

# Appendix 4C

## Shrinkage and Lost Units

### Solutions to Questions

**4C-1** Normal losses can either be assigned to all production by dropping their equivalent units from the calculation, or normal losses can be costed, disclosed and charged to the appropriate completed units.

**4C-2** The second method is usually preferred if managers seek to control losses. Costing normal losses makes such costs visible and therefore managers can take appropriate cost control actions.

**Problem 4C-1** (45 minutes)

**Milliners Flour Limited  
Cost of Production Report  
For the Month of June**

	<b>Quantity Schedule</b>		
Beginning Inventory	0		
Started during June	<u>5,676</u>		
Total units to be accounted for	<u>5,676</u>		
		<b>Equivalent Units (EU)</b>	
		<b>Material</b>	<b>Conversion</b>
Units accounted for:			
Transferred to Fin. goods	5,000	5,000	5,000
Normal spoilage	516		
Ending inventory	<u>160</u>	<u>160</u>	<u>120</u>
Total units accounted for	<u>5,676</u>	<u>5,160</u>	<u>5,120</u>
<b>Unit Costs:</b>	<b>Total</b>	<b>Material</b>	<b>Conversion</b>
Work in process, beg	\$ 0	\$ 0	\$ 0
Costs added by the dept	<u>109,580</u>	<u>56,760</u>	<u>52,820</u>
	<u>\$ 109,580</u>	<u>\$ 56,760</u>	<u>\$ 52,820</u>
Cost per equivalent unit	\$ 21.316	\$ 11.00	\$ 10.316
<b>Total cost accounted for</b>			
Cost of goods completed and transferred out (5,000 x 21.316)	(a) \$ 106,580		
Cost of work in process, ending:			
Materials (\$11 x 160)	(b) 1,760		
Conversion costs (\$10.316 x 120)	(c) <u>1,238</u>		
Total work in process, ending	<u>2,998</u>		
Total costs accounted for (a+b+c)	<u>*\$109,578</u>		

\*Difference due to rounding of \$2

**Problem 4C-2** (50 minutes)

**Baker Company  
Department 2  
Cost of Production Report  
For the Month of May**

	<b>Quantity Schedule</b>			
Units to be accounted for:				
Work in process, beginning (40% complete)	2,000			
Received from Department 1	<u>35,000</u>			
Total units to be accounted for	<u>37,000</u>			
		<b>Equivalent Units</b>		
		<b>Transferred In</b>	<b>Materials</b>	<b>Conversion Costs</b>
Units accounted for as follows:				
Transferred to Department 3	(b) 32,000	32,000	32,000	32,000
Normal losses (90% for conversion) (a-b-c)	1,000	1,000	0	900
Work in process, ending	(c) <u>4,000</u>	<u>4,000</u>	<u>0</u>	<u>2,800</u>
Total units accounted for	(a) <u>37,000</u>	<u>37,000</u>	<u>32,000</u>	<u>35,700</u>

<b>Unit Costs:</b>	<b>Total</b>	<b>Transferred in</b>	<b>Materials</b>	<b>Conversion costs</b>
Work in process, beginning	\$ 11,800	\$ 10,000	0	\$ 1,800
Costs added	<u>322,500</u>	<u>\$205,000</u>	<u>\$ 12,500</u>	<u>105,000</u>
Total cost	<u>\$334,300</u>	<u>\$215,000</u>	<u>\$ 12,500</u>	<u>\$106,800</u>
Equivalent units		37,000	32,000	35,700
Cost per equivalent unit	\$9.19	\$5.81	\$0.39	\$ 2.99
<b>Cost accounted for:</b>				
Transferred to department 3 (32,000 × \$9.19)				\$ 294,080
Normal spoilage (1,000 × \$5.81) +(900 × \$2.99)				\$8,501
Ending work in process inventory (4,000 × \$5.81) + (2,800 × \$2.99)				<u>\$31,612</u>
Total (rounded)				<u>*\$334,193</u>

\* Difference of \$107 due to rounding

- If spoilage were reduced to zero, Baker should save \$8,503 based on May's results. This saving should be beneficial because of the reduction in waste, and the reduction in effort expended. However, workers could be laid-off so some costs might exist. Competitively, however, Baker should be better off thus helping employment.

(CGA, Adapted)

**Problem 4C-3** (50 minutes)

**Mosley Company Ltd.  
Department 2  
Cost of Production Report  
For the Month of April**

		<b>Quantity Schedule</b>			
Work in process, beginning		6,000			
Received from Department 1 .....		<u>22,000</u>			
		<u>28,000</u>			
Units accounted for:			<b>Transferred in</b>	<b>Materials</b>	<b>Conversion</b>
Transferred out .....	(b) 16,000		16,000	16,000	16,000
Normal spoilage (5% of 16,000).....	(c) 800		800	0	800
Abnormal spoilage (a- b-c-d)	1,200		1,200	0	1,200
Ending inventory (60% complete) .....	(d) <u>10,000</u>		<u>10,000</u>	<u>0</u>	<u>6,000</u>
Equivalent units .....	(a) <u>28,000</u>		<u>28,000</u>	<u>16,000</u>	<u>24,000</u>
<b>Unit Costs:</b>			<b>Total Transferred- In Costs</b>	<b>Materials</b>	<b>Conversion Costs</b>
Work in process, beginning	\$ 80,000		\$ 56,000	0	\$ 24,000
Costs added .....	<u>404,000</u>		<u>224,000</u>	<u>\$24,000</u>	<u>156,000</u>
Total cost	<u>\$484,000</u>		<u>\$280,000</u>	<u>\$24,000</u>	<u>\$180,000</u>
Cost/equivalent unit	\$ 19.00		\$ 10.00	\$ 1.50	\$ 7.50
Cost accounted for:					
Good units transferred out (16,000 × \$19.00).....					\$304,000
Normal spoilage (800 × 17.50) .....					<u>14,000</u>
					318,000
Abnormal spoilage (1,200 × 17.50) .....					21,000
Work in process, ending(10,000 × \$10)+(6,000 × \$7.50)....					<u>145,000</u>
Total .....					<u>\$484,000</u>

2. Spoilage was greater than the 5% normal amount. The total cost of spoilage was  $\$14,000 + \$21,000 = \$35,000$ . Abnormal losses, if significant in amount, should always be assigned to the unusual section of the income statement, where they can be offset by any recoveries from insurance or other means.
  
3. The exact savings depends on the costs for a given period plus whether or not abnormal spoilage can be cut. If costs are switched from normal to abnormal, no savings occur. But if 2% is achieved instead of 5%, the savings would be  $\$14,000 \times (1 - 2/5) = \$8,400$ .

(CGA, Adapted)

**Problem 4C-4** (50 minutes)

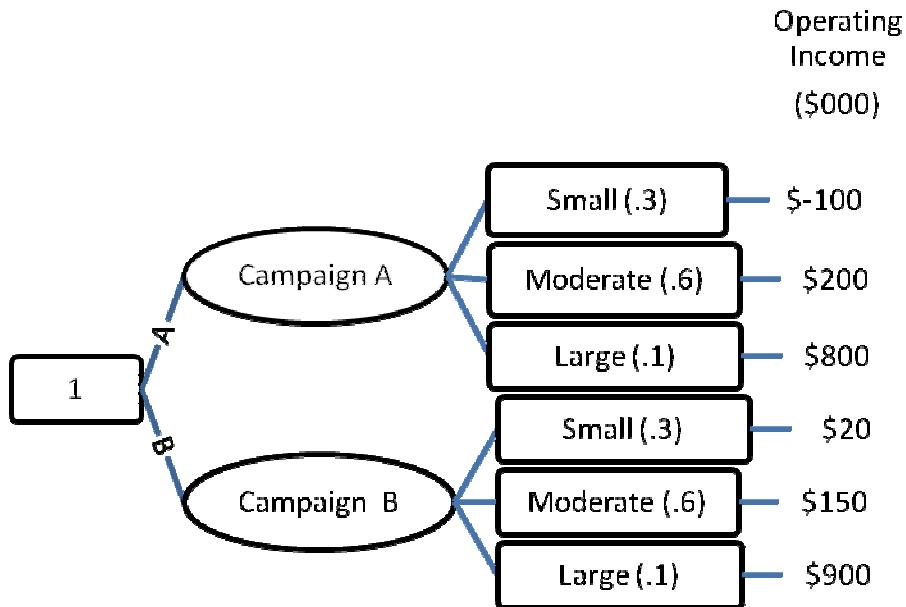
**Cost of Production Report - Department 2**

	<b>Quantity Schedule</b>			
Work in process, beginning .....	1,200			
Received from Department 1 .....	<u>8,000</u>			
Total units to be accounted for:	<u>9,200</u>			
		<b>Transferred In</b>	<b>Materials</b>	<b>Conversion</b>
Units accounted for:				
Transferred to finished goods.....	7,000	7,000	7,000	7,000
Normal spoilage (10% ) .	700	0	0	0
Work in process, ending (2/3 complete) .....	<u>1,500</u>	<u>1,500</u>	<u>0</u>	<u>1,000</u>
	<u>9,200</u>	<u>8,500</u>	<u>7,000</u>	<u>8,000</u>
		<b>Transferred In Costs</b>	<b>Materials</b>	<b>Conversion Costs</b>
<b>Unit Costs:</b>				
Work in process, beginning .....	\$ 8,050	\$ 6,100	0	\$ 1,950
Costs added by department .....	<u>47,950</u>	<u>\$23,900</u>	<u>7,000</u>	<u>17,050</u>
	<u>\$ 56,000</u>	<u>\$30,000</u>	<u>\$ 7,000</u>	<u>\$19,000</u>
Cost per Equivalent Unit.	\$6.91	\$3.53	\$1.00	\$2.38
Costs accounted for as follows:				
Finished goods (7,000 x \$6.91).....				\$ 48,370
Work in process, ending :				
Transferred in (1,500 x \$3.53).....				\$ 5,295
Conversion costs (1,000 x \$2.38).....				<u>2,380</u>
				<u>\$56,045</u>

# Appendix 7A

## Problem 7A-1 (20 minutes)

1. Decision tree:



2. Calculate expected profits.

Campaign A:  
 $.3(-100) + .6(200) +$

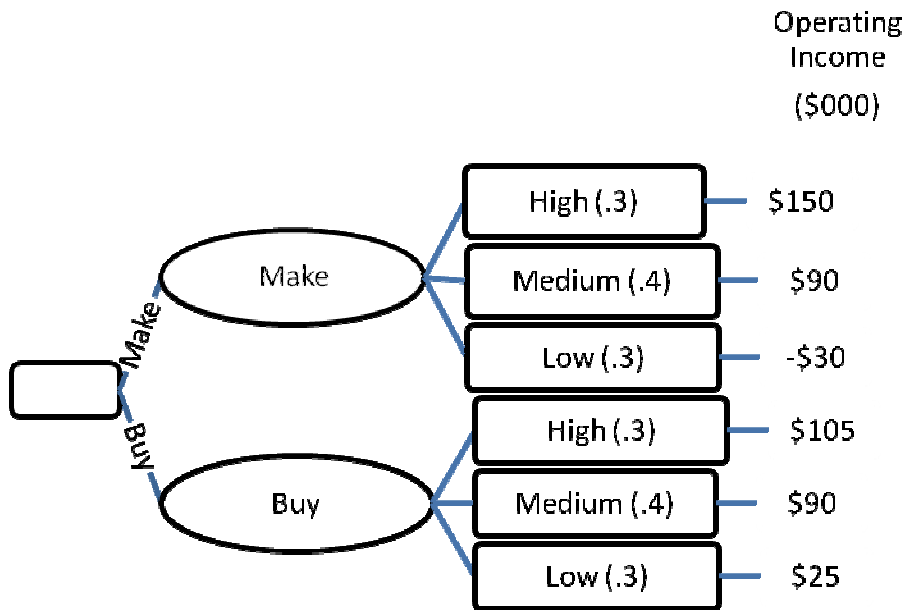
$$.1(800) - 30 + 120 + 80 = \$170$$

Campaign B:  
 $.3(20) + .6(150) + .1(900)$   
 $6 + 90 + 90 = \$186$

The marketing manager should choose Campaign B.



**Problem 7A-2 (20 minutes)**



(a) Decision Tree

(b) For "make" alternative:

Expected profits =

For "buy" alternative:

$$\begin{aligned}
 \text{Expected profits} &= (.3 \times 105) + (.4 \times 90) + (.3 \times 25) \\
 &= 31.5 + 36 + 7.5 \\
 &= 75 \\
 &= \$75,000
 \end{aligned}$$

The company should buy the subassembly.

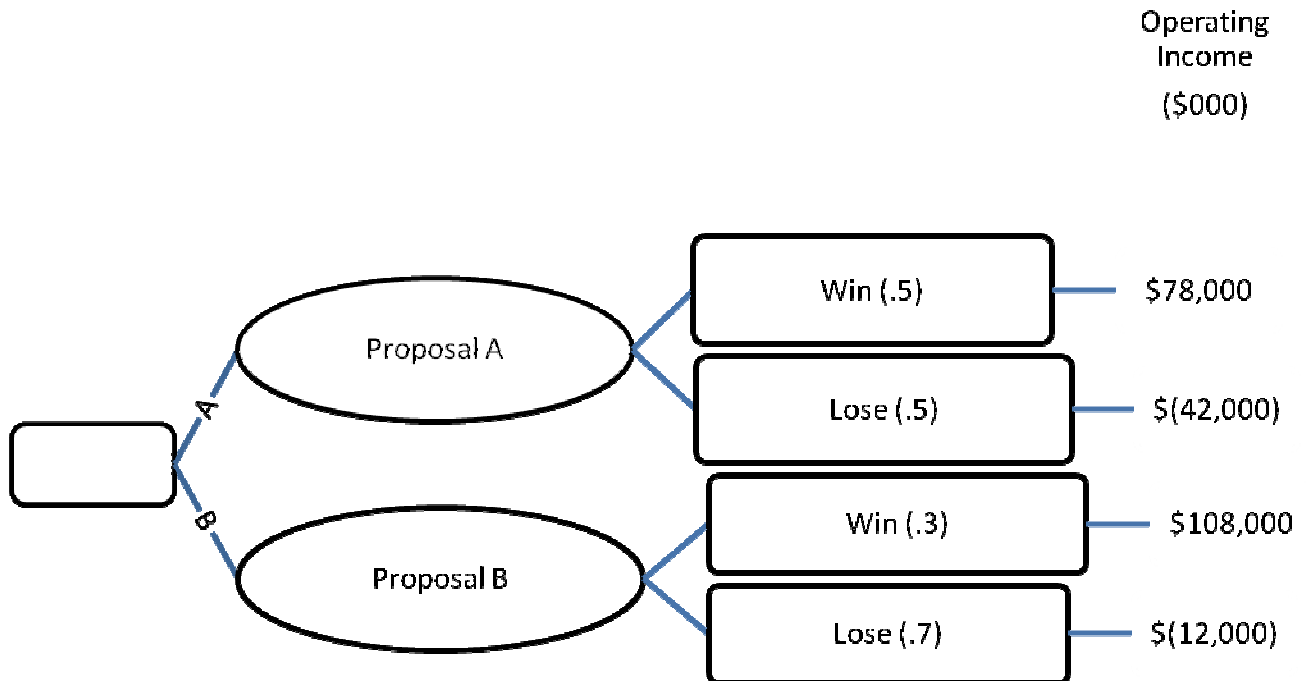
(CGA-Canada Solution, adapted)

**Problem 7A-3 (20 minutes)**

IF Win

Proposals	Revenue	Costs	Net	Tax 40%	After Tax
A	\$200,000	\$70,000	\$130,000	\$52,000	\$ 78,000
B	200,000	20,000	180,000	72,000	108,000

IF Lose



A	0	70,000	(70,000)	28,000	(42,000)
B	0	20,000	(20,000)	8,000	(12,000)

Expected profits:

Proposal A:  $(\$78,000 \times .5) + (-\$42,000 \times .5)$   
 $\$39,000 - \$21,000 = \$18,000$

Proposal B:  $(\$108,000 \times .3) + (-\$12,000 \times .7)$   
 $\$32,400 - \$8,400 = \$24,000$

Since Proposal B has the higher expected value, it should be submitted to the city.

(CGA-Canada Solution, adapted)

**Case 7A-4** (45 minutes)

**Unit Contribution Margin Analysis**

Expected contribution margins per unit at the three suggested selling prices are as follows:

Selling price .....	\$24.00	\$27.00	\$31.50
Variable costs (\$2,800,000 ÷ 350,000) ....	<u>8.00</u>	<u>8.00</u>	<u>8.00</u>
Contribution margin/unit.....	<u>\$16.00</u>	<u>\$19.00</u>	<u>\$23.50</u>

**Expected Value Analysis**

**Market Research Data**

<b>Volume</b>	<b>Probability</b>	<b>Expected Volume</b>	<b>Unit CM</b>	<b>Total Expected Contribution Margin</b>	<b>Ranking</b>
Selling price = \$24.00					
500,000	.20	100,000			
400,000	.50	200,000			
300,000	<u>.30</u>	<u>90,000</u>			
	<u>1.00</u>	<u>390,000</u>	\$16.00	<u>\$6,240,000</u>	2
Selling price = \$27.00					
400,000	.25	100,000			
350,000	.45	157,500			
250,000	<u>.30</u>	<u>75,000</u>			
	<u>1.00</u>	<u>332,500</u>	\$19.00	<u>\$6,317,500</u>	1
Selling price = \$31.50					
300,000	.30	90,000			
250,000	.50	125,000			
200,000	<u>.20</u>	<u>40,000</u>			
	<u>1.00</u>	<u>255,000</u>	\$23.50	<u>\$5,992,500</u>	3

**Case 7A-4** (continued)

**President's Data**

<b>Volume</b>	<b>Probability</b>	<b>Expected Volume</b>	<b>Unit CM</b>	<b>Total Expected Contribution Margin</b>	<b>Ranking</b>
Selling price = \$24.00					
500,000	.10	50,000			
400,000	.50	200,000			
300,000	.40	120,000			
	<u>1.00</u>	<u>370,000</u>	\$16.00	<u>\$5,920,000</u>	3
Selling price = \$27.00					
400,000	.20	80,000			
350,000	.40	140,000			
250,000	.40	100,000			
	<u>1.00</u>	<u>320,000</u>	\$19.00	<u>\$6,080,000</u>	2
Selling price = \$31.50					
300,000	.40	120,000			
250,000	.50	125,000			
200,000	.10	20,000			
	<u>1.00</u>	<u>265,000</u>	\$23.50	<u>\$6,227,500</u>	1

(Note, in all cases for both market research and president's data, CM is high enough to cover fixed overhead.)

From the preceding analysis, we arrive at two different optimum solutions. Using the market research data, setting the selling price slightly below the competition at \$27.00 would yield the highest expected contribution. However, the president's data indicate that it would be best to set the price above that of the competition, representing full cost plus 100 percent. Because the rankings are significantly different, we must examine other factors to determine the best pricing strategy.

## Case 7A-4 (continued)

### Factors to Consider

1. Accuracy of data—One must examine the underlying assumptions on which the data are based. Although the market research data are based on “extensive” market testing, the manner in which the testing was conducted, the composition of the test market, the design of the test, etc., must be examined for their appropriateness. Key factors such as quality of product, warranties, etc., may exist which may not have been considered in the market test. Since the president has past experience to draw from and also has knowledge of factors other than price, his data may be more accurate. On the other hand, the president could be imposing personal biases and “wishful thinking” which could render his data to be overly optimistic.
2. Product life cycle and elasticity of demand—The market research data indicate that demand for this product is fairly elastic and the president’s data reflect a slightly less elastic demand. Both sets of data assume that demand would remain constant over a five-year period. This is highly unlikely. Since this is a relatively new product on the market, it is in the infant stage of its life cycle. Generally, appliance-type products would start with relatively few competitors and fairly inelastic demand. Therefore, a high-price/low-volume (skimming) strategy would be appropriate. Then, as the market begins to accept the product, volumes would increase as prices decline to a fairly stable level—also, at this point, more competitors would enter similar products into the market. Finally, as new substitute products enter the market, volumes and prices would drop. The volumes indicated in both the market research and president’s data would be useful only for the short term. The product cycle would drastically affect the price/volume behaviour in the long term. The fact that the product is now in the infant stage would lend some support to the president’s data for the short term. The market research data may possibly represent a long-term averaging which may better reflect market behaviour two or three years from now.

### Case 7A-4 (continued)

3. Reactions of competitors—One must examine whether BL has historically been a price leader or price follower. If it is generally a price leader, it may be safe to assume that competitors will follow whatever price BL decides to set, which may drastically influence the projected data. On the other hand, if BL is normally a price follower, competitors would probably have no reaction to BL pricing at a skimming price of \$31.50.

However, if BL enters the market with a price of \$27.00 or \$24.00, competitors may react by undercutting BL, and starting a price war, especially if the competitors have cost structures similar to BL (i.e., relatively low variable costs resulting in high contribution margins).

4. Nature of the competitive market—BL must investigate whether the cordless curling irons sold by the competition are of better, worse, or same quality as BL's iron and whether they offer special features or different warranties from those of BL. If BL offers better features, quality, and services, customers will be willing to pay a higher price.
5. Past relations with customers and competitive advantages—BL's past relations and reputation with its customers would have a great impact on the success of the new product. Customers may be willing to pay more for BL's product if, in the past, factors such as product and service quality, warranties, credit terms, flexibility, effectiveness of advertising, brand-name loyalties, etc., have resulted in customers favouring its products. Conversely, customer relations with competitors would also have an impact on the demand that BL can expect for its product. BL must consider how customers would perceive a low, middle, or high price (i.e., if priced at \$24.00, would customers think the product is inferior or that it is a better buy?)
6. Opportunity costs and production constraints—BL currently has capacity to produce 500,000 units per year. Assuming that the maximum expected annual demand over the next 5 years is 500,000 units, we need only be concerned with the opportunity costs of producing cordless curling irons versus utilizing the same capacity by producing some other product. BL must examine whether there are more profitable options for utilizing this capacity in both the short term and the long term. Also, BL should consider if it can profitably utilize the excess capacity if it adopts a high-price/low-volume pricing strategy.

### Case 7A-4 (continued)

7. Sensitivity of the volume projections—The sensitivity of the volume projections should be examined to determine the safety margin in the case that the sales projections do not materialize.

<b>Price</b>	<b>CM/Unit</b>	<b>Fixed Costs</b>	<b>Break-Even Volume (Units)</b>
\$24.00	\$16.00	\$2,712,500	169,532
27.00	19.00	2,712,500	142,764
31.50	23.50	2,712,500	115,426

From the analysis, it can be seen that there is a large margin of safety at each of the prices. Volumes can be considerably lower than the lowest projected volumes before BL would experience losses.

8. BL's cost structure—The unit variable cost of \$8.00 per unit is based on a volume of 350,000 units and the cost projection at this volume is likely based on engineered standards and production of prototypes. Actual unit variable costs may be somewhat higher at annual volumes less than 350,000 units or may be somewhat lower at annual volumes greater than 350,000 units. This is due to economies of scale and the learning curve. It would be reasonable to expect that unit variable costs would decrease over time as a result of the learning curve effect which would give BL additional pricing flexibility in the latter years of the product life cycle.
9. Alternative pricing policies—Variable-cost pricing generally determines the "floor" price that a company requires to cover its direct variable costs. This strategy is easy to develop; it offers easy insights into cost/volume/profit relationships and into short-term pricing decisions. Another advantage is that variable costs tend to be reliable and fairly accurate. One drawback is that it may lead to under-pricing because it does not consider fixed costs.

## Case 7A-4 (continued)

Full-cost pricing considers all costs in the pricing decision. However, determination of full costs requires an allocation of joint costs to products. Allocation bases are arbitrary, and very different cost structures can result depending on the allocation base. Also, this pricing strategy is circular. When products are price elastic, price determines volume and, in full-cost pricing, volume determines unit cost, and unit cost determines price. For example, using the president's data, a \$31.50 price for the new curling iron would result in an expected volume of say 265,000 units. Full cost per unit, therefore, would be  $\$8.00 + \$10.24 = \$18.24$ . Full cost + 100 percent equals a selling price of \$36.48. At this price, the expected volumes would certainly drop.

Other pricing policies that could be considered in the short term are market pricing, target gross margin, return on assets employed, standard costs plus, and pricing to achieve some target market share.

## RECOMMENDATION

Assuming that the president's data took into account some non-price competitive advantages which the market research data did not consider, I would recommend setting the price initially at \$31.50 and consider lowering the price after one or two years once the product life has matured a bit and any economies of scale have been achieved. This strategy would allow BL to take advantage of its idle capacity for other opportunities. Consideration should be given to supporting the product introduction with an extensive advertising and promotional campaign.

Another valid recommendation could be to set the price initially at \$27.00. This strategy would undercut the competition but would likely not cause a price war. With this strategy, BL would maintain its quality image by emphasizing to customers that it is letting them benefit from BL's production efficiency and not allowing the competitors to skim the market.

(SMAC Solution, adapted)



# Chapter 2

## Cost Terms, Concepts, and Classifications

### Solutions to Questions

**2-1** The three major elements of product costs in a manufacturing company are direct materials, direct labour, and manufacturing overhead.

**2-2**

**a.** Direct materials are an integral part of a finished product and their costs can be conveniently traced to it.

**b.** Indirect materials are generally small items of material such as glue and nails. They may be an integral part of a finished product but their costs can be traced to the product only at great cost or inconvenience. Indirect materials are ordinarily classified as manufacturing overhead.

**c.** Direct labour includes those labour costs that can be easily traced to particular individual units of products. Direct labour is also called "touch labour."

**d.** Indirect labour includes the labour costs of janitors, supervisors, materials handlers, and other factory workers that cannot be conveniently traced directly to particular products. These labour costs are incurred to support production, but the workers involved do not directly work on the product.

**e.** Manufacturing overhead includes all manufacturing costs except direct materials and direct labour.

**2-3** A product cost is any cost involved in purchasing or manufacturing goods. In the case of manufactured goods, these costs consist of direct materials, direct labour, and manufacturing overhead. A period cost is a cost that is taken directly to the income statement as an expense in the period in which it is incurred.

**2-4** Marketing or selling costs are those costs incurred to secure customer orders and to deliver the finished product or service into the

hands of the customer. They are always treated as period costs on the income statement. As a result, they are expensed in the period incurred.

**2-5** The schedule of cost of goods manufactured lists the manufacturing costs that have been incurred during the period. These costs are organized under the three major categories of direct materials, direct labour, and manufacturing overhead. The total costs incurred are adjusted for any change in the Work in Process inventory to determine the cost of goods manufactured (i.e. finished) during the period.

The schedule of cost of goods manufactured ties into the income statement through the Cost of Goods Sold section. The cost of goods manufactured is added to the beginning Finished Goods inventory to determine the goods available for sale. In effect, the cost of goods manufactured takes the place of the "Purchases" account in a merchandising firm.

**2-6** Prime costs consist of direct materials and direct labour. Conversion costs consist of manufacturing overhead and direct labour.

**2-7** Total manufacturing costs are the total costs of direct materials, direct labour and manufacturing overhead incurred in the current period for products that are both complete and partially complete at the end of the period. Cost of goods manufactured represents the direct materials, direct labour and manufacturing overhead costs for goods completed during the period.  
Cost of goods manufactured = Total manufacturing costs + beginning WIP – ending WIP.

**2-8** Yes, costs such as salaries and depreciation can end up as assets on the balance sheet if these are manufacturing costs. Manufacturing costs are inventoried until the associated finished goods are sold. Thus, if some units are still

in inventory, such costs may be part of either Work in Process inventory or Finished Goods inventory at the end of a period.

**2-9** Cost behaviour refers to how a cost will react or respond to changes in the level of activity.

**2-10** No. A variable cost is a cost that varies, in total, in direct proportion to changes in the level of activity. A variable cost is constant per unit of product. A fixed cost is fixed in total, but will vary inversely on an average cost per-unit basis with changes in the level of activity.

**2-11** The relevant range is the range of activity within which assumptions about variable and fixed costs are valid. The relevant range is important when predicting costs because cost behaviour may change when activity levels are well below or well above the normal range of activity. For example, if the relevant range of production activity is 10,000 to 20,000 units and next year, 30,000 units of production are expected, both variable and fixed costs may change. Fixed costs will likely increase as the result of needing to expand production capacity; depreciation, insurance, rent, taxes and so on will rise. Variable costs per unit may also change as production volume increases to 30,000 units. Buying raw materials in larger quantities may drive down unit costs but hiring additional employees could result in higher hourly wages if there is a shortage of available labour. Thus, managers will have to estimate the effects of production exceeding the relevant range on both variable and fixed cost behaviour.

**2-12** Manufacturing overhead is an indirect cost since these costs cannot be easily and conveniently traced to particular units of products.

**2-13** A differential cost is a cost that differs between alternatives in a decision. An opportunity cost is the potential benefit that is given up when one alternative is selected over another. A sunk cost is a cost that has already been incurred and cannot be altered by any decision taken now or in the future.

**2-14** No; differential costs can be either variable or fixed. For example, the alternatives might consist of purchasing one machine rather than another to make a product. The difference in the fixed costs of purchasing the two machines would be a differential cost.

**2-15**

Direct labour cost	\$828
(46 hours × \$18 per hour) .....	
Manufacturing overhead cost	
(6 hours × \$9 per hour) .....	<u>54</u>
Total wages earned.....	<u>\$882</u>

**2-16**

Direct labour cost	\$910
(35 hours × \$26 per hour) .....	
Manufacturing overhead cost	
(5 hours × \$26 per hour) .....	<u>130</u>
Total wages earned.....	<u>\$1,040</u>

**Exercise 2-1** (15 minutes)

1. The wages of employees who build the sailboats: direct labour cost.
2. The cost of advertising in the local newspapers: marketing and selling cost.
3. The cost of an aluminum mast installed in a sailboat: direct materials cost.
4. The wages of the assembly shop's supervisor: manufacturing overhead cost.
5. Rent on the boathouse: a combination of manufacturing overhead, administrative, and marketing and selling cost. The rent would most likely be prorated on the basis of the amount of space occupied by manufacturing, administrative, and marketing operations.
6. The wages of the company's bookkeeper: administrative cost.
7. Sales commissions paid to the company's salespeople: marketing and selling cost.
8. Depreciation on power tools: manufacturing overhead cost.

**Exercise 2-2** (15 minutes)

	<i>Product (Inventoria- ble) Cost</i>	<i>Peri- od Cost</i>
1. Depreciation on salespersons' cars .....		X
2. Rent on equipment used in the factory .....	X	
3. Lubricants used for machine maintenance .....	X	
4. Salaries of personnel who work in the fin- ished goods warehouse.....		X
5. Soap and paper towels used by factory workers at the end of a shift .....	X	
6. Factory supervisors' salaries.....	X	
7. Heat, water, and power consumed in the factory .....	X	
8. Materials used for boxing products for ship- ment overseas (units are not normally boxed).....		X
9. Advertising costs.....		X
10 Workers' compensation insurance for factory employees .....	X	
11 Depreciation on chairs and tables in the fac- tory lunchroom.....	X	
12 The wages of the receptionist in the admin- istrative offices.....		X
13 Cost of leasing the corporate jet used by the company's executives .....		X
14 The cost of renting rooms at a British Co- lumbia resort for the annual sales confer- ence .....		X
15 The cost of packaging the company's prod- uct.....	X	

**Exercise 2-3** (15 minutes)

Mountain High  
Income Statement  
For the month ended xxx

Sales.....		\$3,200,000
Cost of goods sold:		
Beginning merchandise inventory .....	\$ 140,000	
Add: Purchases .....	<u>2,550,000</u>	
Goods available for sale .....	2,690,000	
Deduct: Ending merchandise inventory .....	<u>180,000</u>	<u>2,510,000</u>
Gross margin .....		690,000
Selling and administrative expenses:		
Selling expense .....	110,000	
Administrative expense .....	<u>470,000</u>	<u>580,000</u>
Operating income .....		<u>\$ 110,000</u>

**Exercise 2-4** (15 minutes)

Acromould Fabrication  
Schedule of Cost of Goods Manufactured  
For the month ended xxx

Direct materials:		
Beginning raw materials inventory.....	\$ 66,000	
Add: Purchases of raw materials .....	<u>528,000</u>	
Raw materials available for use .....	594,000	
Deduct: Ending raw materials inventory ....	<u>78,000</u>	
Raw materials used in production.....		\$ 516,000
Direct labour .....		258,000
Manufacturing overhead.....		<u>456,000</u>
Total manufacturing costs .....		1,230,000
Add: Beginning work in process inventory ....		<u>228,000</u>
		1,458,000
Deduct: Ending work in process inventory ...		<u>264,000</u>
Cost of goods manufactured.....		<u>\$1,194,000</u>

**Exercise 2-5** (30 minutes)

1. Per unit amounts:

<b>Item</b>			
	<u>Amount</u>	<u>July Activity</u>	<u>Per Unit</u>
Variable expenses:			
Direct materials	\$200,000	1,000	\$200
Direct labour	\$30,000	1,000	\$30
Indirect materials	\$10,000	1,000	\$10
Fixed expenses:			
Installation supervisor's wages	\$4,000	1,000	\$4
Installation scheduler's wages	\$2,000	1,000	\$2
Warehouse expenses	\$5,000	1,000	\$5

2. a & b

<b>Item</b>	(1)	(2)	(3)	(3) ÷ (1)
	<u>August Activity</u>	<u>July Per Unit</u>	<u>August Total</u>	<u>August Per Unit</u>
Variable expenses:				
Direct materials	1,200	\$200	\$240,000	\$200
Direct labour	1,200	\$30	\$36,000	\$30
Indirect materials	1,200	\$10	\$12,000	\$10
Fixed expenses:				
Installation supervisor's wages	1,200	n/a	\$4,000	\$3.33
Installation scheduler's wages	1,200	n/a	\$2,000	\$1.67
Warehouse expenses	1,200	n/a	\$5,000	\$4.17

- Variable expenses per unit do not change within the relevant range of activity so the July and August amounts should not differ.
- Fixed expenses per unit decrease in August because the total fixed expenses are being spread over a higher activity base (1,200 installations versus 1,000).

## Exercise 2-5 continued

3. Factors that could cause variable costs per unit to change when activity levels fall outside the relevant range:
  - Direct material costs per unit could decrease if quantity discounts are received from the manufacturer for larger order quantities.
  - Direct material costs could increase if quantity discounts currently being received are lost if order quantities decrease significantly.
  - Direct labour costs per unit could increase if activity levels increase and installations have to be completed using more expensive overtime hours.
  - Direct labour costs per unit could increase if activity levels decrease and less experienced, and lower paid, installers are laid off.
  - Direct labour costs per unit could decrease as the number of installations increases due to the effects of learning (i.e., the time required for each installation may decrease with experience).

Note: requirement three may be a stretch for many students given that the factors affecting cost behaviour outside the relevant range are not discussed in detail in Chapter 2. Accordingly, providing some hints to generate ideas may be warranted.



**Exercise 2-6** (15 minutes)

Some possibilities:

	Direct Costs	Indirect Costs**
Hotel Guests*	<ol style="list-style-type: none"> <li>1. Newspaper provided for the guest in the morning.</li> <li>2. Room repairs resulting from damage caused by guests.</li> </ol>	<ol style="list-style-type: none"> <li>1. Cleaning supplies for the guest's room.</li> <li>2. Concierge wages.</li> </ol>
Hotel Restaurant	<ol style="list-style-type: none"> <li>1. Salary of the head chef.</li> <li>2. Cleaning supplies used in the restaurant.</li> </ol>	<ol style="list-style-type: none"> <li>1. Fire insurance on the hotel.</li> <li>2. Salary of the hotel's general manager.</li> </ol>
Hotel Fitness Centre	<ol style="list-style-type: none"> <li>1. Fitness equipment maintenance.</li> <li>2. Personal trainers/lifeguards who work in the fitness centre/pool.</li> </ol>	<ol style="list-style-type: none"> <li>1. Hotel utilities.</li> <li>2. Property taxes on the hotel.</li> </ol>
Hotel Business Centre.	<ol style="list-style-type: none"> <li>1. Computer equipment.</li> <li>2. Printer suppliers (e.g., toner, paper, etc.)</li> </ol>	<ol style="list-style-type: none"> <li>1. Internet charges for the hotel.</li> <li>2. Hotel cleaning staff wages.</li> </ol>

\*Students will struggle to identify direct costs that would pass the cost/benefit test of separate identification with individual guests. However, this provides a good example of a cost object that direct costs *could* be accumulated for, but would rarely occur in practice. In service industries such as hospitality, calculating profitability at the customer-level typically involves assigning indirect costs with very few direct costs identified.

\*\*Encourage students to identify two unique indirect costs for each cost object rather than reusing the sample examples.

**Exercise 2-7** (15 minutes)

<i>Item</i>	<i>Differential Cost</i>	<i>Opportunity Cost</i>	<i>Sunk Cost</i>
1. Cost of the new flat-panel displays.....	X		
2. Cost of the old computer terminals.....			X
3. Rent on the space occupied by the registration desk .....			
4. Wages of registration desk personnel .....			
5. Benefits from a new freezer .....		X	
6. Costs of maintaining the old computer terminals .....	X		
7. Cost of removing the old computer terminals .....	X		
8. Cost of existing registration desk wiring.....			X

Note: The costs of the rent on the space occupied by the registration desk and the wages of registration desk personnel are neither differential costs, opportunity costs, nor sunk costs. These are costs that do not differ between the alternatives and are therefore irrelevant in the decision, but they are not sunk costs since they occur in the future.

**Exercise 2-8** (15 minutes)

1. No. It appears that the overtime spent completing the job was simply a matter of how the job happened to be scheduled. Under these circumstances, an overtime premium probably should not be charged to a customer whose job happens to fall at the tail end of the day's schedule.

2. Direct labour cost: 9 hours × \$20 per hour .....	\$180
General overhead cost: 1 hour × \$10 per hour ..	<u>10</u>
Total labour cost .....	<u>\$190</u>

3. A charge for an overtime premium might be justified if the customer requested that the work be done on a "rush" basis.

**Exercise 2-9** (30 minutes)

1. a. USB flash drives purchased	22,000
USB flash drives drawn from inventory	<u>19,500</u>
USB flash drives remaining in inventory	2,500
Cost per USB flash drive	<u>× \$6</u>
Cost in Raw Materials Inventory at May 31	<u>\$15,000</u>
b. USB flash drives used in production (19,500 – 500)	19,000
Units completed and transferred to Finished Goods (95% × 19,000)	<u>18,050</u>
Units still in Work in Process at May 31	950
Cost per flash drive	<u>× \$6</u>
Cost in Work in Process Inventory at May 31	<u>\$ 5,700</u>
c. Units completed and transferred to Finished Goods (above)	18,050
Units sold during the month (80% × 18,050)	<u>14,440</u>
Units still in Finished Goods at May 31	3,610
Cost per USB flash drive	<u>× \$6</u>
Cost in Finished Goods Inventory at May 31	<u>\$21,660</u>
d. Units sold during the month (above)	14,440
Cost per USB flash drive	<u>× \$6</u>
Cost in Cost of Goods Sold at May 31	<u>\$86,640</u>
e. USB flash drives used in advertising	500
Cost per USB flash drive	<u>× \$6</u>
Cost in Advertising Expense at May 31	<u>\$ 3,000</u>
2. Raw Materials Inventory—balance sheet	\$15,000
Work in Process Inventory—balance sheet	5,700
Finished Goods Inventory—balance sheet	21,660
Cost of Goods Sold—income statement	86,640
Advertising Expense—income statement	<u>3,000</u>
	<u>\$132,000</u>

Note: the \$132,000 above reconciles to the total amount spent on the flash drives on May 1: 22,000 × \$6 per unit = \$132,000.

**Exercise 2-10** (30 minutes)

1.

Eccles Company  
 Schedule of Cost of Goods Manufactured  
 For the year ended xxx

Direct materials:		
Raw materials inventory, beginning.....	\$ 8,000	
Add: Purchases of raw materials .....	<u>132,000</u>	
Raw materials available for use.....	140,000	
Deduct: Raw materials inventory, ending .....	<u>10,000</u>	
Raw materials used in production .....		\$130,000
Direct labour .....		90,000
Manufacturing overhead:		
Rent, factory building .....	\$ 80,000	
Indirect labour .....	56,300	
Utilities, factory.....	9,000	
Maintenance, factory equipment .....	24,000	
Supplies, factory .....	700	
Depreciation, factory equipment .....	<u>40,000</u>	
Total manufacturing overhead costs.....		<u>210,000</u>
Total manufacturing costs.....		430,000
Add: Work in process, beginning .....		<u>5,000</u>
		435,000
Deduct: Work in process, ending .....		<u>20,000</u>
Cost of goods manufactured .....		<u>\$415,000</u>

2. The cost of goods sold section would be:

Finished goods inventory, beginning .....	\$ 70,000
Add: Cost of goods manufactured .....	<u>415,000</u>
Goods available for sale .....	485,000
Deduct: Finished goods inventory, ending .....	<u>25,000</u>
Cost of goods sold .....	<u>\$460,000</u>

**Exercise 2-11** (15 minutes)

<i>Cost Item</i>	<i>Cost Behaviour</i>		<i>Selling and Administrative Cost</i>	<i>Product Cost</i>
	<i>Variable</i>	<i>Fixed</i>		
1. The costs of turn signal switches used at a General Motors plant.....	X			X
2. Salary of production manager at RIM .....		X		X
3. Salesperson's commissions at Avon Products .....	X		X	
4. Insurance on one of Bombardier's factory buildings.....		X		X
5. The costs of shipping brass fittings to customers in California.....	X		X	
6. Depreciation on the bookshelves at Reston Bookstore.....		X	X	
7. The costs of X-ray film at the Toronto General's radiology lab.....	X			X
8. The cost of leasing a toll-free telephone number at G.M. Canada .....		X	X	
9. The depreciation on the playground equipment at a McDonald's outlet .....		X	X	
10. The cost of the mozzarella cheese used at a Pizza Hut outlet.....	X			X

**Exercise 2-12** (15 minutes)

- |  |              |
|--|--------------|
| 1. Direct labour cost: 35 hours × \$14 per hour      | \$490        |
| Manufacturing overhead cost: 5 hours × \$14 per hour | <u>70</u>    |
| Total cost   | <u>\$560</u> |
| 2. Direct labour cost: 49 hours × \$14 per hour      | \$686        |
| Manufacturing overhead cost: 9 hours × \$7 per hour  | <u>63</u>    |
| Total cost   | <u>\$749</u> |
3. The company could treat the cost of employee benefits relating to direct labour workers as part of manufacturing overhead. This approach spreads the cost of such benefits over all units of output. Alternatively, the company could treat the cost of employee benefits relating to direct labour workers as additional direct labour cost. This latter approach charges the costs of employee benefits to specific jobs rather than to all units of output.

**Problem 2-13** (30 minutes)

1. a-e

<b>Item</b>	<b>Behaviour</b>	<b>Type</b>	<b>Direct/ Indirect</b>
Leather used for the bicycle seats	Variable	Manufacturing	Direct
Production manager's salary	Fixed	Manufacturing	Indirect
Life insurance for the company president		Administrative	
Electricity used in the production facilities*	Variable/fixed	Manufacturing	Indirect
Sales commissions		Selling	
Internet advertising		Selling	
Employee benefits for the production workers	Variable	Manufacturing	Indirect
Property taxes on the production facilities	Fixed	Manufacturing	Indirect
Shipping costs		Administrative	
Salary of the chief financial officer		Administrative	

\*There is a fixed and variable component to this cost. The base charge of \$100 represents a fixed cost with the remainder varying with the level of production activity.



## Problem 2-13 continued

2. Unit costs for variable manufacturing expenses based on November (October) amounts:

Leather used in seats:  $\$30,000 (\$27,000) \div 1,000 (900) = \$30/\text{bike}$

Electricity:  $\$1,000^* (\$900^*) \div 1,000 (900) = \$1/\text{bike}$

Employee benefits:  $\$20,000 (\$18,000) \div 1,000 (900) = \$20/\text{bike}$

\* $\$1,100 (\$1,000) - \$100 \text{ basic charge} = \$1,000 (\$900)$ .

December manufacturing costs:

Item	Per unit Amount	Activity	Cost
Leather in seats (variable)	\$30	1,200	\$36,000
Electricity (variable)	\$1	1,200	\$1,200
Employee benefits (variable)	\$20	1,200	\$24,000
Production manager's salary (fixed)	n/a	1,200	\$6,000
Electricity (fixed)	n/a	1,200	\$100
Property taxes (fixed)	n/a	1,200	\$1,000

**Problem 2-14** (30 minutes)

1. Total wages for the week:		
Regular time: 40 hours × \$24 per hour .....	\$	960
Overtime: 5 hours × \$36 per hour .....		<u>180</u>
Total wages .....		<u>\$1,140</u>
Allocation of total wages:		
Direct labour: 45 hours × \$24 per hour .....	\$1,080	
Manufacturing overhead: 5 hours × \$12 per hour...		<u>60</u>
Total wages .....		<u>\$1,140</u>
2. Total wages for the week:		
Regular time: 40 hours × \$24 per hour .....	\$	960
Overtime: 10 hours × \$36 per hour .....		<u>360</u>
Total wages .....		<u>\$1,320</u>
Allocation of total wages:		
Direct labour: 46 hours × \$24 per hour .....	\$1,104	
Manufacturing overhead:		
Idle time: 4 hours × \$24 per hour .....	\$ 96	
Overtime premium: 10 hours × \$12 per hour .....	<u>120</u>	<u>216</u>
Total wages .....		<u>\$1,320</u>
3. Total wages and fringe benefits for the week:		
Regular time: 40 hours × \$24 per hour .....	\$	960
Overtime: 8 hours × \$36 per hour .....		288
Fringe benefits: 48 hours × \$8 per hour .....		<u>384</u>
Total wages and fringe benefits .....		<u>\$1,632</u>
Allocation of wages and fringe benefits:		
Direct labour: 45 hours × \$24 per hour .....	\$1,080	
Manufacturing overhead:		
Idle time: 3 hours × \$24 per hour .....	\$ 72	
Overtime premium: 8 hours × \$12 per hour .....	96	
Fringe benefits: 48 hours × \$8 per hour .....	<u>384</u>	<u>552</u>
Total wages and fringe benefits .....		<u>\$1,632</u>

**Problem 2-14** (continued)

4. Allocation of wages and fringe benefits:

Direct labour:

Wage cost: 45 hours × \$24 per hour.....	\$1,080	
Fringe benefits: 45 hours × \$8 per hour .....	<u>360</u>	\$1,440

Manufacturing overhead:

Idle time: 3 hours × \$24 per hour.....	72	
Overtime premium: 8 hours × \$12 per hour .....	96	
Fringe benefits: 3 hours × \$8 per hour .....	<u>24</u>	<u>192</u>
Total wages and fringe benefits.....		<u>\$1,632</u>

**Problem 2-15** (30 minutes)

<i>Name of the Cost</i>	<i>Product Cost</i>			<i>Period</i>			<i>Sunk Cost</i>
	<i>Variable Cost</i>	<i>Fixed Cost</i>	<i>Direct Materials</i>	<i>Direct Labour</i>	<i>Mfg. Overhead</i>	<i>(Selling and Admin.) Cost</i>	
Rental revenue forgone, \$35,000 per year .....							X
Direct materials cost, \$50 per unit ...	X		X				
Supervisor's salary, \$3,000 per month .....		X			X		
Direct labour cost, \$22 per unit.....	X			X			
Rental cost of warehouse, \$1,500 per month .....		X				X	
Rental cost of equipment, \$2,200 per month .....		X			X		
Depreciation of the building, \$7,000 per year .....		X			X		X
Advertising cost, \$28,000 per year .....		X				X	
Shipping cost, \$7 per unit.....	X					X	
Electrical costs, \$4 per unit.....	X				X		
Return earned on investments, \$5,000 per year .....							X

**Problem 2-16** (20 minutes)

<i>Cost Item</i>	<i>Cost Behaviour</i>		<i>To Units of Product</i>	
	<i>Variable</i>	<i>Fixed</i>	<i>Direct</i>	<i>Indirect</i>
1. Plastic washers used to assemble autos* .....	X			X
2. Production superintendent's salary .....		X		X
3. Wages of workers who assemble a product....	X		X	
4. Electricity to run production equipment .....	X			X
5. Janitorial salaries .....		X		X
6. Clay used to make bricks .....	X		X	
7. Rent on a factory building.....		X		X
8. Wood used to make skis.....	X		X	
9. Screws used to make furniture* .....	X			X
10. A supervisor's salary.....		X		X
11. Cloth used to make shirts .....	X		X	
12. Depreciation of cafeteria equipment.....		X		X
13. Glue used to make textbooks* .....	X			X
14. Lubricants for production equipment .....	X			X
15. Paper used to make textbooks.....	X		X	

\*These materials would usually be considered indirect materials because their costs are relatively insignificant. It would not be worth the effort to trace their costs to individual units of product and therefore they would usually be classified as indirect materials.

**Problem 2-17** (60 minutes)

1.

Medco, Inc.  
Schedule of Cost of Goods Manufactured  
For the year ended xxxx

Direct materials:		
Raw materials inventory, beginning.....	\$ 10,000	
Add: Purchases of raw materials.....	<u>90,000</u>	
Raw materials available for use.....	100,000	
Deduct: Raw materials inventory, ending .....	<u>17,000</u>	
Raw materials used in production .....		\$ 83,000
Direct labour .....		60,000
Manufacturing overhead:		
Depreciation, factory.....	42,000	
Insurance, factory.....	5,000	
Maintenance, factory.....	30,000	
Utilities, factory.....	27,000	
Supplies, factory .....	1,000	
Indirect labour.....	<u>65,000</u>	
Total overhead costs .....		<u>170,000</u>
Total manufacturing costs.....		313,000
Add: Work in process inventory, beginning .....		<u>7,000</u>
		320,000
Deduct: Work in process inventory, ending .....		<u>30,000</u>
Cost of goods manufactured .....		<u>\$290,000</u>

**Problem 2-17** (continued)

2.

Medco, Inc.  
Income Statement  
For the year ended xxxx

Sales .....		\$450,000
Cost of goods sold:		
Finished goods inventory, beginning .....	\$ 10,000	
Add: Cost of goods manufactured .....	<u>290,000</u>	
Goods available for sale.....	300,000	
Deduct: Finished goods inventory, ending .....	<u>40,000</u>	<u>260,000</u>
Gross margin.....		190,000
Selling and administrative expenses:		
Selling expenses .....	80,000	
Administrative expenses.....	<u>70,000</u>	<u>150,000</u>
Operating income .....		<u>\$ 40,000</u>

3. Direct materials:  $\$83,000 \div 10,000 \text{ units} = \$8.30 \text{ per unit}$ .  
 Depreciation:  $\$42,000 \div 10,000 \text{ units} = \$4.20 \text{ per unit}$ .

4. Direct materials:  
     Unit cost: \$8.30 (unchanged)  
     Total cost:  $15,000 \text{ units} \times \$8.30 \text{ per unit} = \$124,500$ .  
 Depreciation:  
     Unit cost:  $\$42,000 \div 15,000 \text{ units} = \$2.80 \text{ per unit}$ .  
     Total cost: \$42,000 (unchanged)

5. Unit cost for depreciation dropped from \$4.20 to \$2.80, because of the increase in production between the two years. Since fixed costs do not change *in total* as the activity level changes, they will decrease on a unit basis as the activity level rises.

6. If the company produced 20,000 units then the following costs would appear in inventory:
- |  |  |                 |
|--|--|-----------------|
| Direct materials $(\$83,000/20,000) \times 4,000 \text{ units}$        |  | = \$16,600      |
| Direct labour $(\$60,000/20,000) \times 4,000 \text{ units}$           |  | = 12,000        |
| Manufacturing overhead $(\$170,000/20,000) \times 4,000 \text{ units}$ |  | = <u>34,000</u> |
| Total  |  | <u>\$62,600</u> |

**Problem 2-18** (15 minutes)

1. The controller is correct that the salary cost should be classified as a selling (marketing) cost. The duties described in the problem have nothing to do with manufacturing the product, but rather deal with order-taking and shipping finished goods to customers. As stated in the text, selling costs include all costs necessary to secure customer orders and get the finished product into the hands of customers.
2. No, the president is not correct; how the salary cost is classified can affect the reported operating income for the year. If the salary cost is classified as a selling expense all of it will appear on the income statement as a period cost. However, if the salary cost is classified as a manufacturing (product) cost, then it will be added to Work in Process Inventory along with other manufacturing costs for the period. To the extent that goods are still in process at the end of the period, part of the salary cost will remain with these goods in the Work in Process Inventory account. Only that portion of the salary cost that has been assigned to finished units will leave the Work in Process Inventory account and be transferred into the Finished Goods Inventory account. In like manner, to the extent that goods are unsold at the end of the period, part of the salary cost will remain with these goods in the Finished Goods Inventory account. Only that portion of the salary that has been assigned to finished units *that are sold during the period* will appear on the income statement as an expense (part of Cost of Goods Sold) for the period.



**Problem 2-19** (30 minutes)

Name of the Cost	Product Cost						Period	Opportunity Cost	Sunk Cost
	Variable Cost	Fixed Cost	Direct Materials	Direct Labour	Mfg. Overhead	(Selling and Admin.)			
						Cost			
Todd's present salary of \$2,000 per month .....		X					X		
Rent on the production building, \$1,500 per month .....		X			X				
Rent of production equipment, \$550 per month .....		X			X				
Materials for producing brooms, at \$11.50 each .....	X		X						
Labour cost of producing brooms, at \$4.25 each .....	X			X					
Rent of room for a sales office, \$250 per month .....		X				X			
Voice mail, \$5 per month .....		X				X			
Interest lost on savings account, \$1,100 per year .....							X		
Advertising cost, \$450 per month .....		X				X			
Sales commission, at \$0.80 per broom .....	X					X			
Legal and filing fees, \$1,500.....		X				X		X	

**Problem 2-19** (continued)

2. The \$1,500 legal and filing fees are not a differential cost. These legal and filing fees have already been paid and are a sunk cost. Thus, the cost will not differ depending on whether Todd decides to produce brooms or to stay with the janitorial service. All other costs listed above are differential costs since they will be incurred only if Todd leaves the janitorial service and produces the brooms.

**Problem 2-20** (45 minutes)

1.

<i>Cost Item</i>	<i>Cost Behaviour</i>		<i>Selling or Administrative Cost</i>	<i>Product Cost</i>	
	<i>Variable</i>	<i>Fixed</i>		<i>Direct</i>	<i>Indirect</i>
Direct materials used (wood, glass) .....	\$430,000			\$430,000	
General office salaries .....		\$110,000	\$110,000		
Factory supervision .....		70,000			\$ 70,000
Sales commissions .....	60,000		60,000		
Depreciation, factory building .....		105,000			105,000
Depreciation, office equipment .....		2,000	2,000		
Indirect materials, factory .....	18,000				18,000
Factory labour (cutting and assembly).	90,000			90,000	
Advertising .....		100,000	100,000		
Insurance, factory .....		6,000			6,000
General office supplies .....	4,000		4,000		
Property taxes, factory .....		20,000			20,000
Utilities, factory .....	<u>45,000</u>				<u>45,000</u>
Total costs .....	<u>\$647,000</u>	<u>\$413,000</u>	<u>\$276,000</u>	<u>\$520,000</u>	<u>\$264,000</u>

**Problem 2-20** (continued)

2. Only the product costs will be included in the cost of a bookcase. The cost per bookcase will be:

Direct product costs .....	\$520,000
Indirect product costs .....	<u>264,000</u>
Total product costs .....	<u>\$784,000</u>

$$\$784,000 \div 4,000 \text{ bookcases} = \$196 \text{ per bookcase}$$

3. The cost per bookcase would increase. This is because the fixed costs would be spread over fewer units, causing the cost per unit to rise.
4. a. Yes, there probably would be a disagreement. The president is likely to want a price of at least \$196, which is the average cost per unit to manufacture 4,000 bookcases. He may expect an even higher price than this to cover a portion of the administrative costs as well. The neighbour will probably be thinking of cost as including only materials used, or perhaps materials and direct labour.
- b. The term is opportunity cost. Since the company is operating at full capacity, the president must give up the full, regular price of a set to sell a bookcase to the neighbour. Therefore, the president's cost is really the full, regular price of a set.

**Problem 2-21** (15 minutes)

<i>Item</i>	<i>Description</i>	<i>Direct or Indirect Cost of the Immunization Centre</i>		<i>Direct or Indirect Cost of Particular Patients</i>		<i>Variable or Fixed with Respect to the Number of Immunizations Administered</i>	
		<i>Direct</i>	<i>Indirect</i>	<i>Direct</i>	<i>Indirect</i>	<i>Variable</i>	<i>Fixed</i>
a.	The salary of the head nurse in the Immunization Centre .....	X			X		X
b.	Costs of incidental supplies consumed in the Immunization Centre such as paper towels .....	X			X	X	
c.	The cost of lighting and heating the Immunization Centre .....	X			X		X
d.	The cost of disposable syringes used in the Immunization Centre .....	X		X		X	
e.	The salary of the Central Area Well-Baby Clinic's Information Systems manager .....		X		X		X
f.	The costs of mailing letters soliciting donations to the Central Area Well-Baby Clinic .....		X		X		X
g.	The wages of nurses who work in the Immunization Centre* .....	X			X		X
h.	The cost of medical malpractice insurance for the Central Area Well-Baby Clinic .....		X		X		X
i.	Depreciation on the fixtures and equipment in the Immunization Centre .....	X			X		X

\* The wages of the nurses could be variable and a direct cost of serving particular patients.

**Problem 2-22** (60 minutes)

1.

Veekay Company  
Schedule of Cost of Goods Manufactured  
For the Month Ended June 30

Direct materials:		
Raw materials inventory, June 1 .....	\$ 19,000	
Add: Purchases of raw materials .....	<u>209,000</u>	
Raw materials available for use.....	228,000	
Deduct: Raw materials inventory, June 30 .....	<u>46,000</u>	
Raw materials used in production .....		\$182,000
Direct labour .....		99,000
Manufacturing overhead:		
Rent on facilities (85% × \$40,000) .....	34,000	
Insurance (90% × \$10,000) .....	9,000	
Utilities (80% × \$55,000) .....	44,000	
Indirect labour.....	119,000	
Maintenance, factory.....	8,000	
Depreciation, factory equipment .....	<u>13,000</u>	
Total overhead costs .....		<u>227,000</u>
Total manufacturing costs.....		508,000
Add: Work in process inventory, June 1 .....		<u>77,000</u>
		585,000
Deduct: Work in process inventory, June 30.....		<u>94,000</u>
Cost of goods manufactured .....		<u>\$491,000</u>

**Problem 2-22** (continued)

2.

Veekay Company  
Income Statement  
For the Month Ended June 30

Sales .....		\$660,000
Cost of goods sold:		
Finished goods inventory, June 1 .....	\$ 22,000	
Add: Cost of goods manufactured .....	<u>491,000</u>	
Goods available for sale.....	513,000	
Deduct: Finished goods inventory, June 30.....	<u>66,000</u>	<u>447,000</u>
Gross margin.....		213,000
Selling and administrative expenses:		
Selling and administrative salaries.....	39,000	
Rent on facilities (15% × \$40,000) .....	6,000	
Depreciation, sales equipment .....	11,000	
Insurance (10% × \$10,000).....	1,000	
Utilities (20% × \$55,000).....	11,000	
Advertising .....	<u>88,000</u>	<u>156,000</u>
Operating income .....		<u>\$ 57,000</u>

- 
- 
3. In preparing the income statement shown in the text, the accountant failed to distinguish between product costs and period costs, and also failed to recognize the change in inventories between the beginning and end of the month. Once these errors have been corrected, the financial condition of the company looks much better and continuing operations appears more attractive.



## Problem 2-23 (30 minutes)

1. Mr. Richart's first action was to direct that discretionary expenditures be delayed until the first of the new year. Providing that these "discretionary expenditures" can be delayed without hampering operations, this is a good business decision. By delaying expenditures, the company can keep its cash a bit longer and thereby earn a bit more interest. There is nothing unethical about such an action. The second action was to ask that the order for the parts be cancelled. Since the clerk's order was a mistake, there is nothing unethical about this action either.

The third action was to ask the accounting department to delay recognition of the delivery until the bill is paid in January. This action is dubious. Asking the accounting department to ignore transactions strikes at the heart of the integrity of the accounting system. If the accounting system cannot be trusted, it is very difficult to run a business or obtain funds from outsiders. However, in Mr. Richart's defense, the purchase of the raw materials really shouldn't be recorded as an expense. He has been placed in an extremely awkward position because the company's accounting policy is flawed.

2. The company's accounting policy with respect to raw materials is incorrect. Raw materials should be recorded as an asset when delivered rather than as an expense. If the correct accounting policy were followed, there would be no reason for Mr. Richart to ask the accounting department to delay recognition of the delivery of the raw materials. This flawed accounting policy creates incentives for managers to delay deliveries of raw materials until after the end of the fiscal year. This could lead to raw materials shortages and poor relations with suppliers who would like to record *their* sales before the end of the year.

The company's "manage-by-the-numbers" approach does not foster ethical behaviour—particularly when managers are told to "do anything so long as you hit the target profits for the year." Such "no excuses" pressure from the top too often leads to unethical behaviour when managers have difficulty meeting target profits.

**Problem 2-24** (60 minutes)

1.

Valenko Company  
Schedule of Cost of Goods Manufactured

Direct materials:

Raw materials inventory, beginning.....	\$ 50,000	
Add: Purchases of raw materials .....	<u>260,000</u>	
Raw materials available for use.....	310,000	
Deduct: Raw materials inventory, ending .	<u>40,000</u>	

Raw materials used in production ..... \$270,000

Direct labour ..... 65,000 \*

Manufacturing overhead:

Insurance, factory.....	8,000	
Rent, factory building .....	90,000	
Utilities, factory.....	52,000	
Cleaning supplies, factory .....	6,000	
Depreciation, factory equipment .....	110,000	
Maintenance, factory.....	<u>74,000</u>	

Total overhead costs ..... 340,000

Total manufacturing costs..... 675,000 (given)

Add: Work in process inventory, beginning . 48,000 \*

723,000

Deduct: Work in process inventory, ending...  
ing...

33,000

Cost of goods manufactured ..... \$690,000 \*\*

\*\* computed in Cost of Goods Sold section next page

**Problem 2-24** (continued)

The cost of goods sold section of the income statement follows:

Finished goods inventory, beginning .....	\$ 30,000	
Add: Cost of goods manufactured .....	<u>690,000</u>	*
Goods available for sale.....	720,000	(given)
Deduct: Finished goods inventory, ending .....	<u>85,000</u>	*
Cost of goods sold .....	<u>\$635,000</u>	(given)

\*These items must be computed by working backwards up through the statements. An effective way of doing this is to place the form and known balances on the paper, and then work toward the unknown figures.

2. Direct materials:  $\$270,000 \div 30,000 \text{ units} = \$9.00 \text{ per unit}$ .  
Rent, factory building:  $\$90,000 \div 30,000 \text{ units} = \$3.00 \text{ per unit}$ .
3. Direct materials:  
Per unit: \$9.00 (unchanged)  
Total: 50,000 units  $\times$  \$9.00 per unit = \$450,000.  
Rent, factory building:  
Per unit:  $\$90,000 \div 50,000 \text{ units} = \$1.80 \text{ per unit}$ .  
Total: \$90,000 (unchanged).
4. The average cost per unit for rent dropped from \$3.00 to \$1.80, because of the increase in production between the two years. Since fixed costs do not change *in total* as the activity level changes, the *average* unit cost will decrease as the activity level rises.

**Problem 2-25 (60 minutes)**

	<u>Case 1</u>	<u>Case 2</u>	<u>Case 3</u>	<u>Case 4</u>
Direct materials	\$ 5,600	\$10,400	\$ 6,600	\$ 7,600
Direct labour	1,600	4,600	5,500*	2,900
Manufacturing overhead	8,000	13,800*	7,700	20,000
Total manufacturing costs	15,200*	28,800	19,800	30,500*
Beginning work in process inventory	2,400*	1,200	2,200	1,300*
Ending work in process inventory	(3,200)	(4,000)	(4,400)*	(1,900)
Cost of goods manufactured	\$14,400	\$26,000*	\$17,600	\$29,900
Sales	\$20,000	\$46,000	\$33,000	\$47,500
Beginning finished goods inventory	4,800	9,100*	7,700	8,600
Cost of goods manufactured	14,400	26,000*	17,600	29,900
Goods available for sale	19,200*	35,100*	25,300*	38,500*
Ending finished goods inventory	7,200*	4,600	5,500*	6,700
Cost of goods sold	12,000*	30,500	19,800	31,800*
Gross margin	8,000*	15,500*	13,200*	15,700*
Selling and administrative expenses	4,800	9,200*	9,900*	9,500
Operating income	\$ 3,200*	\$ 6,300	\$ 3,300	\$ 6,200*

\*Missing data in the problem.

**Problem 2-26** (45 minutes)

1.

Hickey Corporation  
Schedule of Cost of Goods Manufactured  
For the year ended xxxx

Direct materials:		
Raw materials inventory, beginning.....	\$ 20,000	
Add: Purchases of raw materials.....	<u>160,000</u>	
Raw materials available for use.....	180,000	
Deduct: Raw materials inventory, ending .....	<u>10,000</u>	
Raw materials used in production .....		\$170,000
Direct labour .....		80,000
Manufacturing overhead:		
Indirect labour.....	60,000	
Building rent (80% × \$50,000) .....	40,000	
Utilities, factory.....	35,000	
Royalty on patent (\$1 per unit × 30,000 units) .....	30,000	
Maintenance, factory.....	25,000	
Rent on equipment: \$6,000 + (\$0.10 per unit × 30,000 units) ...	9,000	
Other factory overhead costs.....	<u>11,000</u>	
Total overhead costs .....		<u>210,000</u>
Total manufacturing costs.....		460,000
Add: Work in process inventory, beginning .....		<u>30,000</u>
		490,000
Deduct: Work in process inventory, ending .....		<u>40,000</u>
Cost of goods manufactured .....		<u>\$450,000</u>

**Problem 2-26** (continued)

2. a. To compute the number of units in the finished goods inventory at the end of the year, we must first compute the number of units sold during the year.

$$\frac{\text{Total sales}}{\text{Unit selling price}} = \frac{\$650,000}{\$25 \text{ per unit}} = 26,000 \text{ units sold}$$

Units in the finished goods inventory, beginning.....	0
Units produced during the year .....	<u>30,000</u>
Units available for sale.....	30,000
Units sold during the year (above) .....	<u>26,000</u>
Units in the finished goods inventory, ending .....	<u><u>4,000</u></u>

- b. The average production cost per unit during the year would be:

$$\frac{\text{Cost of goods manufactured}}{\text{Number of units produced}} = \frac{\$450,000}{30,000 \text{ units}} = \$15 \text{ per unit.}$$

Thus, the cost of the units in the finished goods inventory at the end of the year would be: 4,000 units × \$15 per unit = \$60,000.

3.

Hickey Corporation  
Income Statement  
For the year ended xxxx

Sales .....		\$650,000
Cost of goods sold:		
Finished goods inventory, beginning .....	\$ 0	
Add: Cost of goods manufactured .....	<u>450,000</u>	
Goods available for sale.....	450,000	
Finished goods inventory, ending.....	<u>60,000</u>	<u>390,000</u>
Gross margin.....		260,000
Selling and administrative expenses:		
Advertising .....	50,000	
Building rent (20% × \$50,000).....	10,000	
Selling and administrative salaries.....	140,000	
Other selling and administrative expense.....	<u>20,000</u>	<u>220,000</u>
Operating income .....		<u><u>\$ 40,000</u></u>

**Case 2-27** (60 minutes)

1. No distinction has been made between period expenses and product costs on the income statement. Product costs (e.g., direct materials, direct labour, and manufacturing overhead) should be assigned to inventory accounts and flow through to the income statement as cost of goods sold only when finished products are sold. Since there were ending inventories, some of the product costs should appear on the balance sheet as assets rather than on the income statement as expenses.

2.

Outdoor Living, Inc.  
Schedule of Cost of Goods Manufactured  
For the Quarter Ended June 30

Direct materials:		
Raw materials inventory, beginning.....	\$ 0	
Add: Purchases of raw materials .....	<u>217,000</u>	
Raw materials available for use.....	217,000	
Deduct: Raw materials inventory, ending .....	<u>28,000</u>	
Raw materials used in production .....		\$189,000
Direct labour .....		56,000
Manufacturing overhead:		
Cleaning supplies, factory .....	4,000	
Indirect labour cost.....	91,000	
Maintenance, factory.....	33,000	
Rental cost, facilities (90% × \$50,000) .....	45,000	
Insurance, factory.....	6,000	
Utilities (80% × \$30,000).....	24,000	
Depreciation, production equipment.....	<u>53,000</u>	
Total overhead costs .....		<u>256,000</u>
Total manufacturing costs.....		501,000
Add: Work in process inventory, beginning .....		<u>0</u>
		501,000
Deduct: Work in process inventory, ending .....		<u>21,000</u>
Cost of goods manufactured .....		<u>\$480,000</u>

**Case 2-27** (continued)

3. Before an income statement can be prepared, the cost of the 1,000 tents in the ending finished goods inventory must be determined. Altogether, the company produced 5,000 units during the quarter; thus, the production cost per unit would be:

$$\frac{\text{Cost of goods manufactured}}{\text{Units produced during the quarter}} = \frac{\$480,000}{5,000 \text{ units}} = \$96 \text{ per unit}$$

Since 1,000 tents (5,000 – 4,000 = 1,000) were in the ending finished goods inventory, the total cost of this inventory would be:

$$1,000 \text{ units} \times \$96 \text{ per unit} = \$96,000.$$

With this figure and other data from the case, the company's income statement for the quarter can be prepared as follows:

Outdoor Living, Inc. Income Statement For the Quarter Ended June 30		
Sales.....		\$683,000
Cost of goods sold:		
Finished goods inventory, beginning.....	\$ 0	
Add: Cost of goods manufactured .....	<u>480,000</u>	
Goods available for sale .....	480,000	
Deduct: Finished goods inventory, ending ...	<u>96,000</u>	<u>384,000</u>
Gross margin.....		299,000
Selling and administrative expenses:		
Selling and administrative salaries.....	63,000	
Advertising .....	140,000	
Rental cost, facilities (10% × \$50,000).....	5,000	
Depreciation, office equipment .....	13,000	
Utilities (20% × \$30,000).....	6,000	
Travel, salespersons.....	<u>42,000</u>	<u>269,000</u>
Operating income .....		<u>\$ 30,000</u>



## Case 2-27 (continued)

Note: the difference between the \$30,000 operating income above and the \$115,000 loss reported by the company in the case can be reconciled as follows:

Operating loss reported by company	\$(115,000)
Add back:	
Ending inventory raw materials	28,000
Ending inventory work in process	21,000
Ending inventory finished goods	<u>96,000</u>
Operating income	<u>\$ 30,000</u>

- No, the insurance company probably does not owe Outdoor Living \$159,600. The key question is how "cost" was defined in the insurance contract. It is most likely that the insurance contract limits reimbursement for losses to those costs that would normally be considered product costs—in other words, direct materials, direct labour, and manufacturing overhead. The \$159,600 figure is overstated since it includes elements of selling and administrative expenses as well as all of the product costs. The \$159,600 figure also does not recognize that some costs incurred during the period are in the ending Raw Materials and Work in Process inventory accounts, as explained in part (1) above. The insurance company's liability is probably just \$96,000, which is the amount of cost associated with the ending Finished Goods inventory as shown in part (3) above.

## Case 2-28 (30 minutes)

1. Differential revenues:
  - The rental revenue that will be received from sub-letting 15% of the new warehouse.
  - Sales proceeds (less real estate commissions, legal fees, etc.) received from selling old warehouse.

### Differential costs:

- Monthly lease payments for the new warehouse.
- Utility costs (expected to be lower at new warehouse).
- Property taxes (none paid at new building).
- Building insurance (none paid at new building).
- Maintenance and repair costs (likely lower at new building).
- Salary of current maintenance manager (won't be needed if PE moves to the new building).

Note: some students may want to also include the inventory insurance costs and the security personnel costs as differential costs. However, the facts of the case indicate that Reg does not believe these costs will change if the new warehouse is rented. As a result, these are not differential costs.

2. An opportunity cost is a potential benefit given up when one alternative is chosen over another. If PE sells the old warehouse they will incur an opportunity cost equal to the operating income currently being earned on the small parking lot set up on one corner of the property.
3. The depreciation expense represents a sunk cost because it represents the allocation to reporting periods of the original depreciable cost of the old warehouse. It should not be considered in deciding whether to lease the new warehouse. Because that original cost cannot be changed it is a sunk cost, and thus so too is the depreciation of that original cost.

## **Research and Application**

R2-29 and R2-30 are suggested research questions concerning actual financial statement disclosures. No answers are provided because the specifics depend on the particular company and the time period examined in the research.

## Excel Templates Chapter 2

Student Name:

<Type your name here>

Class:

<Type your class here>

**Problem 2-17****Given Data:****MEDCO, INC.**

Purchases of raw materials	\$	90,000
Raw materials inventory, beginning		10,000
Raw materials inventory, ending		17,000
Depreciation, factory		42,000
Insurance, factory		5,000
Direct labour		60,000
Maintenance, factory		30,000
Administrative expenses		70,000
Sales		450,000
Utilities, factory		27,000
Supplies, factory		1,000
Selling expenses		80,000
Indirect labour		65,000
Work in process inventory, beginning		7,000
Work in process inventory, ending		30,000
Finished goods inventory, beginning		10,000
Finished goods inventory, ending		40,000

**For Part 3**

Units produced	10,000
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**For Part 4**

Units produced	15,000
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**For Part 6**

Units produced	20,000
Finished goods inventory (units)	4,000

<Type your name here>  
 <Type your class here>  
 Excel Templates Chapter 2  
 Problem 2-17

**Part 1**

**MEDCO, INC.**  
 Schedule of Cost of Goods Manufactured  
 For the Year Ended xxxx

Direct materials:		
Raw materials inventory, beginning	\$ 10,000	
Add: Purchases of raw materials	90,000	
Raw materials available for use	<u>100,000</u>	
Deduct: Raw materials inventory, ending	<u>17,000</u>	
Raw materials used in production		\$ 83,000
Direct labour		60,000
Manufacturing overhead:		
Depreciation, factory	42,000	
Utilities, factory	27,000	
Maintenance, factory	30,000	
Supplies, factory	1,000	
Insurance, factory	5,000	
Indirect labour	<u>65,000</u>	
Total overhead costs		<u>170,000</u>
Total manufacturing costs		313,000
Add: Work in process inventory, beginning		7,000
		<u>320,000</u>
Deduct: Work in process inventory, ending		<u>30,000</u>
Cost of goods manufactured		<u><u>\$ 290,000</u></u>

**Part 2**

**MEDCO, INC.**  
 Income Statement  
 For the Year Ended xxxx

Sales		\$ 450,000
Cost of goods sold:		
Finished goods inventory, beginning	\$ 10,000	
Add: Cost of goods manufactured	290,000	
Goods available for sale	<u>300,000</u>	
Deduct: Finished goods inventory, ending	<u>40,000</u>	
Cost of goods sold		<u>260,000</u>
Gross margin		190,000
Selling and administrative expenses:		
Selling expenses	80,000	
Administrative expenses	<u>70,000</u>	
Total selling and administrative expenses:		<u>150,000</u>
Operating income		<u><u>\$ 40,000</u></u>

**Part 3**

Units of product produced	10,000
Average cost per unit for direct materials	\$ 8.30
Average cost per unit for factory depreciation	\$ 4.20

**Part 4**

Units of product produced	15,000
Average cost per unit for direct materials	\$ 8.30
Total cost for direct materials	\$ 124,500
Average cost per unit for factory depreciation	\$ 2.80
Total cost for factory depreciation	\$ 42,000

**Part 5**

Unit cost for depreciation dropped from \$4.20 to \$2.80, because of the increase in production between the two years. Since fixed costs do not change *in total* as the activity level changes, they will decrease on a unit basis as the activity level rises.

**Part 6**

Units of product produced	20,000		
Finished goods inventory (units)	4,000		
	Total for 20,000 units	Cost per Unit	Total for 4,000 units
Cost components:			
Direct material	\$ 83,000	\$ 4.15	\$ 16,600
Direct labour	60,000	3.00	12,000
Manufacturing overhead	170,000	8.50	34,000
All components	<u>\$ 313,000</u>	<u>\$ 15.65</u>	<u>\$ 62,600</u>

Menu for Validated Cells:

*Add: Cost of goods manufactured*

*Add: Purchases of raw materials*

*Add: Work in process inventory, beginning*

*Administrative expenses*

*Deduct: Finished goods inventory, ending*

*Deduct: Raw materials inventory, ending*

*Deduct: Work in process inventory, ending*

*Depreciation, factory*

*Direct labour*

*Finished goods inventory, beginning*

*Goods available for sale*

*Gross margin*

*Indirect labour*

*Insurance, factory*

*Maintenance, factory*

*Raw materials available for use*

*Raw materials inventory, beginning*

*Sales*

*Selling expenses*

*Supplies, factory*

*Total manufacturing costs*

*Utilities, factory*