common fixed expenses | | | 89,600 |
| Operating income | | | \$ 143,000 |

P 8-37 (Continued)

2. If the coffee maker line is dropped, profits will decrease by \$5,000, the segment margin. If the blender line is dropped, profits will decrease by \$227,600.

3.

| | Blenders | Coffee Makers | Total |
|--|--------------------|----------------------|--------------------|
| Sales | \$2,135,000 | \$2,175,000 | \$4,310,000 |
| Less: Variable cost of goods sold | 1,800,000 | 2,025,000 | 3,825,000 |
| Contribution margin | \$335,000 | \$150,000 | \$485,000 |
| Less: Direct fixed expenses | 92,400 | 145,000 | 237,400 |
| Segment margin | \$242,600 | \$5,000 | \$247,600 |
| Less: Common fixed expenses | | | 89,600 |
| Operating income | | | \$158,000 |

Profits increase by \$15,000.

P 8-38

1. Absorption costing:

| | |
|--------------------------|---------------|
| Direct materials | \$1.68 |
| Direct labor | 0.42 |
| Variable overhead | 0.37 |
| Fixed overhead | 1.76 |
| Unit cost | \$4.23 |

Cost of ending inventory = \$4.23 × 1,250 units = \$5,288

2. Variable costing:

| | |
|--------------------------|---------------|
| Direct materials | \$1.68 |
| Direct labor | 0.42 |
| Variable overhead | 0.37 |
| Unit cost | \$2.47 |

Cost of ending inventory = \$2.47 × 1,250 units = \$3,088

3. Selling price \$ 6.95

| | |
|-------------------------------------|----------------|
| Less: | |
| Variable cost of goods sold | (2.47) |
| Commission (\$6.95 × 8%) | (0.56) |
| Contribution margin per unit | \$ 3.92 |

P 8-38 (Continued)

| | | |
|--|-----------------|------------------|
| 4. Sales (\$6.95 × 29,500)..... | | \$205,025 |
| Less variable expenses: | | |
| Variable cost of goods sold..... | \$72,865 | |
| Commissions..... | 16,402 | 89,267 |
| | | <hr/> |
| Contribution margin..... | | \$115,758 |
| Less fixed expenses: | | |
| Fixed overhead..... | \$28,160 | |
| Fixed administrative..... | 37,890 | 66,050 |
| | | <hr/> |
| Operating income..... | | \$ 49,708 |
| | | <hr/> |

Variable costing should be used, since the fixed costs will not increase as production and sales increase.

P 8-39

| | Scented | Musical | Regular | Total |
|------------------------------------|-----------------|-------------------|-----------------|-----------------|
| 1. Sales | \$13,000 | \$19,500 | \$25,000 | \$57,500 |
| Less: Variable expenses | 9,100 | 15,600 | 12,500 | 37,200 |
| | <hr/> | <hr/> | <hr/> | <hr/> |
| Contribution margin | \$ 3,900 | \$ 3,900 | \$12,500 | \$20,300 |
| Less: Direct fixed expenses | 4,250 | 5,750 | 3,000 | 13,000 |
| | <hr/> | <hr/> | <hr/> | <hr/> |
| Product margin | \$ (350) | \$ (1,850) | \$ 9,500 | \$ 7,300 |
| Less: Common fixed expenses | | | | 7,500 |
| | | | | <hr/> |
| Operating income (loss) | | | | \$ (200) |
| | | | | <hr/> |

Kathy should accept this proposal. The 30 percent sales increase, coupled with the increased advertising, reduces the loss from \$1,000 to \$200. Both scented and musical product-line profits increase. However, more must be done. If the scented and musical product margins remain negative, the two products may need to be dropped.

| | |
|-------------------------------------|-----------------|
| 2. Regular | |
| Sales..... | \$20,000 |
| Less: Variable expenses..... | 10,000 |
| | <hr/> |
| Contribution margin..... | \$10,000 |
| Less: Fixed expenses..... | 10,500 |
| | <hr/> |
| Operating income (loss)..... | \$ (500) |
| | <hr/> |

While dropping the two lines results in a \$500 loss versus the original \$1,000 loss, it is worse than the alternative offered in Requirement 1. Other options need to be developed.

P 8-39 (Continued)

3. Combinations would be beneficial. Dropping the musical line (which shows the greatest segment loss) and keeping the scented line while increasing advertising yields a profit (the optimal combination).

| | <u>Scented</u> | <u>Regular</u> | <u>Total</u> |
|-----------------------------|-----------------|-----------------|-----------------|
| Sales | \$13,000 | \$22,500 | \$35,500 |
| Less: Variable expenses | 9,100 | 11,250 | 20,350 |
| Contribution margin | \$ 3,900 | \$11,250 | \$15,150 |
| Less: Direct fixed expenses | 4,250 | 3,000 | 7,250 |
| Product margin | <u>\$ (350)</u> | <u>\$ 8,250</u> | <u>\$ 7,900</u> |
| Less: Common fixed expenses | | | 7,500 |
| Operating income | | | <u>\$ 400</u> |

P 8-40

1. Ordering cost = $50,000 \text{ units} / 2,500 \text{ units} = 20 \text{ orders} \times \$50 = \$1,000$

2. Carrying cost = $\$5 \times (2,500 \text{ units} / 2) = \$6,250$

3. Total cost of current inventory policy = $\$1,000 + \$6,250 = \$7,250$

$$4. \text{EOQ} = \sqrt{\frac{2 \times 50,000 \text{ units} \times \$50}{\$5}}$$

$$= 1,000 \text{ units}$$

5. Ordering cost at EOQ = $50,000 \text{ units} / 1,000 \text{ units} \times \$50 = \$2,500$

Carrying cost at EOQ = $\$5 \times (1,000 \text{ units} / 2) = \$2,500$

6. Total cost EOQ policy = $\$2,500 + \$2,500 = \$5,000$

Savings = $\$6,250 - \$5,000 = \$1,250$

7. Cost of ordering 2,500 units = Ordering cost + Carrying cost
 $= \$1,000 + \$6,250$
 $= \$7,250$

Cost of ordering 1,000 units = Increased price + Ordering cost + Carrying cost
 $= (\$0.05 \times 50,000 \text{ units}) + \$2,500 + \$2,500$
 $= \$2,500 + \$2,500 + \$2,500$
 $= \$7,500$

With the price increase, it is better to go with the original order size.

P 8-41

$$1. \text{ Ordering cost} = \$40 \times (14,000 \text{ units}/400 \text{ units}) \\ = \$1,400$$

$$\text{Carrying cost} = \$1.75^* \times (400 \text{ units}/2) \\ = \$350$$

*10% of purchase price or $0.10 \times \$17.50$.

$$\text{Total cost} = \$1,400 + \$350 = \$1,750$$

$$2. \text{ EOQ} = \sqrt{\frac{2 \times 14,000 \times \$40}{\$1.75}} \\ = \sqrt{640,000} \\ = 800 \text{ units}$$

$$\text{Ordering cost} = \$40 \times (14,000 \text{ units}/800 \text{ units}) \\ = \$700$$

$$\text{Carrying cost} = \$1.75 \times (800 \text{ units}/2) \\ = \$700$$

$$\text{Total cost} = \$700 + \$700 = \$1,400$$

$$\text{Savings} = \$1,750 - \$1,400 = \$350$$

$$3. \text{ Rate of usage} = 7 \text{ units} \times 50 \text{ days} = 350 \text{ days} \\ = 14,000 \text{ units}/350 \text{ days} = 40 \text{ blocks per day}$$

$$\text{Reorder point} = \text{Average rate of usage} \times \text{Lead time} \\ = 40 \text{ units} \times 5 \text{ days} \\ = 200 \text{ units}$$

This coincides with the current reorder policy.

4. The order quantity would have to be 600 instead of 800 (the EOQ).
If so, the following inventory costs would be incurred:

$$\text{Ordering cost} = \$40 \times (14,000 \text{ units}/600 \text{ units}) \\ = \$933$$

$$\text{Carrying cost} = \$1.75 \times (600 \text{ units}/2) \\ = \$525$$

$$\text{Total cost} = \$933 + \$525 \\ = \$1,458$$

This restriction would mean an additional cost of only \$58
(\$1,458 – \$1,400) over the cost of using the EOQ.

5. The most cheese that should be kept on hand given the 10-day constraint is 400 blocks (40 blocks \times 10 days). Reorder would occur when inventory dropped to 200 blocks.

CASES**Case 8-42**

1. Many legitimate reasons support the creation of inventory (e.g., the need to avoid stockouts and the need to ensure on-time delivery). Paul Chesser's reasons, however, are based on self-interest and ignore what's best for the company. Knowingly producing for inventory to obtain personal financial gain at the expense of the company certainly could be labeled as unethical behavior.
2. Since the decision to produce for inventory was not motivated by any sound economic reasoning, and Ruth knows the real motive behind the decision, she should feel discomfort in the role she has been asked to assume. If she decides to appeal to higher-level management, the divisional manager can counter with arguments that inventory was created because he expected the economy to turn around and did not want to be in a position of not having enough goods to meet demand. Even though Ruth may have a difficult time proving any allegation of improper conduct, if she is convinced that the behavior is truly unethical, then appeals to higher-level management with the prospect of ultimate resignation should be the route she takes.

Alternatively, Ruth might decide that the use of absorption costing for internal reporting and bonus calculation has led to this situation. She could lobby higher management to begin using variable costing as a way of avoiding these dysfunctional decisions. Ruth will have a very hard time proving unethical behavior—at worst, Paul may be accused of having poor judgment regarding future economic upturns.

3. The following standards may apply:
Integrity. Refrain from engaging in any conduct that would prejudice carrying out duties ethically. (III-2)
Credibility. Communicate information fairly and objectively. (IV-1) Disclose fully all relevant information that could reasonably be expected to influence an intended user's understanding of the reports, analyses, or recommendations. (IV-2)

Case 8-43

- 1. By discussing the amount by which his company and Piura have reduced costs, Mac may have violated the confidentiality standard. Specifically, Mac should: “keep information confidential except when disclosure is authorized or legally required.” He may also be involved in a conflict of interest, although he may not have realized this until the conversation of the evening unfolded. Finally, he may be guilty of “using confidential information for unethical or illegal advantage.”**
- 2. Mac would violate a host of standards: disclosing confidential information, accepting a gift or favor that would influence his actions, actively subverting his company’s legitimate objectives, and engaging in an activity that would discredit the profession. He would be well advised to refuse the offer and avoid any disclosure of information.**