2

Cost Concepts and Behavior

Solutions to Review Questions

Cost is a more general term that refers to a sacrifice of resources and may be either an opportunity cost or an outlay cost. An expense is an outlay cost charged against sales revenue in a particular accounting period and usually pertains only to external financial reports.

Product costs are those costs that are attributed to units of production, while period costs are all other costs and are attributed to time periods.

Outlay costs are those costs that represent a past, current, or future cash outlay. Opportunity cost is the value of what is given up by choosing a particular alternative.

Common examples include the value forgone because of lost sales by producing low quality products or substandard customer service. For another example, consider a firm operating at capacity. In this case, a sale to one customer precludes a sale to another customer.

Yes. The costs associated with goods sold in a period are not expected to result in future benefits. They provided sales revenue for the period in which the goods were sold; therefore, they are expensed for financial accounting purposes.

The costs associated with goods sold are a product cost for a manufacturing firm. They are the costs associated with the product and recorded in an inventory account until the product is sold.

**2-7.**

Both accounts represent the cost of the goods acquired from an outside supplier, which include all costs necessary to ready the goods for sale (in merchandising) or production (in manufacturing).

The merchandiser expenses these costs as the product is sold, as no additional costs are incurred. The manufacturer transforms the purchased materials into finished goods and charges these costs, along with conversion costs to production (work in process inventory). These costs are expensed when the finished goods are sold.

|  |  |
| --- | --- |
| Direct materials: | Materials in their raw or unconverted form, which become an integral part of the finished product are considered direct materials. In some cases, materials are so immaterial in amount that they are considered part of overhead. |
| Direct labor: | Costs associated with labor engaged in manufacturing activities. Sometimes this is considered as the labor that is actually responsible for converting the materials into finished product. Assembly workers, cutters, finishers and similar “hands on” personnel are classified as direct labor. |
| Manufacturing overhead: | All other costs directly related to product manufacture. These costs include the indirect labor and materials, costs related to the facilities and equipment required to carry out manufacturing operations, supervisory costs, and all other support activities. |

Gross margin is the difference between revenue (sales) and cost of goods sold. Contribution margin is the difference between revenue (sales) and variable cost.

Contribution margin is likely to be more important, because it reflects better how profits will change with decisions.

Step costs change with volume in steps, such as when supervisors are added. Semivariable or mixed costs have elements of both fixed and variable costs. Utilities and maintenance are often mixed costs.



Total variable costs change in direct proportion to a change in volume (within the relevant range of activity). Total fixed costs do not change as volume changes (within the relevant range of activity).



A value income statement typically uses a contribution margin framework, because the contribution margin framework is more useful for managerial decision-making. In addition, it splits out value-added and non value-added costs. Therefore, it differs in two ways from the gross margin income statement: classifying costs by behavior and highlighting value-added and non value-added costs. It differs from the contribution margin income statement by highlighting the value-added and non value-added costs.

A value income statement is useful to managers, because it provides information that is useful for them in identifying and eliminating non value-added activities.

Solutions to Critical Analysis and Discussion Questions

The statement is not true. Materials can be direct or indirect. Indirect materials include items such as lubricating oil, gloves, paper supplies, and so on. Similarly, indirect labor includes plant supervision, maintenance workers, and others not directly associated with the production of the product.

No. Statements such as this almost always refer to the full cost per unit, which includes fixed and variable costs. Therefore, multiplying the cost per seat-mile by the number of miles is unlikely to give a useful estimate of flying one passenger. We should multiply the *variable* cost per mile by 1,980 miles to estimate the costs of flying a passenger from Detroit to Los Angeles.

Marketing and administrative costs are treated as period costs and expensed for financial accounting purposes in both manufacturing and merchandising organizations. However, for decision making or assessing product profitability, marketing and administrative costs that can be reasonably associated with the product (product-specific advertising, for example) are just as important as the manufacturing costs.

There is no “correct” answer to this allocation problem. Common allocation procedures would include: (1) splitting the costs equally (25% each), (2) dividing the costs by the miles driven and charging based on the miles each person rides, (3) charging the incremental costs of the passengers (almost nothing), assuming you were going to drive to Texas anyway.

The costs will not change. Your allocation in 2-18 was not “incorrect,” because the purpose of the allocation is not to determine incremental costs.



Answers will vary. The major cost categories include servers (mostly fixed), personnel (mostly fixed), and licensing costs (mostly variable).

Answers will vary. The major cost categories include servers (mostly fixed), personnel (mostly fixed), and legal costs (mostly fixed). There are only small variable costs for Uber or Lyft. For the drivers, the costs of the vehicle and technology are mostly fixed. Vehicle operating expenses (fuel and maintenance) are mostly variable.



Direct material costs include the cost of supplies and medicine. One possible direct labor cost would be nursing staff assigned to the unit. Indirect costs include the costs of hospital administration, depreciation on the building, security costs, and so on.

Answers will vary. Common suggestions are number of students in each program, usage (cafeteria: meals; library: study rooms reserved; or career placement: interviews, for example), assuming usage is measured, or revenue (tuition dollars).



No, R&D costs are relevant for many decisions. For example, should a program of research be continued? Was a previous R&D project profitable? Should we change our process of approving R&D projects? R&D costs are expensed (currently) for financial reporting, but for managerial decision-making the accounting treatment is not relevant.

This question can create a good discussion of the different roles of financial and managerial accounting. An important issue is identifying the activities that are non value-added. These are almost certainly better known to the managers of the firm than to outsiders. These costs are also difficult to measure, meaning there are many different “reasonable” numbers that might be reported. Because managers have an interest in reporting favorable numbers (however favorable is defined), there is a potential for managerial bias in the reports.

A second reason is that most firms would be concerned about revealing potentially valuable competitive information.

Solutions to Exercises

1. (15 min.) Basic Concepts.

|  |  |
| --- | --- |
| a. | False. The statement refers to an expense. For example, R&D costs are incurred in expectation of *future* benefits. |
| b. | False. Variable costs can be direct (direct materials) or indirect (lubricating oil for machines that produce multiple products.) |
| c. | True. Each unit of a product has the same amount of direct material (same cost per unit), but producing more units requires more material (and more cost). |

1. (15 min.) Basic Concepts.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | Cost Item | Fixed (F)  Variable (V) |  | Period (P)  Product (M) |
|  |  |  |  |  |  |
| a. |  | Depreciation on buildings for administrative staff offices | F |  | P |
| b. |  | Cafeteria costs for the factory | F |  | M |
| c. |  | Overtime pay for assembly workers | V |  | M |
| d. |  | Transportation-in costs on materials purchased | V |  | M |
| e. |  | Salaries of top executives in the company | F |  | P |
| f. |  | Sales commissions for sales personnel | V |  | P |
| g. |  | Assembly line workers’ wages | V |  | M |
| h. |  | Controller’s office rental | F |  | P |
| i. |  | Administrative support for sales supervisors | F |  | P |
| j. |  | Energy to run machines producing units of output in the factory….............. | V |  | M |

1. (10 min.) Basic Concepts.

|  |  |  |
| --- | --- | --- |
| a. | Assembly line worker’s salary. | B |
| b. | Direct materials used in production process. | P |
| c. | Property taxes on the factory. | C |
| d. | Lubricating oil for plant machines. | C |
| e. | Transportation-in costs on materials purchased. | P |

1. (15 min.) Basic Concepts.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Concept |  | Definition |
| 9 | Period cost |  | Cost that can more easily be attributed to time intervals. |
| 2 | Indirect cost |  | Cost that *cannot* be directly related to a cost object. |
| 10 | Fixed cost |  | Cost that does not vary with the volume of activity. |
| 8 | Opportunity cost |  | Lost benefit from the best forgone alternative. |
| 7 | Outlay cost |  | Past, present, or near-future cash flow. |
| 6 | Direct cost |  | Cost that can be directly related to a cost object. |
| 5 | Expense |  | Cost charged against revenue in a particular accounting period. |
| 1 | Cost |  | Sacrifice of resources. |
| 3 | Variable cost |  | Cost that varies with the volume of activity. |
| 4 | Full absorption cost |  | Cost used to compute inventory value according to GAAP. |
| 11 | Product cost |  | Cost that is part of inventory. |

1. (15 min.) Basic Concepts.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Cost Item | Fixed (F) Variable (V) |  | Period (P) Product (M) |
| a. | Power to operate factory equipment | V |  | M |
| b. | Chief financial officer’s salary | F |  | P |
| c. | Commissions paid to sales personnel | V |  | P |
| d. | Office supplies for the human resources manager | F |  | P |
| e. | Depreciation on pollution control equipment in the plant | F |  | M |

1. (15 min.) Basic Concepts.

|  |  |  |
| --- | --- | --- |
| a. | Variable production cost per unit: ($360 + $60 + $15 + $30) | $465 |
| b. | Variable cost per unit: ($465 + $45) | $510 |
| c. | Full cost per unit: [$510 + ($225,000 ÷ 1,500 units)] | $660 |
| d. | Full absorption cost per unit: [$465 + ($135,000 ÷ 1,500)] | $555 |
| e. | Prime cost per unit. (materials + labor + outsource) | $435 |
| f. | Conversion cost per unit: (labor + overhead + outsource) | $540 |
| g. | Contribution margin per unit: ($900 – $510) | $390 |
| h. | Gross margin per unit: ($900 – full absorption cost of $555) | $345 |
| i. | Suppose the number of units decreases to 1,250 units per month, which is within the relevant range. Which parts of (*a*) through (*h*) will change? For each amount that will change, give the new amount for a volume of 1,250 units.  c. Full cost = $510 + ($225,000 ÷ 1,250) = $690  d. Full absorption cost = $465 + ($135,000 ÷ 1,250) = $573  f. Conversion costs = $360 + $30 + ($135,000 ÷ 1,250) + $60 = $558  h. Gross margin = $900 – $573 = $327 | c, d, f and h will change, as follows |

1. (15 min.) Basic Concepts: Intercontinental, Inc.

|  |  |  |
| --- | --- | --- |
| a. | Prime cost per unit: (materials + labor) | $40 |
| b. | Contribution margin per unit: ($100 – $72) | $28 |
| c. | Gross margin per unit: ($100 – full absorption cost of $74) | $26 |
| d. | Conversion cost per unit: (labor + overhead) | $50 |
| e. | Variable cost per unit: ($60 + $12) | $72 |
| f. | Full absorption cost per unit: [$60 + ($4,200,000 ÷ 300,000)] | $74 |
| g. | Variable production cost per unit: ($16 + $24 + $20) | $60 |
| h. | Full cost per unit. [$72 + ($5,400,000 ÷ 300,000 units)] | $90 |
| i. | Suppose the number of units increase to 400,000 units per month, which is within the relevant range. Which parts of (*a*) through (*h*) will change? For each amount that will change, give the new amount for a volume of 400,000 units.  c. Gross margin = $100.00 – $70.50 = $29.50  d. Conversion costs = $16 + $20 + ($4,200,000 ÷ 400,000) = $46.50  f. Full absorption cost = $60 + ($4,200,000 ÷ 400,000) = $70.50  h. Full cost = $72 + ($5,400,000 ÷ 400,000) = $85.50 | c, d, f and h will change,  as follows |

1. (15 min.) Cost Allocation—Ethical Issues

This problem is based on the experience of the authors’ research at several companies.

a. Answers will vary as there are several defensible bases on which to allocate the product development costs. As an example, many government-purchasing contracts are based on the cost of the product or service. In this case, using expected sales (units or revenue) leads to a potential circularity. Price depends on cost, which depends on sales, which depends on price.

b. The company has an incentive to allocate as much cost as possible to government sales. This cost will be reimbursed (and the government may be less price-sensitive). Of course, the government recognizes this and has detailed allocation guidelines in place and an agency (the Defense Contract Audit Agency) that monitors contracts and the allocation of costs.

1. (15 min.) Cost Allocation—Ethical Issues

This problem is based on the experience of the authors’ research at several companies.

a. Answers will vary as there are several defensible bases on which to allocate the common costs. One possibility is relative sales revenue. (We ignore here whether we should allocate these costs, something we discuss in chapter 4.)

b. You should explain to Star that you cannot agree with the allocation basis, especially given the reason for selecting the basis. If this fails to persuade Star, you should disclose to Star’s boss your disagreement with the analysis and the relation between Star and the vendor.

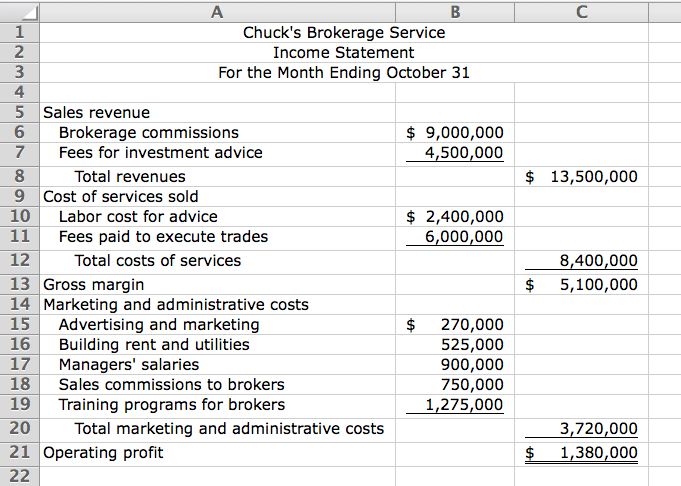
1. (30 min.) Prepare Statements for a Manufacturing Company: Tappan Parts.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Tappan Parts Cost of Goods Sold Statement For the Year Ended December 31 | | | | | | | |
| Beginning work in process inventory |  |  |  | |  | $1,354,000 |  |
| Manufacturing costs: |  |  |  | |  |  |  |
| Direct materials: |  |  |  | |  |  |  |
| Beginning inventory | $962,000 |  | |  |  |  |  |
| Purchases | 1,118,000 | (a)\* | |  |  |  |  |
| Materials available | $2,080,000 |  | |  |  |  |  |
| Less ending inventory | 884,000 |  | |  |  |  |  |
| Direct materials used |  |  | | $1,196,000 |  |  |  |
| Other manufacturing costs |  |  | | 310,000 | \*\* |  |  |
| Total manufacturing costs |  |  | |  |  | 1,506,000 | (c) |
| Total costs of work in process |  |  | |  |  | $2,860,000 |  |
| Less ending work in process |  |  | |  |  | 1,430,000 |  |
| Cost of goods manufactured |  |  | |  |  | $ 1,430,000 | (b) |
| Beginning finished goods inventory |  |  | |  |  | 312,000 |  |
| Finished goods available for sale |  |  |  | |  | $ 1,742,000 |  |
| Ending finished goods inventory |  |  |  | |  | 364,000 |  |
| Cost of goods sold |  |  |  | |  | $1,378,000 |  |

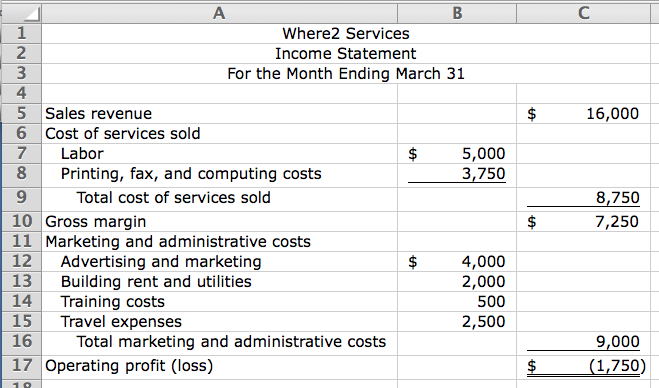
\* Letters (a), (b), and (c) refer to amounts found in solutions to requirements *a, b,* and *c.*

\*\* Difference between total manufacturing costs of $1,506,000 and direct materials used of $1,196,000.

1. (10 min.) Prepare Statements for a Service Company: Chuck’s Brokerage Service.



1. Prepare Statements for a Service Company: Where2 Services.



1. (10 min.) Prepare Statements for a Service Company: Remington Advisors

|  |  |  |
| --- | --- | --- |
| Sales revenue | $1,700,000 | (Given) |
| Cost of services sold (b) | 890,000 | (Sales revenue – gross margin) |
| Gross margin | $810,000 | (Given) |
| Marketing and administrative  costs (a) | 505,000 | (Gross margin – operating profit) |
| Operating profit | $305,000 | (Given) |

1. (20 min.) Prepare Statements for a Service Company: Lead! Inc.

You can solve this in the order shown below.

|  |  |  |
| --- | --- | --- |
| Lead!, Inc. Income Statement  For the Month Ended April 30 | | |
| Sales revenue | $600,000 | a |
| Cost of services sold | 384,000 | c |
| Gross margin | $216,000 | d |
| Marketing and administrative costs | 96,000 | e |
| Operating profit ($600,000 x 20%) | $120,000 | b |

a. Given

b. $120,000 = 20% x $600,000.

c. To find the cost of services sold plus marketing and administrative costs, start with the operating profit (b). Then cost of services plus marketing and administrative costs is $480,000 (= $600,000 – $120,000). But, marketing and administrative costs equal 25% of cost of services sold, so,

Cost of services sold + marketing and administrative costs = $480,000 and

Marketing and adminstrative costs = .25 x Cost of services sold.

Combining these equations yields,

1.25 x Cost of services sold = $480,000

or cost of services sold = $384,000 (= $480,000 ÷ 1.25).

d. $216,000 = $600,000 – $384,000.

e. $96,000 = 25% x $384,000.

1. (30 min.) Prepare Statements for a Manufacturing Company: Crabtree Machining Company.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Crabtree Machining Company Cost of Goods Sold Statement For the Year Ended December 31 | | | | | | |
| Beginning work-in-process inventory |  |  |  |  | $  139,200 |  |
| Manufacturing costs: |  |  |  |  |  |  |
| Direct materials: |  |  |  |  |  |  |
| Beginning inventory | $115,200 |  |  |  |  |  |
| Purchases | 717,600 |  |  |  |  |  |
| Materials available | $832,800 |  |  |  |  |  |
| Less ending inventory | 141,600 |  |  |  |  |  |
| Direct materials used |  |  | $ 691,200 | (a)\* |  |  |
| Other manufacturing costs |  |  | 1,901,760 | \*\* |  |  |
| Total manufacturing costs |  |  |  |  | 2,592,960 | (c) |
| Total costs of work in process |  |  |  |  | $ 2,732,160 |  |
| Less ending work in process |  |  |  |  | 134,400 |  |
| Cost of goods manufactured |  |  |  |  | $ 2,597,760 | (b) |
| Beginning finished goods inventory |  |  |  |  | 117,120 |  |
| Finished goods available for sale |  |  |  |  | $ 2,714,880 |  |
| Ending finished goods inventory |  |  |  |  | 108,000 |  |
| Cost of goods sold |  |  |  |  | $2,606,880 |  |

\* The best approach to solving this problem is to lay out the format of the Cost of Goods Sold Statement first, then fill in the amounts known. Next find the subtotals that are possible (e.g., Finished goods available for sale). Finally, solve for letters (a), (b), and (c) where (a), (b), and (c) refer to amounts found in solutions to requirements *a, b,* and *c.*

\*\* Difference between total manufacturing costs and direct materials used.

1. (15 min.) Basic Concepts: Monroe Fabricators

|  |  |  |
| --- | --- | --- |
| a. | From the basic inventory equation,  Beginning Inventory + Transferred in  = Transferred out + Ending Inventory, so  Ending Materials Inventory, December 31,  = Beginning balance + Transferred in – Transferred out  = $7,800 + $48,300 - $43,800 | = $12,300 |
| b. | Total manufacturing costs = Cost of goods manufactured  – Beginning work-in-process + Ending work-in-process  = $163,350 – $8,100 + $11,400  (also can be found solving for Transferred in to Finished Goods) | = $166,650 |
| c. | Total manufacturing costs = Direct materials + Direct labor  + Manufacturing overhead, so,  Direct labor = Total manufacturing costs  – Direct materials used – Manufacturing overhead,  = $166,650 – $43,800 – $41,400 | = $81,450 |
| d. | Sales revenue = Gross margin + Cost of Goods Sold  = $147,750 + $168,150 | = $315,900 |

1. (15 min.) Basic Concepts: Talmidge Co.

|  |  |  |
| --- | --- | --- |
| a. | From the basic inventory equation,  Beginning work-in-process inventory + Total manufacturing cost  = Cost of goods manufactured + Ending work-in-process inventory, so  Ending work-in-process inventory, March 31,  = Beginning balance + Total manufacturing cost – Cost of goods manufactured  = $10,000 + $254,000 – $260,000 | = $4,000 |
| b. | Purchases of direct materials = Ending direct materials inventory + Direct materials used – Beginning materials inventory  = $27,000 + $62,000 – $32,000  (also can be found solving for Transferred in to Finished Goods) | = $57,000 |
| c. | Cost of goods sold = Sales revenue – Gross Margin  = $480,000 – $170,000 | = $310,000 |
| d. | Manufacturing overhead = Total manufacturing cost  – Direct materials used – Direct labor  = $254,000 – $62,000 – $120,000 | = $72,000 |

1. (15 min.) Prepare Statements for a Merchandising Company: Angie’s Apparel.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Angie’s Apparel  Income Statement  For the Month Ended July 31 | | | | | |
| Sales revenue | | |  | $570,000 | |
| Cost of goods sold (see statement below) | | |  | 388,500 | |
| Gross margin | | |  | $181,500 | |
| Marketing and administrative costs  ($42,000 + $27,000 + $9,000 + $16,500) | | |  | 94,500 | |
| Operating profit | | |  | $87,000 | |
| Angie's Apparel  Cost of Goods Sold Statement  For the Month Ended July 31 | | | | |
| Merchandise inventory, July 1 |  |  | $ 9,000 | |
| Merchandise purchases | $360,000 |  |  | |
| Transportation-in | 27,000 |  |  | |
| Total cost of goods purchased |  |  | 387,000 | |
| Cost of goods available for sale |  |  | $396,000 | |
| Merchandise inventory, July 31 |  |  | 7,500 | |
| Cost of goods sold |  |  | $388,500 | |

1. (15 min.) Prepare Statements for a Merchandising Company: University Electronics.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| University Electronics Income Statement  For the Year Ended February 28 | | | | | |
| Sales revenue | | |  | $4,000,000 | |
| Cost of goods sold (see statement below) | | |  | 2,830,000 | |
| Gross margin | | |  | $1,170,000 | |
| Marketing and administrative costs  ($220,000 + $135,000 + $290,000 + $650,000) | | |  | 1,295,000 | |
| Operating profit (loss) | | |  | $(125,000) | |
| University Electronics Cost of Goods Sold Statement  For the Year Ended February 28 | | | | |
| Merchandise inventory, March 1 |  |  | $ 185,000 | |
| Merchandise purchases | $2,750,000 |  |  | |
| Transportation-in | 105,000 |  |  | |
| Total cost of goods purchased |  |  | 2,855,000 | |
| Cost of goods available for sale |  |  | $3,040,000 | |
| Merchandise inventory, February 28 |  |  | 210,000 | |
| Cost of goods sold |  |  | $2,830,000 | |

1. (10 min.) Cost Behavior for Forecasting: Dayton, Inc.

The variable costs will be 20 percent higher because there will be an increase of 36,000 – 30,000 = 6,000 units (20% = 6,000 ÷ 30,000).

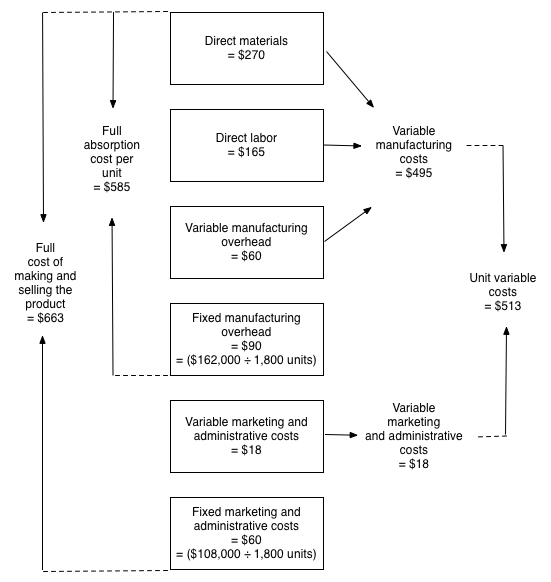
|  |  |  |  |
| --- | --- | --- | --- |
| Variable costs: | |  | |
| Direct materials used ($510,000 x 1.2) | | $ 612,000 | |
| Direct labor ($1,120,000 x 1.2) | | 1,344,000 | |
| Indirect materials and supplies ($120,000 x 1.2) | | 144,000 | |
| Power to run plant equipment ($140,000 x 1.2) | | 168,000 | |
| Total variable costs | | $2,268,000 | |
| Fixed costs: | |  | |
| Supervisory salaries | | $ 470,000 | |
| Plant utilities (other than power to run plant equipment) | | 120,000 | |
| Depreciation on plant and equipment | | 67,500 | |
| Property taxes on building | | 98,500 | |
| Total fixed costs | | 756,000 | |
| Total costs for 36,000 units | | $3,024,000 | |
| Unit costs (= $3,024,000 ÷ 36,000) | | $84 | |

Note that the variable cost per unit is $63 at both 30,000 units and at 36,000 units.

Total variable cost at 30,000 units is $1,890,000 (= $510,000 + $1,120,000 + $120,000 + $140,000).

Unit variable cost = $63 per unit = ($1,890,000 30,000 units) or ($2,268,000 ÷ 36,000 units).

1. (30 min.) Components of Full Costs: Madrid Corporation

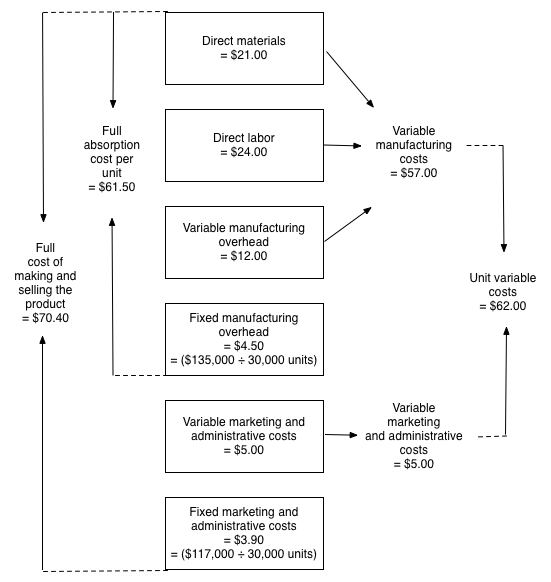


|  |  |
| --- | --- |
| a. | Variable manufacturing cost: $270 + $165 + $60= $495 |
| b. | Variable cost: $270 + $165 + $60 + $18 = $513 |
| c. | Full absorption cost: $270 + $165 + $60 + ($162,000 ÷ 1,800 units) = $585 |
| d. | Full cost: $270 + $165 + $60 + $18 + ($162,000 ÷ 1,800 units) + ($108,000 ÷ 1,800 units) = $663 |

1. (15 min.) Components of Full Costs: Madrid Corporation.

|  |  |
| --- | --- |
| a. | Product cost = Direct materials + Direct labor + Manufacturing overhead. |
|  | Product cost per unit: $270 + $165 + $60 + ($162,000 ÷ 1,800 units) = $585 |
|  |  |
| b. | Period costs = Marketing and administrative costs. |
|  | Period costs for the period: $108,000 + ($18 x 1,800 units) = $140,400 |

1. (30 min.) Components of Full Cost: Larcker Manufacturing.



a. Variable cost: $21.00 + $24.00 + $12.00 + $5.00 = $62.00

b. Variable manufacturing cost: $21.00 + $24.00 + $12.00 = $57.00

c. Full-absorption cost: $21.00 + $24.00 + $12.00 + ($135,000 ÷ 30,000 units) = $61.50

2-48. (continued)

d. Full cost: $21.00 + $24.00 + $12.00 + ($135,000 ÷ 30,000 units) + $5.00 + ($117,000 ÷ 30,000 units) = $70.40

e. Profit margin = Sales price – full cost = $79.00 – $70.40 = $8.60

f. Gross margin = Sales price – full absorption cost = $79.00 – $61.50 = $17.50

g. Contribution margin = Sales price – variable cost = $79.00 – $62.00 = $17.00

1. (20 Min.) Gross Margin and Contribution Margin Income Statements: Larcker Manufacturing.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | |  |  | |
| Gross Margin Income Statement | |  | Contribution Margin Income Statement | |
| Sales revenue(a) | $2,370,000 |  | Sales revenue | $2,370,000 |
| Variable manufacturing costs (b) | 1,710,000 |  | Variable manufacturing costs | 1,710,000 |
| Fixed manufacturing overhead costs | 135,000 |  | Variable marketing and administrative costs | 150,000 |
| Gross margin | $525,000 |  | Contribution margin | $510,000 |
| Variable marketing and administrative costs (c) | 150,000 |  | Fixed manufacturing overhead costs | 135,000 |
| Fixed marketing and administrative costs | 117,000 |  | Fixed marketing and administrative costs | 117,000 |
| Operating profit | $258,000 |  | Operating profit | $258,000 |

(a) $79 x 30,000 units = $2,370,000

(b) $57 x 30,000 units = $1,710,000; $57 = ($21 direct material + $24 direct labor + $12 variable manufacturing overhead).

(c) $5 x 30,000 units = $150,000

1. (20 Min.) Gross Margin and Contribution Margin Income Statements: Niles Castings.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | |  |  | |
| Gross Margin Income Statement | |  | Contribution Margin Income Statement | |
| Sales revenue | $264,000 |  | Sales revenue | $264,000 |
| Variable manufacturing costsa | 119,000 |  | Variable manufacturing costs | 119,000 |
| Fixed manufacturing costs | 44,000 |  | Variable marketing and administrative costs | 13,600 |
| Gross margin | $ 101,000 |  | Contribution margin | $131,400 |
| Variable marketing and administrative costs | 13,600 |  | Fixed manufacturing costs | 44,000 |
| Fixed marketing and administrative costs | 32,000 |  | Fixed marketing and administrative costs | 32,000 |
| Operating profit | $ 55,400 |  | Operating profit | $ 55,400 |

a Variable manufacturing costs = $68,000 + $34,000 + $17,000 = $119,000

1. (20 Min.) Gross Margin and Contribution Margin Income Statements: Alpine Coffee Roasters.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gross Margin Income Statement | |  | Contribution Margin Income Statement | |
| Sales revenuea | $230,400 |  | Sales revenue | $230,400 |
| Variable manufacturing costsb | 126,000 |  | Variable manufacturing costs | 126,000 |
| Fixed manufacturing overhead costsc | 45,000 |  | Variable marketing and administrative costs | 10,800 |
| Gross margin | $59,400 |  | Contribution margin | $93,600 |
| Variable marketing and administrative costsd | 10,800 |  | Fixed manufacturing overhead costs | 45,000 |
| Fixed marketing and administrative costse | 18,000 |  | Fixed marketing and administrative costs | 18,000 |
| Operating profit | $30,600 |  | Operating profit | $30,600 |

a Revenue = $6.40 x 36,000 = $230,400

b Variable manufacturing costs = ($3.00 + $0.40 + $0.10) x 36,000 = $126,000

c Fixed manufacturing overhead costs = $1.25 x 36,000 = $45,000

d Variable marketing and administrative costs = $0.30 x 36,000 = $10,800

e Fixed marketing and administrative costs = $0.50 x 36,000 = $18,000

1. (30 min.) Value Income Statement: Ralph’s Restaurant.

a.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Ralph’s Restaurant  Value Income Statement For the year 2 ending December 31 | | | | | | | |
|  | Nonvalue-added activities | | |  | Value-added activities |  | Total |
| Sales revenue |  | |  |  | $1,000,000 |  | $1,000,000 |
| Cost of merchandise |  | |  |  |  |  |  |
| Cost of food serveda | $ 52,500 | |  |  | 297,500 |  | 350,000 |
| Gross margin | $ (52,500) | |  |  | $ 702,500 |  | $ 650,000 |
| Operating expenses |  | |  |  |  |  |  |
| Employee salaries and wagesb | 37,500 | |  |  | 212,500 |  | 250,000 |
| Managers’ salariesc | 20,000 | |  |  | 80,000 |  | 100,000 |
| Building costsd | | 30,000 |  |  | 120,000 |  | 150,000 |
| Operating income (loss) | $(140,000) | |  |  | $ 290,000 |  | $ 150,000 |

a 15% nonvalue-added activities (= 5% not used + 10% incorrectly prepared)

b 15% nonvalue-added activities

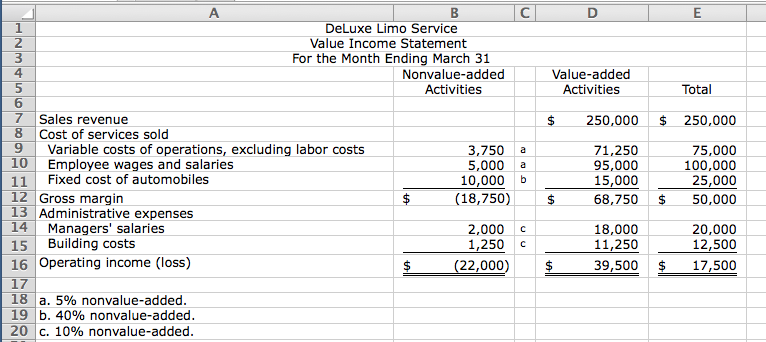
c 20% nonvalue-added activities

d 20% unused and nonvalue-added activities

b. The information in the value income statement enables Ralph to identify nonvalue-added activities. He could eliminate such activities without reducing value to customers. Ralph can take steps to ensure that food is used prior to the expiration date, either by changing scheduling or purchasing procedures. He can also spend time training staff to take orders more carefully. Preparing a Year 3 statement helps Ralph see whether the company is improving in reducing nonvalue-added activities.

1. (30 min.) Value Income Statement: DeLuxe Limo Service.

a.



b. The information in the value income statement enables the managers at DeLuxe to identify nonvalue-added activities. They could eliminate such activities without reducing value to customers. They can take steps to improve how directions are given to drivers and reduce customer complaints, for example. By preparing the same information in April, they can see how DeLuxe is improving (or becoming worse) in reducing nonvalue-added activities.

Solutions to Problems

1. (30 min.) Cost Concepts: Chelsea, Inc.

a.

Prime costs = direct materials + direct labor

|  |  |  |  |
| --- | --- | --- | --- |
|  | Direct materials | = | beginning inventory + purchases – ending inventory |
|  |  | = | $9,000 + $120,000 – $7,500 |
|  |  | = | $121,500 |

Direct labor is given as $96,000

|  |  |  |  |
| --- | --- | --- | --- |
|  | Prime costs | = | $121,500 + $96,000 |
|  |  | = | $217,500 |

b.

Conversion costs = Direct labor + Manufacturing overhead

Conversion costs = $96,000 + $126,000 = $222,000

c.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Total manufacturing costs | = | Direct materials + Direct labor + Manufacturing overhead |
|  |  | = | $121,500 (from a above) + $96,000 + $126,000 |
|  |  | = | $343,500 |

d.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Cost of goods  manufactured | = | Beginning Work In Process + Total manufacturing costs  – Ending Work In Process |
|  |  | = | $4,500 + $343,500 (from c above) – $3,000 |
|  |  | = | $345,000 |

e.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Cost of  Goods  Sold | = | Cost of  Goods Manufactured | + | Beginning Finished Goods Inventory | – | Ending Finished Goods Inventory |
|  |  | = | $345,000 | + | $27,000 | – | $36,000 |
|  |  |  | (from d above) |  |  |  |  |
|  |  | = | $336,000 |  |  |  |  |

1. (30 Minutes) Cost Concepts: Lawrence Components.

a. $58,000.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Prime costs | = | Direct materials used + Direct labor costs |
|  | Direct materials used | = | Prime costs – Direct labor costs |
|  |  | = | $98,000 – $40,000 |
|  |  | = | $58,000 |

b. $12,000.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Direct materials used | = | Beginning inventory + purchases – ending inventory |
|  | Direct materials, beginning inventory | = | Direct materials used – purchases + ending inventory |
|  |  |  | $58,000 – $56,000 + $10,000 |
|  |  | = | $12,000 |

c. $120,000.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Total manufacturing costs | = | Prime costs + Conversion costs – Direct labor cost |
|  | Conversion cost | = | Total manufacturing costs – Prime costs + Direct labor cost |
|  |  | = | $178,000 – $98,000 + $40,000 |
|  |  | = | $120,000 |

d. $4,000.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Work-in-process, ending | = | Work-in-process, beginning + Total manufacturing costs – Cost of goods manufactured |
|  |  |  | $6,000 + $178,000 – $180,000 |
|  |  | = | $4,000 |

e. $80,000.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Conversion cost | = | Direct labor costs + Manufacturing overhead |
|  | Manufacturing overhead | = | Conversion costs – Direct labor costs |
|  |  | = | $120,000 – $40,000 |
|  |  | = | $80,000 |

2-55. (continued)

f. $10,000.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Cost of goods sold | = | Finished goods, beginning + Cost of goods manufactured – Finished goods, ending |
|  | Finished goods, beginning | = | Cost of goods sold – Cost of goods manufactured + Finished goods, ending |
|  |  |  | $142,000 – $180,000 + $48,000 |
|  |  | = | $10,000 |

1. (30 minutes) Cost Concepts: Columbia Products.

a. Amounts per unit:

(1) $217.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Variable manufacturing cost | = | Manufacturing overhead + Direct labor + Direct materials |
|  |  | = | $70 + $35 + $112 |
|  |  | = | $217 |

(2) $362.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Full unit cost | = | All unit fixed costs + All unit variable costs |
|  |  |  | Unit fixed manufacturing = ($50,400 ÷ 900 units) = $56 |
|  |  |  | Unit fixed marketing and administrative cost = ($67,500 ÷ 900 units) = $75 |
|  |  | = | $56 + $75 + $35 + $112 + $70 + $14 |
|  |  | = | $362 |

(3) $231.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Variable cost | = | All variable unit costs |
|  |  | = | $14 + $70 + $35 + $112 |
|  |  | = | $231 |

(4) $273.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Full absorption cost | = | Fixed and variable manufacturing overhead + Direct labor + direct materials |
|  |  | = | $56 + $70 + $35 + $112 |
|  |  | = | $273 |

(5) $147.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Prime cost | = | Direct labor + Direct materials |
|  |  | = | $35 + $112 |
|  |  | = | $147 |

2-56. (continued)

(6) $161.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Conversion cost | = | Direct labor + Manufacturing overhead |
|  |  | = | $35 + ($70 + $56) |
|  |  | = | $161 |

(7) $86.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Profit margin | = | Sales price – Full cost |
|  |  | = | $448 – $362 |
|  |  | = | $86 |

(8) $217.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Contribution margin | = | Sales price – Variable costs |
|  |  | = | $448 – $231 |
|  |  | = | $217 |

(9) $175.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Gross margin | = | Sales price – Full absorption cost |
|  |  | = | $448 – $273 |
|  |  | = | $175 |

b. As the number of units increases (reflected in the denominator), fixed manufacturing cost per unit (and the total cost per unit) decreases. The numerator (i.e., total fixed costs) remains the same. However, that does not mean Columbia should produce more units. That decision should be based on the *total* profits (revenues minus costs), not on *unit* profits.

1. (30 min.) Prepare Statements for a Manufacturing Company: Yolo Windows.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Yolo Windows Statement of Cost of Goods Sold For the Year Ended December 31  ($000) | | | | | |
| Work in process, Jan. 1 |  |  |  |  | $  48 |
| Manufacturing costs: |  |  |  |  |  |
| Direct materials: |  |  |  |  |  |
| Beginning inventory, Jan. 1 | $  36 |  |  |  |  |
| Add material purchases | 3,280 |  |  |  |  |
| Direct materials available | 3,316 |  |  |  |  |
| Less ending inventory, Dec. 31 | 32 |  |  |  |  |
| Direct materials used |  |  | $ 3,284 |  |  |
| Direct labor |  |  | 4,240 |  |  |
| Manufacturing overhead: |  |  |  |  |  |
| Indirect factory labor | 1,120 |  |  |  |  |
| Indirect materials and supplies | 280 |  |  |  |  |
| Factory supervision | 840 |  |  |  |  |
| Factory utilities | 360 |  |  |  |  |
| Factory and machine depreciation | 4,640 |  |  |  |  |
| Property taxes on factory | 112 |  |  |  |  |
| Total manufacturing overhead |  |  | 7,352 |  |  |
| Total manufacturing costs |  |  |  |  | 14,876 |
| Total cost of work in process during the year |  |  |  |  | 14,924 |
| Less work in process, Dec. 31 |  |  |  |  | 56 |
| Costs of goods manufactured during the year |  |  |  |  | 14,868 |
| Beginning finished goods, Jan. 1 |  |  |  |  | 656 |
| Finished goods inventory available for sale |  |  |  |  | 15,524 |
| Less ending finished goods inventory, Dec. 31 |  |  |  |  | 588 |
| Cost of goods sold |  |  |  |  | $14,936 |

2-57. (continued)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Yolo Windows Income Statement For the Year Ended December 31  ($000) | | | | |
| Sales revenue |  |  | $18,160 |
| Less: Cost of goods sold |  |  | 14,936 |
| Gross margin |  |  | $3,224 |
| Administrative costs | $1,440 |  |  |
| Marketing costs | 600 |  |  |
| Total marketing and administrative costs |  |  | 2,040 |
| Operating profit |  |  | $1,184 |

1. (30 min.) Prepare Statements for a Manufacturing Company: Mesa Designs.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Mesa Designs Statement of Cost of Goods Sold For the Year Ended December 31  ($000) | | | | | |
| Work in process, Jan. 1 |  |  |  |  | $  152 |
| Manufacturing costs: |  |  |  |  |  |
| Direct materials: |  |  |  |  |  |
| Beginning inventory, Jan. 1 | $  96 |  |  |  |  |
| Add materials purchases | 10,300 |  |  |  |  |
| Direct materials available | $10,396 |  |  |  |  |
| Less ending inventory, Dec. 31 | 110 |  |  |  |  |
| Direct materials used |  |  | $10,286 |  |  |
| Direct labor |  |  | 13,000 |  |  |
| Manufacturing overhead: |  |  |  |  |  |
| Depreciation (factory) | $5,560 |  |  |  |  |
| Depreciation (machines) | 9,240 |  |  |  |  |
| Indirect labor (factory) | 3,340 |  |  |  |  |
| Indirect materials (factory) | 960 |  |  |  |  |
| Property taxes on factory | 370 |  |  |  |  |
| Utilities (factory) | 1,060 |  |  |  |  |
| Total manufacturing overhead |  |  | 20,530 |  |  |
| Total manufacturing costs |  |  |  |  | 43,816 |
| Total cost of work in process during the year |  |  |  |  | $43,968 |
| Less work in process, Dec. 31 |  |  |  |  | 136 |
| Costs of goods manufactured during the year |  |  |  |  | $43,832 |
| Beginning finished goods, Jan. 1 |  |  |  |  | 1,974 |
| Finished goods inventory available for sale |  |  |  |  | $45,806 |
| Less ending finished goods inventory, Dec. 31 |  |  |  |  | 2,026 |
| Cost of goods sold |  |  |  |  | $43,780 |

2-58. (continued)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Mesa Designs Income Statement For the Year Ended December 31  ($000) | | | | |
| Sales revenue |  |  | $60,220 |
| Less: Cost of goods sold |  |  | 43,780 |
| Gross margin |  |  | $ 16,440 |
| Administrative costs | $4,200 |  |  |
| Selling costs | 2,140 |  |  |
| Total marketing and administrative costs |  |  | 6,340 |
| Operating profit |  |  | $10,100 |

1. (30 min.) Prepare Statements for a Manufacturing Company: Billings Tool & Die.

.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Billings Tool & Die Statement of Cost of Goods Sold For the Year Ended December 31  ($ 000) | | | | | |
| Beginning work in process, Jan. 1 |  |  |  |  | $   192 |
| Manufacturing costs: |  |  |  |  |  |
| Direct materials: |  |  |  |  |  |
| Beginning inventory, Jan. 1 | $  72 |  |  |  |  |
| Add: Purchases | 21,900 |  |  |  |  |
| Direct materials available | 21,972 |  |  |  |  |
| Less ending inventory, Dec. 31 | 84 |  |  |  |  |
| Direct materials used |  |  | $21,888 |  |  |
| Direct labor |  |  | 5,040 |  |  |
| Manufacturing overhead: |  |  |  |  |  |
| Indirect factory labor | 5,472 |  |  |  |  |
| Factory supervision | 2,940 |  |  |  |  |
| Indirect materials and supplies | 4,110 |  |  |  |  |
| Building utilities (90% of total) | 6,750 |  |  |  |  |
| Building & machine depreciation (75% of $5,400) | 4,050 |  |  |  |  |
| Property taxes—factory (80% of total) | 4,032 |  |  |  |  |
| Total manufacturing overhead |  |  | 27,354 |  |  |
| Total manufacturing costs |  |  |  |  | 54,282 |
| Total cost of work in process during the year |  |  |  |  | 54,474 |
| Less work in process, Dec. 31 |  |  |  |  | 174 |
| Costs of goods manufactured during the year |  |  |  |  | 54,300 |
| Beginning finished goods, Jan. 1 |  |  |  |  | 324 |
| Finished goods available for sale |  |  |  |  | 54,624 |
| Less ending finished goods, Dec. 31 |  |  |  |  | 390 |
| Cost of goods sold |  |  |  |  | $ 54,234 |

2-59. (continued)

|  |  |  |  |
| --- | --- | --- | --- |
| Billings Tool & Die Income Statement For the Year Ended December 31  ($ 000) | | | |
| Sales revenue |  |  | $77,820 |
| Less: Cost of goods sold (per statement) |  |  | 54,234 |
| Gross profit |  |  | $ 23,586 |
| Marketing and administrative costs: |  |  |  |
| Depreciation (25% of total) | $ 1,350 |  |  |
| Utilities (10% of total) | 750 |  |  |
| Property taxes (20% of total) | 1,008 |  |  |
| Administrative costs | 9,600 |  |  |
| Marketing costs | 5,226 |  |  |
| Total marketing and administrative costs |  |  | 17,934 |
| Operating profit |  |  | $  5,652 |

1. (10 Min.) Cost Allocation with Cost Flow Diagram: Coastal Computer.

a.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| (1) |  | Main Street | Lakeland Mall | Total |
|  | Number of computers sold | 2,000 | 1,600 | 3,600 |
|  | Percentage | 55.56% | 44.44% | 100% |
|  | Allocated Accounting  Department cost ($180,000) | $100,000 | $80,000 | $180,000 |
|  |  |  |  |  |
| (2) |  | Main Street | Lakeland Mall | Total |
|  | Revenue | $1,000,000 | $2,000,000 | $3,000,000 |
|  | Percentage | 33.33% | 66.67% | 100% |
|  | Allocated Accounting  Department cost ($180,000) | $60,000 | $120,000 | $180,000 |

b.

Prob-02-49_Flow

a 33.33% = $1,000,000 ÷ ($1,000,000 + $2,000,000)

b 66.67% = $2,000,000 ÷ ($1,000,000 + $2,000,000)

1. (20 Min.) Cost Allocation with Cost Flow Diagram: Wayne Casting, Inc.

a.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| (1) |  | Chillicothe Metals | Ames Supply | Total |
|  | Material purchased (tons) | 130 | 120 | 250 |
|  | Percentage | 52% | 48% | 100% |
|  | Allocated waste handling cost ($300,000) | $156,000 | $144,000 | $300,000 |
|  |  |  |  |  |
| (2) |  | Chillicothe Metals | Ames Supply | Total |
|  | Amount of waste (tons) | 12.8 | 2.2 | 15 |
|  | Percentage | 85.33% | 14.67% | 100% |
|  | Allocated waste handling cost ($300,000) | $256,000 | $44,000 | $300,000 |
|  |  |  |  |  |
| (3) |  | Chillicothe Metals | Ames Supply | Total |
|  | Cost of materials purchased | $624,000 | $876,000 | $1,500,000 |
|  | Percentage | 41.6% | 58.4% | 100% |
|  | Allocated waste handling cost ($300,000) | $124,800 | $175,200 | $300,000 |

2-61. (continued)

Prob-02-50_Flowb.

a 52% = 130 tons ÷ (130 tons + 120 tons)

b 48% = 120 tons ÷ (130 tons + 120 tons)

1. (20 Min.) Cost Allocation with Cost Flow Diagram: Pacific Business School.

a.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Undergraduate | Graduate | Total |
| Number of students | 900 | 600 | 1,500 |
| Percentage | 60% | 40% | 100% |
| Credit Hours | 13,500 | 16,500 | 30,000 |
| Percentage | 45% | 55% | 100% |
|  |  |  |  |
| Allocation of student-related  costsa | $1,350,000 | $900,000 | $2,250,000 |
| Allocation of credit-hour costsb | 803,250 | 981,750 | 1,785,000 |
| Total Allocations | $2,153,250 | $1,881,750 | $4,035,000 |

a $1,350,000 = 60% x $2,250,000; $900,000 = 40% x $2,250,000.

b $803,250 = 45% x $1,785,000; $981,750 = 55% x $1,785,000.

2-62. (continued)

Problem-02-51_Flowb.

a 45% = 13,500 credit hours ÷ (13,500 credit hours + 16,500 credit hours)

b 55% = 16,500 students ÷ (13,500 credit hours + 16,500 credit hours)

c 60% = 900 students ÷ (900 students + 600 students)

d 40% = 600 students ÷ (900 students + 600 students)

1. (40 Min.) Find the Unknown Information.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |
| a. | Finished goods beginning inventory | + | Cost of goods manufactured | – | Cost of  goods sold | = | Finished goods  ending inventory |
|  | Finished goods beginning inventory | + | $88,800 | – | $87,040 | = | $14,080 |
|  | Finished goods beginning inventory | = | $ 12,320 | (= $14,080 – $88,800 + $87,040) | | | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| b. | Direct  materials used | + | Direct labor | + | Manufacturing overhead | = | Total manufacturing costs |
|  | Direct  materials used | + | $ 12,160 | + | $23,040 | = | $77,600 |
|  | Direct  materials used | = | $42,400 | (= $77,600 – $12,160 – $23,040) | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| c. | Gross margin % | = | Gross margin | ÷ | | Sales revenue |
|  |  | = | (Sales revenue – COGS) | ÷ | | Sales revenue |
|  | Rearranging, |  |  |  | | |
|  | Sales revenue | = | Cost of Goods Sold | ÷ | (1.0 – Gross Margin %) | | |
|  |  |  | $87,040 | ÷ | (1.0 – .375) | | |
|  |  |  | $87,040 | ÷ | 0.625 | | |
|  |  |  |  |  |  | | |
|  |  |  |  |  | | |
|  | Sales revenue | = | $139,264 |  | | |

1. (40 Min.) Find the Unknown Information.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |
| a. | Cost of goods sold | = | Finished goods  beginning inventory | + | Cost of goods manufactured | – | Finished goods  ending inventory |
|  |  | = | $22,320 | + | $611,650 | – | $38,770 |
|  | Cost of goods sold | = | $595,200 |  | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| b. | Total manufacturing costs | = | Direct  materials used | | + | Direct labor | + | Manufacturing overhead |
|  | $612,320 | = | Direct  materials used | | + | $270,400 | + | $225,000 |
|  | Direct  materials used | = | $116,920 | (= $612,320 – $270,400 – $225,000) | | | | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| c. | Direct  materials used | = | Beginning inventory | + | Materials purchased | – | Ending inventory |
|  | $116,920 | = | $2,520 | + | Materials purchased | – | $2,088 |
|  | Materials purchased | = | $116,488 | (= 116,920 – $2,520 + $2,088) | | | |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| d. | Gross margin % | = | | Gross margin | | | | | ÷ | | Sales revenue |
|  | 38% | = | | (Sales revenue – Cost of goods sold) | | | | | ÷ | | Sales revenue |
|  | 38% x Sales revenue | | | | | = | Sales revenue | | – | | Cost of goods sold |
|  | Cost of goods sold | | = | | Sales revenue | | | – | | (38% x Sales revenue) | |
|  | Cost of goods sold | | = | | Sales revenue | | | x | | (1 – 38%) | |
|  | Sales revenue | = | | Cost of goods sold | | | | | ÷ | | (100% – 38%) |
|  |  | = | | $595,200 (from a) | | | | | ÷ | | 62% |
|  |  |  | | $960,000 | | | | |  | |  |

1. (40 min.) Cost Allocation and Regulated Prices: The City of Imperial Falls.

a. The rate is 20 percent above the average cost of collection:

|  |  |  |
| --- | --- | --- |
| Total cost of collection | = | $400,000 + $1,280,000 + $320,000 |
|  | = | $2,000,000 |
| Total waste collected (tons) | = | 4,000 + 12,000 |
|  | = | 16,000 tons |
|  | = | 32,000,000 pounds |
| Average cost per pound | = | $2,000,000 ÷ 32,000,000 pounds |
|  | = | $.0625 per pound |
|  |  |  |
| Price per pound | = | $.0625 x 1.20 |
|  | = | $.075 per pound |

b.

First, allocate costs to the two cost objects: households and businesses:

Allocation of administrative costs and truck costs:

|  |  |  |
| --- | --- | --- |
| Total costs | = | $400,000 + $1,280,000 |
|  | = | $1,680,000 |
| Number of customers | = | 12,000 + 3,000 |
|  | = | 15,000 customers |
| Allocated cost per customer | = | $1,680,000 ÷ 15,000 customers |
|  | = | $112 per customer |

Allocation of other collection costs:

|  |  |  |
| --- | --- | --- |
| Total costs | = | $320,000 |
| Total waste collected (tons) | = | 4,000 + 12,000 |
|  | = | 16,000 tons |
| Allocated cost per ton of waste | = | $320,000 ÷ 16,000 tons |
|  | = | $20 per ton |

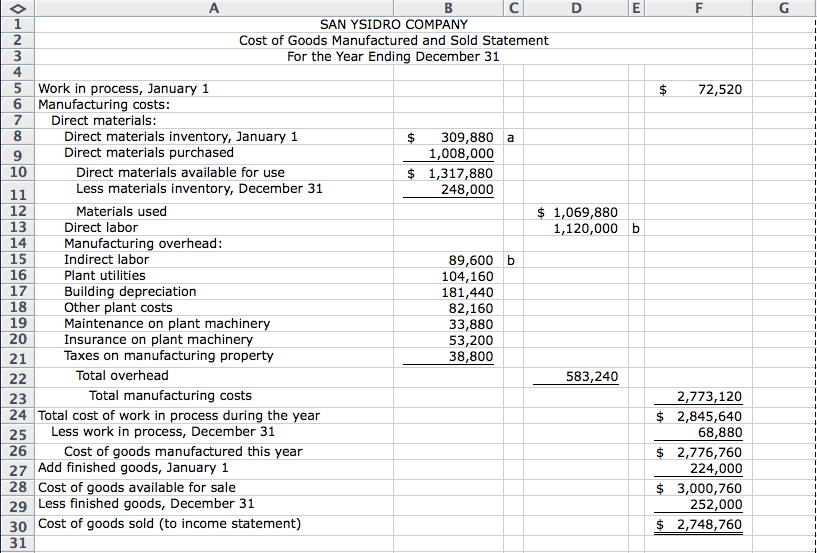
2-65. (continued)

Allocation to customer types:

|  |  |  |
| --- | --- | --- |
|  | Households | Business |
| Allocation of customer cost: |  |  |
| Allocated cost per customer | $112 | $112 |
| Number of customers | 12,000 | 3,000 |
| Allocated cost | $1,344,000 | $336,000 |
| Allocation of other costs: |  |  |
| Allocated cost per ton | $20 | $20 |
| Number of tons | 4,000 | 12,000 |
| Allocated cost | $80,000 | $240,000 |
|  |  |  |
| Total allocated cost | $1,424,000 | $576,000 |
| Total number of tons | 4,000 | 12,000 |
| Number of pounds | 8,000,000 | 24,000,000 |
| Average allocated cost per pound | $.1780 | $.0240 |
| Price (= 1.20 x average cost) | $.2136 | $.0288 |

c. Answers will vary. This problem illustrates that cost allocation can have an important effect on decisions when the allocated costs are used as if they are actual costs. In the current example, the proposed allocation approach allows the company to compete with other haulers for business customers because they maintain a monopoly on the household business.

1. (30 min.) Reconstruct Financial Statements: San Ysidro Company.



aMaterials used is given, but this number is not. To obtain it,

Beg. Bal. + Purchases = Mat. Used + End. Bal.

Beg. Bal. = Mat. Used + End. Bal. – Purchases

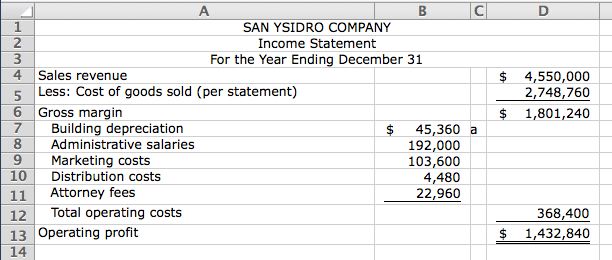
$309,880 = $1,069,880 + $248,000 – $1,008,000

bTotal labor = Indirect labor + Direct labor = $1,209,600 = 0.08 Direct labor + Direct labor

Direct labor = $1,209,600 ÷ 1.08 = $1,120,000

Indirect labor = 0.08 x $1,120,000 = $89,600

2-66 (continued)



a Total depreciation = Depreciation on plant + Depreciation on administrative building

portion

Depreciation on plant is 80% of the total depreciation, so total depreciation is,

= $181,440 ÷ 0.80

= $226,800

Depreciation on administrative portion = $226,800 x (1.0 – 0.8)

= $45,360.

1. (20 Min.) Finding Unknowns: Mary’s Mugs.

a. $2,812.50.

Direct materials cost per unit = Direct materials cost ÷ Units produced

= $6,000 ÷ 20,000 units = $0.30 per unit.

Direct materials used per mug = 0.4 pounds.

Direct materials cost per pound = $0.30 ÷ 0.4 pounds = $0.75 per pound.

Direct materials inventory = 3,750 pounds × $0.75 per pound = $2,812.50.

b. 2,750 units.

Finished goods inventory (in units)

= Finished goods inventory ÷ Manufacturing cost per unit.

Manufacturing cost per unit

= (Direct material + Direct labor + Indirect manufacturing cost) ÷ Units produced

= ($6,000 + $27,000 + $5,400 + $6,000) ÷ 20,000 = $44,400 ÷ 20,000

= $2.22 per unit.

Finished goods inventory (in units) December 31, Year 1 = $6,105 ÷ $2.22

= 2,750 units

c. $4.25.

Selling price per unit = Sales revenue ÷ Units sold

= Sales revenue ÷ (Units produced – units in ending finished goods inventory)

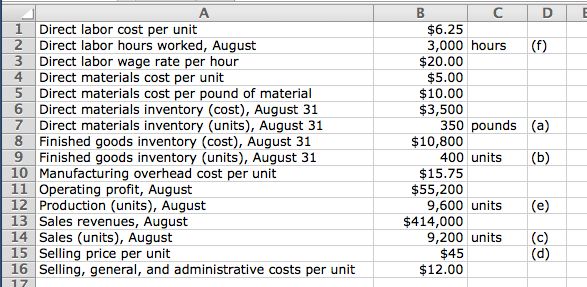
= $73,312 ÷ (20,000 – 2,750) = $73,312 ÷ 17,250 = $4.25.

d. $13,642.

Operating income for the year:

|  |  |  |
| --- | --- | --- |
| Sales revenue |  | $ 73,312 |
| Cost of goods sold (17,250 x $2.22) |  | 38,295 |
| Gross margin |  | $ 35,017 |
| Less marketing and administrative costs |  |  |
| Variable marketing and administrative costs | $3,375 |  |
| Fixed marketing and administrative costs | 18,000 | 21,375 |
| Operating profit |  | $ 13,642 |

1. (40 Min.) Finding Unknowns: BS&T Partners.

Note: This problem is challenging, because there is no indication of how to begin or the order in which to solve for the unknowns.

We begin by computing the following unit costs:

Manufacturing cost per unit = Direct materials + Direct labor + Manufacturing overhead

= $5.00 + $6.25 + $15.75 = $27.00

Full cost per unit = Manufacturing cost per unit + Selling, general & administrative

= $27.00 + $12.00 = $39.00

a. Direct material inventory (pounds) = Direct material inventory (cost) ÷ Cost per pound

= $3,500 ÷ $10.00 = 350 pounds.

b. Finished goods inventory, cost = (Finished goods inventory, units) ÷ (Manufacturing

cost per unit)

= $10,800 ÷ $27 = 400 units

2-68 (continued)

c. Full costs = Cost of goods sold + Selling, general, and administrative costs

Then,

Operating profit = Sales revenue – Cost of goods sold – Selling, general, and

administrative costs

= Sales revenue – Full costs

$55,200 = $414,000 – Full costs

Full costs = $414,000 — $55,200 = $358,800

Full costs = Units sold x Full cost per unit

$358,800 = Units sold x $39.00

Units sold = $358,800 ÷ $39.00

= 9,200 units sold

d. Sales revenue = Selling price per unit x Units sold

$414,000 = Selling price per unit x 9,200 units sold

Selling price per unit = $414,000 ÷ 9,200

= $45.00

e. Finished goods ending (units) = Finished goods beginning (units) + Units produced

– Units sold

400 = 0 + Units produced — 9,200

Units produced = 9,200 + 400 = 9,600

f. Direct labor cost incurred = Direct-labor hours worked x Wage rate per hour

Direct labor cost incurred = Units produced x Direct labor cost per unit

= 9,600 x $6.25 = $60,000

$60,000 = Direct-labor hours worked x $20.00

Direct-labor hours worked = $60,000 ÷ $20.00

= 3,000 direct-labor hours

Solutions to Integrative Case

1. (30 min.) Analyze the Impact of a Decision on Income Statements: Tunes2Go.

a. This year’s income statement:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Baseline  (Status Quo) | | |  | Rent Equipment |  | Difference | | |
| Sales revenue |  | $4,800,000 |  |  | $4,800,000 |  |  | 0 | |  |
| Operating costs: |  |  |  |  |  |  |  |  | |  |
| Variable |  | (600,000) |  |  | (600,000) |  |  | 0 | |  |
| Fixed (cash expenditures) |  | (2,250,000) |  |  | (2,250,000) |  |  | 0 | |  |
| Equipment depreciation |  | (450,000) |  |  | (450,000) |  |  | 0 | |  |
| Other depreciation |  | (375,000) |  |  | (375,000) |  |  | 0 | |  |
| Loss from equipment write-off |  | 0 |  |  | (2,550,000) | a |  | $2,550,000 | lower | | |
| Operating profit (before taxes) |  | $1,125,000 |  |  | $ (1,425,000) |  |  | $2,550,000 | lower | | |

a Equipment write-off = $3 million cost – $450,000 accumulated depreciation for one year (equipment was purchased on January 1 of the year).

b. Next year’s income statement:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Baseline (Status Quo) | | |  | Rent Equipment | |  | Difference | |
| Sales revenue |  | $4,800,000 |  |  | $5,136,000 | a |  | $336,000 | higher |
| Operating costs: |  |  |  |  |  |  |  |  |  |
| Equipment rental |  | 0 |  |  | (690,000) |  |  | 690,000 | higher |
| Variable |  | (600,000) |  |  | (600,000) |  |  | 0 |  |
| Fixed cash expenditures |  | (2,250,000) |  |  | (2,115,000) | b |  | 135,000 | lower |
| Equipment depreciation |  | (450,000) |  |  | 0 |  |  | 450,000 | lower |
| Other depreciation |  | (375,000) |  |  | (375,000) |  |  | 0 |  |
| Operating profit |  | $1,125,000 |  |  | $1,356,000 |  |  | $231,000 | higher |

a $5,136,000 = 1.07 × $4,800,000

b $2,115,000 = (1.00 – 0.06) × $2,250,000

c. Despite the effect on next year’s income statement, the company should not rent the new machine because net cash inflow as a result of installing the new machine ($336,000 + $135,000) does not cover cash outflow for equipment rental ($690,000).