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.

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.

A retailer does not typically have a Work-in-Process account, because it buys finished products and does not manufacture them. Therefore, nothing is “in-process.”

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| --- | --- |
| 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 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 nonvalue-added costs. Therefore, it differs in two ways from the gross margin income statement: classifying costs by behavior and highlighting value-added and nonvalue-added costs. It differs from the contribution margin income statement by highlighting the value-added and nonvalue-added costs.

A value income statement is useful to managers, because it provides information that is useful for them in identifying and eliminating nonvalue-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 2-19 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).

Based on the policies included in the Target financial statements, the costs in the distribution center will be included in the Cost of Goods Sold (product cost) and the costs incurred in the retail stores will be treated as period expenses. This would be consistent with the current treatment of other operating costs.

Most store cleaning costs associated with the virus (additional wipe downs, additional sanitary wipes dispensers, and so on) would be outlay costs. Enforcement of social distancing protocols such as limiting the number of customers in the store would lead to opportunity costs if customers decided to forgo purchases.



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.

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| 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.

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| a. | True. Cost accountants need to consider both types of costs regardless of financial treatment, because both affect firm value. |
| b. | False. Opportunity costs, such as lost sales or reduction in brand value because of poor quality control, tend to be more difficult to measure than outlay costs such as materials and labor. |
| c. | False. Cost accountants should be concerned with both, because both affect value. The fact that opportunity costs might not be observable or more difficult to measure does not mean that they should be ignored. |

1. (15 min.) Basic Concepts.

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

1. (10 min.) Basic Concepts.

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| --- | --- | --- |
| a. | Transportation-in costs for steel. | P |
| b. | Lease payments on the factory. | C |
| c. | Steel used in making the components | P |
| d. | Maintenance on the manufacturing machines. | C |
| e. | Machine operator wages. | B |

1. (15 min.) Basic Concepts.

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

1. (15 min.) Basic Concepts: Multiple Choice. Gregorie Tool & Die.

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| --- | --- | --- |
| a. | (2) | Variable cost per unit: $35 (= $15 + $12 + $3 + $5) |
| b. | (1) | Variable production cost per unit: $30 (= $15 + $12 + $3) |
| c. | (4) | Full cost per unit: $45 (= [$35 + ($250,000 ÷ 25,000 units)]) |
| d. | (3) | Full absorption cost per unit: $37 (= [$30 + ($175,000 ÷ 25,000 units)]) |
| e. | (3) | Prime cost per unit: $27 (= $15 + $12) |
| f. | (2) | Conversion cost per unit: $22 (= [$12 + $3 + ($175,000 ÷ 25,000 units)]) |
| g. | (2) | Contribution margin per unit: $20 (= $55 – variable cost per unit of $35) |
| h. | (2) | Gross margin per unit: $18 (= $55 – full absorption cost of $37) |

1. (15 min.) Basic Concepts: Multiple Choice. Alcoy Partners.

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| --- | --- | --- |
| a. | (3) | Variable cost per unit: $21 (= $9 + $3 + $6 + $3) |
| b. | (2) | Variable production cost per unit: $18 (= $9 + $3 + $6) |
| c. | (3) | Full cost per unit: $28 (= [$21 + ($980,000 ÷ 140,000 units)]) |
| d. | (3) | Full absorption cost per unit: $22 (= [$18 + ($560,000 ÷ 140,000 units)]) |
| e. | (2) | Prime cost per unit: $12 (= $9 + $3) |
| f. | (4) | Conversion cost per unit: $13 (= [$3 + $6 + ($560,000 ÷ 140,000 units)]) |
| g. | (3) | Contribution margin per unit: $13 (= $34 – variable cost per unit of $21) |
| h. | (2) | Gross margin per unit: $12 (= $34 – full absorption cost of $22) |

1. (15 min.) Basic Concepts.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Cost Item | Fixed (F) Variable (V) |  | Period (P) Product (M) |
| a. | Straight-line depreciation on corporate headquarters | F |  | P |
| b. | Plant manager’s salary | F |  | M |
| c. | Property taxes on land on which factory is located | F |  | M |
| d. | Factory supplies for cleaning assembly machines | V |  | M |
| e. | Freight costs for shipping products to customers | V |  | P |

1. (15 min.) Basic Concepts: Elmo Security Consultants.

|  |  |  |
| --- | --- | --- |
| a. | Variable review (production) cost per unit: ($250 + $40 + $10 + $20) | $320 |
| b. | Variable total cost per unit: ($320 + $30) | $350 |
| c. | Full cost per unit: [$350 + ($120,000 ÷ 2,500 units)] | $398 |
| d. | Full absorption cost per unit: [$320 + ($70,000 ÷ 2,500)] | $348 |
| e. | Prime cost per unit: (materials + labor + outsource) | $300 |
| f. | Conversion cost per unit: (labor + overhead + outsource) | $338 |
| g. | Contribution margin per unit: ($500 – $350) | $150 |
| h. | Gross margin per unit: ($500 – full absorption cost of $348) | $152 |
| i. | Suppose the number of units decreases to 2,000 reviews 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 2,000 units.  c. Full cost = $350 + ($120,000 ÷ 2,000) = $410  d. Full absorption cost = $320 + ($70,000 ÷ 2,000) = $355  f. Conversion costs = $250 + $40 + ($70,000 ÷ 2,000) + $20 = $345  h. Gross margin = $500 – $355 = $145 | c, d, f, and h will change, as follows |

1. (15 min.) Basic Concepts: Lillibridge & Friends, Inc.

|  |  |  |
| --- | --- | --- |
| a. | Prime cost per unit: (materials + labor) | $19 |
| b. | Contribution margin per unit: ($50 – $8 – $11 – $9 – $5) | $17 |
| c. | Gross margin per unit: ($50 – full absorption cost of $37) | $13 |
| d. | Conversion cost per unit: (labor + overhead) | $26 |
| e. | Variable cost per unit: ($8 + $11 + $9 + $5) | $33 |
| f. | Full absorption cost per unit: [$28 + ($4,500,000 ÷ 500,000)] | $37 |
| g. | Variable production cost per unit: ($8 + $11 + $9) | $28 |
| h. | Full cost per unit: [$33 + ($6,000,000 ÷ 500,000 units)] | $45 |
| i. | Suppose the number of units increase to 600,000 units per quarter, 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 600,000 units.  c. Gross margin = $50.00 – $35.50 = $14.50  d. Conversion costs = $8 + $9 + ($4,500,000 ÷ 600,000) = $24.50  f. Full absorption cost = $28 + ($4,500,000 ÷ 600,000) = $35.50  h. Full cost = $33 + ($6,000,000 ÷ 600,000) = $43.00 | 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 the manager that you cannot agree with the allocation basis, especially given the reason for selecting the basis. If this fails to persuade the manager, you should disclose to the manager’s supervisor at corporate headquarters your disagreement with the analysis and the relation between the manager and the pastry vendor.

1. (30 min.) Prepare Statements for a Manufacturing Company: Greusel Fabrication.

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| --- | --- | --- | --- | --- | --- | --- | --- |
| Greusel Fabrication Cost of Goods Sold Statement For the Month Ended March 31 | | | | | | | |
| Beginning work in process inventory |  |  |  | |  | $ 62,000 |  |
| Manufacturing costs: |  |  |  | |  |  |  |
| Direct materials: |  |  |  | |  |  |  |
| Beginning inventory | $36,000 |  | |  |  |  |  |
| Purchases | 530,000 | (a)\* | |  |  |  |  |
| Materials available | $566,000 |  | |  |  |  |  |
| Less ending inventory | 41,000 |  | |  |  |  |  |
| Direct materials used (given) |  |  | | $525,000 |  |  |  |
| Other manufacturing costs |  |  | | 910,900 | \*\* |  |  |
| Total manufacturing costs |  |  | |  |  | 1,435,900 | (c) |
| Total costs of work in process |  |  | |  |  | $1,497,900 |  |
| Less ending work in process |  |  | |  |  | 66,200 |  |
| Cost of goods manufactured |  |  | |  |  | $1,431,700 | (b) |
| Beginning finished goods inventory |  |  | |  |  | 42,500 |  |
| Finished goods available for sale |  |  |  | |  | $1,474,200 |  |
| Ending finished goods inventory |  |  |  | |  | 38,200 |  |
| Cost of goods sold (given) |  |  |  | |  | $1,436,000 |  |

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

\*\* Difference between total manufacturing costs of $1,435,900 and direct materials used of $525,000.

1. (30 min.) Prepare Statements for a Manufacturing Company: Birwood Furniture.

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| Birwood Furniture Cost of Goods Sold Statement For the Year Ended December 31  ($000) | | | | | | | |
| Beginning work in process inventory |  |  |  | |  | $1,154 |  |
| Manufacturing costs: |  |  |  | |  |  |  |
| Direct materials: |  |  |  | |  |  |  |
| Beginning inventory | $712 |  | |  |  |  |  |
| Purchases | 1,168 | (a)\* | |  |  |  |  |
| Materials available | $1,880 |  | |  |  |  |  |
| Less ending inventory | 784 |  | |  |  |  |  |
| Direct materials used (given) |  |  | | $1,096 |  |  |  |
| Other manufacturing costs |  |  | | 483 | \*\* |  |  |
| Total manufacturing costs |  |  | |  |  | 1,579 | (c) |
| Total costs of work in process |  |  | |  |  | $2,733 |  |
| Less ending work in process |  |  | |  |  | 1,330 |  |
| Cost of goods manufactured |  |  | |  |  | $1,403 | (b) |
| Beginning finished goods inventory |  |  | |  |  | 139 |  |
| Finished goods available for sale |  |  |  | |  | $1,542 |  |
| Ending finished goods inventory |  |  |  | |  | 264 |  |
| Cost of goods sold (given) |  |  |  | |  | $1,278 |  |

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

\*\* Difference between total manufacturing costs of $1,579,000 and direct materials used of $1,096,000.

1. (15 min.) Prepare Statements for a Service Company: Harbor Island Investments.

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1. (15 min.)  Prepare Statements for a Service Company: Tuscola Counseling Services.

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1. (10 min.) Prepare Statements for a Service Company: Gray Services.

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| Sales revenue | $1,640,000 | (Given) |
| Cost of services sold (b) | 1,005,000 | (Sales revenue – gross margin) |
| Gross margin | $635,000 | (Given) |
| Marketing and administrative  costs (a) | 395,000 | (Gross margin – operating profit) |
| Operating profit | $240,000 | (Given) |

1. (20 min.)  Prepare Statements for a Service Company: Sheffield Advisors.

You can solve this in the order shown below.

|  |  |  |
| --- | --- | --- |
| Sheffield Advisors Income Statement  For the Month Ended October 31 | | |
| Sales revenue | $840,000 | a |
| Cost of services sold | 504,000 | c |
| Gross margin | $336,000 | d |
| Marketing and administrative costs | 151,200 | e |
| Operating profit ($840,000 x 22%) | $184,800 | b |

a. Given

b. $184,800 = 22% x $840,000.

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 $655,200 (= $840,000 – $184,800). But, marketing and administrative costs equal 30% of cost of services sold, so,

Cost of services sold + marketing and administrative costs = $655,200 and

Marketing and adminstrative costs = .30 x Cost of services sold.

Combining these equations yields,

1.30 x Cost of services sold = $655,200

or cost of services sold = $504,000 (= $655,200 ÷ 1.30).

d. $336,000 = $840,000 – $504,000.

e. $151,200 = 30% x $504,000.

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Santa Maria Parts Cost of Goods Sold Statement For the Quarter Ended September 30 | | | | | | |
| Beginning work-in-process inventory |  |  |  |  | $  69,600 |  |
| Manufacturing costs: |  |  |  |  |  |  |
| Direct materials: |  |  |  |  |  |  |
| Beginning inventory | $ 76,800 |  |  |  |  |  |
| Purchases (given) | 480,000 |  |  |  |  |  |
| Materials available | $556,800 |  |  |  |  |  |
| Less ending inventory | 94,400 |  |  |  |  |  |
| Direct materials used |  |  | $ 462,400 | (a)\* |  |  |
| Other manufacturing costs |  |  | 1,239,200 | \*\* |  |  |
| Total manufacturing costs |  |  |  |  | 1,701,600 | (c) |
| Total costs of work in process |  |  |  |  | $1,771,200 |  |
| Less ending work in process |  |  |  |  | 37,200 |  |
| Cost of goods manufactured |  |  |  |  | $1,734,000 | (b) |
| Beginning finished goods inventory |  |  |  |  | 78,000 |  |
| Finished goods available for sale |  |  |  |  | $1,812,000 |  |
| Ending finished goods inventory |  |  |  |  | 72,000 |  |
| Cost of goods sold (given) |  |  |  |  | $1,740,000 |  |

\* 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: Bonita Components.

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| a. | From the basic inventory equation,  Beginning Inventory + Transferred in  = Transferred out + Ending Inventory, so  Beginning Materials Inventory, May 1,  = Transferred out + Ending balance – Transferred in  = $22,000 + $3,900 − $25,000 | = $900 |
| b. | Total manufacturing costs = Cost of goods manufactured  – Beginning work-in-process + Ending work-in-process  = $87,000 – $4,000 + $5,200  (also can be found solving for Transferred in to Finished Goods) | = $88,200 |
| c. | Gross margin = Sales revenue – Cost of Goods Sold  = $108,000 – $85,000 | = $23,000 |
| d. | Total manufacturing costs = Direct materials + Direct labor  + Manufacturing overhead, so,  Direct labor = Total manufacturing costs  – Direct materials used – Manufacturing overhead,  = $88,200 – $22,000 – $20,500 | = $45,700 |

1. (25 min.)  Basic Concepts: Sterritt Co.

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| --- | --- | --- |
| a. | From the basic inventory equation,  Beginning materials inventory + Purchases of direct  materials = Ending direct materials inventory + Direct  materials used  Direct materials used = Beginning materials inventory +  Direct materials purchases – Ending materials  inventory  = $205 + $565 – $213 | = $557 |
| b. | Gross margin = Sales revenue – Cost of goods sold  = $5,050 – $3,250 | = $1,800 |
| c. | Total manufacturing costs = Direct materials used + Direct  labor + Manufacturing overhead  = $557 (from *a* above) + $1,170 + $680 | = $2,407 |
| d. | From the basic inventory equation,  Beginning work-in-process inventory + Total manufacturing cost  = Ending work-in-process inventory + Cost of goods  manufactured, so  Beginning work-in-process inventory, July 1,  = Ending balance, June 30 + Cost of goods manufactured – Total manufacturing cost  = $51 + $2,800 – $2,407 | = $444 |

1. (15 min.) Prepare Statements for a Retailing Company: Sunset Fashions.

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| --- | --- | --- | --- | --- | --- |
| Sunset Fashions  Income Statement  For the Quarter Ended June 30 | | | | | |
| Sales revenue | | |  | $2,970,000 | |
| Cost of goods sold (see statement below) | | |  | 1,861,500 | |
| Gross margin | | |  | $1,108,500 | |
| Marketing and administrative costs  ($208,000 + $21,000 + $132,000 + $47,000 + $55,500 + $710,000) | | |  | 1,173,500 | |
| Operating profit (loss) | | |  | ($ 65,000) | |
| Sunset Fashions  Cost of Goods Sold Statement  For the Quarter Ended June 30 | | | | |
| Merchandise inventory, April 1 |  |  | $ 49,000 | |
| Merchandise purchases | $1,730,000 |  |  | |
| Transportation-in | 122,000 |  |  | |
| Total cost of goods purchased |  |  | 1,852,000 | |
| Cost of goods available for sale |  |  | $1,901,000 | |
| Merchandise inventory, June 30 |  |  | 39,500 | |
| Cost of goods sold |  |  | $1,861,500 | |

1. (15 min.) Prepare Statements for a Retailing Company: Norwood Stationary.

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| --- | --- | --- | --- | --- | --- |
| Norwood Stationary Income Statement  For the Month Ended October 31  ($000) | | | | | |
| Sales revenue | | |  | $526.7 | |
| Cost of goods sold (see statement below) | | |  | 297.2 | |
| Gross margin | | |  | $229.5 | |
| Selling, general, and administrative costs  ($16.3 + $58.0 + $10.8 + $23.5 + $4.2 + $13.4) | | |  | 126.2 | |
| Operating profit (loss) | | |  | $103.3 | |
| Norwood Stationary Cost of Goods Sold Statement  For the Month Ended October 31  ($000) | | | | |
| Merchandise inventory, October 1 |  |  | $ 16.2 | |
| Merchandise purchases | $291.3 |  |  | |
| Transportation-in | 9.8 |  |  | |
| Total cost of goods purchased |  |  | 301.1 | |
| Cost of goods available for sale |  |  | $317.3 | |
| Merchandise inventory, October 31 |  |  | 20.1 | |
| Cost of goods sold |  |  | $297.2 | |

1. (15 min.) Cost Behavior for Forecasting: Trumball Catering.

The variable costs will be 20 percent higher because there will be an increase of 4,800 – 4,000 = 800 meals (20% = 800 ÷ 4,000).

|  |  |  |  |
| --- | --- | --- | --- |
| Variable costs: | |  | |
| Ingredients used ($10,200 × 1.2) | | $12,240 | |
| Direct labor ($22,500 × 1.2) | | 27,000 | |
| Indirect materials and supplies ($9,300 × 1.2) | | 11,160 | |
| Utilities ($3,600 × 1.2) | | 4,320 | |
| Truck fuel and other variable expenses ($6,200 x 1.2) | | 7,440 | |
| Total variable costs | | $62,160 | |
| Fixed costs: | |  | |
| Managers’ salaries | | $28,700 | |
| Rent | | 14,200 | |
| Depreciation on equipment | | 7,600 | |
| Miscellaneous fixed costs | | 3,500 | |
| Total fixed costs | | 54,000 | |
| Total costs for 4,800 units | | $116,160 | |
| Unit costs (= $116,160 ÷ 4,800) | | $24.20 | |

Note that the variable cost per unit is $12.95 at both 4,000 units and at 4,800 units.

Total variable cost at 4,000 units is $51,800 (= $10,200 + $22,500 + $9,300+ $3,600 +

$6,200).

Unit variable cost = $12.95 per unit = ($62,160 4,800 units) or ($51,800 ÷ 4,000 units).

1. (15 min.) Cost Behavior for Forecasting: Otsego Industries.

The variable costs will be 15 percent lower, because there will be a decrease of 300,000 – 255,000 = 45,000 units (15% = 45,000 ÷ 300,000).

|  |  |  |  |
| --- | --- | --- | --- |
| Variable costs ($000): | |  | |
| Direct materials used ($6,120 × .85) | | $ 5,202.0 | |
| Direct labor ($4,060 × .85) | | 3,451.0 | |
| Indirect materials and supplies ($1,420 × .85) | | 1,207.0 | |
| Power to run plant equipment ($1,300 × .85) | | 1,105.0 | |
| Total variable costs | | $10,965.0 | |
| Fixed costs ($000): | |  | |
| Supervisory salaries | | $ 560.0 | |
| Plant utilities (other than power to run plant equipment) | | 851.7 | |
| Depreciation on plant and equipment | | 1,335.0 | |
| Property taxes on building | | 568.3 | |
| Total fixed costs | | 3,315.0 | |
| Total costs for 36,000 units | | $14,280.0 | |
| Unit costs (= $14,280,000 ÷ 255,000) | | $56 | |

Note that the variable cost per unit is $43 at both 300,000 units and at 255,000 units.

Total variable cost at 300,000 units is $12,900,000 (= $6,120,000 + $4,060,000 + $1,420,000 + $1,300,000).

Unit variable cost = $43 per unit = ($12,900,000 300,000 units) or ($10,965,000 ÷ 255,000 units).

1. (15 min.) Cost Behavior for Forecasting: Trumball Catering.

The variable costs will be 30 percent higher because there will be a 30 percent increase in the number of meals to 5,200 (= 1.30 × 4,000). This also means an additional part-time manager.

|  |  |  |  |
| --- | --- | --- | --- |
| Variable costs: | |  | |
| Ingredients used ($10,200 × 1.30) | | $13,260 | |
| Direct labor ($22,500 × 1.30) | | 29,250 | |
| Indirect materials and supplies ($9,300 × 1.30) | | 12,090 | |
| Utilities ($3,600 × 1.30) | | 4,680 | |
| Depreciation on trucks and equipment ($6,200 x 1.30) | | 8,060 | |
| Total variable costs | | $67,340 | |
| Fixed costs: | |  | |
| Managers’ salaries ($28,700 + $3,195) | | $31,895 | |
| Rent | | 14,200 | |
| Depreciation on equipment | | 7,600 | |
| Miscellaneous fixed costs ($3,500 × 1.15) | | 4,025 | |
| Total fixed costs | | 57,720 | |
| Total costs for 5,750 units | | $125,060 | |
| Unit costs (= $125,060 ÷ 5,200) | | $24.05 | |

Note that the variable cost per unit is $12.95 at both 5,200 units and at 4,000 units.

Total variable cost at 4,000 units is $51,800 (= $10,200 + $22,500 + $9,300+ $3,600 +

$6,200).

Unit variable cost = $12.95 per unit = ($67,340 5,200 units) or ($51,800 ÷ 4,000 units).

1. A close up of a map

   Description automatically generated(30 min.) Components of Full Costs: Acacia Manufacturing.

A close up of a map

Description automatically generated

|  |  |
| --- | --- |
| a. | Variable manufacturing cost: $13.00 + $9.00 + $3.00= $25.00 |
| b. | Variable cost: $13.00 + $9.00 + $3.00 + $2.00 = $27.00 |
| c. | Full absorption cost: $13.00 + $9.00 + $3.00 + ($8,400 ÷ 21,000 units) = $25.40 |
| d. | Full cost: $13.00 + $9.00 + $3.00 + $2.00 + ($8,400 ÷ 21,000 units) + ($23,100 ÷ 21,000 units) = $28.50 |

1. (15 min.) Components of Full Costs: Acacia Manufacturing.

|  |  |
| --- | --- |
| a. | Product cost = Direct materials + Direct labor + Manufacturing overhead. |
|  | Product cost per unit: $13.00 + $9.00 + $3.00 + ($8,400 ÷ 21,000 units) = $25.40 |
|  |  |
| b. | Period costs = Marketing and administrative costs. |
|  | Period costs for the period: $23,100 + ($2 x 21,000 units) = $65,100 |

1. (30 min.) Components of Full Cost: Wesson Company.

A close up of a piece of paper

Description automatically generated

a. Variable cost: $96 + $54 + $37 + $4 = $191

b. Variable manufacturing cost: $96 + $54 + $37 = $187

c. Full-absorption cost: $96 + $54 + $37 + ($2,340,000 ÷ 45,000 units) = $239

2-56. (continued)

d. Full cost: $96 + $54 + $37 + ($2,340,000 ÷ 45,000 units) + $4.00 + ($270,000 ÷ 45,000 units) = $249

e. Profit margin = Sales price – full cost = $325 – $249 = $76

f. Gross margin = Sales price – full absorption cost = $325 – $239 = $86

g. Contribution margin = Sales price – variable cost = $325 – $191 = $134

1. (20 Min.)  Gross Margin and Contribution Margin Income Statements: The Ralston Company.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | |  |  | |
| Gross Margin Income Statement | |  | Contribution Margin Income Statement | |
| Sales revenue | $369,600 |  | Sales revenue | $369,600 |
| Variable manufacturing costsa | 166,600 |  | Variable manufacturing costs | 166,600 |
| Fixed manufacturing costs | 61,600 |  | Variable marketing and administrative costs | 19,500 |
| Gross margin | $141,400 |  | Contribution margin | $183,500 |
| Variable marketing and administrative costs | 19,500 |  | Fixed manufacturing costs | 61,600 |
| Fixed marketing and administrative costs | 46,700 |  | Fixed marketing and administrative costs | 46,700 |
| Operating profit | $75,200 |  | Operating profit | $75,200 |

a Variable manufacturing costs = $95,200 + $47,600 + $23,800 = $166,600

1. (20 Min.)  Gross Margin and Contribution Margin Income Statements: Wesson Company.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  | | | |
| Gross Margin Income Statement | | |  | Contribution Margin Income Statement | |
| Sales revenue(a) | $14,625,000 | |  | Sales revenue | $14,625,000 |
| Variable manufacturing costs (b) | 8,415,000 | |  | Variable manufacturing costs | 8,415,000 |
| Fixed manufacturing overhead costs | 2,340,000 | |  | Variable marketing and administrative costs | 180,000 |
| Gross margin | $3,870,000 | |  | Contribution margin | $6,030,000 |
| Variable marketing and administrative costs (c) | 180,000 | |  | Fixed manufacturing overhead costs | 2,340,000 |
| Fixed marketing and administrative costs | 270,000 | |  | Fixed marketing and administrative costs | 270,000 |
| Operating profit | $3,420,000 | |  | Operating profit | $3,420,000 |

(a) $325 x 45,000 units = $14,625,000

(b) $187 x 45,000 units = $8,415,000; $187 = ($96 direct material + $54 direct labor + $37 variable manufacturing overhead).

(c) $4 x 45,000 units = $180,000

1. (20 Min.)  Gross Margin and Contribution Margin Income Statements: Tracey Packaged Snax.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gross Margin Income Statement | |  | Contribution Margin Income Statement | |
| Sales revenuea | $992,000 |  | Sales revenue | $992,000 |
| Variable manufacturing costsb | 448,000 |  | Variable manufacturing costs | 448,000 |
| Fixed manufacturing overhead costsc | 288,000 |  | Variable marketing and administrative costs | 32,000 |
| Gross margin | $256,000 |  | Contribution margin | $512,000 |
| Variable marketing and administrative costsd | 32,000 |  | Fixed manufacturing overhead costs | 288,000 |
| Fixed marketing and administrative costse | 160,000 |  | Fixed marketing and administrative costs | 160,000 |
| Operating profit | $64,000 |  | Operating profit | $64,000 |

a Revenue = $3.10 x 320,000 = $992,000

b Variable manufacturing costs = ($1.00 + $0.25 + $0.15) x 320,000 = $448,000

c Fixed manufacturing overhead costs = $0.90 x 320,000 = $288,000

d Variable marketing and administrative costs = $0.10 x 320,000 = $32,000

e Fixed marketing and administrative costs = $0.50 x 320,000 = $160,000

1. (20 min.) Value Income Statement: Coastal Bistro.

a.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Coastal Bistro  Value Income Statement For the month ending July 31 | | | | | | | |
|  | Nonvalue-added activities | | |  | Value-added activities |  | Total |
| Sales revenue |  | |  |  | $125,000 |  | $125,000 |
| Cost of merchandise |  | |  |  |  |  |  |
| Cost of food serveda | 9,900 | |  |  | 35,100 |  | 45,000 |
| Gross margin | $(9,900) | |  |  | $89,900 |  | $80,000 |
| Operating expenses |  | |  |  |  |  |  |
| Employee salaries and wagesb | 4,160 | |  |  | 27,840 |  | 32,000 |
| Managers’ salariesc | 2,100 | |  |  | 11,900 |  | 14,000 |
| Building costsd | | 5,400 |  |  | 12,600 |  | 18,000 |
| Operating income (loss) | $(21,560) | |  |  | $37,560 |  | $16,000 |

a 22% nonvalue-added activities (= 10% not used + 12% incorrectly prepared)

b 13% nonvalue-added activities

c 15% nonvalue-added activities

d 30% unused and nonvalue-added activities

b. The information in the value income statement enables managers at Coastal Bistro to identify nonvalue-added activities. They could eliminate such activities without reducing value to customers. For example. they can take steps to ensure that food is used prior to the expiration date, either by changing scheduling or purchasing procedures. They can also spend time training staff to take orders more carefully. Preparing a monthly statement helps the managers see whether the restaurant is improving in reducing nonvalue-added activities.

1. (30 min.) Value Income Statement: Baubee Meal Delivery Service.

a.

A screenshot of a cell phone

Description automatically generated

b. The information in the value income statement enables the managers at BMDS 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 the fourth quarter (and beyond), they can see how BMDS is improving (or becoming worse) in reducing nonvalue-added activities.

Solutions to Problems

1. (30 min.) Cost Concepts: Roland Industries

a.

Prime costs = direct materials + direct labor

|  |  |  |  |
| --- | --- | --- | --- |
|  | Direct materials | = | beginning inventory + purchases – ending inventory |
|  |  | = | $20,700 + $271,500 – $17,100 |
|  |  | = | $275,100 |

Direct labor is given as $202,000

|  |  |  |  |
| --- | --- | --- | --- |
|  | Prime costs | = | $275,100 + $202,000 |
|  |  | = | $477,100 |

b.

Conversion costs = Direct labor + Manufacturing overhead

Conversion costs = $202,000 + $293,000 = $495,000

c.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Total manufacturing costs | = | Direct materials + Direct labor + Manufacturing overhead |
|  |  | = | $275,100 (from *a* above) + $202,000 + $293,000 |
|  |  | = | $770,100 |

d.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Cost of goods  manufactured | = | Beginning Work-in-Process + Total manufacturing costs  – Ending Work-in-Process |
|  |  | = | $11,700 + $770,100 (from *c* above) – $8,900 |
|  |  | = | $772,900 |

e.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Cost of  Goods  Sold | = | Cost of  Goods Manufactured | + | Beginning Finished Goods Inventory | – | Ending Finished Goods Inventory |
|  |  | = | $772,900 | + | $61,000 | – | $80,400 |
|  |  |  | (from *d* above) |  |  |  |  |
|  |  | = | $753,500 |  |  |  |  |

1. (30 Minutes) Cost Concepts: Bethune Chemicals.

a. $276,600.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Prime costs | = | Direct materials used + Direct labor costs |
|  | Direct materials used | = | Prime costs – Direct labor costs |
|  |  | = | $460,600 – $184,000 |
|  |  | = | $276,600 |

b. $59,400.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Direct materials used | = | Beginning inventory + purchases – ending inventory |
|  | Direct materials, beginning inventory | = | Direct materials used – purchases + ending inventory |
|  |  |  | $276,600 – $263,200 + $46,000 |
|  |  | = | $59,400 |

c. $577,800.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Total manufacturing costs | = | Prime costs + Conversion costs – Direct labor cost |
|  | Conversion cost | = | Total manufacturing costs – Prime costs + Direct labor cost |
|  |  | = | $854,400 – $460,600 + $184,000 |
|  |  | = | $577,800 OR  = Total manufacturing costs – Direct materials used  = $854,400 - $276,600  = $577,800 |

d. $28,600.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Work-in-process, ending | = | Work-in-process, beginning + Total manufacturing costs – Cost of goods manufactured |
|  |  |  | $20,200 + $854,400 – $846,000 |
|  |  | = | $28,600 |

e. $393,800.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Conversion cost | = | Direct labor costs + Manufacturing overhead |
|  | Manufacturing overhead | = | Conversion costs – Direct labor costs |
|  |  | = | $577,800 – $184,000 |
|  |  | = | $393,800 |

2-63. (continued)

f. $51,800.

|  |  |  |  |
| --- | --- | --- | --- |
|  | 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 |
|  |  |  | $667,400 – $846,000 + $230,400 |
|  |  | = | $51,800 |

1. (30 minutes) Cost Concepts: Loretto Audio.

a. Amounts per unit:

(1) $267.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Variable manufacturing cost | = | Manufacturing overhead + Direct labor + Direct materials |
|  |  | = | $86 + $44 + $137 |
|  |  | = | $267 |

(2) $478.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Full unit cost | = | All unit fixed costs + All unit variable costs |
|  |  |  | Unit fixed manufacturing = ($62,250 ÷ 750 units) = $83 |
|  |  |  | Unit fixed marketing and administrative cost = ($83,250 ÷ 750 units) = $111 |
|  |  | = | $83 + $111 + $44 + $137 + $86 + $17 |
|  |  | = | $478 |

(3) $284.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Variable cost | = | All variable unit costs |
|  |  | = | $17 + $86 + $44 + $137 |
|  |  | = | $284 |

(4) $350.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Full absorption cost | = | Fixed and variable manufacturing overhead + Direct labor + direct materials |
|  |  | = | $83 + $86 + $44 + $137 |
|  |  | = | $350 |

(5) $181.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Prime cost | = | Direct labor + Direct materials |
|  |  | = | $44 + $137 |
|  |  | = | $181 |

2-64. (continued)

(6) $213.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Conversion cost | = | Direct labor + Manufacturing overhead |
|  |  | = | $44 + ($86 + $83) |
|  |  | = | $213 |

(7) $217.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Profit margin | = | Sales price – Full cost |
|  |  | = | $695 – $478 |
|  |  | = | $217 |

(8) $217.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Contribution margin | = | Sales price – Variable costs |
|  |  | = | $695 – $284 |
|  |  | = | $411 |

(9) $345.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Gross margin | = | Sales price – Full absorption cost |
|  |  | = | $695 – $350 |
|  |  | = | $345 |

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 Loretto should produce more units. That decision should be based on the *total* profits (revenues minus costs), not on *unit* profits. In addition, of course, if there is no demand for the additional products, the company will incur more costs, but not earn any additional revenue.

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| East Ferry Tool & Die Statement of Cost of Goods Sold For the Year Ended December 31  ($000) | | | | | |
| Work in process, Jan. 1 |  |  |  |  | $  56 |
| Manufacturing costs: |  |  |  |  |  |
| Direct materials: |  |  |  |  |  |
| Beginning inventory, Jan. 1 | $  47 |  |  |  |  |
| Add material purchases | 4,674 |  |  |  |  |
| Direct materials available | 4,721 |  |  |  |  |
| Less ending inventory, Dec. 31 | 54 |  |  |  |  |
| Direct materials used |  |  | $4,667 |  |  |
| Direct labor |  |  | 3,546 |  |  |
| Manufacturing overhead: |  |  |  |  |  |
| Indirect plant labor | 1,558 |  |  |  |  |
| Indirect plant supplies | 652 |  |  |  |  |
| Machine depreciation | 3,951 |  |  |  |  |
| Plant depreciation | 1,235 |  |  |  |  |
| Plant supervision | 956 |  |  |  |  |
| Plant utilities | 633 |  |  |  |  |
| Property taxes on plant and equipment | 281 |  |  |  |  |
| Total manufacturing overhead |  |  | 9,266 |  |  |
| Total manufacturing costs |  |  |  |  | 17,479 |
| Total cost of work in process during the year |  |  |  |  | 17,535 |
| Less work in process, Dec. 31 |  |  |  |  | 49 |
| Costs of goods manufactured during the year |  |  |  |  | 17,486 |
| Beginning finished goods, Jan. 1 |  |  |  |  | 624 |
| Finished goods inventory available for sale |  |  |  |  | 18,110 |
| Less ending finished goods inventory, Dec. 31 |  |  |  |  | 643 |
| Cost of goods sold |  |  |  |  | $17,467 |

2-65. (continued)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| East Ferry Tool & Die Income Statement For the Year Ended December 31  ($000) | | | | |
| Sales revenue |  |  | $20,234 |
| Less: Cost of goods sold |  |  | 17,467 |
| Gross margin |  |  | $2,767 |
| Administrative costs | $1,540 |  |  |
| Marketing costs | 984 |  |  |
| Total marketing and administrative costs |  |  | 2,524 |
| Operating profit |  |  | $ 243 |

1. (30 min.) Prepare Statements for a Manufacturing Company: Mount Elliott Fixtures.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Mount Elliott Fixtures Statement of Cost of Goods Sold For the Year Ended December 31  ($000) | | | | | |
| Work in process, Jan. 1 |  |  |  |  | $  210 |
| Manufacturing costs: |  |  |  |  |  |
| Direct materials: |  |  |  |  |  |
| Beginning inventory, Jan. 1 | $  154 |  |  |  |  |
| Add materials purchases | 14,030 |  |  |  |  |
| Direct materials available | $14,184 |  |  |  |  |
| Less ending inventory, Dec. 31 | 172 |  |  |  |  |
| Direct materials used |  |  | $14,012 |  |  |
| Direct labor |  |  | 20,137 |  |  |
| Manufacturing overhead: |  |  |  |  |  |
| Depreciation (Factory) | 8,002 |  |  |  |  |
| Depreciation (Factory machines) | 14,112 |  |  |  |  |
| Indirect labor (Factory) | 4,981 |  |  |  |  |
| Indirect materials (Factory) | 1,421 |  |  |  |  |
| Property taxes (Factory) | 528 |  |  |  |  |
| Utilities (Factory) | 1,499 |  |  |  |  |
| Total manufacturing overhead |  |  | 30,543 |  |  |
| Total manufacturing costs |  |  |  |  | 64,692 |
| Total cost of work in process during the year |  |  |  |  | $64,902 |
| Less work in process, Dec. 31 |  |  |  |  | 184 |
| Costs of goods manufactured during the year |  |  |  |  | $64,718 |
| Beginning finished goods, Jan. 1 |  |  |  |  | 2,918 |
| Finished goods inventory available for sale |  |  |  |  | $67,636 |
| Less ending finished goods inventory, Dec. 31 |  |  |  |  | 3,265 |
| Cost of goods sold |  |  |  |  | $64,371 |

2-66. (continued)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Mount Elliott Fixtures Income Statement For the Year Ended December 31  ($000) | | | | |
| Sales revenue |  |  | $70,897 |
| Less: Cost of goods sold |  |  | 64,371 |
| Gross margin |  |  | $ 6,526 |
| Administrative costs | $6,891 |  |  |
| Depreciation (Corporate building) | 654 |  |  |
| Property taxes (Corporate building) | 142 |  |  |
| Selling costs | 3,211 |  |  |
| Total marketing and administrative costs |  |  | 10,898 |
| Operating profit (loss) |  |  | ($4,372) |

1. (30 min.) Prepare Statements for a Manufacturing Company: Alwar Brothers.

.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Alwar Brothers Statement of Cost of Goods Sold For the Year Ended December 31  ($ 000) | | | | | |
| Beginning work in process, Jan. 1 |  |  |  |  | $  16.1 | |
| Manufacturing costs: |  |  |  |  |  | |
| Direct materials: |  |  |  |  |  | |
| Beginning inventory, Jan. 1 | $  10.2 |  |  |  |  | |
| Add: Purchases | 2,058.0 |  |  |  |  | |
| Direct materials available | $2,068.2 |  |  |  |  | |
| Less ending inventory, Dec. 31 | 13.1 |  |  |  |  | |
| Direct materials used |  |  | $2,055.1 |  |  | |
| Direct labor |  |  | 511.0 |  |  | |
| Manufacturing overhead: |  |  |  |  |  | |
| Utilities (80% of $810.0) | 648.0 |  |  |  |  | |
| Indirect factory labor | 566.0 |  |  |  |  | |
| Depreciation (85% of $480.0) | 408.0 |  |  |  |  | |
| Property taxes (60% of 470) | 282.0 |  |  |  |  | |
| Factory supplies | 415.0 |  |  |  |  | |
| Factory supervision | 311.0 |  |  |  |  | |
| Total manufacturing overhead |  |  | $2,630.0 |  |  | |
| Total manufacturing costs |  |  |  |  | $5,196.1 | |
| Total cost of work in process during the year |  |  |  |  | $5,212.2 | |
| Less work in process, Dec. 31 |  |  |  |  | 14.2 | |
| Costs of goods manufactured during the year |  |  |  |  | $5,198.0 | |
| Beginning finished goods, Jan. 1 |  |  |  |  | 41.0 | |
| Finished goods available for sale |  |  |  |  | $5,239.0 | |
| Less ending finished goods, Dec. 31 |  |  |  |  | 46.0 | |
| Cost of goods sold |  |  |  |  | $5,193.0 | |

2-67. (continued)

|  |  |  |  |
| --- | --- | --- | --- |
| Alwar Brothers Income Statement For the Year Ended December 31  ($ 000) | | | |
| Sales revenue |  |  | $7,985.0 |
| Less: Cost of goods sold (per statement) |  |  | 5,193.0 |
| Gross profit |  |  | $2,792.0 |
| Marketing and administrative costs: |  |  |  |
| Administrative costs | $976.0 |  |  |
| Utilities (20% of $810.0) | 162.0 |  |  |
| Marketing costs | 532.0 |  |  |
| Depreciation (15% of $480.0) | 72.0 |  |  |
| Property taxes (40% of $470.0) | 188.0 |  |  |
| Total marketing and administrative costs |  |  | 1,930.0 |
| Operating profit |  |  | $ 862.0 |

1. (10 Min.)  Cost Allocation with Cost Flow Diagram: Merton Electronics.

a.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| (1) |  | Downtown | Docklands | Total |
|  | Number of employees | 45 | 30 | 75 |
|  | Percentage | 60% | 40% | 100% |
|  | Allocated Accounting  Corporate costs ($162,000) | $97,200 | $64,800 | $162,000 |
|  |  |  |  |  |
| (2) |  | Downtown | Docklands | Total |
|  | Revenue | $720,000 | $900,000 | $1,620,000 |
|  | Percentage | 44.44% | 55.56% | 100% |
|  | Allocated Accounting  Corporate costs ($162,000) | $72,000 | $90,000 | $162,000 |

A close up of a piece of paper

Description automatically generatedb.

a 44.44% = $720,000 ÷ ($720,000 + $900,000)

b 55.56% = $900,000 ÷ ($720,000 + $900,000)

1. (20 Min.)  Cost Allocation with Cost Flow Diagram: Algonac Moldings.

a.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| (1) |  | Liebold Metals | Cecil Distributors | Total |
|  | Material purchased (tons) | 64.8 | 115.2 | 180 |
|  | Percentage | 36% | 64% | 100% |
|  | Allocated waste handling cost ($1,200,000) | $432,000 | $768,000 | $1,200,000 |
|  |  |  |  |  |
| (2) |  | Liebold Metals | Cecil Distributors | Total |
|  | Amount of waste (tons) | 9.0 | 11.0 | 20 |
|  | Percentage | 45% | 55% | 100% |
|  | Allocated waste handling cost ($1,200,000) | $540,000 | $660,000 | $1,200,000 |
|  |  |  |  |  |
| (3) |  | Liebold Metals | Cecil Distributors | Total |
|  | Cost of materials purchased | $1,488,000 | $3,312,000 | $4,800,000 |
|  | Percentage | 31% | 69% | 100% |
|  | Allocated waste handling cost ($1,200,000) | $372,000 | $828,000 | $1,200,000 |

2-69. (continued)

Diagram

Description automatically generatedb.

a 36% = 64.8 tons ÷ (64.8 tons + 115.2 tons)

b 48% = 115.2 tons ÷ (64.8 tons + 115.2 tons)

1. (20 Min.)  Cost Allocation with Cost Flow Diagram: Norfolk School of Commerce.

a.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Undergraduate | Graduate | Total |
| Enrollment (students) | 825 | 275 | 1,100 |
| Percentage | 75% | 25% | 100% |
| Usage (hours) | 9,450 | 17,550 | 27,000 |
| Percentage | 35% | 65% | 100% |
|  |  |  |  |
| Allocation of enrollment-related  costsa | $1,692,900 | $564,300 | $2,257,200 |
| Allocation of usage-related  costsb | 623,700 | 1,158,300 | 1,782,000 |
| Total Allocations | $2,316,600 | $1,722,600 | $4,039,200 |

a $1,692,900 = 75% x $2,257,200; $564,300 = 40% x $2,257,200.

b $623,700 = 35% x $1,782,000; $1,158,300 = 65% x $1,782,000.

2-70. (continued)

b.

A close up of a piece of paper

Description automatically generated

a 75% = 825 students ÷ (825 students + 275 students)

b 25% = 275 students ÷ (825 students + 275 students)

c 35% = 9,450 hours ÷ (9,450 hours + 17,550 hours)

d 65% = 17,550 hours ÷ (9,450 hours + 17,550 hours)

1. (30 Min.)  Cost Allocation and Pricing: Woodrow Economic Advisors.

a.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1. | Commercial | | | | | Defense | Total |
| Direct cost | | | $1,470,000 | | | $3,430,000 | $4,900,000 |
| Percentage | | | 30% | | | 70% | 100% |
| Allocation of indirect cost | | | $1,911,000 | | | $4,459,000 | $6,370,000 |
| ($6,370,000) | | | 30% | | | 70% | 100% |
|  | | |  | | |  |  |
| 2. | | | Corporate | | | Government | Total |
| Direct cost | | |  | | | $3,430,000 |  |
| Allocated indirect cost | | |  | | | 4,459,000 |  |
| Total cost | | |  | | | $7,889,000 |  |
| Fixed fee (Corporate) | | | $3,000,000 | | |  | |
| Fixed fee Government | |  | | | | 1,183,350 | |
| (= 0.15 x $7,889,000) | |  | | | |  | |
| Total revenue | | | $3,000,000 | | | $9,072,350 | $12,072,350 |
| b. | | |  | | |  |  |
| 1. | Commercial | | | | | Defense | Total |
| Direct contract hours | | | | | 1,760 | 6,240 | 8,000 |
| Percentage | | | | | 22% | 78% | 100% |
| Allocation of indirect cost | | | | | $1,401,400 | $4,968,600 | $6,370,000 |
| ($6,370,000) | | | | | 22% | 78% | 100% |
|  | | | | |  |  |  |
| 2. | | | | | Commercial | Defense | Total |
| Direct cost | | | | |  | $3,430,000 |  |
| Allocated indirect cost | | | | |  | 4,968,600 |  |
| Total cost | | | | |  | $8,398,600 |  |
| Fixed fee (Corporate) | | | | | $3,000,000 |  | |
| Fixed fee Government | | | | |  | 1,259,790 | |
| (= 0.15 x $8,398,600) | | | | |  |  | |
| Total revenue | | | | | $3,000,000 | $9,658,390 | $12,658,390 |
|  |  | | | | |  |  |
|  | | | |  | |  |  |

1. (20 Min.)  Cost Allocation and Pricing: Woodrow Economic Advisors.
2. Answers will vary. Either allocation of the indirect costs in this case can be justified on some sort of cause-and-effect basis. Indirect costs are likely related to (though not necessarily caused by) a number of things related to the activity of the consultants (direct contract hours) and the direct costs incurred (travel costs, for example).
3. The ethical issue that arises for the Controller is to ensure that the basis for the allocation is related to some view of the underlying cost process. It is also important that once a basis is chosen, it is not changed with every billing cycle depending on the activity undertaken every period.
4. (40 Min.)  Basic Cost Behaviors: Salvay Company.

Table

Description automatically generateda. and b.

Notes:

(a). $10,000,000 (= 500,000 units x $20); $15,000,000 (= 750,000 units x $20).

(b). $1,500,000 (= 500,000 units x $3.00);

$2,610,000 [= (550,000 units x $3.00) + (750,000 units – 550,000 units) x $4.80.

(c). $2,250,000 (= 500,000 units x $4.50); $3,375,000 (= 750,000 units x $4.50)

(d). $1,125,000 (= 500,000 x $2.25); $1,687,500 (= 750,000 units x $2.25).

(e) $625,000 (= 500,000 x $1.25); $937,500 (= 750,000 units x $1.25).

(f). $218,000 (fixed cost; does not vary with production).

(g). $102,000 (fixed cost; does not vary with production).

(h). $105,000 (one shift; production is less than 600,000 units);

$210,000 (two shifts; production is greater than 600,000 units).

2-73. (continued)

(i). $280,000 (one shift; production is less than 600,000 units);

$560,000 (two shifts; production is greater than 600,000 units).

(j). $210,000 (fixed cost; does not vary with production).

(k). $65,000 (f ixed cost; does not vary with production).

(l). $6,480,000 (= sum of materials, labor, overhead; with no inventories, cost of goods

sold is equal to cost of goods manufactured is equal to total manufacturing cost);

$9,975,000 (= sum of materials, labor, overhead; with no inventories, cost of goods

sold is equal to cost of goods manufactured is equal to total manufacturing cost).

(m). $3,520,000 (= revenue minus cost of goods sold);

$5,025,000 (= revenue minus cost of goods sold).

(n). $12.96 (= $3,520,000 ÷ 500,000 units); $13.30 (= $9,975,000 ÷ 750,000 units).

(o). $7.04 (= $3,520,000 ÷ 500,000 units); $6.70 (= $5,025,000 ÷ 750,000 units).

1. (30 Min.)  Basic Cost Behaviors -- Visualization: Salvay Company.

Answers will vary.

Some of the issues that should be addressed in the presentation include:

* Factors that lead to different costs per unit (and the effect on gross margin per unit).
  + The effect of fixed costs and volume changes.
  + The effect of semi-variable costs and step costs.
  + The fact that not all direct costs are strictly variable.
* Although it is common that increasing volume in a setting with fixed costs will reduce unit costs, we see that the opposite has occurred here. This is the result of two factors:
  + The semi-variable materials unit cost, making production above 550,000 units more costly;
  + The step-fixed costs, meaning higher production incurs higher (total) fixed costs.
* Although the unit costs are higher (and the unit gross margin is lower) for the higher production volume, the total gross margin is higher at the 750,000 unit level.

The visuals that will be used will vary by what conclusions are highlighted and what software is used for producing the visuals. The following are two possibilities produced using the charting function in Microsoft Excel.

The first chart shows the two major components of the unit cost along with the unit gross margin. This shows that the reduction unit overhead costs resulting from higher production is more than offset by the higher materials cost per unit at the higher level of production.

The second chart shows how the percentage of the total unit cost for each of the individual costs components changes at different volumes.

2-74. (continued)

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1. (40 Min.)  Basic Cost Behaviors: Cheyenne Contractors.

a. and b.

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Description automatically generated

Notes:

(a). $7,800,000 (= 25,000 units x $312); $14,040,000 (= 45,000 units x $312).

(b). $1,300,000 (= 25,000 units x $52); $2,340,000 (= 45,000 units x $52).

(c). $625,000 (= 25,000 units x $25); $1,125,000 (= 45,000 units x $25).

(d). $1,500,000 (= 25,000 x $60); $2,700,000 (= 45,000 units x $60).

(e) $350,000 (= 25,000 x $14); $630,000 (= 45,000 units x $14).

(f). $698,000 (fixed cost below 35,000 units); $1,233,000 (fixed cost above 35,000

units).

(g). $0 (no overtime); $225,000 [= (45,000 units – 30,000 units)] x $15.

(h). $122,000 (fixed cost; does not vary with production)

(i). $210,000 (one shift; production is less than 35,000 units);

$420,000 (two shifts; production is greater than 35,000 units).

2-75. (continued)

(j). $200,000 (one shift; production is less than 35,000 units);

$450,000 (two shifts; production is greater than 35,000 units plus $50,000 shift

differential).

(k). $190,000 (fixed cost; does not vary with production).

(l). $105,000 (fixed cost; does not vary with production).

(m). $5,300,000 (= sum of materials, labor, overhead; with no inventories, cost of goods

sold is equal to cost of goods manufactured is equal to total manufacturing cost);

$9,540,000 (= sum of materials, labor, overhead; with no inventories, cost of goods

sold is equal to cost of goods manufactured is equal to total manufacturing cost).

(n). $2,500,000 (= revenue minus cost of goods sold);

$4,500,000 (= revenue minus cost of goods sold).

(0). $212 (= $5,300,000 ÷ 25,000 units); $212 (= $9,540,000 ÷ 45,000 units).

(p). $100 (= $2,500,000 ÷ 25,000 units); $100 (= $4,500,000 ÷ 45,000 units).

1. (30 Min.)  Basic Cost Behaviors -- Visualization: Cheyenne Contractors.

Answers will vary.

Some of the issues that should be addressed in the presentation include:

* Factors that lead to different costs per unit (and the effect on gross margin per unit).
  + The effect of fixed costs and volume changes.
  + The effect of semi-variable costs and step costs.
  + The fact that not all direct costs are strictly variable.
* Perhaps unexpectedly, the unit costs and gross margins are identical even with fixed costs as a result of:
  + The semi-variable materials unit cost, making production above 550,000 units more costly;
  + The step-fixed costs, meaning higher production incurs higher (total) fixed costs.
* It should be emphasized that the gross margins are identical only coincidentally. This is not true for any production level. Therefore, there should be no conclusion that unit gross margin will be $100 regardless of production and sales levels.

The visuals that will be used will vary by what conclusions are highlighted and what software is used for producing the visuals. The following are two possibilities produced using the charting function in Microsoft Excel.

The first chart shows the unit cost of the components of overhead. There is little to be gained by including the direct costs as these are both variable and do not change. This shows that the reduction in unit overhead costs resulting from higher production for some elements of overhead (for example miscellaneous overhead) is offset by the higher supervisory cost per unit at the higher level of production.

The second chart shows how the percentage of the total overhead cost for each of the individual costs components changes at different volumes.

2-76. (continued)

A screenshot of a cell phone

Description automatically generated

1. (40 Min.)  Find the Unknown Information: Gates Manufacturing.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |
| a. | Finished goods beginning inventory | + | Cost of goods manufactured | = | Cost of  goods sold | + | Finished goods  ending inventory |
|  |  |  |  |  |  |  |  |
|  | Cost of goods manufactured | = | Cost of goods sold | + | Finished goods ending inventory | – | Finished goods beginning inventory |
|  | Cost of goods manufactured | = | $221,000 | + | $31,800 | – | $30,800 |
|  | Cost of goods manufactured | = | $222,000 |  | | | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| b. | Work-in-process beginning inventory | | | + | | Total manufacturing costs | | | | = | | Cost of goods manufactured | | | | + | | Work-in-process ending inventory | | | |
|  |  |  | |  | | | |  |  | | | | |  |  | | | |
|  | Total manufacturing costs | | = | | Cost of goods manufactured | | | | | | — | | Change in work-in-process inventory | | | |  |  | |
|  | Total manufacturing costs | | | = | | | 222,000 | | | | — 28,000 | | | | | | | | | |
|  | Total manufacturing costs | | | = | | | $194,000 | | | |  | | | | | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| c. | Total manufacturing costs | = | | Direct materials used | | + | Direct labor | | | | + |  | Manufacturing overhead | | | |
|  | Direct materials used | | = | | Total manufacturing costs | | | | — | Direct labor costs | | | | — |  | Manufacturing overhead | |
|  | Direct materials used | | = | | $194,000 | | | | — | $30,400 | | | | — |  | $57,600 | |
|  | Direct materials used | | = | | $106,000 | | |  | |  | | | | | | | | |

2-77. (continued)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| d. | Gross margin % | = | Gross margin | ÷ | | Sales revenue |
|  |  | = | (Sales revenue – COGS) | ÷ | | Sales revenue |
|  | Rearranging, |  |  |  | | |
|  | Sales revenue | = | Cost of Goods Sold | ÷ | (1.0 – Gross Margin %) | | |
|  |  |  | $221,000 | ÷ | (1.0 – .35) | | |
|  |  |  | $221,000 | ÷ | 0.65 | | |
|  |  |  |  |  |  | | |
|  |  |  |  |  | | |
|  | Sales revenue | = | $340,000 |  | | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| e. | Direct materials beginning inventory | | + | | Direct materials purchases | = | | Direct materials used | | | | + | | Direct materials  ending inventory | |
|  | Change in direct materials inventory | | = | | Direct materials used | – | Direct materials purchases | | | | | |  |  | |
|  | Change in direct materials inventory | | = | | $106,000 | – | | $96,000 | | | |  | |  | |
|  | Decrease in direct materials inventory | | = | | $10,000 |  | | | | | | | | | |
|  |  |  | |  | | | | |  | |  | | | |
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|  |  |  | |  | | | | |  | | | | | |

1. (40 Min.)  Find the Unknown Information: Paul & Paul, Inc.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  | |
| a. | Cost of goods manufactured | = | Cost of goods sold | + | Finished goods ending inventory | – | | Finished goods  beginning inventory |
|  |  | = | $2,083,200 | + | $57,575 |  | |  |
|  | Cost of goods manufactured | = | $2,140,775 |  | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| b. | Total manufacturing costs | = | Direct  materials used | | + | Direct labor | + | Manufacturing overhead |
|  | $2,143,120 | = | Direct  materials used | | + | $946,400 | + | $787,500 |
|  | Direct  materials used | = | $409,220 | (= $2,143,120 – $946,400 – $787,500) | | | | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| c. | Direct  materials used | = | Materials purchased | + | Beginning Inventory | – | Ending inventory |
|  | $409,220 | = | Materials purchased | – | $1,512 |  |  |
|  | Materials purchased | = | $407,708 | (= $409,22 – $1,512) | | | |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| d. | Gross margin % | = | | Gross margin | | | | | ÷ | | Sales revenue |
|  | 30% | = | | (Sales revenue – Cost of goods sold) | | | | | ÷ | | Sales revenue |
|  | 30% x Sales revenue | | | | | = | Sales revenue | | – | | Cost of goods sold |
|  | Cost of goods sold | | = | | Sales revenue | | | – | | (30% x Sales revenue) | |
|  | Cost of goods sold | | = | | Sales revenue | | | x | | (1 – 30%) | |
|  | Sales revenue | = | | Cost of goods sold | | | | | ÷ | | (100% – 30%) |
|  |  | = | | $2,083,200 | | | | | ÷ | | 70% |
|  |  |  | | $2,976,000 | | | | |  | |  |
|  | Units sold | = | | Sales revenue | | | | | ÷ | | Sales price |
|  |  | = | | $2,976,000 | | | | | ÷ | | $64 |
|  |  | = | | 46,500 units | | | | |  | |  |

2-78. (continued)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| e. | Cost of goods manufactured | = | Total manufacturing cost | | | | + | Work-in-process beginning Inventory | | | – | Work-in-process ending inventory | | |
|  |  |  |  | | | |  |  | | |  |  | | |
|  | Cost of goods manufactured | = | Total manufacturing cost | | | | – | | Change in work-in-process inventory | | | |
|  |  | = | $2,143,120 | | | – | | | | Change in work-in-process inventory | | | | | |
|  |  | = | $2,140,775 | | |  | | | |  | | | | | |
|  |  |  |  | | |  | | | |  | | | | | |
|  | Change in work-in-process inventory | = | $2,143,120 | – | $2,140,775 | | | | | | | | |
|  |  | = | $2,345 |  | | | | | |  | | | | | |

1. (40 min.) Cost Allocation and Regulated Prices: Alpine Township.

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

|  |  |  |
| --- | --- | --- |
| Total cost of collection | = | $480,000 + $1,536,000 + $384,000 |
|  | = | $2,400,000 |
| Total waste collected (tons) | = | 4,000 + 12,000 |
|  | = | 16,000 tons |
|  | = | 32,000,000 pounds |
| Average cost per pound | = | $2,400,000 ÷ 32,000,000 pounds |
|  | = | $.075 per pound |
| Price per pound | = | $.075 x 1.20 |
|  | = | $.09 per pound |
|  |  |  |

b.

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

Allocation of administrative costs and truck costs:

|  |  |  |
| --- | --- | --- |
| Total costs | = | $480,000 + $1,536,000 |
|  | = | $2,016,000 |
| Number of customers | = | 11,520 + 2,880 |
|  | = | 14,400 customers |
| Allocated cost per customer | = | $2,016,000 ÷ 14,400 customers |
|  | = | $140 per customer |

Allocation of other collection costs:

|  |  |  |
| --- | --- | --- |
| Total costs | = | $384,000 |
| Total waste collected (tons) | = | 4,000 + 12,000 |
|  | = | 16,000 tons |
| Allocated cost per ton of waste | = | $384,000 ÷ 16,000 tons |
|  | = | $24 per ton |

2-79. (continued)

Allocation to customer types:

|  |  |  |
| --- | --- | --- |
|  | Households | Business |
| Allocation of customer cost: |  |  |
| Allocated cost per customer | $140 | $140 |
| Number of customers | 11,520 | 2,880 |
| Allocated cost | $1,612,800 | $403,200 |
| Allocation of other costs: |  |  |
| Allocated cost per ton | $24 | $24 |
| Number of tons | 4,000 | 12,000 |
| Allocated cost | $96,000 | $288,000 |
|  |  |  |
| Total allocated cost | $1,708,800 | $691,200 |
| Total number of tons | 4,000 | 12,000 |
| Number of pounds | 8,000,000 | 24,000,000 |
| Average allocated cost per pound | $.2136 | $.0288 |
| Price per pound (= 1.20 x average cost) | $.2563 | $.0346 |

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. (20 min.) Reconstruct Financial Statements: Melville Manufacturing.

Problems 2-80 through 2-82 are similar, but vary in difficulty. Problem 2-80 is a straightforward completion of the statements based on the data provided. Problem 2-81 requires students to compute some of the information from the data provided, but they can complete the two statements in sequence. Problem 2-82 requires students to complete the income statement before they finish the Cost of Goods Manufactured and Sold Statement, although they will likely begin with the Cost of Goods Manufactured and Sold Statement.

Table

Description automatically generated

2-80. (continued)

Table

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1. (30 min.) Reconstruct Financial Statements: Omira Cycle Parts.

Table

Description automatically generated

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

Beg. Bal. = $5,349,400 + $1,240,000 – $5,040,000

= $1,549,400

bTotal labor = Indirect labor + Direct labor = $6,048,000

= 0.08 Direct labor + Direct labor

Direct labor = $6,048,000 ÷ 1.08 = $5,600,000

Indirect labor = 0.08 x $5,600,000 = $448,000

2-81 (continued)

Graphical user interface, application, table, Excel

Description automatically generated

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

portion

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

= $907,200 ÷ 0.80

= $1,134,000

Depreciation on administrative portion = $1,134,000 x (1.0 – 0.8)

= $226,800.

1. (40 Min.)  Reconstruct Financial Statements: Kessler Brothers.

**Table

Description automatically generated**

a Total labor is $3,600 (= $540 indirect labor ÷ 0.15)

Direct labor is $3,060 [= $3,600 x (1.00 – 0.15)]

b The manufacturing portion of the building occupies 75 percent of the floor space or

180,000 square feet (= 240,000 x 0.75). Plant depreciation is $900,000

(= $1,200,000 x 0.75).

c From the completed Income Statement.

d Cost of Goods Available for Sale is $11,220 (= $10,980 cost of goods sold + $240 Finish Goods Inventory, December 31).

e Finished Goods Inventory, January 1 is $429 (= $11,220 Cost of Goods Available for Sale − $10,791 Cost of Goods Manufactured).

2-82 (continued)

Graphical user interface, application, table, Excel

Description automatically generated

a The administrative portion of the building occupies 25 percent of the floor space or

60,000 square feet (= 240,000 x 0.25). Administrative depreciation is $300,000

(= $1,200,000 x 0.25).

b Gross margin is $4,020 (= $2,880 Operating profit + $1,140 Total operating costs).

c Cost of Goods Sold is $10,980 (= $15,000 Sales revenue − $4,020 Gross margin).

1. (20 Min.)  Finding Unknowns: Conner’s Fixtures.

a. $5,625.

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

= $24,000 ÷ 10,000 units = $2.40 per unit.

Direct materials used per unit = 3.2 pounds.

Direct materials cost per pound = $2.40 ÷ 3.20 pounds = $0.75 per pound.

Direct materials inventory = 7,500 pounds × $0.75 per pound = $5,625.

b. 1,375 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

= ($24,000 + $108,000 + $21,600 + $24,000) ÷ 10,000 = $177,600 ÷ 10,000

= $17.76 per unit.

Finished goods inventory (in units) December 31, Year 1 = $24,420 ÷ $17.76

= 1,375 units

c. $34.

Selling price per unit = Sales revenue ÷ Units sold

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

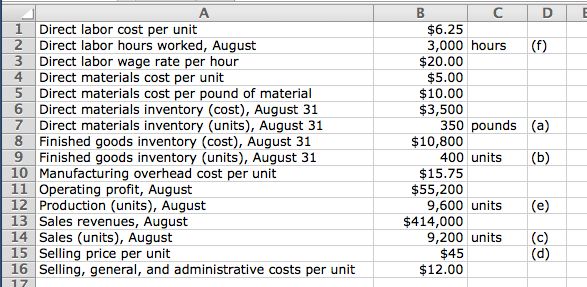
= $293,250 ÷ (10,000 – 1,375) = $293,250 ÷ 8,625 = $34.

d. $54,570.

Operating profit for year 1:

|  |  |  |
| --- | --- | --- |
| Sales revenue |  | $293,250 |
| Cost of goods sold (8,625 x $17.76) |  | 153180 |
| Gross margin |  | $140,070 |
| Less marketing and administrative costs |  |  |
| Variable marketing and administrative costs | $13,500 |  |
| Fixed marketing and administrative costs | 72,000 | 85,500 |
| Operating profit |  | $54,570 |

1. (40 Min.)  Finding Unknowns: Guilford Boards.

Note: This problem can be 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

= $40 + $50 + $126 = $216.00

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

= $216 + $96 = $312

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

= $1,600 ÷ $8 = 200 pounds.

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

cost per unit)

= $8,640 ÷ $216 = 40 units

2-84 (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

$9,545 = $45,425 – Full costs

Full costs = $45,425 — $9,545 = $35,880

Full costs = Units sold x Full cost per unit

$35,880 = Units sold x $312

Units sold = $35,880 ÷ $312

= 115 units sold

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

$45,425 = Selling price per unit x 115 units sold

Selling price per unit = $45,425 ÷ 115

= $395

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

– Units sold

40 = 0 + Units produced — 115

Units produced = 115 + 40 = 155

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

= 155 x $50 = $7,750

$7,750 = Direct-labor hours worked x $20

Direct-labor hours worked = $7,750 ÷ $20.00

= 387.5 direct-labor hours

Solutions to Integrative Case

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

a. This year’s income statement:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Baseline  (Status Quo) | | |  | Rent Equipment |  | Difference | | |
| Sales revenue |  | $3,200,000 |  |  | $3,200,000 |  |  | 0 | |  |
| Operating costs: |  |  |  |  |  |  |  |  | |  |
| Variable |  | (400,000) |  |  | (400,000) |  |  | 0 | |  |
| Fixed (cash expenditures) |  | (1,500,000) |  |  | (1,500,000) |  |  | 0 | |  |
| Equipment depreciation |  | (300,000) |  |  | (300,000) |  |  | 0 | |  |
| Other depreciation |  | (250,000) |  |  | (250,000) |  |  | 0 | |  |
| Loss from equipment write-off |  | 0 |  |  | (1,700,000) | a |  | $1,700,000 | lower | | |
| Operating profit (before taxes) |  | $750,000 |  |  | $ (950,000) |  |  | $1,700,000 | lower | | |

a Equipment write-off = $2 million cost – $300,000 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 |  | $3,200,000 |  |  | $3,424,000 | a |  | $224,000 | higher |
| Operating costs: |  |  |  |  |  |  |  |  |  |
| Equipment rental |  | 0 |  |  | (460,000) |  |  | 460,000 | higher |
| Variable |  | (400,000) |  |  | (400,000) |  |  | 0 |  |
| Fixed cash expenditures |  | (1,500,000) |  |  | (1,410,000) | b |  | 90,000 | lower |
| Equipment depreciation |  | (300,000) |  |  | 0 |  |  | 300,000 | lower |
| Other depreciation |  | (250,000) |  |  | (250,000) |  |  | 0 |  |
| Operating profit |  | $750,000 |  |  | $904,000 |  |  | $154,000 | higher |

a $3,424,000 = 1.07 × $3,200,000

b $1,410,000 = (1.00 – 0.06) × $1,500,000

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 ($224,000 + $90,000) does not cover cash outflow for equipment rental ($460,000). In terms of your bonus, renting the new equipment will increase you bonus next year (operating profit is higher), but lower it this year (because of the loss from the equipment disposal).