Problem 7-13

1. a. and b.

	Absorption Costing	*Variable Costing*
Direct materials	$48	$48
Variable manufacturing overhead	2	2
Fixed manufacturing overhead ($360,000 ÷ 12,000 units)	30	—
Unit product cost	$80	$50

2. Absorption costing income statement:

Sales (10,000 units x $150 per unit)		$1,500,000
Less cost of goods sold:		
Beginning inventory	$ 0	
Add cost of goods manufactured (12,000 units x $80 per unit)	960,000	
Good available for sale	960,000	
Less ending inventory (2,000 units x $80 per unit)	160,000	800,000
Gross margin		700,000
Less selling and administrative expenses [(12% x $1,500,000) + $470,000]		650,000
Operating income		$ 50,000

Problem 7-13 (continued)

3. Variable costing income statement:

Sales (10,000 units x $150 per unit)		$1,500,000
Less variable expenses:		
Variable cost of goods sold:		
Beginning inventory.....	$ 0	
Add variable manufacturing costs (12,000 units x $50 per unit)	600,000	
Goods available for sale	600,000	
Less ending inventory (2,000 units x $50 per unit)	100,000	
Variable cost of goods sold*	500,000	
Variable selling and administrative expenses.....	180,000	680,000
Contribution margin.....		820,000
Less fixed expenses:		
Fixed manufacturing overhead	360,000	
Fixed selling and administrative expenses ...	470,000	830,000
Operating loss.....		$ (10,000)

* This could be computed more simply as 10,000 units x $50 per unit = $500,000

4. A manager may prefer to take the statement prepared under the absorption approach in part (2), since it shows a profit for the month. As long as inventory levels are rising, absorption costing will report higher profits than variable costing. Notice in the situation above that the company is operating below its theoretical break-even point, but yet reports a profit under the absorption approach. The ethics of this approach are debatable.

5.

Variable costing operating loss	$ (10,000)
Add: Fixed manufacturing overhead cost deferred in inventory under absorption costing (2,000 units x $30 per unit).....	60,000
Absorption costing operating income	$ 50,000

Problem 7-14

1. a. and b.

	Absorption Costing	*Variable Costing*
Direct materials	$ 7	$ 7
Direct labour	10	10
Variable manufacturing overhead	5	5
Fixed manufacturing overhead ($315,000 ÷ 17,500 units)	18	—
Unit product cost	$40	$22

2.

	July	*August*
Sales	$900,000	$1,200,000
Less variable expenses:		
Variable cost of goods sold @ $22 per unit	330,000	440,000
Variable selling and administrative expenses @ $3 per unit	45,000	60,000
Total variable expenses	375,000	500,000
Contribution margin	525,000	700,000
Less fixed expenses:		
Fixed manufacturing overhead	315,000	315,000
Fixed selling and administrative expenses	245,000	245,000
Total fixed expenses	560,000	560,000
Operating income (loss)	$ (35,000)	$ 140,000

3.

	July	*August*
Variable costing operating income (loss)	$ (35,000)	$ 140,000
Add: Fixed manufacturing overhead cost deferred in inventory under absorption costing (2,500 units x $18 per unit)	45,000	
Deduct: Fixed manufacturing overhead cost released from inventory under absorption costing (2,500 units x $18 per unit)		(45,000)
Absorption costing operating income	$ 10,000	$ 95,000

Problem 7-14 (continued)

4. As shown in the reconciliation in part (3) above, $45,000 of fixed manufacturing overhead cost was deferred in inventory under absorption costing at the end of July, since $18 of fixed manufacturing overhead cost "attached" to each of the 2,500 unsold units that went into inventory at the end of that month. This $45,000 was part of the $560,000 total fixed cost that has to be covered each month in order for the company to break even. Since the $45,000 was added to the inventory account, and thus did not appear on the income statement for July 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 $515,000 of fixed cost ($560,000 – $45,000) was expensed for July, rather than the full $560,000 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 7-15

1. a. and b.

	Absorption Costing		*Variable Costing*	
	Year 1	*Year 2*	*Year 1*	*Year 2*
Variable production costs	$ 8	$ 8	$8	$8
Fixed manufacturing overhead costs:				
$300,000 ÷ 20,000 units	15			
$300,000 ÷ 25,000 units		12		
Unit product cost	$23	$20	$8	$8

2.

	Year 1		*Year 2*	
Sales		$700,000		$700,000
Less variable expenses:				
Variable cost of goods sold:				
Beginning inventory	$ 0		$ 0	
Add variable manufacturing costs	160,000		200,000	
Goods available for sale	160,000		200,000	
Less ending inventory	0		40,000	
Variable cost of goods sold*	160,000		160,000	
Variable selling expense and administrative expenses (20,000 units x $1 per unit)	20,000	180,000	20,000	180,000
Contribution margin		520,000		520,000
Less fixed expenses:				
Fixed manufacturing overhead	300,000		300,000	
Fixed selling and administrative expenses	180,000	480,000	180,000	480,000
Operating income		$ 40,000		$ 40,000

*This could be computed more simply as 20,000 units x $8 per unit = $160,000.

Problem 7-15 (continued)

3.

	Year 1	*Year 2*
Variable costing operating income	$ 40,000	$ 40,000
Add: Fixed manufacturing overhead cost deferred in inventory under absorption costing (5,000 units x $12 per unit).....		60,000
Absorption costing operating income	$ 40,000	$100,000

4. The increase in production in Year 2, in the face of level sales, caused a buildup of inventory and a deferral of a portion of Year 2's fixed manufacturing overhead costs to the next year. This deferral of cost relieved Year 2 of $60,000 (5,000 units x $12 per unit) of fixed manufacturing overhead cost that it otherwise would have borne. Thus, operating income was $60,000 higher in Year 2 than in Year 1, even though the same number of units was sold each year. In summary, by increasing production and building up inventory, profits increased without any increase in sales or reduction in costs. This is a major criticism of the absorption costing approach.

5. a. Under JIT, production would have been geared to sales. Hence inventories would not have been built up in Year 2.

   b. Under JIT, the operating income for Year 2 using absorption costing would have been $40,000—the same as in Year 1. With production geared to sales, there would have been no inventory buildup at the end of Year 2 and therefore there would have been no fixed manufacturing overhead costs deferred in inventory. The entire $300,000 in fixed manufacturing overhead costs would have been charged against Year 2 operations, rather than having $60,000 of it deferred to future periods through the inventory account. Thus, operating income would have been about the same in each year under *both* variable and absorption costing.

Case 7-18

1.

	July	*August*	*September*
Sales	$1,750,000	$1,875,000	$2,000,000
Less variable expenses:			
Variable manufacturing costs @ $9 per unit	630,000	675,000	720,000
Variable selling and administrative expenses @ $6 per unit	420,000	450,000	480,000
Total variable expenses	1,050,000	1,125,000	1,200,000
Contribution margin	700,000	750,000	800,000
Less fixed expenses:			
Fixed manufacturing overhead[1]	560,000	560,000	560,000
Fixed selling and administrative expenses[2]	200,000	200,000	200,000
Total fixed expenses	760,000	760,000	760,000
Operating income (loss)	$ (60,000)	$ (10,000)	$ 40,000

[1] $1,680,000 ÷ 3 = $560,000 per month.

[2] Fixed selling and administrative expenses (from July's figures): $620,000 – (70,000 units x $6 per unit = $420,000) = $200,000.

Note how clear and easy to follow the variable costing statements are as compared to the absorption costing statements.

The $560,000 monthly fixed manufacturing overhead cost can also be obtained by the following computation:

	July	*August*	*September*
Fixed manufacturing overhead cost applied	$595,000	$560,000	$420,000
Underapplied or (overapplied) overhead	(35,000)		140,000
Fixed manufacturing overhead cost	$560,000	$560,000	$560,000

Case 7-18 (continued)

2. The break-even point under variable costing would be:

$$\text{Break-even point} = \frac{\text{Fixed costs}}{\text{Unit contribution margin}}$$

$$= \frac{\$760{,}000}{\$25-(\$9+\$6)} = \frac{\$760{,}000}{\$10 \text{ per unit}} = 76{,}000 \text{ units}$$

On the surface this answer appears to be incorrect, since the company sold *less* than 76,000 units in both July and August and yet showed a profit in both months on the absorption costing statements. In fact, when a student gives an answer of 76,000 units as the break-even point, you should ask, "How can 76,000 units be the break-even point when the company sold only 70,000 units in July and 75,000 units in August and reported a profit in both months?"

The answer to this apparent inconsistency is that production exceeded sales in both July and August. This resulted in deferring a portion of the fixed manufacturing overhead costs of these months to the future rather than showing the cost as an expense on the income statement. In each month, this deferral of fixed manufacturing overhead cost was large enough to permit the company to report a profit, even though less than the break-even volume of units was sold.

3. Under absorption costing, profits are affected by both sales and production. If production exceeds sales, then a portion of the fixed manufacturing overhead cost of the period will be deferred to the future. In periods where these deferrals of fixed manufacturing overhead cost take place, profits will be inflated, as in July for Warner Company. If production is less than sales, then fixed manufacturing overhead costs that were deferred in inventory and carried over from prior periods will be released from inventory and charged as an expense on the income statement. In addition, if production in these months is less than planned, then underapplied overhead will result, which, when added to the costs being released from inventory through inventory reduction, will depress earnings. We can see this happening in September in Warner Company, where planned production was 80,000 units, but only 60,000 units were produced.

Case 7-18 (continued)

In summary, with profits dependent on both sales and production under absorption costing, profits can move erratically, depending on the relation between sales and production in a given period.

4. It is helpful to prepare a schedule showing inventories, production, and sales as a guide in preparing a reconciliation:

	Beginning Inventory	*Units Produced*	*Units Sold*	*Ending Inventory*
July.....	5,000	85,000	70,000	20,000
August	20,000	80,000	75,000	25,000
September.....	25,000	60,000	80,000	5,000

Before preparing a reconciliation, we must also determine the fixed manufacturing overhead rate per unit of product. This rate would be:

$$\text{Fixed manufacturing overhead rate} = \frac{\text{Monthly fixed manufacturing overhead cost}}{\text{Planned monthly production}}$$

$$= \frac{\$560{,}000}{80{,}000 \text{ units}} = \$7 \text{ per unit}$$

Case 7-18 (continued)

Given these data, the reconciliation would be:

	July	*August*	*September*
Variable costing operating income (loss)	$ (60,000)	$ (10,000)	$ 40,000
Deduct: Fixed manufacturing overhead cost released from inventory in July (5,000 units x $7 per unit)	(35,000)		
Add: Fixed manufacturing overhead cost deferred in inventory in July (20,000 units x $7 per unit)	140,000		
Deduct: Fixed manufacturing overhead cost released from inventory in August (20,000 units x $7 per unit)		(140,000)	
Add: Fixed manufacturing overhead cost deferred in inventory in August (25,000 units x $7 per unit)		175,000	
Deduct: Fixed manufacturing overhead cost released from inventory in September (25,000 units x $7 per unit)			(175,000)
Add: Fixed manufacturing overhead cost deferred in inventory in September (5,000 units x $7 per unit)			35,000
Absorption costing operating income (loss)	$ 45,000	$ 25,000	$(100,000)

Case 7-18 (continued)

An alternate approach to the reconciliation would be as follows:

	July	*August*	*September*
Variable costing operating income (loss)	$(60,000)	$(10,000)	$ 40,000
Add: Fixed manufacturing overhead cost deferred in inventory at the end of July (15,000 unit increase x $7 per unit)	105,000		
Add: Fixed manufacturing overhead cost deferred in inventory at the end of August (5,000 unit increase x $7 per unit)		35,000	
Deduct: Fixed manufacturing overhead cost released from inventory during September (20,000 unit decrease x $7 per unit)			(140,000)
Absorption costing operating income (loss)	$ 45,000	$ 25,000	$(100,000)

5. a. Under JIT, production is geared strictly to sales. Therefore, the company would have produced only enough units during September to meet sales needs. The computation is as follows:

Units sold during September	80,000
Less units in inventory at the beginning of the month	25,000
Units produced during September under JIT	55,000

Although not asked for in the question, a move to JIT during September would have resulted in an even deeper loss for the month. The reason is that producing only 55,000 units (rather than 60,000 units, as in the problem) would have resulted in $35,000 more in underapplied overhead (see the computation below), or a loss of $135,000 instead of a loss of $100,000 for the month.

Case 7-18 (continued)

Units produced during September.....	60,000
Units that would have been produced under JIT	55,000
Decrease in production	5,000
Fixed manufacturing overhead rate per unit.....	x× $7
Increased loss for the month.....	$35,000

b. Starting with the next quarter, there will be little or no difference between the income reported under variable costing and the income reported under absorption costing. With no inventories on hand, fixed manufacturing overhead cost is not shifted between periods under absorption costing.

c. With no inventories available for deferral of fixed manufacturing overhead costs to other periods, it would not be possible to show a profit under absorption costing if sales were less than the break-even level. As stated in part (5b) above, profits (and losses) will be the same under both costing methods.