CHAPTER 2

Management Accounting: Cost Terms and Concepts

ANSWERS TO REVIEW QUESTIONS

2.1 See Exhibit 2.1 'Traditional versus modern management accounting systems', which identifies the four key components of management accounting systems: costing, budgeting, performance measurement and cost management. *Traditional costing systems* focus on costing responsibility centres, such as departments and products. *Modern costing systems* focus on activities, together with goods and services, and both customers and suppliers. The focus of *traditional* budgeting systems is on departments rather than activities and processes. The focus of t*raditional* performance measurement systems is on financial outcomes, especially cost, whereas modern systems focus on all the critical success factors, including financial factors. Further, modern costing systems take a broader perspective in that they support the management of both customer value and shareholder wealth. Apart from financial performance measures, there is little emphasis on cost management in *traditional* systems. In contrast, while cost management is an important aspect of modern management accounting, it takes the form of a proactive approach to managing resources by analysing the real causes of costs and eliminating wasteful activities.

2.2 The reasons why management accounting systems pay so much attention to costs and why a focus on costs will probably always be paramount in management accounting are:

- Ready availability of cost data and information internally provided through the accounting system.
- Cost information is important in helping managers allocate and manage resources effectively to create customer value and shareholder value. Management accountants historically have focused on manufacturing production costs, not only because of the need to value inventory and cost of goods sold for external reporting, but because costs incurred outside the production area of the value chain were relatively insignificant and because internal costs were seen as controllable whereas external factors were seen as largely uncontrollable. Today, with the growth of the service sector, globalisation, competition and sophisticated IT capability,

management accountants tend to focus on many different types of costs (not just manufacturing product costs) and the causes of those costs along the value chain. The monitoring of external factors relating to customer satisfaction and product differentiation and so on is now seen as an important aspect of management accounting.

The 'Real life' examples in the chapter illustrate how viability can depend on managing, controlling and reducing costs and why management accounting systems pay so much attention to costs.

IAG, to keep insurance premiums as low as possible for its customers and to meet its obligations to shareholders, needs to manage costs in every part of its business. It needs to minimise administration costs, look for savings in its supply chain, use technology to increase efficiency and find synergies within its operations, including achieving cost savings through reducing carbon emissions and managing the environment.

The Australian hotel industry, to determine the trade-off between room rates and occupancy (as the room rate goes down, the occupancy level goes up), uses cost classification to help set room prices and manage the yield on providing accommodation. In setting room rates the hotel manager must consider cost behaviour: which costs are variable costs of providing accommodation, such as room cleaning costs, and which are committed costs, such as council rates, premises costs and insurance costs. Room rates must be set so that they cover at least the variable cost per room per day. The system identifies the variable costs of the two major products of the hotel: rooms and food and beverages. The variable costs per room tend to be low, whereas the variable costs for food and beverage service tend to be high. This means that the extra profit that can be earned from each extra night of accommodation sold is high. The key to improving profitability is, therefore, maximising room sales. The appropriate classification of costs helps the hotel industry to understand and manage its costs and profitability.

The Japanese experience, where it wanted to retain its competitive advantage in high technology manufacturing but was faced with competing against low labour costs in other Asian countries, has been that some companies have found it cost effective to return their manufacturing operations to Japan. Kenwood returned to Japan because of a lower foreign exchange rate, higher skills and productivity of Japanese labour, and a reduced need for re-exporting. These factors resulted in cost savings across the value

chain of 10 per cent, reduced lead times from two weeks to one or two days and reduced inventory levels from 18 to three days. In Japan a cell production method of small production teams working on a range of tasks is used rather than an assembly line approach. This results in labour savings and the flexibility of small production lots to meet customer demand more effectively and quickly. Canon returned to Japan because it identified that costs across the value chain from development through to production and distribution can be managed more efficiently and effectively in Japan by using automation to offset Japan's relatively higher labour costs.

Film makers also need to analyse and manage their costs effectively. In seeking finance, film producers provide detailed budgets of estimated production costs. They need to manage actual costs carefully once production begins. Careful costing becomes even more important in an environment of rising costs and, according to the Australian Film Commission, the costs of making Australian feature films have increased significantly over time. The Film Finance Corporation Australia (FFC) compared the costs in 1993 and 2001 of shooting the same feature film. Location costs, including council fees, security fees, facilities and cleaning up, rose by more than 380 per cent; equipment, including cameras, grips, lighting and sound, increased by an average of 177 per cent; rentals and storage, including for the art department and office, construction, toilets, cleaning, and editing facilities, increased by 81 per cent; and fringe costs, including cast and crew overtime, night and other loadings, rose by more than 150 per cent.

The cost of gold production in Australia has continued to rise and the price of gold is subject to world market supply and demand. Assigning costs to cost objects is important in assessing the future of the gold industry. A key figure for gold miners and their investors is the estimated production cost per ounce for gold. When the gold price in June 1997 fell to $450 per ounce, only nine of the top 25 mines were comfortably covering costs. Recent record prices have more than offset the increase in gold production costs; but gold mining is capital intensive, involving large scale power generation and mining equipment. By the end of 2006 average global mine cash costs had risen to approximately $400 per ounce, and the total production costs including depreciation and other capital expenses had risen to $508 per ounce. There are high energy costs in extracting the ore from the ground and refining it; these processes may need particular attention to reduce environmental costs in a carbon-constrained future.

2.3 We often classify information as qualitative or quantitative. We can then further categorise quantitative information as financial or non-financial (i.e. representing monetary amounts or numerically representing other measures). However, this question asks the student to first distinguish between financial and non-financial information. The non-financial information can therefore be presented in the subcategories of qualitative and quantitative information.

Many answers are possible. A quick check on the internet will reveal to students that the Australian Open run by Tennis Australia encourages applications for a wide range of jobs, both paid and voluntary. Data is therefore required about the staffing requirements of the Open. Weather information assists with decisions relating to having the roof of centre court open or closed at the start of a match, as only extreme weather events will lead to it being closed after the start of the match. The timing of an Australia Day fireworks display in the area also affects matches, as they pause matches while the display is on. Weather forecasts can also affect the amount and nature of drinks that are ordered; more cold drinks and ice creams are probably sold during hot spells, whereas colder sessions can create higher demand for hot food and drink. Hotter weather puts a strain on medical services, whereas wet and cold weather can change demand at the tournament clothing outlets. The timing of cricket matches at the neighbouring MCG has an impact on parking and should be known in advance. The number of presold tickets can affect both the number of tickets sold on the day and the number of quick entry lanes for presold tickets (when they have them) needed.

Instructor: a useful discussion can focus on which information is quantitative and which is qualitative.

2.4 Managers in the head office of Qantas could use cost information in planning when they develop a budget for their operations during the following year. Included in that budget would be projected costs associated with: existing planes, buildings and equipment (rent, depreciation, maintenance etc.); staff salaries, recruitment and training; food for on-board meals in the different classes of seat (a few years ago there was publicity about how much Qantas saved by cutting one olive from each First Class meal); advertising contracts; and so on. At the end of the year, or each month, this budget would be used for cost control, by comparing the actual costs incurred with projected costs in the budget and analysing variances.

2.5 Costs can be classified and reported in many different ways, depending on the purpose for which managers will use the information. Students should be careful how they interpret this phrase. It is not really different *costs* but the same bundle of costs with different *cost classifications* for different purposes. Cost data that are classified and reported in a particular way for one purpose may be inappropriate for another use.

2.6 Fixed costs remain constant in total across changes in activity levels, whereas variable costs change in proportion to the level of activity. Examples are:

Fixed costs	**Variable costs**
Salaries of permanent staff	Casual staff salaries will vary with forecast demand and the need to cover permanent staff leave arrangements
Depreciation of buildings and equipment	Paper and postage costs, while declining, vary with the number of customers who have not adopted the online communication methods
Security services: if they are outsourced they are often subject to long-term contracts which would also make them fixed Other long-term contracts may include those for cleaning	Telephone banking costs and across the counter retail banking may decline as internet banking increases

Students should note that it is important to recognise what a variable cost 'varies with'. The answer to Question 2.7 is directly relevant here. In the context of a bank it is interesting to discuss the measures of output, the activities and the measures of input; cost is one measure of the inputs (resources consumed) that support the activities that produce the outputs. Costs in the table above can be extended to include those relating to investment activity and community engagement.

2.7 When analysing cost behaviour the 'level of activity' refers to the level of work performed in the organisation. The activity causes the cost and, for this reason, the level of activity is often referred to as the level of cost driver. Activity can be expressed in many different ways, including units produced, number of machine hours, number of direct labour hours, number of transactions, kilometres driven, kilowatts used, pages printed, number of set-ups, number of engineering hours and so on. In a university, academic teaching activity is variously related to the number of courses/units/subjects prepared and taught, the number of hours of class contact, the number of students taught, marking load and various online teaching tasks.

2.8 *Cost objects* are items for which managers need separate measures of cost. Examples are:

Cost object	'Real life' examples	Reason for management interest
customer	IAG policy holders, hotel industry guests, bar patrons, restaurant patrons	to find out if particular customers are profitable
product	IAG policies, hotel industry accommodation, food and beverage; high technology TVs, cameras, printers and so on; a film; an ounce of gold	to find out if a product is profitable
activities	IAG claims handling; hotel room cleaning; assembling TVs; film editing; drilling for gold	to obtain activity cost / per unit of activity for estimating the costs of other cost objects such as products, as well as for benchmarking
department	IAG policy and claims departments; hotel accommodation and food and beverage departments; high technology research and development and administrative departments; film location logistics; gold refining	to evaluate performance against a budget

2.9 A *direct cost* can be traced to a cost object in an economic manner. An *indirect cost* cannot be traced in an economic manner. Many costs could be traced if the organisation was willing to spend resources on tracing the costs. This is why we use the term 'in an economic manner'. For indirect costs, the benefits of tracing the cost to the cost object are less than the cost of doing so.

In an IT department in a law firm, for example, direct costs would include the depreciation of computer hardware, the cost of software and the salary costs of the IT staff. Other direct costs to the department include heating and lighting and depreciation on their office furniture. Costs that are indirect to the department include a share of accounting costs, the use of cleaning staff, and security costs.

2.10 Costs that are direct to a plant but indirect to the products they produce include the cost

of secretarial staff at the plant, the salaries of the manager, telephone and IT costs, the depreciation of buildings, cleaning costs, car park and landscaping costs. Even costs more closely related to the manufacturing process can be direct to the plant but indirect to items produced. Hence, three other costs that could be classified as direct costs of a chemicals production plant but indirect costs of the chemicals produced are rent of factory, factory machine maintenance and factory supervision.

2.11

Controllable by CEO of the AFL	**Uncontrollable by CEO of the AFL**
Wages of staff hired by and under the direction of AFL staff	Items controlled by others such as the football club managers, e.g. the maintenance of playing arenas
Costs for cleaning and security directly managed by AFL staff	Items affected by outside influences such as the weather, legislation, and suppliers, e.g. refreshment costs
Contract items at the time of making the contract. These can include outsourced security, cleaning and so on. Note that lease costs are included here	Contract/lease costs during the life of the contracts

Note that 'control' relates to the manager's degree of influence. There is a broad spectrum between absolute, total control and no influence at all. Absolute and total control is rare. When we refer to 'controllable' we usually mean 'significant influence'.

2.12 The value chain is a set of linked processes or activities that begins with resources and ends with providing (and supporting) products (i.e. goods and services) which customers value. Each of these segments can be examined from the viewpoint of providing managers with useful cost information.

Research and development costs include building and running laboratories or research facilities, developing and testing new products and obtaining market data to ascertain demand for the product. As competition escalates, managers need to know where their competitive advantage might lie in keeping ahead of the market in introducing new (or modified) products or services.

Design costs involve translating the research and development information into

products that will satisfy customers' needs. This includes all costs associated with the design of the product and the processes by which it will be produced. It may also require further R & D to be undertaken if the product or process design reaches a point where the firm cannot proceed until additional information is attained. It is important for managers to know the extent of design costs, since these must be recovered over the life of the product. Changing the design of the product can also bring changes in the costs of production, supply and distribution.

Supply costs relate to the procurement and receipt of all incoming materials, parts or components related to the production of the product. Included also should be the costs of dealing with various suppliers so that the firm can evaluate its most suitable and cost-effective supplier profile. Managers who have (and fully understand) supply costs will make more effective supplier relationship decisions.

Production costs include the costs associated with the collection and assembly of the resources to produce a product or service. Manufacturing costs (as opposed to costs in service environments) are the most common example of production costs and are regarded as those costs which are incurred within the factory area. Managers can use production costs to determine the cost per unit produced, whether this varies with batch size or volume produced, what additional costs are incurred with variations to the product, and so on. Apart from knowing these costs for planning, control and decision making, production costs are required for financial reporting purposes.

Marketing costs include costs associated with linking product features with customer needs and wants, together with promoting and selling the product. Managers need these costs to manage a vital part of the value chain, which is often misunderstood—and the total costs of which are often difficult to determine.

Distribution costs are any costs associated with getting the finished product into the hands of the customer, and include transport and storage, distribution channel costs and so on. Managers need these costs to determine the most cost-effective way to distribute the product – something which may change over time and with different markets served by the firm.

Customer service (or support) costs comprise all costs incurred in serving or

supporting the customer: answering inquiries, providing information about product features, installation, after-sales service, warranties and repairs, and so on. Managers who understand these costs will be better placed to accurately determine customer profitability compared to managers who do not.

2.13 Value chain for a computer manufacturer:

Value chain segment	Examples of costs
Research and development	Evaluating the suitability of using new material to manufacture the computers
	Study of overseas trends to determine appropriate styles for local market
Design	Developing a new look computer
	Designing new functionality into the computers
Supply	Cost of materials
	Customs duties on imported materials
Manufacturing or production	Direct materials and direct labour
	Factory overhead
Marketing	Media advertising to promote the product
	Sales force costs associated with calling on prospective retail customers
Distribution	Warehousing and storage
	Delivery to customers
Customer service	Warranty claims relating to defective workmanship
	Answering customer queries relating to installation of software and so on

Only manufacturing costs are included in the inventory value (shown on the balance sheet) for financial reporting purposes.

2.14 The three main components of product cost are direct material, direct labour and manufacturing overhead. Direct material is the cost of materials consumed in the process of manufacturing the product that can be directly traced to each product. Direct labour is the cost of personnel who work directly on the manufactured product, including salary, wages and labour on-costs. Manufacturing overhead covers all other costs of manufacturing the product that are not direct material or direct labour, including indirect materials, indirect labour and costs of depreciation, insurance, utilities and costs of manufacturing support departments. For example, if we consider Calvin Klein jeans, the cost of the denim used to make the jeans would be classified as direct material, the wages of the workers who cut and sew the jeans would constitute a direct labour cost and the heating and lighting of the assembly area would be part of the manufacturing overhead cost. A useful discussion can cover the classification of stitching thread as indirect material although it could technically be traced to the jeans. However, when fancy stitching is a design feature of the jeans, how should that thread be classified?

2.15 *Inventoriable cost* is another term for product cost. It relates to the costs normally permitted to be included as product cost for external reporting purposes (i.e. as inventory cost in the list of assets and for the determination of cost of goods sold in the calculation of profit). The term is derived from the storage of the goods as inventory until the goods are sold.

2.16 *Product costs* are costs that are associated with manufactured goods and once they are sold the product costs become expenses. *Period costs* are those costs that are expensed during the time period in which they are incurred. Examples of each follow:

Product costs	**Period costs**
Direct labour	Upstream costs such as research and development
Direct material	Support service costs such as accountants' salaries, depreciation of office equipment
Manufacturing overhead such as wages of factory manager and supervisors, machine maintenance, depreciation of factory building and equipment	Downstream costs of selling and marketing such as sales personnel salaries, advertising, distribution

2.17 In most service firms there is no inventory as the product is consumed as it is produced. All costs are thus treated as period costs.

2.18 The four major steps in the flow of costs through a manufacturing company are outlined in Exhibit 2.6 and described as follows:

1 When raw material for manufacturing production is purchased, its cost is added to raw materials inventory.

2 As it is consumed in the production, its cost is removed from raw material inventory and added to work in process inventory account, which records the cost of products on which manufacture has begun but has only partially been completed at balance date. Work in process inventory also accumulates the costs of direct labour and manufacturing overhead incurred in the production.

3 When products are finished, their costs are transferred from work in process inventory to finished goods inventory, which refers to manufactured goods that are complete and ready for sale.

4 Finally, when products are sold their costs are transferred from finished goods inventory to cost of goods sold account, which is an expense during the period when the sale is made.

2.19 Product cost in a manufacturing context is the cost assigned to goods that are manufactured. Product cost is classified as an asset and appears on the balance sheet when it moves through the raw material, work in process and finished goods inventories. When the goods are sold, their cost is transferred from finished goods inventory account to cost of goods sold, an expense account, and is deducted from sales revenue to estimate the gross profit appearing on the income statement. As costs are resources given up to obtain future benefits, if the benefits extend beyond the current accounting period, the costs are recorded as assets (e.g. raw material or finished goods inventories accounts). When the benefits from a cost are confined to the current period, the costs are recorded as an expense that is used up in the generation of revenue (e.g. cost of goods sold expense).

2.20 *Cost of goods manufactured* is the total cost of goods that are completed during the period and moved to finished goods inventory, and *cost of goods sold* is the total cost of goods that are sold during the period and removed from finished goods inventory.

Cost of goods manufactured can also be distinguished from manufacturing costs. The manufacturing costs are the total cost of resources consumed in production within a particular period. These can include resources still in the production stage at the end of the period. The cost of goods manufactured is the cost of goods finished in the period, even if they were started in a previous period.

SOLUTIONS TO EXERCISES

EXERCISE 2.21 (10 minutes) Classifying costs of support department; direct, indirect, controllable and uncontrollable costs

Cost item number	Direct / indirect cost of equipment maintenance department	At least partially controllable by department supervisor
1	direct	no
2	direct	yes
3	indirect	no
4	indirect	no
5	direct	yes

EXERCISE 2.22 (20 minutes) Classifying product and period costs, variable and fixed costs, manufacturing costs

1 Advertising costs: period cost, fixed non-manufacturing cost

2 Straight-line depreciation: product cost, fixed manufacturing overhead

3 Wages of assembly line workers: product cost, variable, direct labour

4 Delivery costs on customer shipments: period cost, variable non-manufacturing cost

5 Newsprint consumed: product cost, variable, manufacturing cost (direct material)

6 Plant insurance: product cost, fixed, manufacturing cost (manufacturing overhead)

7 Glass costs: product cost, variable, direct material

8 Tyre costs: product cost, variable, manufacturing cost (direct material)

9 Sales commissions: period cost, variable non-manufacturing cost

10 Wood glue: product cost, variable, manufacturing cost (either direct material or manufacturing overhead (i.e., indirect material) depending on how significant the cost is)

11 Wages of security guards: product cost, variable, (manufacturing cost) manufacturing overhead

12 Salary of financial vice president: period cost, fixed non-manufacturing cost

EXERCISE 2.23 (20 minutes) Classifying product and period costs, variable and fixed costs, manufacturing costs

1 Handbrake pads: product cost, variable, manufacturing cost (direct material)

2 Inward shipping costs: product cost, variable, manufacturing cost (direct material)

3 Oil consumed by sewing machines: product cost, variable, manufacturing cost (manufacturing overhead)

4 Hourly wages of cleaners: period cost, variable, non-manufacturing cost

5 Salary of financial controller: period cost, fixed, non-manufacturing cost

6 Advertising: period cost, fixed, non-manufacturing cost

7 Straight-line depreciation on factory machinery: product cost, fixed, manufacturing cost (manufacturing overhead)

8 Wages of assembly workers: product cost, variable, manufacturing cost (direct labour)

9 Delivery costs on customer shipments: period cost, variable, non-manufacturing cost

10 Printed circuit boards: product cost, variable, manufacturing cost (direct material)

11 Plant insurance: product cost, fixed, manufacturing cost (manufacturing overhead)

12 Grain costs: product cost, variable, manufacturing cost (direct material)

EXERCISE 2.24 (10 minutes) Classifying costs; value chain: manufacturer

1 (d)

2 (f)

3 (f)

4 (d)

5 (a)

6 (e)

EXERCISE 2.25 (10 minutes) Idle time: manufacturer

1

Hours worked	38
Wage rate	× $29
Total wages	$1102

2 Classification:

Direct labour (32 hours × $29)	$928
Overhead (idle time: 6 hours × $29)	174
Total wages	$1102

The wages cost for this employee for this week is split between direct labour and overhead according to the hours dedicated to production and idle hours. It would cause distortion of product costs if the cost of idle time due to the fire were not spread over production of all products.

3 Following on from the answer to requirement 2 above, the 'normal' weekly wage for this employee could only be treated as an indirect cost if he or she did not work directly on production for some reason. The solution to the treatment of idle time given in requirement 2 above, suggests that when a worker is idle because of uncontrollable reasons, but is still entitled to be paid, his or her wage should be transferred to manufacturing overhead, so it will be spread over all production.

EXERCISE 2.26 (10 minutes) Overtime cost: manufacturer

1

Regular wages (38 hours × $30)	$1140
Overtime wages (10 hours × $35)	350
Total wages	$1490

2

Overtime hours	10 hours
Overtime premium per hour ($35 - $30)	× $5
Total overtime premium	$50

3 Classification:

Direct labour (48 hours × $30)	$1440
Overhead (overtime premium: 10 hours × $5)	50
Total compensation	$1490

The regular wage of $30 per hour is treated as direct labour, even when ten hours were worked during overtime. The overtime premium of $10 per hour is classified as manufacturing overhead, rather than direct labour cost of the particular product that is produced during the overtime hours, because the overtime was caused by all the production scheduled for the period, not just that particular product.

4 The 'normal' hourly rate for this employee could only be treated as an indirect cost if he or she did not work directly on production for some reason, perhaps because of idle time, or the transfer of his or her labour to non-production related duties, or the worker acts as the production supervisor.

EXERCISE 2.27 (10 minutes) Cost of goods manufactured and sold

1 The general formula for solving all three cases is as follows:

Beginning inventory of finished goods	+	Cost of goods manufactured during period	–	Ending inventory of finished goods	=	Cost of goods sold expense

Using this formula, we can find the missing amounts as follows:

	Case		
	A	B	C
Beginning inventory of finished goods	$60 000	$100 000*	$ 5 500
Add: Cost of goods manufactured during period	200 000	480 000	147 000*
Subtract: Ending inventory of finished goods	20 000	80 000	12 500
Equals: Cost of goods sold expense	$240 000*	$500 000	$140 000

* Amount missing in exercise.

2 Cost of goods manufactured measures the cost of the completed production during a period, which is moved to the finished goods inventory. It is calculated using the following formula:

Cost of goods manufactured	=	Beginning work in process	+	Total manufacturing costs	–	Ending work in process

Work in process inventory is an account which records the cost of manufactured products that are only partially completed at the balance date. Total manufacturing costs consist of direct material, direct labour and manufacturing overhead costs incurred during a period. The schedule of costs of goods manufactured details the cost of direct material, direct labour and manufacturing overhead applied to work in process during the period and shows the changes to the work in process inventory.

EXERCISE 2.28 (10 minutes) Cost of goods manufactured and sold

1 The general formula for solving all three cases is as follows:

Beginning inventory of finished goods	+	Cost of goods manufactured during period	−	Ending inventory of finished goods	=	Cost of goods sold expense

Using this formula, we can find the missing amounts as follows:

	Case		
	A	B	C
Beginning inventory of finished goods	*$21 500	$18 000	$ 3 500
Add: Cost of goods manufactured during period	104 750	142 500	*157 000
Subtract: Ending inventory of finished goods	25 000	12 000	10 500
Equals: Cost of goods sold expense	$101 250	*$148 500	$150 000

* Amount missing in exercise.

2 The schedule of cost of goods manufactured calculates the cost of the goods completed in the period and made available for sale (usually transferred to a finished goods inventory). The schedule of cost of goods sold allows for the change in the level of inventory available for sale when it calculates the cost of the goods actually sold in the period, as opposed to the goods produced in the period. To do this it adds the goods available for sale at the start of the period to the cost of goods manufactured and deducts the goods remaining for sale at the end of the period.

EXERCISE 2.29 (25 minutes) Schedules of cost of goods manufactured and sold; income statement: manufacturer

1

Matilda Surf Gear
Schedule of cost of goods manufactured
for the year ended 31 December

Direct material:		
Raw materials inventory, 1 January	$ 55 000	
Add: Purchases of raw materials	240 000	
Raw material available for use	295 000	
Less Raw materials inventory, 31 December :	75 000	
Raw materials used		$220 000
Direct labour:		420 000
Manufacturing overhead:		
Indirect material	$ 12 000	
Indirect labour	22 000	
Depreciation of plant and equipment	110 000	
Utilities	23 000	
Other	35 000	
Total manufacturing overhead		202 000
Total manufacturing costs		842 000
Add: Work in process inventory, 1 January		110 000
Subtotal		952 000
Less Work in process inventory, 31 December :		125 000
Cost of goods manufactured		$827 000

2

Matilda Surf Gear
Schedule of cost of goods sold
for the year ended 31 December

Finished goods inventory, 1 January	$ 160 000
Add: Cost of goods manufactured	827 000
Cost of goods available for sale	987 000
Finished goods inventory, 31 December	155 000
Cost of goods sold	$ 832 000

3

Matilda Surf Gear
Income Statement
for the year ended 31 December

Sales revenue	$ 1 210 000
Less: Cost of goods sold	832 000
Gross profit	378 000
Selling and administrative expenses	105 000
Profit before taxes	273 000
Income tax expense	95 550
Net profit	$177 450

4 The spreadsheet should give the above results when using the initial data. Students should be made aware that they must only change data in the data sheet of their worksheet. The changes to the statements must be consequent on this. The changed data will produce the following statements (changes are highlighted):

i.

Matilda Surf Gear
Schedule of cost of goods manufactured
for the year ended 31 December

Direct material:		
Raw materials inventory, 1 January	$ 55 000	
Add: Purchases of raw materials	240,000	
Raw material available for use	295 000	
Less: Raw materials inventory, 31 December	75 000	
Raw materials used		$220 000
Direct labour:		410 000
Manufacturing overhead:		
Indirect material	$ 12 000	
Indirect labour	22 000	
Depreciation of plant and equipment	110 000	
Utilities	24 000	
Other	35 000	
Total manufacturing overhead		203 000
Total manufacturing costs		833 000
Add: Work in process inventory, 1 January		110 000
Subtotal		943 000
Less: Work in process inventory, 31 December		125 000
Cost of goods manufactured		$818 000

ii.

Matilda Surf Gear
Schedule of cost of goods sold
for the year ended 31 December

Finished goods inventory, 1 January	$ 160 000
Add: Cost of goods manufactured	818 000
Cost of goods available for sale	978 000
Finished goods inventory, 31 December	155 000
Cost of goods sold	$ 823 000

iii.

Matilda Surf Gear
Income Statement
for the year ended 31 December

Sales revenue	$ 1 210 000
Less: Cost of goods sold	823 000
Gross profit	387 000
Selling and administrative expenses	105 000
Profit before taxes	282 000
Income tax expense	98 700
Net profit	$183 300

EXERCISE 2.30 (25 minutes) Schedules of cost of goods manufactured and sold; income statement: manufacturer

1

Australian Aluminium Company
Schedule of cost of goods manufactured
for the year ended 31 December

Direct material:		
Raw materials inventory, 1 January	$ 144 000	
Add: Purchases of raw materials	600 000	
Raw material available for use	744 000	
Less: Raw materials inventory, 31 December	168 000	
Raw materials used		$576 000
Direct labour:		960 000
Manufacturing overhead:		
Indirect material	$ 24 000	
Indirect labour	60 000	
Depreciation of plant and equipment	240 000	
Electricity	60 000	
Other	72 000	
Total manufacturing overhead		456 000
Total manufacturing costs		1 992 000
Add: Work in process inventory, 1 January		288 000
Subtotal		2 280000
Less: Work in process inventory, 31 December		276 000
Cost of goods manufactured		$2 004 000

2

Australian Aluminium Company
Schedule of Cost of Goods Sold
for the year ended 31 December

Finished goods inventory, 1 January	$ 360 000
Add: Cost of goods manufactured	2 004 000
Cost of goods available for sale	2 364 000
Finished goods inventory, 31 December	396 000
Cost of goods sold	$ 1 968 000

3

Australian Aluminium Company
Income Statement
for the year ended 31 December

Sales revenue	$ 2 652 000
Less: Cost of goods sold	1 968 000
Gross profit	684 000
Selling and administrative expenses	264 000
Profit before taxes	420 000
Income tax expense	168 000
Net profit	$252 000

SOLUTIONS TO PROBLEMS

PROBLEM 2.31 (15 minutes) Classifying costs; value chain: manufacturer

Some of these classifications are open to interpretation. The real test is whether the student shows an understanding of the various classifications in making a case for each item.

1 d, h

2 d, j

3 d, j (assuming cooking oil is treated as an indirect material)

4 d, h

5 d, i

6 d, j

7 f or d

8 f or d

9 Not clear. What does the accountant do? Use this opportunity to discuss the need to 'overlay' various support functions over the simple value chain described in the book.

10 d, j

11 e, k

12 d, j

13 f, k

The costs considered above do not include any research and development, design, or customer service costs. It is conceivable that the first two of these would have occurred at some time (in researching the donut market and developing a suitable product) and, occasionally, customer service (maybe due to customer complaints).

PROBLEM 2.32 (25 minutes) Product cost classification: manufacturer

1 Total prime costs:

Direct material	$1 050 000
Direct labour:	
Wages	242 500
Labour on-costs	47 500
Total prime costs	$1 340 000

2 Total manufacturing overhead:

Depreciation on factory building	$ 57 500
Indirect labour wages	70 000
Production supervisor's salary	22 500
Service department costs	50 000
Indirect labour: labour on-costs	15 000
Labour on-costs for production supervisor	4 500
Total overtime premiums paid	27 500
Cost of idle time: production employees	20 000
Total manufacturing overhead	$ 267 000

3 Total conversion costs:

Direct labour ($242 500 + $47 500)	$ 290 000
Manufacturing overhead	267 000
Total conversion costs	$557 000

4 Total product costs:

Direct material	$1 050 000
Direct labour	290 000
Manufacturing overhead	267 000
Total product costs	$1 607 000

5 Total period costs:

Advertising expense	$ 49 500
Administrative costs	75 000
Rental of office space for sales personnel	7 500
Sales commissions	2 500
Product promotion costs	5 000
Total period costs	$139 500

PROBLEM 2.33 (10 minutes) Classifying costs; product versus period: components of product cost

Some of these classifications are open to interpretation. The real test is whether the student shows an understanding of the various classifications in making a case for each item.

Cost	Product / Period	Conversion	Prime	Direct material / Direct labour / Manufacturing overhead
1	Product			
2	Product		Yes	Direct material
3	Period*			
4	Period*			
5	Product	Yes	Yes	Direct labour
6	Product		Yes	Direct material
7	Product	Yes		Manufacturing overhead
8	Period*			
9	Product	Yes		Manufacturing overhead
10	Period			
11	Product	Yes		Manufacturing overhead

* Service industry firms typically treat all costs as operating expenses, which are period expenses. Such firms do not inventory costs.

PROBLEM 2.34 (15 minutes) Direct and indirect labour: manufacturer

1

Regular hours: 40 × $21	$840.00
Overtime hours: 9 × $28.50	256.50
Total cost of wages	$1 096.50

2

(a)	Direct labour: 41 × $21	$861.00
(b)	Manufacturing overhead (idle time): 2 × $21	42.00
(c)	Manufacturing overhead (overtime premium): 9 × ($28.50 –$21)	67.50
(d)	Manufacturing overhead (indirect labour): 6 × $21	126.00
	Total cost of wages	$1 096.50

3 The normal wage for this employee would be treated as an indirect cost if he or she did not work directly on production for some reason, because of idle time or a need to transfer his or her labour to non-production related duties.

PROBLEM 2.35 (40 minutes) Incomplete data: manufacturing costs

The asterisked amounts were requested in the problem.

	Case A	Case B	Case C
Sales revenue	*$1 600 000	*$1 500 000	*$240 000
Beginning inventory, raw materials	*120 000	60 000	7 500
Ending inventory, raw materials	180 000	*30 000	15 000
Purchases of raw materials	200 000	255 000	*35 000
Direct material used	140 000	285 000	*27 500
Direct labour	*400 000	300 000	62 500
Manufacturing overhead	500 000	*450 000	80 000
Total manufacturing costs	1 040 000	1 035 000	170 000
Beginning inventory, work in process	70 000	60 000	*7 500
Ending inventory, work in process	*60 000	105 000	2 500
Cost of goods manufactured	1 050 000	*990 000	175 000
Beginning inventory, finished goods	100 000	120 000	*10 000
Cost of goods available for sale	*1 150 000	*1 110 000	185 000
Ending inventory, finished goods	*60 000	*120 000	12 500
Cost of goods sold	1 090 000	990 000	*172 500
Gross profit	510 000	510 000	*67 500
Selling and administrative expenses	*210 000	225 000	*22 500
Income before taxes	300 000	*285 000	45 000
Income tax expense	80 000	135 000	*17 500
Net profit	*220 000	*150 000	27 500

PROBLEM 2.36 (15 minutes) Cost of production, income statement, fixed and variable costs; forecasting: manufacturer

1 Fixed manufacturing overhead per unit:

$600 000 ÷ 24 000 units produced = $25

Average unit manufacturing cost:

Direct material	$ 20
Direct labour	37
Variable manufacturing overhead	48
Fixed manufacturing overhead	25
Average unit cost	$130
Production	24 000 units
Sales	20 000 units
Ending finished goods inventory	4 000 units

Cost of 31 December finished goods inventory:

4000 units x $130 = $520 000

2 Net profit:

Sales revenue (20 000 units x $185)	$3 700 000
Cost of goods sold (20 000 units x $130)	2 600 000
Gross margin	1 100 000
Selling and administrative expenses	860 000
Profit before taxes	240 000
Income tax expense ($240 000 x 30%)	72 000
Net profit	$168 000

3 (a) No change. Direct labour is a variable cost and the cost per unit will remain constant.

(b) No change. Despite the decrease in the number of units produced, this is a fixed cost, which remains the same in total.

(c) No change. The selling and administrative cost is a fixed cost, which remains the same in total.

(d) Increase. The average unit cost of production will change because of the per-unit fixed manufacturing overhead. A reduced production volume will be divided into the fixed dollar amount, which increases the cost per unit.

PROBLEM 2.37 (25 minutes) Inventory estimates, partial data: manufacturer

Since gross margin equals 30% of sales, cost of goods sold equals 70% of sales, or $231 000 ($330 000 x 70%).

Thus, the finished goods destroyed by the fire cost $44,000, calculated as follows:

Finished goods inventory, 1 January (given)	$ 37 000
Add: Cost of goods manufactured*	238 000
Cost of goods available for sale (given)	275 000
Deduct: Finished goods inventory, 12 April*	44 000
Cost of goods sold (calculated above)	$231 000

*Fill in these blanks, given the other numbers in this table.

Direct material used:
Direct material averages 25% of prime costs (i.e., direct material + direct labour). Thus: Let X = direct material used

X = (X + $120 000) x 25%

0.75X = $30 000

X = $40 000

Manufacturing overhead:
Manufacturing overhead equals 50% of total production costs.

Thus: Let Y = manufacturing overhead

Y = (direct material used + direct labour + manufacturing overhead) x 50%

Y = ($40 000 + $120 000 + Y) x 50%

0.50Y = $80 000

Y = $160 000

The work in process destroyed by the fire cost $103 000, calculated as follows:

Direct material	$ 40 000
Direct labour (given)	120 000
Manufacturing overhead	160 000
Total manufacturing costs	320 000
Add: Work in process inventory, 1 January (given	21 000
Subtotal	341 000
Deduct: Work in process inventory, 12 April*	103 000
Cost of goods manufactured (from above)	$238 000

*$103 000 = $341 000 – $238 000.

PROBLEM 2.38 (35 minutes) Schedules of cost of goods manufactured and sold; income statement

1

Flintoff Fashions
Schedule of cost of goods manufactured
For the year ended 31 December

Direct material:		
Raw material inventory, 1 January	$24 000	
Add: Purchases of raw material	108 000	
Raw material available for use	132 000	
Deduct: Raw material inventory, 31 December	15 000	
Raw material used		$117 000
Direct labour		120 000
Manufacturing overhead:		
Indirect material	6 000	
Indirect labour	9 000	
Electricity: plant	24 000	
Depreciation: plant and equipment	36 000	
Other	48 000	
Total manufacturing overhead		123 000
Total manufacturing costs		360 000
Add: Work in process inventory, 1 January		24 000
Subtotal		384,000
Deduct: Work in process inventory, 31 December		18 000
Cost of goods manufactured		$366 000

2

Flintoff Fashions
Schedule of cost of goods sold
For the year ended 31 December

Finished goods inventory, 1 January	$12 000
Add: Cost of goods manufactured	366 000
Cost of goods available for sale	378 000
Deduct: Finished goods inventory, 31 December	30 000
Cost of goods sold	$348 000

3

Flintoff Fashions
Income Statement
For the year ended 31 December

Sales revenue	$570 000
Less: Cost of goods sold	348 000
Gross margin	222 000
Selling and administrative expenses	90 000
Profit before taxes	132 000
Income tax expense	54 000
Net profit	$78 000

(a) By changing the raw material purchases to $110 400 in the data section of the spreadsheet the cost schedules and income statement figures change as follows:

Cost of Goods Manufactured

Direct material:		
Raw material inventory, 1 January	$24 000	
Add: Purchases of raw material	110 400	
Raw material available for use	134 400	
Deduct: Raw material inventory, 31 December	15 000	
Raw material used		$119 400
Direct labour		120 000
Manufacturing overhead:		
Indirect material	6 000	
Indirect labour	9 000	
Electricity: plant	24 000	
Depreciation: plant and equipment	36 000	
Other	48 000	
Total manufacturing overhead		123 000
Total manufacturing costs		362 400
Add: Work in process inventory, 1 January		24 000
Subtotal		386 400
Deduct: Work in process inventory, 31 December		18 000
Cost of goods manufactured		$368 400

Cost of Goods Sold

Finished goods inventory, 1 January	$12 000
Add: Cost of goods manufactured	368 400
Cost of goods available for sale	380 400
Deduct: Finished goods inventory, 31 December	30 000
Cost of goods sold	$350 400

Income Statement

Sales revenue	$570 000
Less: Cost of goods sold	350 400
Gross margin	219 600
Selling and administrative expenses	90 000
Profit before taxes	129 600
Income tax expense*	54 000
Net profit	$75 600

*Although the data given in the textbook shows income tax as $54 000, in reality we would expect income tax to decrease in proportion with the decrease in profit before taxes

(b) By changing indirect labour to $9600 in the data section of the spreadsheet, the cost schedules and income statement figures change as follows:

Cost of Goods Manufactured

Direct material:		
Raw material inventory, 1 January	$24 000	
Add: Purchases of raw material	108 000	
Raw material available for use	132 000	
Deduct: Raw material inventory, 31 December	15 000	
Raw material used		$117 000
Direct labour		120 000
Manufacturing overhead:		
Indirect material	6 000	
Indirect labour	9 600	
Electricity: plant	24 000	
Depreciation: plant and equipment	36 000	
Other	48 000	
Total manufacturing overhead		123 600
Total manufacturing costs		360 600
Add: Work in process inventory, 1 January		24 000
Subtotal		384 600
Deduct: Work in process inventory, 31 December		18 000
Cost of goods manufactured		$366 600

Cost of Goods Sold

Finished goods inventory, 1 January	$12 000
Add: Cost of goods manufactured	366 600
Cost of goods available for sale	378 600
Deduct: Finished goods inventory, 31 December	30 000
Cost of goods sold	$348 600

Income Statement

Sales revenue	$570 000
Less: Cost of goods sold	348 600
Gross margin	221 400
Selling and administrative expenses	90 000
Profit before taxes	131 400
Income tax expense*	54 000
Net profit	$77 400

*Although the data given in the textbook shows income tax as $54 000, in reality we would expect income tax to decrease in proportion with the decrease in profit before taxes

PROBLEM 2.39 (45 minutes) Schedules of cost of goods manufactured and

sold; income statement

1

Maximus Manufacturing Ltd
Schedule of cost of goods manufactured
for the year ended 31 December

Direct material:			
	Raw materials inventory, 1 January	$106 800	
	Add: Purchases of raw materials	877 200	
	Raw material available for use	984 000	
	Deduct: Raw materials inventory, 31 December	70 800	
	Raw material used		$913 200
Direct labour			568 800
Manufacturing overhead:			
	Indirect material	54 000	
	Indirect labour	180 000	
	Depreciation on factory building	150 000	
	Depreciation on factory equipment	72 000	
	Electricity for factory	84 000	
	Council rates	108 000	
	Insurance	48 000	
	Total manufacturing overhead		696 000
Total manufacturing costs			2 178 000
Add: Work in process inventory, 1 January			0
Subtotal			2 178 000
Less: Work in process inventory, 31 December			48 000
Cost of goods manufactured			$2 130 000

2

Maximus Manufacturing Ltd
Schedule of Cost of Goods Sold
for the year ended 31 December

Finished goods inventory, 1 January	$ 42 000
Add: Cost of goods manufactured	2 130 000
Cost of goods available for sale	2 172 000
Finished goods inventory, 31 December	48 000
Cost of goods sold	$2 124 000

3

Maximus Manufacturing Ltd
Income Statement
for the year ended 31 December

Sales revenue	$2 526 000
Less: Cost of goods sold	2 124 000
Gross margin	402 000
Selling and administrative expenses	322 800
Profit before taxes	79 200
Income tax expense	30 000
Net profit	$ 49 200

PROBLEM 2.40 (5 minutes) Interpreting the schedule of cost of goods manufactured

1 $48 000. Since there was no work in process inventory at the beginning of the year, all of the cost in the year-end work in process inventory was incurred during the current year.

2 The direct material cost would have been larger, probably by (roughly) 20 per cent, because direct material is a variable cost.

3 Depreciation is a fixed cost, so it would not have been any larger if the firm's volume had increased.

4 Only the $36 000 of equipment depreciation would have been included in manufacturing overhead on the schedule of cost of goods manufactured. The $36 000 of depreciation related to selling and administrative equipment would have been treated as a period cost and expensed during the year.

SOLUTIONS TO CASES

CASE 2.41 Cost classifications; schedules of cost of goods manufactured and sold; income statement; product costs: manufacturer

1 The current income statement provides limited management information. In particular it does not identify the costs of goods manufactured and sold, and the gross profit.

2 Cost of goods manufactured

Direct material:		
Raw materials, beginning inventory	0	
Purchases	$300 000	
Less: Raw materials, closing inventory	30 000	
Raw materials used		$270 000
Direct labour		250 000
Manufacturing overhead:		
Production supervisor's salary	35 000	
Rent	64 000	
Council rates	4 000	
Equipment depreciation	23750	
Manager's salary	40 000	
Electricity	12 000	
Total manufacturing overhead		178 750
Total manufacturing cost		699750
Less: Work in process, end of year		140150
Cost of goods manufactured		560600
Less: Finished goods, end of year		0
Cost of goods sold		$559 000

3 Revised income statement

Sales revenue	$980 000
Less: Cost of goods sold	559 000
Gross profit	0
Selling and administrative expenses	196 250*
Net profit	$223150
*Selling and administrative expenses:	
Rent	$16 000
Council rates	1 000
Sales staff	110 000
Advertising	18 000
Equipment depreciation	1 250
Manager's salary	40 000
Truck lease	10 000
	$196 250

4 The net profit in the revised Income Statement is different to the net profit provided in the case. This is because $30 000 of raw materials inventory and $139 750 of work-in-process inventory at the end of the year were incorrectly included in the costs in the initial profit calculation. When these balances are added back to the initial profit figure, the correct profit of $224 750 is obtained. When the inventory balances are taken into account, CTC's profit performance appears to be very strong.

5 It may be useful to separate administrative and selling expenses. It may also be useful to develop income statements for different market segments (e.g. brass and chrome taps) and to prepare product profitability reports.

6 In the case it is stated that prices are based on a 50 per cent mark up of the cost of direct material and direct labour. This is a fairly crude way to determine prices and may cause some distortion in prices. It does not take into account that some products may use more or less overhead resources than others. If brass taps have more material and labour but need less supervision and machinery than other products, they may be over-priced.

7 It may be helpful to allocate some overheads, especially manufacturing costs, to products. For example, the supervision costs may be allocated on the basis of the number of batches going through the factory.

CASE 2.42 (60 minutes) Cost classifications; schedules of cost of goods manufactured and sold; income statement: manufacturer

1 Earl's overdraft facility should not be cancelled as the business has made a substantial profit ($76 800). The reasons that the profit was reported as a loss are summarised below.

2 Corrections to Smith's reported loss:

Total operating expenses reported in statement	$701 400
Arithmetic error	(6 000) [a]
Assets recorded as expenses:	
Factory equipment (net of depreciation)	(134 400) [b]
Office equipment (net of depreciation)	(9 600) [c]
Sales vehicles (net of depreciation)	(14 400) [d]
Raw material inventory	(24 000)
Work in process inventory	(48 000)
Finished goods inventory	(1 800)
Total overstatement of expenses	(238 200)
Operating loss as per statement	(161 400)
Corrected profit	$ 76 800

[a] Total operating expenses shown in statement	$701 400
Sum of individual operating expenses shown in statement	694 400
Error	$ 6 000
[b] Factory equipment: acquisition cost	$168 000
Less depreciation	33 600
Carrying value	$134 400
[c] Office equipment: acquisition cost	$12 000
Less depreciation	2 400
Carrying value	$ 9 600
[d] Sales vehicles: acquisition cost	$18 000
Less depreciation	3 600
Carrying value	$14 400

Earl's Gyms Company
Schedule of cost of goods manufactured
Year ended 31 December

Direct material:		
Raw materials inventory, January 1	0	
Add: Purchases of raw materials	$240 000	
Raw material available for use	240 000	
Less: Raw materials inventory, 31 December	24 000	
Raw material used		$216 000
Direct labour		90 000
Manufacturing overhead:		
Factory supplies	12 000	
Indirect labour	12 000	
Factory manager's salary	24 000	
Cleaning costs	4 800	
Rent	24 000	
Electricity	5 400	
Depreciation: factory equipment	33 600	
Total manufacturing overhead		115 800
Total manufacturing costs		421 800
Add: Work in process inventory, 1 January		0
Subtotal		421 800
Deduct work in process inventory, 31 December		48 000
Cost of goods manufactured		$373 800

Earl's Gyms Company

Schedule of cost of goods sold

Year ended 31 December

Finished goods inventory, 1 January	0
Add: Cost of goods manufactured	$373 800
Cost of goods available for sale	$373 800
Less: Finished goods 31 December	1 800
Cost of goods sold	$372 000

Earl's Gyms Company

Income Statement
Year ended 31 December

Sales			$540 000
Less: Cost of goods sold			372 000
Gross profit			168 000
Selling and administrative expenses:			
Selling	Manager's salary	$12 000	
	Sales staff salaries	26 400	
	Rent: sales area	4 500	
	Depreciation: sales vehicles	3 600	
	Advertising	6 000	
	Cleaning: sales area	900	
	Total selling expenses		53 400
Admin	Manager's salary	12 000	
	Office staff salaries	12 000	
	Rent: administration area	1 500	
	Administrative expenses	9 600	
	Depreciation: office equipment	2 400	
	Cleaning: administration area	300	
	Total administrative expenses		37 800
Profit			$76 800

It is useful here to discuss the way in which non-accountants often misunderstand the distinction between cash flow and the calculation of profit using accrual accounting.