

Problem 8-18 (45 minutes)

1. a. and b.

	<i>Absorption Costing</i>	<i>Variable Costing</i>
Direct materials.....	\$ 6	\$ 6
Direct labour.....	12	12
Variable manufacturing overhead	4	4
Fixed manufacturing overhead (\$240,000 ÷ 30,000 units)	<u>8</u>	<u>—</u>
Unit product cost.....	<u>\$30</u>	<u>\$22</u>

2.

	<i>May</i>	<i>June</i>
Sales (26,000 units, 34,000 units)	<u>\$1,040,000</u>	<u>\$1,360,000</u>
Variable expenses:		
Variable production costs @ \$22 per unit ..	572,000	748,000
Variable selling and administrative @ \$3 per unit	<u>78,000</u>	<u>102,000</u>
Total variable expenses.....	<u>650,000</u>	<u>850,000</u>
Contribution margin.....	<u>390,000</u>	<u>510,000</u>
Fixed expenses:		
Fixed manufacturing overhead.....	240,000	240,000
Fixed selling and administrative	<u>180,000</u>	<u>180,000</u>
Total fixed expenses	<u>420,000</u>	<u>420,000</u>
Operating income (loss).....	<u>\$ (30,000)</u>	<u>\$ 90,000</u>

3.

	<i>May</i>	<i>June</i>
Variable costing operating income (loss)	\$ (30,000)	\$ 90,000
Add: Fixed manufacturing overhead cost deferred in inventory under absorption costing (4,000 units × \$8 per unit)	32,000	
Deduct: Fixed manufacturing overhead cost released from inventory under absorption costing (4,000 units × \$8 per unit)		<u>(32,000)</u>
Absorption costing operating income	<u>\$ 2,000</u>	<u>\$ 58,000</u>

Problem 8-18 (continued)

4. As shown in the reconciliation in part (3) above, \$32,000 of fixed manufacturing overhead cost was deferred in inventory under absorption costing at the end of May, because \$8 of fixed manufacturing overhead cost "attached" to each of the 4,000 unsold units that went into inventory at the end of that month. This \$32,000 was part of the \$420,000 total fixed cost that has to be covered each month in order for the company to break even. Because the \$32,000 was added to the inventory account, and thus did not appear on the income statement for May as an expense, the company was able to report a small profit for the month even though it sold less than the break-even volume of sales. In short, only \$388,000 of fixed cost ($\$420,000 - \$32,000$) was expensed for May, rather than the full \$420,000 as contemplated in the break-even analysis. As stated in the text, this is a major problem with the use of absorption costing internally for management purposes. The method does not harmonize well with the principles of cost-volume-profit analysis, and can result in data that are unclear or confusing to management.

Problem 8-23(75 minutes)

1.	<i>Year 1</i>	<i>Year 2</i>	<i>Year 3</i>
Sales	<u>\$1,000,000</u>	<u>\$ 800,000</u>	<u>\$1,000,000</u>
Variable expenses:			
Variable cost of goods sold @			
\$4 per unit.....	200,000	160,000	200,000
Variable selling and			
administrative @ \$2 per unit...	<u>100,000</u>	<u>80,000</u>	<u>100,000</u>
Total variable expenses.....	<u>300,000</u>	<u>240,000</u>	<u>300,000</u>
Contribution margin.....	<u>700,000</u>	<u>560,000</u>	<u>700,000</u>
Fixed expenses:			
Fixed manufacturing overhead...	600,000	600,000	600,000
Fixed selling and administrative .	<u>70,000</u>	<u>70,000</u>	<u>70,000</u>
Total fixed expenses	<u>670,000</u>	<u>670,000</u>	<u>670,000</u>
Operating income (loss).....	<u>\$ 30,000</u>	<u>\$(110,000)</u>	<u>\$ 30,000</u>

2. a.	<i>Year 1</i>	<i>Year 2</i>	<i>Year 3</i>
Variable manufacturing cost.....	\$ 4	\$ 4	\$ 4
Fixed manufacturing cost:			
\$600,000 ÷ 50,000 units.....	12		
\$600,000 ÷ 60,000 units.....		10	
\$600,000 ÷ 40,000 units.....			15
Unit product cost.....	<u>\$16</u>	<u>\$14</u>	<u>\$19</u>

b. Variable costing operating			
income (loss)	\$30,000	\$(110,000)	\$ 30,000
Add (Deduct): Fixed manufacturing			
overhead cost deferred in invento-			
ry from Year 2 to Year 3 under			
absorption costing (20,000 units ×			
\$10 per unit).....		200,000	(200,000)
Add: Fixed manufacturing overhead			
cost deferred in inventory from			
Year 3 to the future under			
absorption costing (10,000 units ×			
\$15 per unit).....			150,000
Absorption costing operating			
income (loss)	<u>\$30,000</u>	<u>\$ 90,000</u>	<u>\$(20,000)</u>

Problem 8-23(continued)

3. Production went up sharply in Year 2 thereby reducing the unit product cost, as shown in (2a). This reduction in cost, combined with the large amount of fixed manufacturing overhead cost deferred in inventory for the year, more than offset the loss of revenue. The net result is that the company's operating income rose even though sales were down.
4. The fixed manufacturing overhead cost deferred in inventory from Year 2 was charged against Year 3 operations, as shown in the reconciliation in (2b). This added charge against Year 3 operations was offset somewhat by the fact that part of Year 3's fixed manufacturing overhead costs was deferred in inventory to future years [again see (2b)]. Overall, the added costs charged against Year 3 were greater than the costs deferred to future years, so the company reported less income for the year even though the same number of units was sold as in Year 1.
5.
 - a. With lean production, production would have been geared to sales in each year so that little or no inventory of finished goods would have been built up in either Year 2 or Year 3.
 - b. If lean production had been in use, the operating income under absorption costing would have been the same as under variable costing in all three years. With production geared to sales, there would have been no ending inventory on hand, and therefore there would have been no fixed manufacturing overhead costs deferred in inventory to other years. Assuming that the company *expected* to sell 50,000 units in each year and that unit product costs were set on the basis of that level of expected activity, the income statements under absorption costing would have appeared as shown on the next page.

Problem 8-23(continued)

	<i>Year 1</i>	<i>Year 2</i>	<i>Year 3</i>
Sales.....	<u>\$1,000,000</u>	<u>\$ 800,000</u>	<u>\$1,000,000</u>
Cost of goods sold:			
Cost of goods manufactured			
@ \$16 per unit	800,000	640,000 *	800,000
Add underapplied overhead	<u> </u>	<u>120,000 **</u>	<u> </u>
Cost of goods sold	<u>800,000</u>	<u>760,000</u>	<u>800,000</u>
Gross margin.....	200,000	40,000	200,000
Selling and administrative			
expenses	<u>170,000</u>	<u>150,000</u>	<u>170,000</u>
Operating income (loss)	<u>\$ 30,000</u>	<u>\$(110,000)</u>	<u>\$ 30,000</u>

* 40,000 units × \$16 per unit = \$640,000.

** 10,000 units *not* produced × \$12 per unit fixed manufacturing overhead cost = \$120,000 fixed manufacturing overhead cost not applied to products.