Fundamentals of Cost Accounting 5th edition Lanen Solutions Manual

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2
Cost Concepts and Behavior

Solutions to Review Questions

2-1.

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.

2-2.

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.

2-3.

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.

2-4.

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.

2-5.

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.

2-6.

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.

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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.

2-8.

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.

2-9.

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

2-10.

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

2-11.

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.

2-12.

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).

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2-13.

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.

2-14.

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.

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Solutions to Critical Analysis and Discussion Questions

2-15.

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.

2-16.

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.

2-17.

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.

2-18.

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.

2-19.

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.

2-20.

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

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2-21.

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.

2-22.

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.

2-23.

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).

2-24.

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.

2-25.

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.

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Solutions to Exercises

2-26. (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).

2-27. (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

2-28. (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

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2-29. (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.

2-30. (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

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2-31. (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, d, f and h will change, as follows

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

2-32. (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, d, f and h will change, as follows

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

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2-33. (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.

2-34. (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.

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2-35. (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.

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2-36. (10 min.) Prepare Statements for a Service Company: Chuck's Brokerage Service.

	A	B	C
1	Chuck's Brokerage Service		
2	Income Statement		
3	For the Month Ending October 31		
4			
5	Sales revenue		
6	Brokerage commissions	$ 9,000,000	
7	Fees for investment advice	4,500,000	
8	Total revenues		$ 13,500,000
9	Cost of services sold		
10	Labor cost for advice	$ 2,400,000	
11	Fees paid to execute trades	6,000,000	
12	Total costs of services		8,400,000
13	Gross margin		$ 5,100,000
14	Marketing and administrative costs		
15	Advertising and marketing	$ 270,000	
16	Building rent and utilities	525,000	
17	Managers' salaries	900,000	
18	Sales commissions to brokers	750,000	
19	Training programs for brokers	1,275,000	
20	Total marketing and administrative costs		3,720,000
21	Operating profit		$ 1,380,000
22			

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2-37. Prepare Statements for a Service Company: Where2 Services.

	A	B	C
1	Where2 Services		
2	Income Statement		
3	For the Month Ending March 31		
4			
5	Sales revenue		$ 16,000
6	Cost of services sold		
7	Labor	$ 5,000	
8	Printing, fax, and computing costs	3,750	
9	Total cost of services sold		8,750
10	Gross margin		$ 7,250
11	Marketing and administrative costs		
12	Advertising and marketing	$ 4,000	
13	Building rent and utilities	2,000	
14	Training costs	500	
15	Travel expenses	2,500	
16	Total marketing and administrative costs		9,000
17	Operating profit (loss)		$ (1,750)

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2-38. (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)

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2-39. (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.

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2-40. (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.

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2-41. (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 ..... = $166,650
(also can be found solving for Transferred in to Finished Goods)

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

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2-42. (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 ..... = $57,000
(also can be found solving for Transferred in to Finished Goods)

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

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2-43. (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

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2-44. (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

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2-45. (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).

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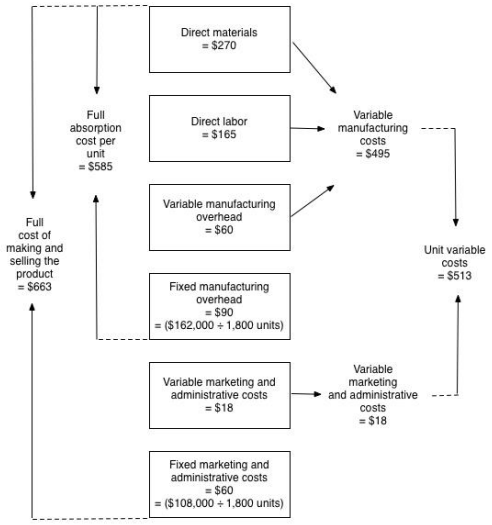
2-46. (30 min.) Components of Full Costs: Madrid Corporation



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

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2-47. (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

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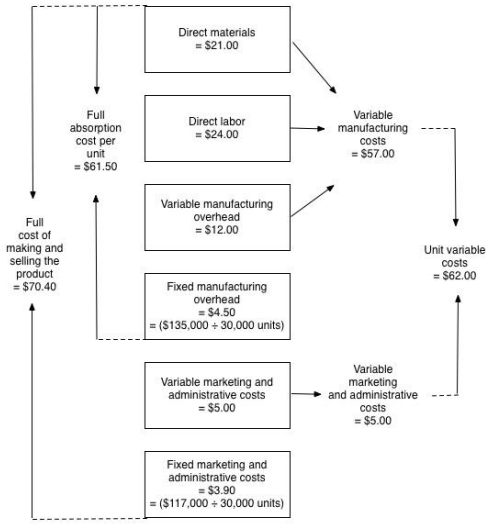
2-48. (30 min.) Components of Full Cost: Larcker Manufacturing.



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

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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

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2-49. (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

2-50. (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 costs[a]	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

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2-51. (20 Min.) Gross Margin and Contribution Margin Income Statements: Alpine Coffee Roasters.

Gross Margin Income Statement	
Sales revenue[a]	$230,400
Variable manufacturing costs[b]	126,000
Fixed manufacturing overhead costs[c]	45,000
Gross margin	$59,400
Variable marketing and administrative costs[d]	10,800
Fixed marketing and administrative costs[e]	18,000
Operating profit	$30,600

Contribution Margin Income Statement	
Sales revenue	$230,400
Variable manufacturing costs	126,000
Variable marketing and administrative costs	10,800
Contribution margin	$93,600
Fixed manufacturing overhead costs	45,000
Fixed marketing and administrative costs	18,000
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

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2-52. (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 served[a]	$ 52,500	297,500	350,000
Gross margin	$ (52,500)	$ 702,500	$ 650,000
Operating expenses			
Employee salaries and wages[b]	37,500	212,500	250,000
Managers' salaries[c]	20,000	80,000	100,000
Building costs[d]	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.

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2-53. (30 min.) Value Income Statement: DeLuxe Limo Service.

a.

	A	B	C	D	E
1	DeLuxe Limo Service				
2	Value Income Statement				
3	For the Month Ending March 31				
4		Nonvalue-added		Value-added	
5		Activities		Activities	Total
6					
7	Sales revenue			$ 250,000	$ 250,000
8	Cost of services sold				
9	Variable costs of operations, excluding labor costs	3,750	a	71,250	75,000
10	Employee wages and salaries	5,000	a	95,000	100,000
11	Fixed cost of automobiles	10,000	b	15,000	25,000
12	Gross margin	$ (18,750)		$ 68,750	$ 50,000
13	Administrative expenses				
14	Managers' salaries	2,000	c	18,000	20,000
15	Building costs	1,250	c	11,250	12,500
16	Operating income (loss)	$ (22,000)		$ 39,500	$ 17,500
17					
18	a. 5% nonvalue-added.				
19	b. 40% nonvalue-added.				
20	c. 10% nonvalue-added.				

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.

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Solutions to Problems

2-54. (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 (from d above)	+	$27,000	–	$36,000
	=	$336,000				

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2-55. (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

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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

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2-56. (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

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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.

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2-57. (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

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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

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2-58. (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

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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

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2-59. (30 min.) Prepare Statements for a Manufacturing Company: Billings Tool & Die.

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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

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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

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2-60. (10 Min.) Cost Allocation with Cost Flow Diagram: Coastal Computer.

a.

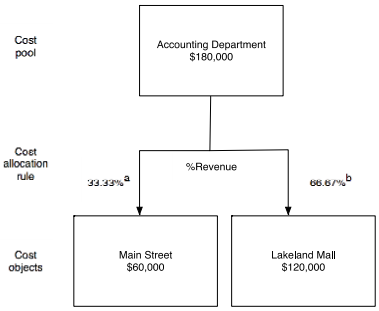
(1)

	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.



[a] 33.33% = $1,000,000 ÷ ($1,000,000 + $2,000,000)
[b] 66.67% = $2,000,000 ÷ ($1,000,000 + $2,000,000)

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2-61. (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

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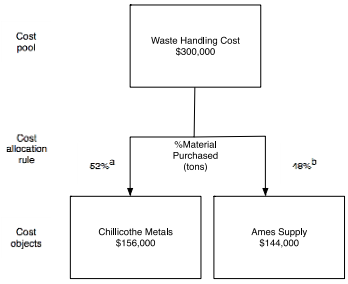
2-61. (continued)

b.



[a] 52% = 130 tons ÷ (130 tons + 120 tons)
[b] 48% = 120 tons ÷ (130 tons + 120 tons)

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2-62. (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 costs[a]	$1,350,000	$900,000	$2,250,000
Allocation of credit-hour costs[b]	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.

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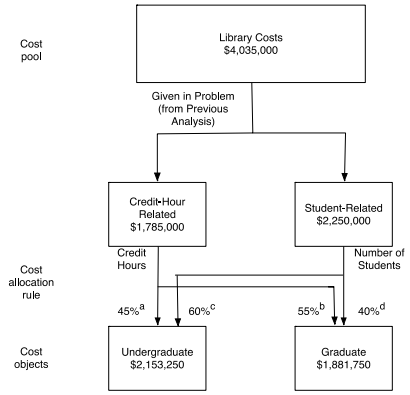
2-62. (continued)

b.



[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)

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2-63. (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

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2-64. (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	=	<u>$595,200</u>				

b.

Total manufacturing costs	=	Direct materials used	+	Direct labor	+	Manufacturing overhead
$612,320	=	Direct materials used	+	$270,400	+	$225,000
Direct materials used	=	<u>$116,920</u>	(= $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	=	<u>$116,488</u>	(= 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%
		<u>$960,000</u>		

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2-65. (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

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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.

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2-66. (30 min.) Reconstruct Financial Statements: San Ysidro Company.

	A	B	C	D	E	F	G
1	SAN YSIDRO COMPANY						
2	Cost of Goods Manufactured and Sold Statement						
3	For the Year Ending December 31						
4							
5	Work in process, January 1					$ 72,520	
6	Manufacturing costs:						
7	Direct materials:						
8	Direct materials inventory, January 1	$ 309,880	a				
9	Direct materials purchased	1,008,000					
10	Direct materials available for use	$ 1,317,880					
11	Less materials inventory, December 31	248,000					
12	Materials used			$ 1,069,880			
13	Direct labor			1,120,000	b		
14	Manufacturing overhead:						
15	Indirect labor	89,600	b				
16	Plant utilities	104,160					
17	Building depreciation	181,440					
18	Other plant costs	82,160					
19	Maintenance on plant machinery	33,880					
20	Insurance on plant machinery	53,200					
21	Taxes on manufacturing property	38,800					
22	Total overhead			583,240			
23	Total manufacturing costs					2,773,120	
24	Total cost of work in process during the year					$ 2,845,640	
25	Less work in process, December 31					68,880	
26	Cost of goods manufactured this year					$ 2,776,760	
27	Add finished goods, January 1					224,000	
28	Cost of goods available for sale					$ 3,000,760	
29	Less finished goods, December 31					252,000	
30	Cost of goods sold (to income statement)					$ 2,748,760	
31							

[a]Materials 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

[b]Total 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

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2-66 (continued)

	A	B	C	D
1	SAN YSIDRO COMPANY			
2	Income Statement			
3	For the Year Ending December 31			
4	Sales revenue			$ 4,550,000
5	Less: Cost of goods sold (per statement)			2,748,760
6	Gross margin			$ 1,801,240
7	Building depreciation	$ 45,360	a	
8	Administrative salaries	192,000		
9	Marketing costs	103,600		
10	Distribution costs	4,480		
11	Attorney fees	22,960		
12	Total operating costs			368,400
13	Operating profit			$ 1,432,840
14				

[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.

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2-67. (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

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2-68. (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.

	A	B	C	D
1	Direct labor cost per unit	$6.25		
2	Direct labor hours worked, August	3,000	hours	(f)
3	Direct labor wage rate per hour	$20.00		
4	Direct materials cost per unit	$5.00		
5	Direct materials cost per pound of material	$10.00		
6	Direct materials inventory (cost), August 31	$3,500		
7	Direct materials inventory (units), August 31	350	pounds	(a)
8	Finished goods inventory (cost), August 31	$10,800		
9	Finished goods inventory (units), August 31	400	units	(b)
10	Manufacturing overhead cost per unit	$15.75		
11	Operating profit, August	$55,200		
12	Production (units), August	9,600	units	(e)
13	Sales revenues, August	$414,000		
14	Sales (units), August	9,200	units	(c)
15	Selling price per unit	$45		(d)
16	Selling, general, and administrative costs per unit	$12.00		

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

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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

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Solutions to Integrative Case

2-69. (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).

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Chapter 2
Cost Concepts and Behavior

Learning Objectives

1. Explain the basic concept of "cost."
2. Explain how costs are presented in financial statements.
3. Explain the process of cost allocation.
4. Understand how material, labor, and overhead costs are added to a product at each stage of the production process.
5. Define basic cost behaviors, including fixed, variable, semivariable, and step costs.
6. Identify the components of a product's costs.
7. Understand the distinction between financial and contribution margin income statements.

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Chapter Overview

I. WHAT IS A COST?
- Cost versus Expenses

II. PRESENTATION OF COSTS IN FINANCIAL STATEMENTS
- Service Organizations
- Retail and Wholesale Companies
- Manufacturing Companies
- Direct and Indirect Manufacturing (Product) Costs
- Prime Costs and Conversion Costs
- Nonmanufacturing (Period) Costs

III. COST ALLOCATION
- Direct versus Indirect Costs

IV. DETAILS OF MANUFACTURING COST FLOWS

V. HOW COSTS FLOW THROUGH THE STATEMENTS
- Income Statements
- Cost of Goods Manufactured and Sold Statement

VI. COST BEHAVIOR
- Fixed Versus Variable Costs

VII. COMPONENTS OF PRODUCT COSTS
- Unit Fixed Costs Can Be Misleading for Decision Making

VII. HOW TO MAKE COST INFORMATION MORE USEFUL FOR MANAGERS
- Gross Margin versus Contribution Margin Income Statements
- Developing Financial Statements for Decision Making

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Chapter Outline

LO 2-1 Explain the basic concept of "cost."

WHAT IS A COST?

- Cost versus Expenses
  - The cost accounting system records and maintains the use of economic resources by the organization.
    - The financial statements prepared by the firm for external reporting use information from the cost accounting system.
    - Cost accounting systems also provide information to help managers make better decisions. Managers need to understand the common terms used in cost accounting.
    - Companies are interested in the costs of their products and services for many reasons.
    - See the Business Application box "Calculating the costs of E-Books versus Paper Books."
  - **Cost** represents a sacrifice of resources (typically cash or a line of credit). The price of each item purchased measures the sacrifice made to acquire it.
    - **Expense** is a cost charged against (i.e., deducted from) revenue in an accounting period.
    - Cost initially recorded as an asset becomes an expense when the asset has been consumed (e.g., the prepaid rent becomes rent expense after the office space has been used for a period of time). Generally accepted accounting principles (GAAP) and regulations such as tax laws govern when and how costs are to be treated as expenses.
    - Cost accounting focuses on costs; expenses are referred to only in the context of external financial reporting (in this text).
  - The two major categories of costs are:
    - **Outlay cost:** a past, present, or future cash outflow, such as tuition, books, and fees paid for a college education, and
    - **Opportunity cost:** the forgone benefit that could have been realized from the best forgone alternative course of a resource, such as the time and income sacrificed to get a college education.

See Demonstration Problem 1

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- Managers tend to overlook or ignore opportunity costs while making decisions because:
  - No one can ever know all possible opportunities available at any moment.
  - Typical accounting system only records outlay costs but not opportunity costs.
- Opportunity costs are relevant for managerial decisions and should be captured in a well-designed cost accounting system.

LO 2-2 Explain how costs are presented in financial statements.

PRESENTATION OF COSTS IN FINANCIAL STATEMENTS

- **Operating profit** is the excess of operating revenues over the operating costs incurred to generate those revenues.
  - Operating profit differs from net income.
  - Net income is operating profit adjusted for interest, income taxes, extraordinary items, and other adjustments required to comply with GAAP or other regulations.
  - Information generated by the cost accounting system is used to help managers make decisions that improve firm value. It is a means to an end.
    - Such information is best (in terms of relevancy) for various decisions but not necessarily most accurate.
    - How the cost information is used in decision making and the costs of preparing and using such information should also be considered.
  - A generic income statement for a firm, a division, a product, or any unit has the following format:

Income statement

Revenue	xxx
Costs	(xx)
Operating profit	xxx

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- Service Organizations

  - Service organizations provide customers an intangible product, such as advice and analyses. Labor costs and/or costs of information technology represent the most significant cost category for service organizations.

  - Exhibit 2.2 illustrates the income statement of a typical service company. Cost of services sold includes costs of billable hours, which are the hours billed to clients plus the cost of other items billed to clients. Costs that are not part of services billable to clients are included in the marketing and administrative costs.

- Retail and Wholesale Companies

  - Retail and wholesale companies sell but do not make a tangible product, such as food, clothes, or a book.

  - Exhibit 2.3 illustrates an income statement for a merchandising company. Cost of goods sold keeps track of the tangible goods the company buys and sells.

  - A typical income statement for a merchandising company has the following format:

Income Statement

Sales revenue	xxx
Cost of goods sold	(xx)
Gross margin	xxx
Marketing and administrative costs	(xx)
Operating profit	xxx

  - The cost of goods sold statement shows how the cost of goods sold was computed. The typical format follows:

Cost of Goods Sold Statement

Beginning inventory		xxx
Cost of goods purchased		
Merchandise cost	xxx	
Transportation-in costs	xxx	
Total costs of goods purchased		xxx
Cost of goods available for sale		xxx
Less cost of goods in ending inventory		(xx)
Cost of goods sold		xxx

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        - The gross margin reflects the amount available to cover marketing and administrative costs and earn a profit.

        - Cost of goods sold includes only the actual costs of the goods that were sold. It does not include the costs required to sell them, such as the salaries of salespeople, which are marketing costs, or the salaries of top executives, which are administrative costs.

- Manufacturing Companies

    - Manufacturing companies make the goods for sale and need to know the different costs associated with making them.

- Direct and Indirect Manufacturing (Product) Costs

    - **Product costs** are those costs assigned to units of production and recognized (i.e., expensed) when the product is sold. Product costs follow the product through inventory.

        - Direct manufacturing costs are product costs that can be identified with units (or batches of units) at relatively low cost, including:

        - Direct materials are those that can be feasibly identified directly, at relatively low cost, with the product. (For manufacturers, direct materials are purchased parts, including transportation-in.) Direct materials are often called raw materials.

        - Direct labor represents labor costs that can be identified with the product at reasonable cost. Direct labor of workers transforms the materials into a finished product.

- Prime Costs and Conversion Costs

    - **Prime costs** = Direct materials + Direct labor.

        - Companies with relatively low manufacturing overhead tend to focus on managing prime costs.

            - **Indirect manufacturing costs** are all product costs other than direct manufacturing costs, often referred to in total as manufacturing overhead.

            - **Manufacturing overhead** represents all other costs of transforming the materials into a finished product, including:

                - Indirect labor (the cost of workers who do not work directly on the product, yet are required so that the factory can operate, such as supervisors, maintenance workers, inventory storekeepers, etc.)

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        - Indirect materials (materials not a part of the finished product but are necessary to manufacture it, such as lubricants, polishing and cleaning materials, etc.)

        - Other manufacturing costs (expenses incurred to keep the factory running, such as depreciation of the factory building and equipment, taxes and insurance on the factory assets, heat, light, power, etc.)

    - In practice, manufacturing overhead is also called factory burden, factory overhead, burden, factory expense, or just overhead.

  - **Conversion costs** = Direct labor + Manufacturing overhead.

    - Conversion costs are the costs that convert direct materials into the final product. Companies with high direct labor and/or manufacturing overhead tend to emphasize more about conversion costs.

      - Exhibit 2.4 summarizes the relationship between prime costs, conversion costs, and the three elements of manufactured product costs: direct materials, direct labor, and manufacturing overhead.

- Nonmanufacturing (Period) Costs

  - **Period costs** (nonmanufacturing costs are all other costs recognized for financial reporting when incurred, including marketing and administrative costs.

    - **Marketing costs** are the costs required to obtain customer orders and provide customers with finished products, including advertising, sales commissions, and shipping costs.

    - **Administrative costs** are the costs required to manage the organization and provide staff support, including executive and clerical salaries, costs for legal, financial, data processing, accounting services, and building space for administrative personnel.

  - For financial accounting purposes, nonmanufacturing costs are expensed in the period incurred; for managerial purposes, however, these costs (especially advertising and commissions) may be assigned to products.

- The distinction between manufacturing and nonmanufacturing costs is not always clear-cut. Companies usually set their own guidelines and follow them consistently.

  - Service companies often have costs that are mostly indirect. Managing indirect costs is extremely important in these firms if they are to remain profitable. (See Business Application box "Indirect Costs in Banking.")

  - Most firms are made up of activities that combine features of all three types of activities (service, retailing, and manufacturing).

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- In many of the firms which are usually considered to be of manufacturing type, virtually all employees are engaged in service-related activities. (See Business Application box "A New Manufacturing Mantra.")

LO 2-3 Explain the process of cost allocation.

COST ALLOCATION

- Direct versus Indirect Costs
  - **Cost allocation** is the process of assigning indirect costs to product, services, people, business units, etc. Cost allocation is necessary when several departments share facilities or services.
    - **Cost object** is any end to which a cost is assigned. Examples include a unit of product or service, a department, or a customer.
    - **Cost pool** is the collection of costs to be assigned to the cost objects. Examples are department costs, rental costs, or travel costs a consultant incurs to visit multiple clients.
    - **Cost allocation rule** refers to the method or process used to assign costs in the cost pool to the cost objects.
  - **Cost flow diagram** is a diagram or flowchart illustrating the cost allocation process.
    - Fundamental approach to cost allocation:
      - Identify the cost objects
      - Determine the cost pools
      - Select a cost allocation rule
    - Cost flow diagrams help managers understand
      - How a cost system works
      - The likely effects on the reported costs of different cost objects from changes in the cost allocation rule.
    - Exhibit 2.5 illustrates an example of cost flow diagram.

See Demonstration Problem 2

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- **Direct cost** is any cost that can be directly (unambiguously) related to a cost object at reasonable cost; **indirect cost** is any cost that cannot be directly related to a cost object.
    - A cost may be direct to one cost object and indirect to another.
    - Whether a cost is considered direct or indirect also depends on the costs of linking it to the cost object.

LO 2-4 Understand how material, labor, and overhead costs are added to a product at each stage of the production process.

- Any production process involves three basic steps:
    - Delivering direct materials to receiving area, inspecting, and then placing in direct material inventory area (store).
    - Transporting direct materials to an assembly line and undergoing the production process. **Work in process** is a product in the production process but not yet complete.
    - Moving the product to separate area in factory with other completed products. **Finished goods** are products fully completed, but not yet sold.
- For manufacturing companies, there are three inventory accounts in a cost accounting system. Each inventory account is likely to have the following structure (in T-account):

Inventory Account
(Direct materials, Work-in-process, or Finished goods)

Beginning inventory *Debit: Additions*	*Credit: Withdrawals*
Ending inventory	

    - **Inventoriable costs** are costs added (debited) to inventory accounts.
- The cost flows coincide with the physical flows of goods in and out of their respective storage areas.

Direct materials inventory

Beginning inventory Add: Purchases	Less: *Direct materials put into production* →
Ending inventory	

Work-in-process inventory

Beginning inventory Add: *Direct materials* Add: Direct labor Add: Manufacturing overhead	Less: *Cost of goods manufactured* →
Ending inventory	

Finished goods inventory

Beginning inventory Add: *Cost of goods manufactured*	Less: Cost of goods sold
Ending inventory	

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- The inventory account balances at the end of an accounting period appear on the balance sheet as part of the current assets.

- If the company uses just-in-time (JIT) inventory people in direct materials receiving department send the components to the assembly line immediately; if not, people in this department send the components to a materials warehouse until it is needed for production.

HOW COSTS FLOW THROUGH THE STATEMENTS

- Income Statements – Exhibit 2.7 illustrates an income statement for a manufacturing firm.

- Cost of Goods Manufactured and Sold Statement – Exhibit 2.8 illustrates a cost of goods manufactured and sold statement for a manufacturing company.

  - A typical cost of goods sold statement for a manufacturing company is more complicated than that of a merchandising firm and has the following structure:

Cost of Goods Manufactured and Sold Statement

Beginning work-in-process inventory			xx
Manufacturing costs during the year:			
Direct materials			
Beginning inventory	xx		
Add: Purchase of direct materials	xx		
Direct materials available	xx		
Less ending inventory	(xx)		
Direct material put into production		xx	
Direct labor		xx	
Manufacturing overhead		xx	
Total manufacturing costs incurred			xx
Total work in process during the year			xx
Less ending work-in-process inventory			(xx)
Cost of goods manufactured			xx
Beginning finished goods inventory			xx
Finished goods available for sale			xx
Less ending finished goods inventory			(xx)
Cost of goods sold			xx

    - The three shaded areas deal with direct materials, work-in-process, and finished goods, respectively.

  - The cost of goods manufactured and sold statement is prepared through the internal reporting system and is for managerial use only.

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- Total manufacturing costs incurred equals the sum of direct material put into production, direct labor, and manufacturing overhead incurred during the period. Managers in production and operations give careful attention to these costs.

- The total cost of work in process during the year (i.e., the sum of the beginning work-in-process inventory and total manufacturing costs incurred) is a measure of the resources that have gone into production.

- Cost of goods manufactured represents the cost of goods that were finished during the. Production departments usually have a goal for goods completed each period. Managers usually compare cost of goods manufactured to that goal to see whether the production departments are successful in meeting it.

- Beginning finished goods inventory and cost of goods manufactured together determine the cost of finished goods available for sale. The available finished goods either are sold and become cost of goods sold, or are still on hand as part of the ending finished goods inventory.

- The actual formats of financial statements vary a lot in practice. For managerial purposes, it is important that the format be tailored to what users want.

See Demonstration Problem 3

LO 2-5 Define basic cost behaviors, including fixed, variable, semivariable, and step costs.

COST BEHAVIOR

- Fixed Versus Variable Costs

  - Cost behavior deals with the way costs respond to changes in activity levels; a cost driver is a factor that causes, or "drives," costs.

    - Managers need to know how costs behave to make informed decisions about products, to plan, and to evaluate performance.

    - Exhibit 2.9 illustrates the four cost behavior patterns to be discussed: fixed costs, variable costs, semivariable costs, and step costs.

  - **Fixed costs** are costs that are unchanged as volume changes within the relevant range of activity. Examples: much of manufacturing overhead, many nonmanufacturing costs.

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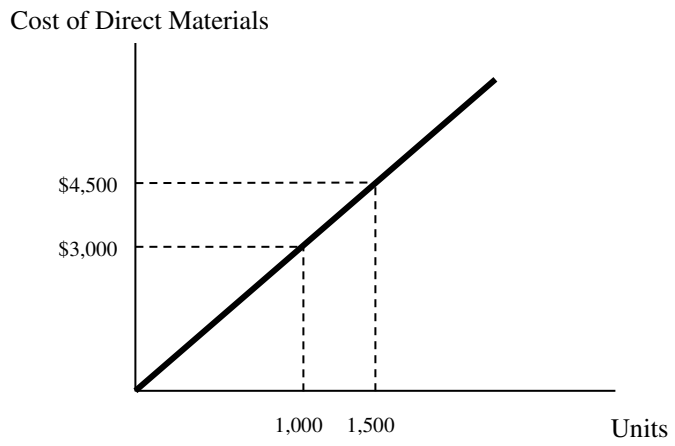
- **Variable costs** are costs that change in direct proportion with a change in volume within the relevant range of activity. Examples: for manufacturing companies, direct materials, and certain manufacturing overhead, direct labor in some cases; for merchandising businesses, cost of the product, some marketing and administrative costs; for service organizations, certain types of labor, supplies, copying, and printing costs.

The following graph shows a variable cost relationship between activity (units of production) and the resulting cost of direct materials used.



When the production volume is increased from 1,000 units to 1,500 units, it represents a 50 percent increase in activity (i.e., $\frac{1,500 - 1,000}{1,000} \times 100\% = 50\%$). There is a corresponding 50 percent increase in direct materials costs as well (i.e., $\frac{\$4,500 - \$3,000}{\$3,000} \times 100\% = 50\%$). This example demonstrates the direct and proportionate relationship between activity and variable costs.

- **Relevant range** refers to the activity levels within which a given total fixed costs or unit variable cost will be unchanged.

- A **semivariable cost** is a cost that has both fixed and variable components; also called mixed cost. Examples: electric utility costs, phone charges.

- A **step cost** is a cost that increases with volume in steps; also called semifixed cost. Examples: supervisors' salaries as each supervisor has a limited span of control.

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- Four aspects of cost behavior complicate the task of classifying costs into fixed or variable categories.
  - Not all costs are strictly fixed or variable.
  - Some costs increase with volume in "steps."
  - The cost relations are valid only within a relevant range of activity.
  - The classification of costs as fixed or variable depends on the measure of activity used.

LO 2-6 Identify the components of a product's costs.

COMPONENTS OF PRODUCT COSTS

- Some cost concepts are determined by the rules of financial accounting. Some are more useful for managerial decision making.
  - **Full cost** is the sum of all fixed and variable costs of manufacturing and selling a unit of product.
  - **Full absorption cost** is the sum of all variable and fixed manufacturing costs. Full absorption cost is used to compute a product's inventory value under GAAP; as such, it excludes nonmanufacturing costs.
  - Exhibit 2.11 illustrates the product cost components for a company.
  - On a per-unit basis:
    - Full absorption cost = Direct materials + Direct labor + Variable manufacturing overhead + Fixed manufacturing overhead.
    - Full cost = Full absorption cost + Variable marketing and administrative costs + Fixed marketing and administrative costs.
    - Variable manufacturing cost = Direct materials + Direct labor + Variable manufacturing overhead.
    - Variable cost = Variable manufacturing cost + Variable marketing and administrative cost.

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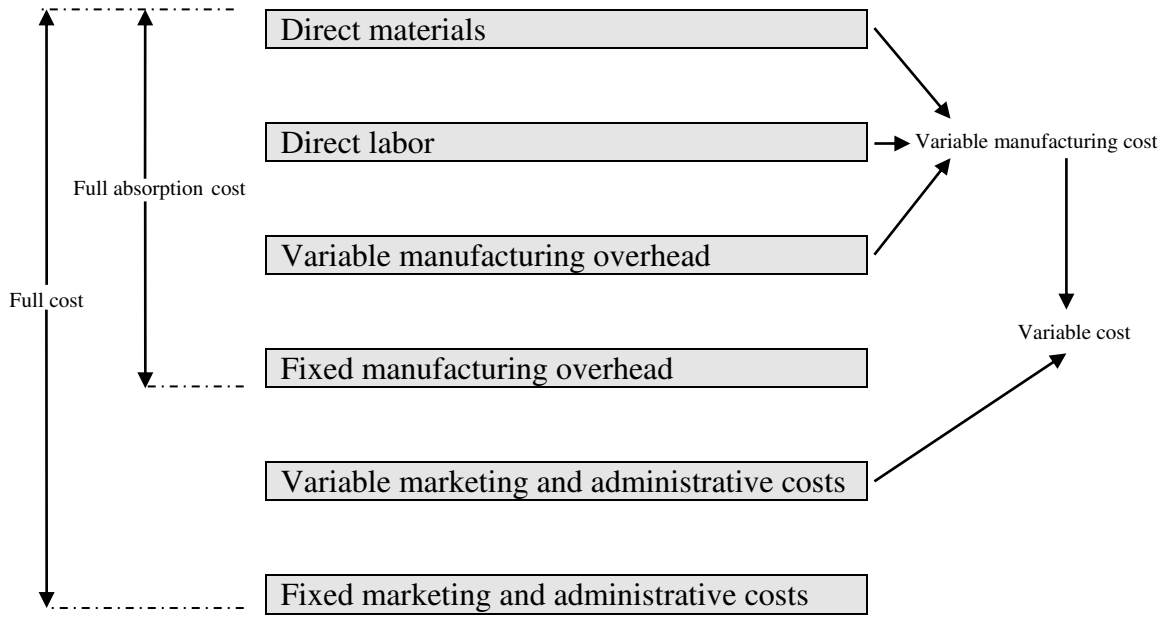
- The diagram below demonstrates the relationship among various product cost components.



- Unit Fixed Costs Can Be Misleading for Decision Making
  - Unit fixed costs are valid only at one volume.
  - When fixed costs are allocated to each unit, accounting records often make the costs appear as though they are variable.
  - It is easy to interpret unit costs incorrectly and make incorrect decisions.

See Demonstration Problem 4

- **Gross margin** as reported in the external financial statements is the difference between revenue and cost of goods sold, or
  - Gross margin = Revenue – Cost of goods sold.
  - Gross margin per unit = Sales price – Full absorption cost per unit.
  - Cost of goods sold = Full absorption cost per unit × Number of units sold.
  - The income statement format that emphasizes gross margin is referred to as the traditional income statement.

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- **Contribution margin per unit** = Sales price – Variable costs per unit. Contribution margin is the amount available to cover fixed costs and earn a profit.
    - The income statement format that emphasizes contribution margin is referred to as the contribution margin income statement.
        - Exhibit 2.12 highlights gross margin information while Exhibit 2.13 showcases contribution margin information. In both cases, the operating profit per unit remains the same.
        - The interaction behind the calculations of gross margin per unit and contribution margin per unit is presented below.

Traditional Income Statement	Components	Contribution margin Income Statement
Sales price		Sales price
Less: Full absorption cost	= Variable manufacturing cost + Fixed manufacturing costs	Less: Variable cost
Gross margin		Contribution margin
Less: Marketing and administrative costs	= Variable marketing and administrative cost + Fixed marketing and administrative cost	Less: Fixed costs
Operating profit		Operating profit

LO 2-7 Understand the distinction between financial and contribution margin income statements.

HOW TO MAKE COST INFORMATION MORE USEFUL FOR MANAGERS

- Period costs can be determined once product costs are properly defined. Three approaches to determining product costs are available.
    - Full absorption costing (traditional income statement): As required by GAAP, all fixed and variable manufacturing costs are product costs. All other costs are period costs.
    - Variable costing (contribution margin income statement): Only variable manufacturing costs are product costs. All other costs are period costs.
    - Managerial costing: Management determines which costs are associated with the product. Any new costs resulting from adding a product are considered product costs.

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See Demonstration Problem 5

- Gross Margin versus Contribution Margin Income Statements
  - A comparison of the first two income statement formats is shown below.

Gross Margin Income Statement	**Contribution Margin Income Statement**
Sales revenue	Sales revenue
Less: Cost of goods sold (including variable manufacturing costs and fixed manufacturing costs)	Less: Variable costs (including variable manufacturing and variable marketing and administrative costs)
Gross margin	Contribution margin
Less: Marketing and administrative costs (including variable marketing and administrative costs and fixed marketing and administrative costs)	Less: Fixed costs (including fixed manufacturing and fixed marketing and administrative costs)
Operating profit	Operating profit

  - Exhibit 2.14 illustrates the differences between gross margin and contribution margin income statements.
  - The product costs assigned to inventory are carried in the accounts as assets. When the goods are sold, the costs flow from inventory to the cost of goods sold account of the income statement.

See Demonstration Problem 6

- Developing Financial Statements for Decision Making
  - The cost accounting system is designed to provide managers with relevant information for decision making. Financial statements may be developed to serve special purposes.
  - Case in point is the development of a value income statement that classifies costs into value-added and nonvalue-added categories. By classifying activities as value added or nonvalue added, managers are better able to reduce or eliminate nonvalue-added activities and therefore reduce costs.
  - Exhibit 2.15 illustrates a value income statement.

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- Depending on the business and strategic environment of the firm, it is possible to construct financial statements around activities related to quality, environmental compliance, or new product development.

SUMMARY

- Exhibit 2.16 provides a summary of cost terms and definitions.

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Matching

A. Administrative costs
B. Conversion costs
C. Cost allocation
D. Cost object
E. Cost pool
F. Direct cost
G. Full absorption cost
H. Indirect cost
I. Opportunity cost
J. Prime costs
K. Semivariable cost
L. Work in process

_____ 1. The foregone benefit from the best (forgone) alternative course of action.

_____ 2. Sum of direct labor and manufacturing overhead.

_____ 3. All variable and fixed manufacturing costs; used to compute a product's inventory value under GAAP.

_____ 4. The process of assigning indirect costs to products, services, people, business units, etc.

_____ 5. Any cost that cannot be directly related to a cost object.

_____ 6. Any end to which a cost is assigned.

_____ 7. Costs required to manage the organization and provide staff support.

_____ 8. Sum of direct materials and direct labor.

_____ 9. Collection of costs to be assigned to the cost objects.

_____ 10. A cost that has both fixed and variable components.

_____ 11. A product in the production process but not yet complete.

_____ 12. Any cost that can be directly (unambiguously) related to a cost object at reasonable cost.

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Matching Answers

1. I
2. B
3. G
4. C
5. H
6. D
7. A
8. J
9. E
10. K
11. L
12. F

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Multiple Choice Questions

1. Which of the following statements about costs and expenses is correct?
   a. A cost is a sacrifice of resources.
   b. Cost and expense are the same.
   c. All assets will become expenses.
   d. There is no guidance as to when costs are to be treated as expenses.

2. A cost of goods sold statement for a retail business:
   a. Includes transportation-in costs.
   b. Has a cost of goods manufactured section.
   c. Covers a period of time.
   d. Both a and c.

3. A period cost:
   a. Is also known as manufacturing cost.
   b. Includes both marketing and administrative costs.
   c. Will be expensed when products are sold.
   d. Is part of cost of goods sold.

Use the following information to answer questions 4 through 7:
A product is sold for $75 each with unit cost of direct materials $20, direct labor $15, variable manufacturing overhead $12, and fixed manufacturing overhead $10. The volume produced and sold is 6,000 units. Variable and fixed marketing and administrative costs are $4 and $3, respectively.

4. Which of the following statements is correct?
   a. Prime cost is $35.
   b. Conversion cost is $37.
   c. Inventoriable cost is $57.
   d. All of the above.

5. What is the amount of cost of goods sold?
   a. $342,000
   b. $201,500
   c. $364,000
   d. None of the above.

6. Which of the following statements is correct?
   a. Operating profit is $66,000.
   b. Gross margin is $108,000.
   c. Contribution margin is $144,000.
   d. All of the above.

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7. What is the full absorption cost per unit?
   a. The same as full cost.
   b. The same as inventoriable cost.
   c. The full absorption cost per unit is $55.
   d. The sum of variable manufacturing cost and variable marketing and administrative cost.

8. Which of the following statements regarding cost behavior within the relevant range is incorrect?
   a. Total fixed cost remains the same.
   b. Fixed cost per unit remains constant.
   c. Variable cost per unit remains constant.
   d. Semivariable cost is also called mixed cost.

9. Unit fixed cost:
   a. Is treated as variable cost when allocated to each unit.
   b. Can be used for decision making under any circumstances.
   c. Is misleading as the total fixed cost does not change.
   d. Both a and c.

10. A value income statement:
   a. Is developed for managerial decision making.
   b. Distinguishes between value-added and nonvalue-added activities.
   c. Is governed by GAAP.
   d. Both a and b.

11. Which of the following statements is correct?
   a. A cost object is any end to which a cost is assigned.
   b. A cost pool is the collection of costs to be assigned to the cost objects.
   c. A cost flow diagram is a diagram illustrating the cost allocation process.
   d. All of the above.

12. The annual operating expense of running a copy center is shared by the three departments that use its service: Human resource, Accounting, and Legal. Last year, the copy center incurred $30,000 while HR copied 20,000 pages, Accounting 30,000 pages, and Legal 50,000 pages. What was Accounting department's share of the copy center cost?
   a. $15,000
   b. $6,000
   c. $9,000
   d. $7,500

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Multiple Choice Answers

1. a (LO1)

2. d (LO2)

3. b (LO2)

4. d (LO4)

Prime cost = \$20 + \$15 = \$35
Conversion cost = \$15 + \$12 +\$10 = \$37
Inventoriable cost = \$20 + \$15 + \$12 +\$10 = \$57

5. a (LO4)

\$57 × 6,000 = \$342,000

6. d (LO4, LO7)

Gross margin = (\$75 × 6,000) – \$342,000 = \$108,000
Operating profit = \$108,000 – [(\$4 + \$3) × 6,000] = \$66,000
Contribution margin = (\$75 – \$20 – \$15 – \$12 – \$4) × 6,000 = \$144,000

7. b (LO6)

8. b (LO5)

9. d (LO6)

10. d (LO7)

11. d (LO3)

12. c (LO3)

Accounting department's share of usage = $\frac{30,000}{20,000+30,000+50,000} \times 100\% = 30\%$

Accounting department's share of cost = \$30,000 × 30% = \$9,000

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Demonstration Problem 1

A developer plans to buy a parcel of land and construct an office building on top of it. He narrows his search to two possible lots in adjacent states with convenient access to highways. The expected returns from Lots C and D are $190,000 and $210,000, respectively.

Required:

What is the opportunity cost of funds the developer uses to purchase Lot D?

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Demonstration Problem 1 – Solution

The opportunity cost of funds the developer uses to purchase Lot D is the forgone return the developer could have earned from purchasing Lot C, assuming that both investments are equal in risk and liquidity

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Demonstration Problem 2

Kahn Industry, Inc. has three divisions. The following information was available for last quarter.

	Division A	Division B	Division C	Company
Revenues	$200,000	$320,000	$140,000	$660,000
Cost of goods (or services) sold	160,000	240,000	100,000	500,000
Gross margin	$240,000	$ 80,000	$ 40,000	$160,000
Marketing and administrative costs	18,000	20,000	12,000	50,000
Operating profit	$ 22,000	$ 60,000	$ 28,000	$110,000
Interest				10,000
Income taxes (30%)				30,000
Net income				$ 70,000

The CEO of Kahn Industry wanted to allocate the interest cost of $10,000 to the three divisions.

Required:

1. Identify the cost object(s) and the cost pool.
2. Allocate the interest cost based on each division's (1) revenues, (2) gross margin, and (3) operating profit.
3. Draw a cost flow diagram assuming the allocation of interest cost is based on revenues.

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Demonstration Problem 2 – Solution

Part 1

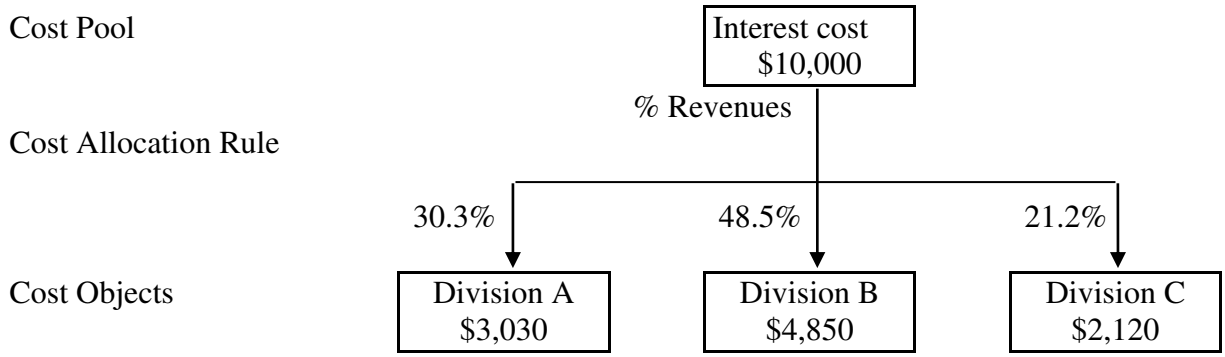
The cost objects are the three divisions; the cost pool is the interest cost incurred for the company as a whole.

Part 2

	Division A	Division B	Division C	Total
(1) Revenues	$200,000	$320,000	$140,000	$660,000
Allocation rule	30.3%[a]	48.5%[b]	21.2%[c]	100%
Allocation	$3,030	$4,850	$2,120	$10,000
(2) Gross margin	$40,000	$80,000	$40,000	$160,000
Allocation rule	25%	50%	25%	100%
Allocation	$2,500	$5,000	$2,500	$10,000
(3) Operating profit	$22,000	$60,000	$28,000	$110,000
Allocation rule	20.0%	54.5%	25.5%	100%
Allocation	$2,000	$5,450	$2,550	$10,000

[a] $200,000 ÷ $660,000 = 0.303, or 30.3%.
[b] $320,000 ÷ $660,000 = 0.485, or 48.5%.
[c] $140,000 ÷ $660,000 = 0.212, or 21.2%.

Part 3



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Demonstration Problem 3

The account balances are listed below for Eagle Manufacturing Company for the month of March.

Finished goods inventory, March 31	$29,000
Direct materials purchases	70,000
Indirect labor	21,000
Direct labor	48,000
Work-in-process inventory, March 31	73,000
Factory supervisory salaries	12,000
Direct materials inventory, March 1	12,000
Factory utilities expense	4,000
Direct materials inventory, March 31	21,000
Work-in-process inventory, March 1	54,000
Factory depreciation expense	5,000
Finished goods inventory, March 1	33,000

Required:

Prepare a cost of goods manufactured and sold statement for Eagle Manufacturing Company for the month ended March 31.

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Demonstration Problem 3 – Solution

Eagle Manufacturing Company
Cost of Goods Manufactured and Sold Statement
For the month of March

Beginning work-in-process inventory			$ 54,000
Manufacturing costs during the year:			
Direct materials			
Beginning inventory	$12,000		
Add: Purchase of direct materials	70,000		
Direct materials available	$82,000		
Less ending inventory	(21,000)		
Direct material put into production		$61,000	
Direct labor		48,000	
Manufacturing overhead:			
Indirect labor	$21,000		
Factory supervisory salaries	12,000		
Factory utilities expense	4,000		
Factory depreciation expense	5,000		
Total manufacturing overhead		42,000	
Total manufacturing costs incurred			151,000
Total work in process during the year			$205,000
Less ending work-in-process inventory			(73,000)
Cost of goods manufactured			$132,000
Beginning finished goods inventory			33,000
Finished goods available for sale			$165,000
Less ending finished goods inventory			(29,000)
Cost of goods sold			$136,000

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Demonstration Problem 4

Gourmet Industry manufactures pasta machines. The accountant of the company provides the cost structure for each pasta machine produced as follows:

Variable manufacturing cost	$ 85
Fixed manufacturing cost	
$\left(= \dfrac{\text{Fixed manufacturing cost per year}}{\text{Units produced per year}} = \dfrac{\$120,000}{2,000}\right)$	60
	$145

The regular price for each pasta machine is $200. A regional restaurant chain wants to buy 150 pasta machines for $120 each. Gourmet Industry is also responsible for a one-time shipping cost of $850. Marketing, administrative, total fixed costs, and regular sales are not affected by the decision. Gourmet Industry has enough idle capacity to handle the order.

Required:

Determine if Gourmet Industry should accept the special order.

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Demonstration Problem 4 – Solution

By accepting the special order, Gourmet Industry will increase its operating profit by $4,400.

Revenues from special order ($120 × 150)	$18,000
Variable manufacturing cost ($85 × 150)	(12,750)
One-time shipping cost	(850)
Contribution of special order to operating profit	$ 4,400

The fixed manufacturing cost of $60 per unit will not affect the decision as the total fixed cost remains unchanged. Based on the analysis, Gourmet Industry should accept the special order.

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Demonstration Problem 5

The following information is available for each unit of the finished product produced and sold:

Sales price	$60
Variable manufacturing cost	20
Fixed manufacturing cost*	12
Variable marketing and administrative cost	6
Fixed marketing and administrative cost*	4

* The unit fixed manufacturing cost and fixed marketing and administrative costs are based on an estimated volume of 6,000 units produced and sold.

Required:

Determine full absorption cost, variable cost, full cost, gross margin, contribution margin, and operating profit per unit.

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Demonstration Problem 5 – Solution

Full absorption cost = $20 + $12 = $32

Variable cost = $20 + $6 = $26

Full cost = ($20 + $12 + $6 + $4) = $42

Gross margin = $60 – $32 = $28

Contribution margin = $60 – $26 = $34

Operating profit (from traditional income statement format) = $28 – ($6 + $4) = $18

Operating profit (from contribution margin income statement format) = $34 – ($12 + $4) = $18

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Demonstration Problem 6

(Continued from Demonstration Problem 5)

The following information is available for each unit of the finished product produced and sold:

Sales price	$60
Variable manufacturing cost	20
Fixed manufacturing cost*	12
Variable marketing and administrative cost	6
Fixed marketing and administrative cost*	4

* The unit fixed manufacturing cost and fixed marketing and administrative costs are based on an estimated volume of 6,000 units produced and sold.

Required:

Prepare a traditional income statement and contribution margin income statement when 6,000 units are produced and sold.

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Demonstration Problem 6 – Solution

Traditional Income Statement		Contribution Margin Income Statement	
Revenues	$360,000	Revenues	$360,000
Less: Cost of goods sold	(192,000)	Less: Variable cost	(156,000)
Gross margin	168,000	Contribution margin	204,000
Less: Marketing and administrative costs	(60,000)	Less: Fixed costs	(96,000)
Operating profit	$108,000	Operating profit	$108,000

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Student Name: **Instructor**
Class: **McGraw-Hill/Irwin**
Exercise 02-41

MONROE FABRICATORS

Part a.

Beginning direct materials inventory	$ 7,800
Transferred In	48,300
Transferred Out	43,800
Ending direct materials inventory	$ 12,300

Correct!

Part b.

Cost of goods manufactured	$ 163,350
Beginning work-in-process inventory	8,100
Ending work-in-process inventory	11,400
Total Manufacturing cost	$ 166,650

Correct!

Part c.

Total manufacturing cost	$ 166,650
Direct materials used	$ 43,800
Manufacturing overhead	41,400
Direct labor	$ 81,450

Correct!

Part d.

Gross margin	$ 147,750
Cost of goods sold	168,150
Sales revenue	$ 315,900

Correct!

Given Data E02-41:

MONROE FABRICATORS

Direct materials inventory, January 1	$	7,800
Direct materials inventory, December 31	a.	?
Work-in-process inventory, January 1		8,100
Work-in-process inventory, December 31		11,400
Finished goods inventory, January 1		5,700
Finished goods inventory, December 31		900
Purchases of direct materials		48,300
Cost of goods manufactured during the year		163,350
Total manufacturing cost	b.	?
Cost of goods sold		168,150
Gross margin		147,750
Direct labor	c.	?
Direct materials used		43,800
Manufacturing overhead		41,400
Sales revenue	d.	?

Student Name: **Instructor**
Class: **McGraw-Hill/Irwin**
Exercise 02-46

MADRID CORPORATION

Direct Materials	$ 270	
Direct Labor	165	
Variable Manufacturing Overhead	60	
Variable Manufacturing Costs		$ 495
Variable Marketing and Administrative Cost	18	
Unit Variable Cost		$ 513
Fixed Manufacturing overhead:	90	
Full-absorption Cost		$ 585
Fixed Marketing and Administrative Cost	60	
Full Cost of Making and Selling Product		$ 663

«- Correct!

«- Correct!

«- Correct!

«- Correct!

Given Data E02-46:

MADRID CORPORATION

Information provided by accounting system:		
Sales price (per unit)	$	900
Fixed costs (for the month)		
Marketing and administrative	$	108,000
Manufacturing overhead	$	162,000
Variable costs (per unit)		
Marketing and administrative	$	18
Direct materials	$	270
Manufacturing overhead	$	60
Direct labor	$	165
Units produced and sold (for the month)		1,800

Student Name: **Instructor**
Class: **McGraw-Hill/Irwin**
Problem 02-54

CHELSEA, INC.

a. Total Prime Cost Computation

Beginning Inventory	$ 9,000
Plus Purchases	120,000
Minus Ending Inventory	7,500
Direct materials	121,500
Direct Labor	96,000
Prime Cost	$ 217,500

Correct!

b. Total Conversion Cost Computation

Direct Labor	$ 96,000
Manufacturing Overhead	126,000
Conversion Cost	$ 222,000

Correct!

c. Total Manufacturing Costs Computation

Direct materials	$ 121,500
Direct Labor	96,000
Manufacturing Overhead	126,000
Total Manufacturing Costs	$ 343,500

Correct!

d. Cost of Goods Manufactured Calculation

Beginning Work-in-Process	$ 4,500
Total Manufacturing Costs	343,500
Ending Work-in-Process	3,000
Cost of Goods Manufactured	$ 345,000

Correct!

e. Cost of Goods Sold Calculation

Cost of Goods Manufactured	$ 345,000
Beginning Finished Goods Inventory	27,000
Ending Finished Goods Inventory	36,000
Cost of Goods Sold	$ 336,000

Correct!

Given Data P02-54:

CHELSEA, INC.

Information provided by accounting records:

Direct materials inventory, May 1	$	9,000
Direct materials inventory, May 31		7,500
Work-in-process inventory, May 1		4,500
Work-in-process inventory, May 31		3,000
Finished goods inventory, May 1		27,000
Finished goods inventory, May 31		36,000
Direct materials purchased during May		120,000
Direct labor costs, May		96,000
Manufacturing overhead, May		126,000

Student Name: **Instructor**
Class: **McGraw-Hill/Irwin**
Problem 02-56

COLUMBIA PRODUCTS

a. Computations

1. Variable Manufacturing Cost

Manufacturing overhead	$	70
Direct labor		35
Direct materials		112
Variable Manufacturing Cost	$	217

Correct!

2. Full Unit Cost

Fixed manufacturing	$	56
Fixed marketing and administrative cost		75
Direct labor		35
Direct materials		112
Variable overhead		70
Variable costs		14
Full Unit Cost	$	362

Correct!

3. Variable Cost per Unit

Variable cost	$	14
Variable overhead		70
Direct labor		35
Direct materials		112
Variable Cost	$	231

Correct!

4. Full Absorption Cost per Unit

Fixed manufacturing overhead	$	56
Variable manufacturing overhead		70
Direct labor		35
Direct materials		112
Full Absorption Cost	$	273

Correct!

5. **Prime Cost per Unit**

Direct labor	$ 35
Direct materials	112
Prime Cost	$ 147

Correct!

6. **Conversion Cost per Unit**

Direct labor	$ 35
Manufacturing overhead	126
Conversion Cost	$ 161

Correct!

7. **Profit Margin per Unit**

Sales price	$ 448
Full cost	362
Profit Margin	$ 86

Correct!

8. **Contribution Margin per Unit**

Sales price	$ 448
Variable costs	231
Contribution Margin	$ 217

Correct!

9. **Gross Margin per Unit**

Sales price	$ 448
Full absorption cost	273
Gross Margin	$ 175

Correct!

b. **If the number of units decreases from 1,200 to 800, which is within the relevant range, will the *fixed manufacturing cost* per unit increase, decrease, or remain the same? Explain.**

As the number of units increases (reflected in the denominator), fixed manufacturing 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.

Given Data P02-56:

COLUMBIA PRODUCTS

Information provided by accounting system:		
Sales price (per unit)	$	448
Manufacturing costs:		
Fixed overhead (for the month)	$	50,400
Direct labor (per unit)		35
Direct materials (per unit)		112
Variable overhead (per unit)		70
Marketing and administrative costs:		
Fixed costs (for the month)	$	67,500
Variable costs (per unit)		14

Student Name: **Instructor**
Class: **McGraw-Hill/Irwin**
Integrative Case 2-69

Tunes2Go
Drive Systems Division (DSD)

a. This year's income statement	**Baseline (status quo)**	**Rent Equipment**	**Difference**	**Change**
Sales Revenue	$ 4,800,000	$ 4,800,000	$ -	No Change
Operating costs:				
Variable	(600,000)	(600,000)	-	No Change
Fixed (cash expenditures)	(2,250,000)	(2,250,000)	-	No Change
Equipment depreciation	(450,000)	(450,000)	-	No Change
Other depreciation	(375,000)	(375,000)	-	No Change
Loss from equipment write-off	-	(2,550,000)	2,550,000	Lower
Operating profit (before taxes)	$ 1,125,000	$ (1,425,000)	$ 2,550,000	Lower
	Correct!	Correct!	Correct!	

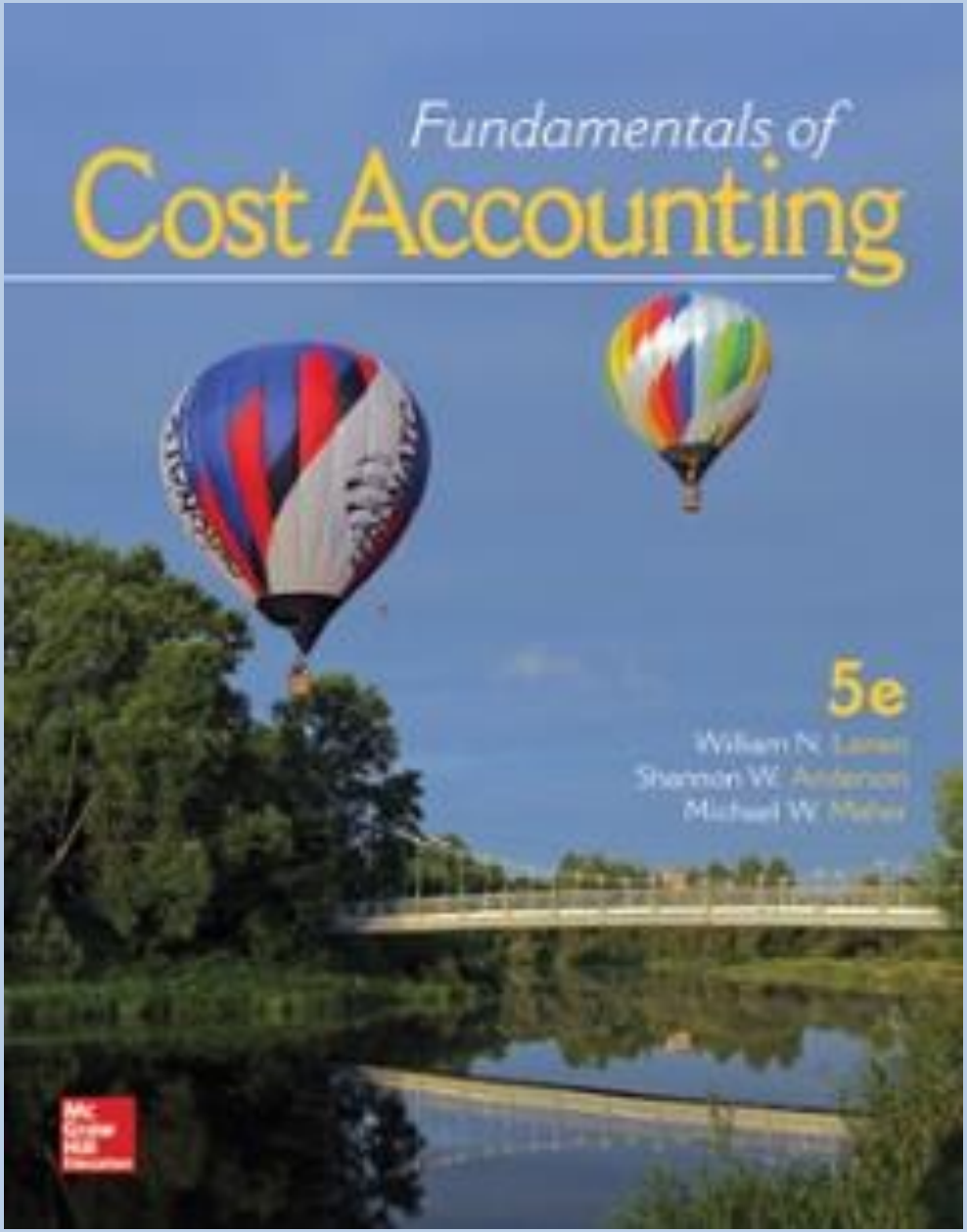
b. Next year's income statement	**Baseline (status quo)**	**Rent Equipment**	**Difference**	
Sales Revenue	$ 4,800,000	$ 5,136,000	$ 336,000	Higher
Operating costs:				
Equipment rental	-	(690,000)	690,000	Higher
Variable	(600,000)	(600,000)	-	No Change
Fixed cash expenditures	(2,250,000)	(2,115,000)	135,000	Lower
Equipment depreciation	(450,000)	-	450,000	Lower
Other depreciation	(375,000)	(375,000)	-	No Change
Operating profit	$ 1,125,000	$ 1,356,000	$ 231,000	Higher
	Correct!	Correct!	Correct!	

c. Would you rent the new equipment? Why or why not?

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).

Given Data IC2-69:

Tunes2Go Drive Systems Division (DSD)	
Cost of existing automated testing equipment	$ 3,000,000
No salvage value	
Annual rental charge for new testing machine	$ 690,000
Percentage increase in DSD's annual revenue	7%
Percentage decrease in fixed cash expenditures	6%
Revenue and expense estimates without new machine:	
Sales revenue	$ 4,800,000
Variable operating costs	600,000
Fixed operating costs	2,250,000
Equipment depreciation	450,000
Other depreciation	375,000



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Fundamentals of Cost Accounting 5th edition Lanen Solutions Manual

Cost Concepts and Behavior

Chapter 2

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Learning Objectives

LO 2-1 Explain the basic concept of "cost."

LO 2-2 Explain how costs are presented in financial statements.

LO 2-3 Explain the process of cost allocation.

LO 2-4 Understand how material, labor, and overhead costs are added to a product at each stage of the production process.

LO 2-5 Define basic cost behaviors, including fixed, variable, semivariable, and step costs.

LO 2-6 Identify the components of a product's costs.

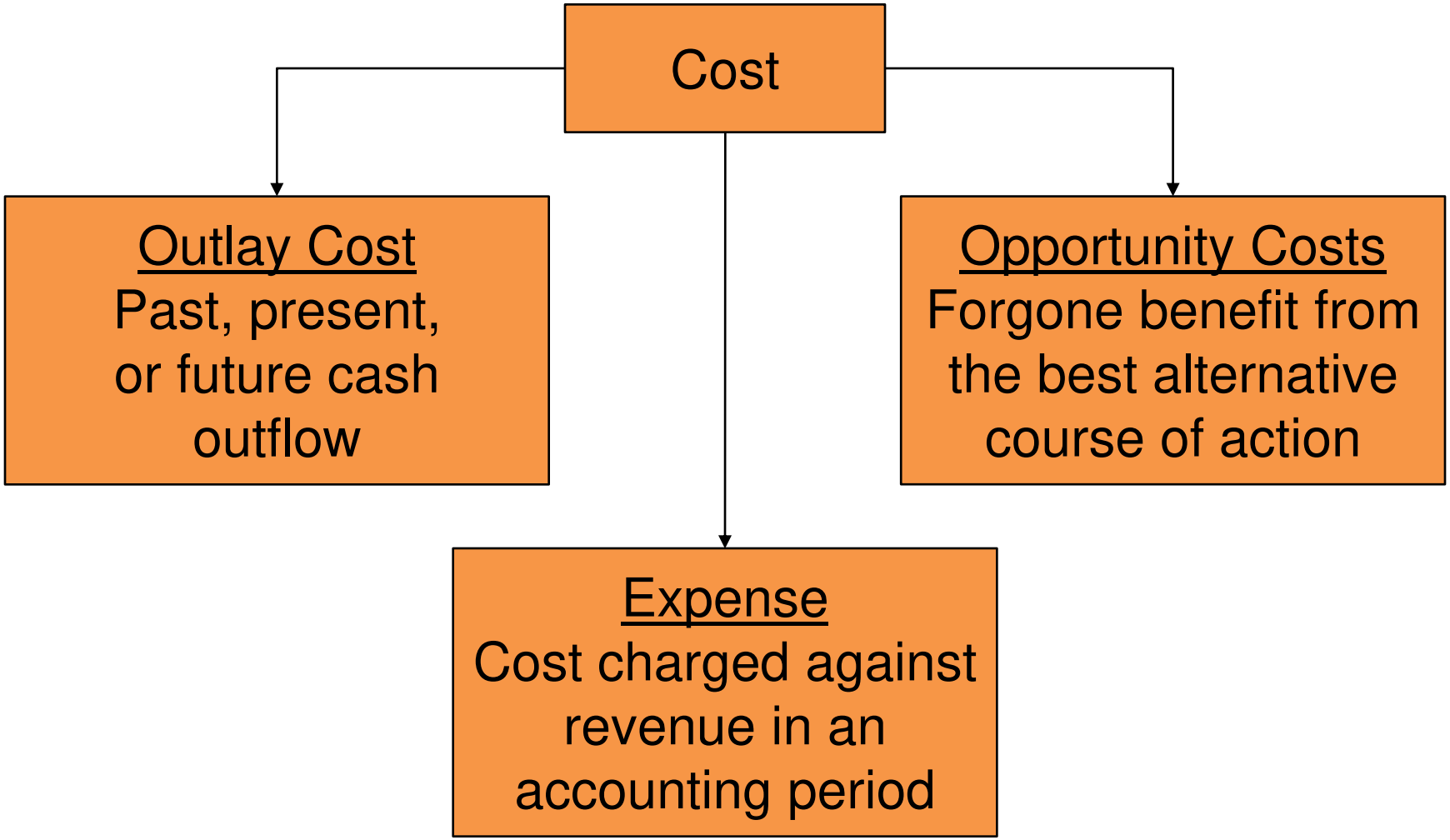
LO 2-7 Understand the distinction between financial and contribution margin income statements.

What is a Cost?

LO 2-1 Explain the basic concept of "cost."

Cost is a sacrifice of resources.

Cost versus Expenses



Presentation of Costs in Financial Statements

LO 2-2 Explain how costs are presented in financial statements.

RPE ASSOCIATES
Income Statement
For the Year Ended December 31, Year 2
($000)

Revenues	$32,000
Cost of services sold	23,500
Gross margin	$ 8,500
Marketing and administrative costs	4,300
Operating profit	$ 4,200

Cost of billable hours

The excess of operating revenue over costs necessary to generate those revenues

Presentation of Costs in Financial Statements

SOUTHWEST OFFICE PRODUCTS
Income Statement
For the Year Ended December 31, Year 2
($000)

Sales revenue	$3,225
Cost of goods sold (see following statement)	1,775
Gross margin	$1,450
Marketing and administrative costs	825
Operating profit	$ 625

Cost of Goods Sold Statement
For the Year Ended December 31, Year 2
($000)

Beginning inventory		$ 300
Cost of goods purchased		
Merchandise cost	$1,830	
Transportation-in costs	90	
Total cost of goods purchased		1,920
Cost of goods available for sale		$2,220
Less cost of goods in ending inventory		445
Cost of goods sold		$1,775

Expense assigned to products sold during a period

The excess of operating revenue over costs necessary to generate those revenues

Presentation of Costs in Financial Statements

Cost incurred to manufacture the product sold

Product costs recorded as "inventory" when cost is incurred

Expense when sold

JACKSON GEARS
Income Statement
For the Year Ending December 31, Year 2
($000)

Sales revenue	$20,450
Cost of goods sold (see Exhibit 2.8)	13,100
Gross margin	$ 7,350
Less marketing and administrative costs	3,850
Operating profit before taxes	$ 3,500

Period costs recorded as an expense in the period the cost is incurred

Product versus Period Costs

Two types of manufacturing costs:

Product costs: Costs related to inventory	Period costs: Non-manufacturing costs related to the firm

Product versus Period Costs

Product costs:
Costs that are recorded as an asset in inventory when incurred and expensed as Cost of Goods Sold when sold

Period costs:
Costs recognized for financial reporting when incurred

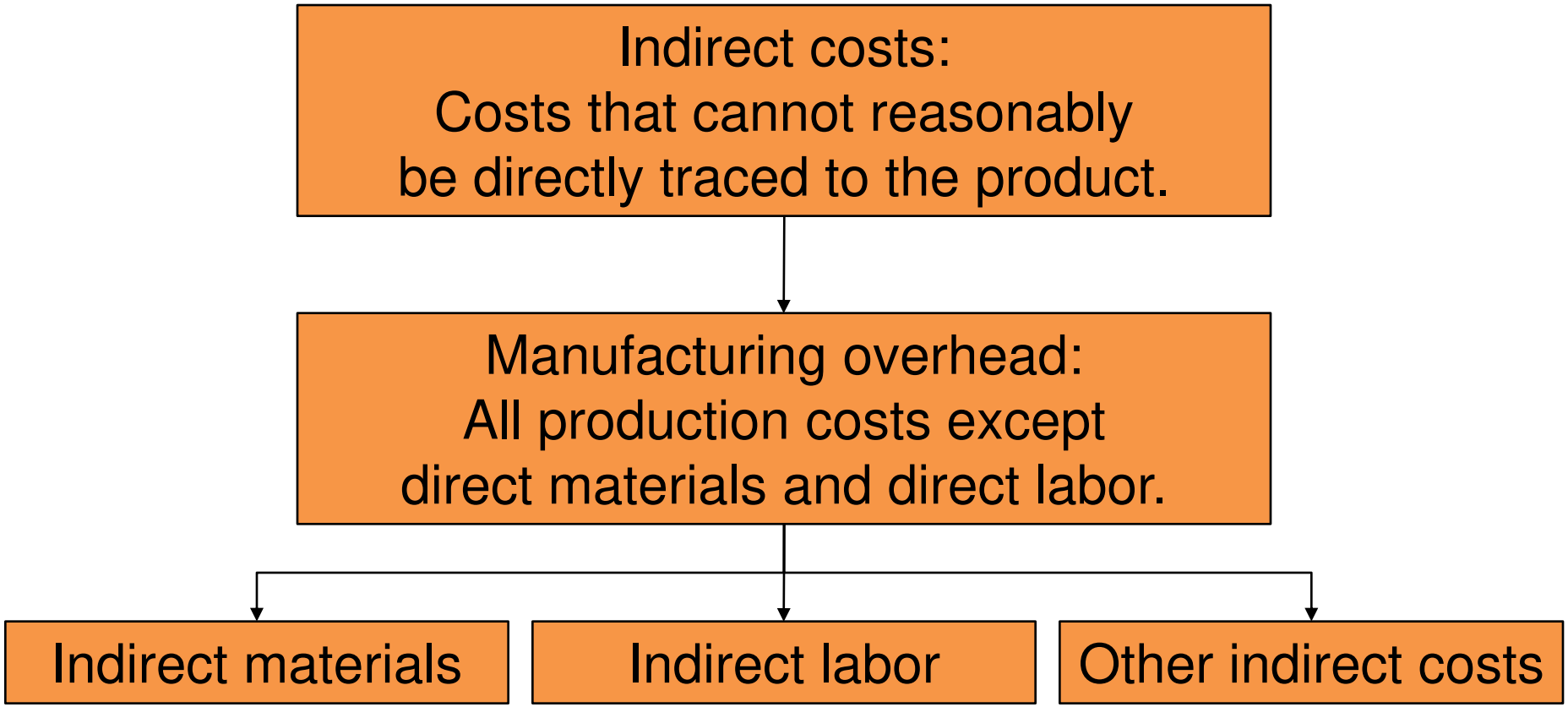
Direct and Indirect Manufacturing Costs

Direct costs:
Costs that, for a reasonable cost, can be directly traced to the product.

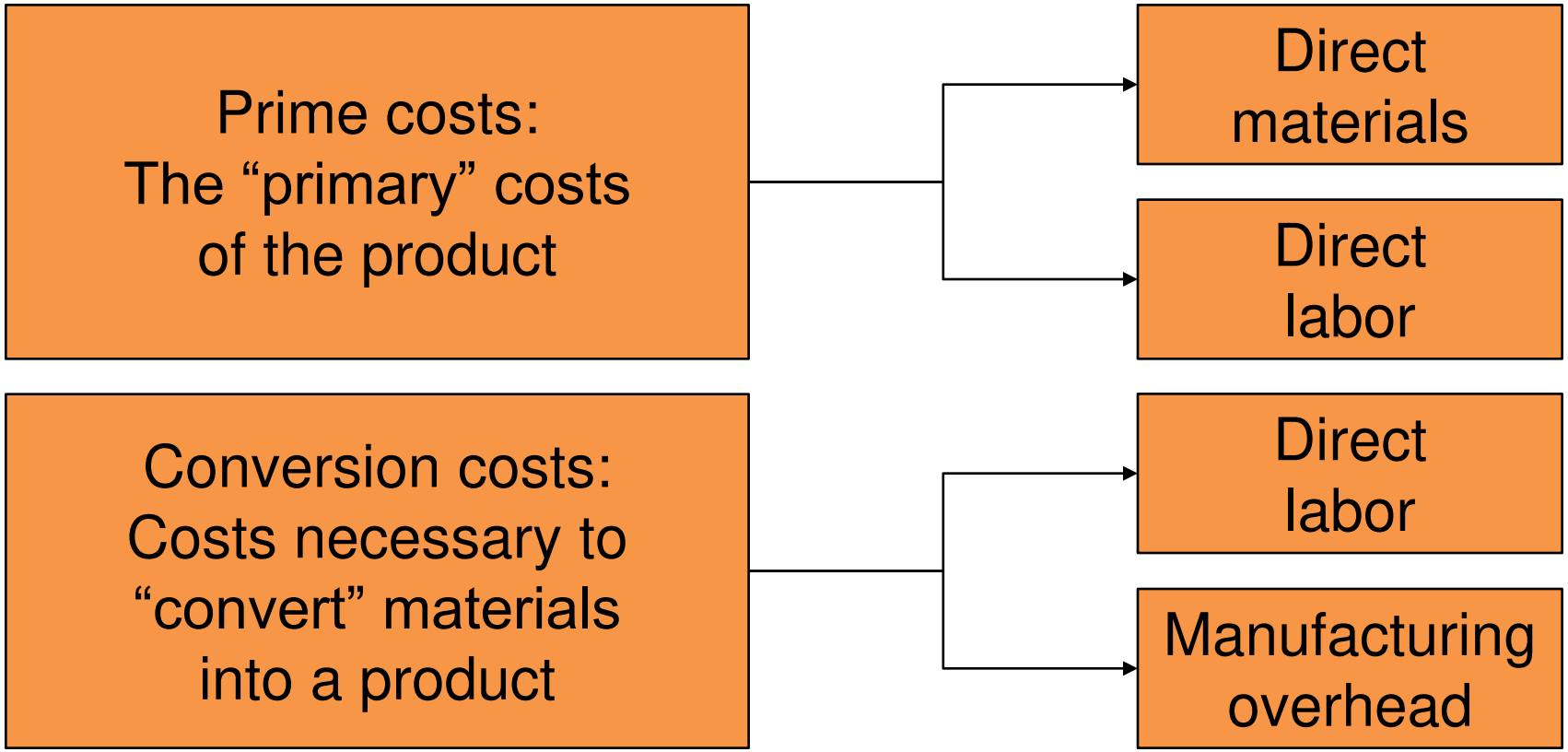
Direct materials:
Materials directly traceable to the product

Direct labor:
Work directly traceable to transforming materials into the finished product

Direct and Indirect Manufacturing Costs

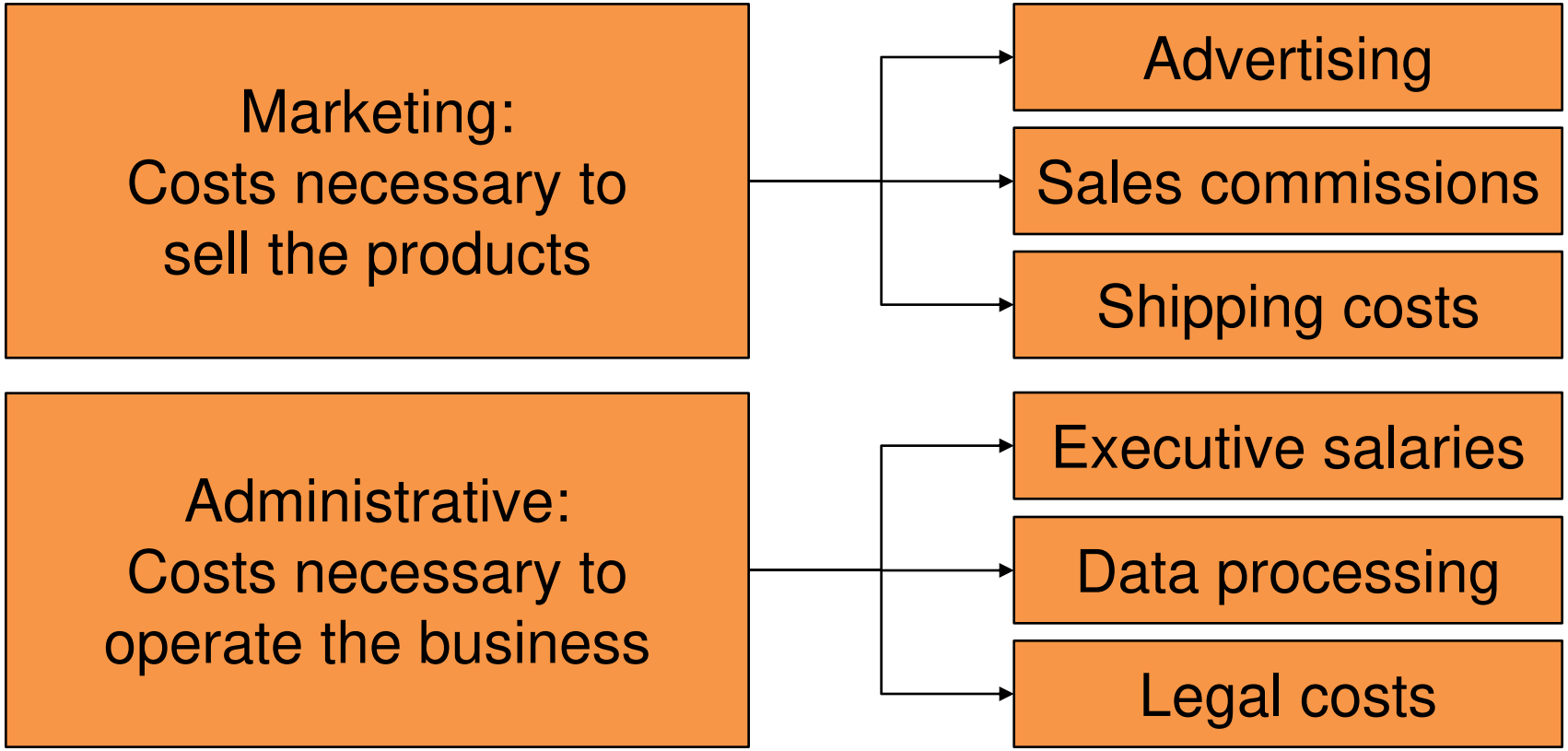


Prime Costs and Conversion Costs



Non-manufacturing (Period) Costs

Recognized as expenses when the costs are incurred



Cost Allocation

LO 2-3 Explain the process of cost allocation.

It is the process of assigning indirect costs to products, services, business units, etc.

Cost Allocation

1. Define the cost pool:
   The collection of costs to be assigned to cost objects

2. Determine the cost allocation rule:
   The method used to assign costs in the cost pool to cost objects

3. Assign the costs in the cost pool to the cost object:
   Any end to which a cost is assigned – product, product line, department, customer, etc.

Cost Allocation: Example

Rockford Corporation has two divisions, East Coast and West Coast. Both divisions are supported by the IS Group.

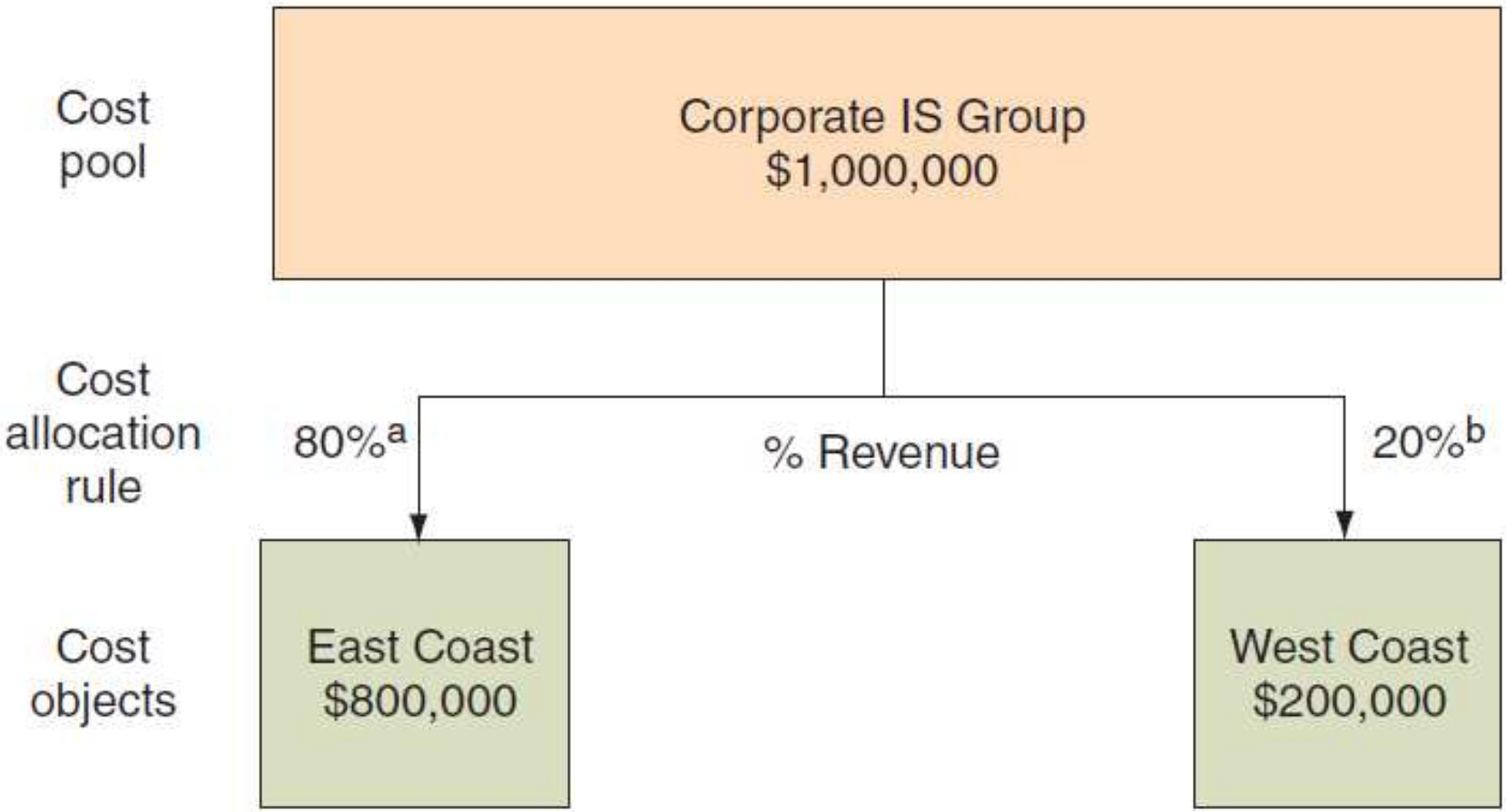
	East Coast	West Coast	Total
Revenues	$80 million	$20 million	$100 million

1. Define the cost pool: IS department's costs of $1,000,000

2. Determine the cost allocation rule: IS costs are allocated based on divisional revenue. (% of revenue)

3. Assign to the cost object: East Coast: 80% of cost
   West Coast: 20% of cost

Cost Flow Diagram



[a] 80% = $80 million revenue ÷ ($80 million + $20 million) [b] 20% = $20 million revenue ÷ ($80 million + $20 million)

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Details of Manufacturing Cost Flows

LO 2-4 Understand how material, labor, and overhead costs are added to a product at each stage of the production process.

Product costs are recorded in inventory when costs are incurred.

A manufacturing company has three inventory accounts:

1. Raw Materials Inventory:
   Materials purchased to make a product
2. Work-in-Process Inventory:
   Products currently in the production process, but not yet completed
3. Finished Goods Inventory:
   Completed products that have not yet been sold

Inventory Accounts – The Balance Sheet

Direct Materials Inventory	
	Beg. RM inventory
+	Purchases
=	Raw materials available for production
–	Ending RM inventory
=	Raw materials transferred to WIP

Work-in-Process Inventory	
	Beg. WIP inventory
+	Direct materials transferred from raw materials
+	Direct labor
+	Manufacturing overhead
=	Total manufacturing costs
=	Ending WIP inventory
–	Costs of goods completed and transferred to finished goods (or cost of goods manufactured)

Finished Goods Inventory	
	Beg. FG inventory
+	Cost of goods completed and transferred from WIP
=	Goods available for sale
=	Ending FG inventory
–	Cost of goods sold

To the Income Statement

How Costs Flow Through the Statements

JACKSON GEARS
Income Statement
For the Year Ending December 31, Year 2
($000)

Sales revenue	$20,450
Cost of goods sold (see Exhibit 2.8)	13,100
Gross margin	$ 7,350
Less marketing and administrative costs	3,850
Operating profit before taxes	$ 3,500

How Costs Flow Through the Statements

JACKSON GEARS
Cost of Goods Manufactured and Sold Statement
For the Year Ending December 31, Year 2
($000)

Beginning work-in-process inventory, January 1			$270
Manufacturing costs during the year:			
Direct materials:			
Beginning inventory, January 1	$ 95		
Add purchases	5,627		
Direct materials available	$5,722		
Less ending inventory, December 31	72		
Direct material put into production		$5,650	
Direct labor		1,220	
Manufacturing overhead		6,780	
Total manufacturing costs incurred			13,650
Total work in process during the year			$13,920
Less ending work-in-process inventory, December 31			310
Cost of goods manufactured			$13,610

Next, determine the cost of goods sold.

How Costs Flow Through the Statements

JACKSON GEARS
Cost of Goods Manufactured and Sold Statement
For the Year Ending December 31, Year 2
($000)

Beginning work-in-process inventory, January 1			$270
Manufacturing costs during the year:			
Direct materials:			
Beginning inventory, January 1	$ 95		
Add purchases	5,627		
Direct materials available	$5,722		
Less ending inventory, December 31	72		
Direct material put into production		$5,650	
Direct labor		1,220	
Manufacturing overhead		6,780	
Total manufacturing costs incurred			13,650
Total work in process during the year			$13,920
Less ending work-in-process inventory, December 31			310
Cost of goods manufactured			$13,610
Beginning finished goods inventory, January 1			420
Finished goods available for sale			$14,030
Less ending finished goods inventory, December 31			930
Cost of goods sold			$13,100

Cost Behavior

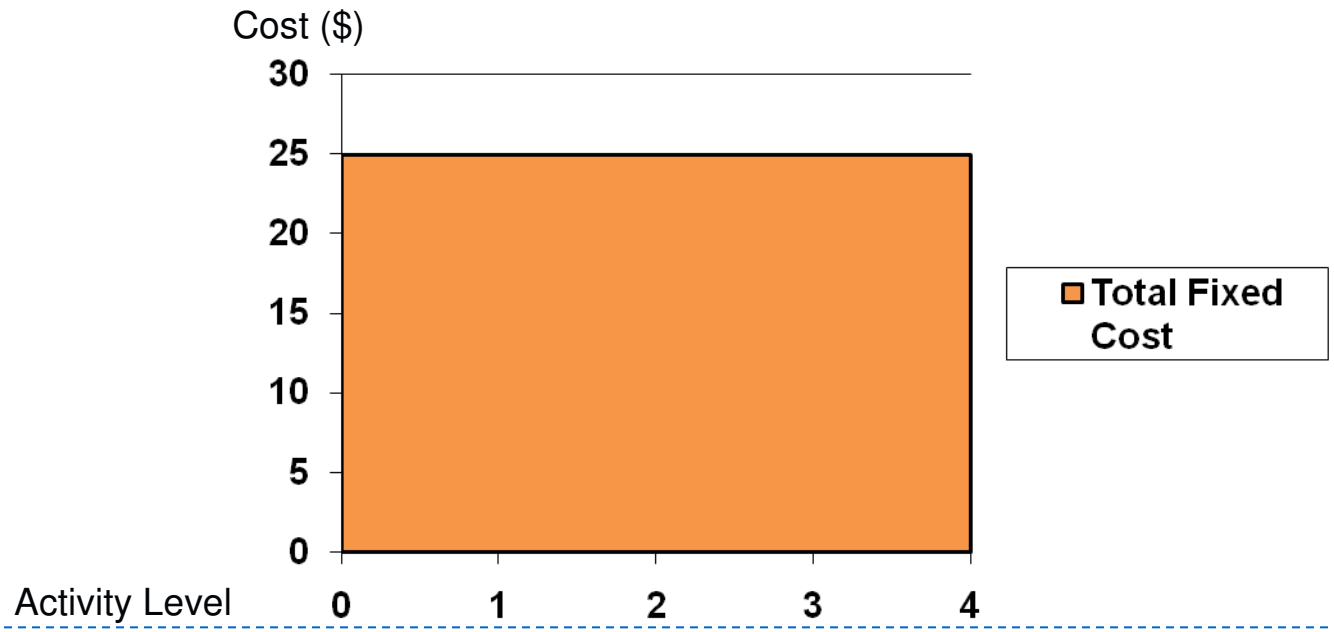
LO 2-5 Define basic cost behaviors, including fixed, variable, semivariable, and step costs.

Cost behavior:
How costs respond to a change in activity level within the relevant range

Relevant range:
Activity levels within which a given total fixed cost or unit variable cost will be unchanged

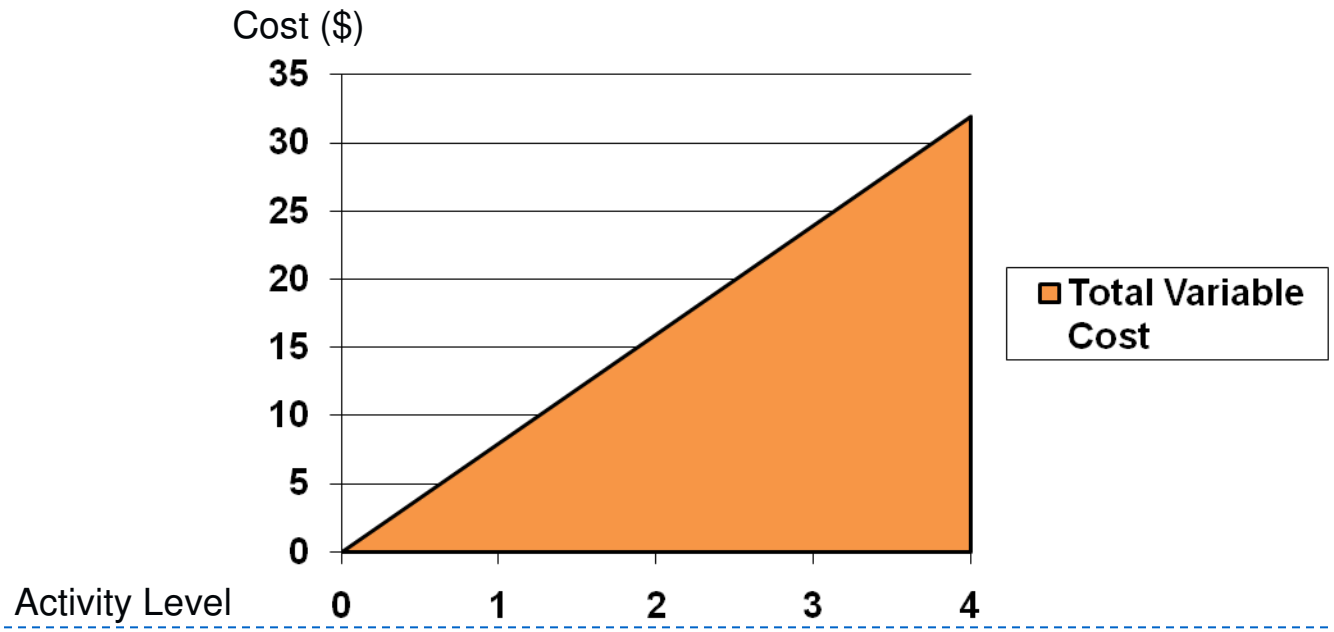
Fixed Costs

Fixed costs in total remain unchanged as volume changes within the relevant range.
Fixed costs per unit varies inversely to a change in activity.
Fixed costs are “fixed” in “total” as activity changes.

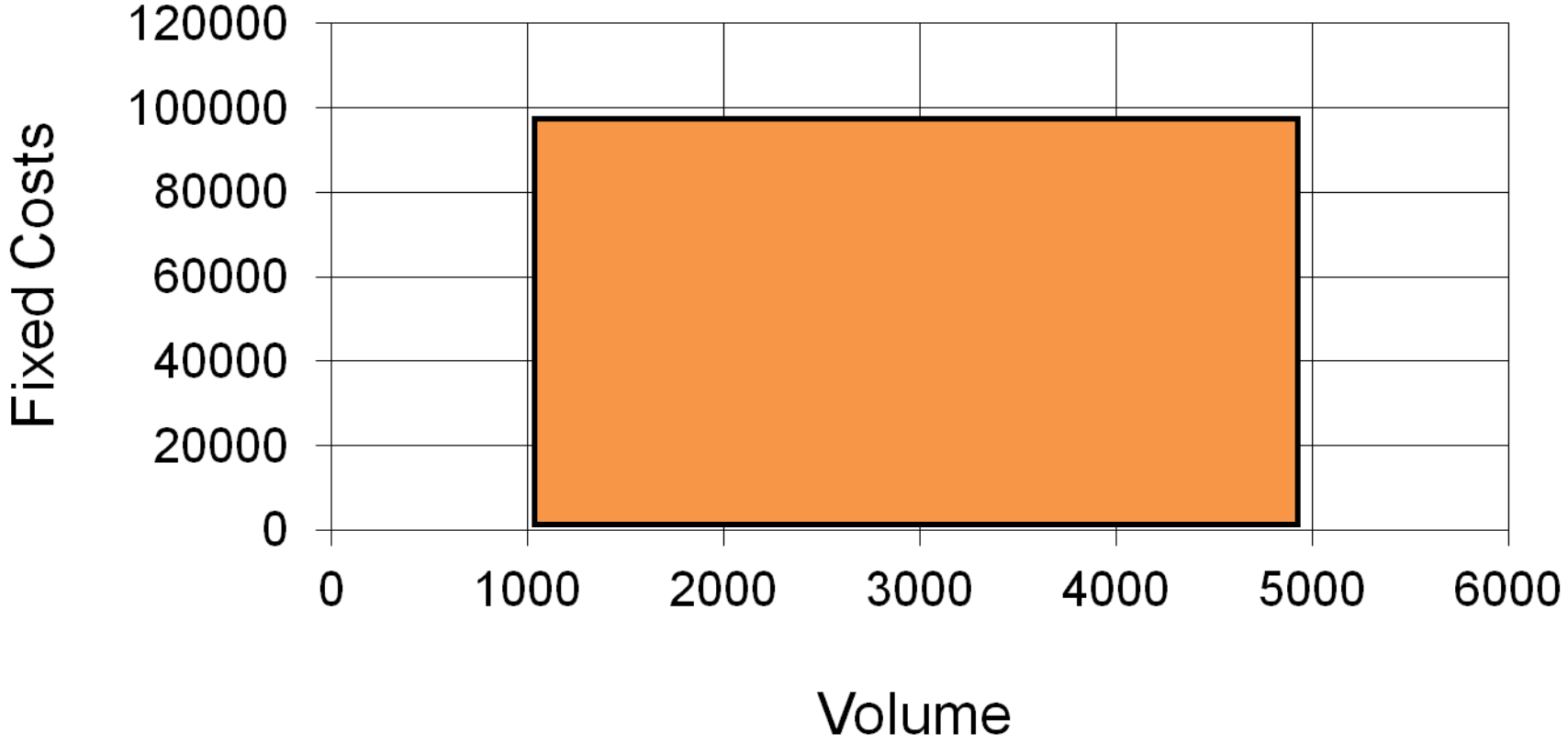


Variable Costs

Costs that change in direct proportion with a change in the volume within the relevant range
Variable costs “vary” in “total” as activity changes.
Variable cost per unit stays constant when activity changes within the relevant range.



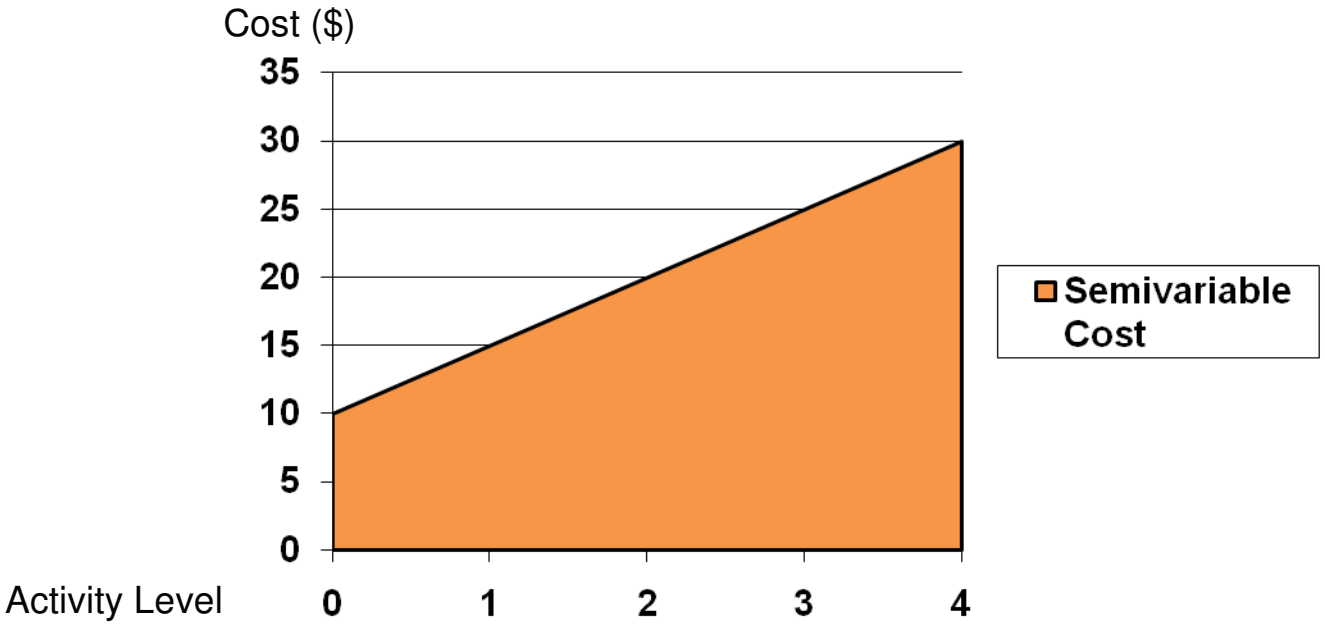
Relevant Range



Semivariable Costs

Costs that have both fixed and variable components

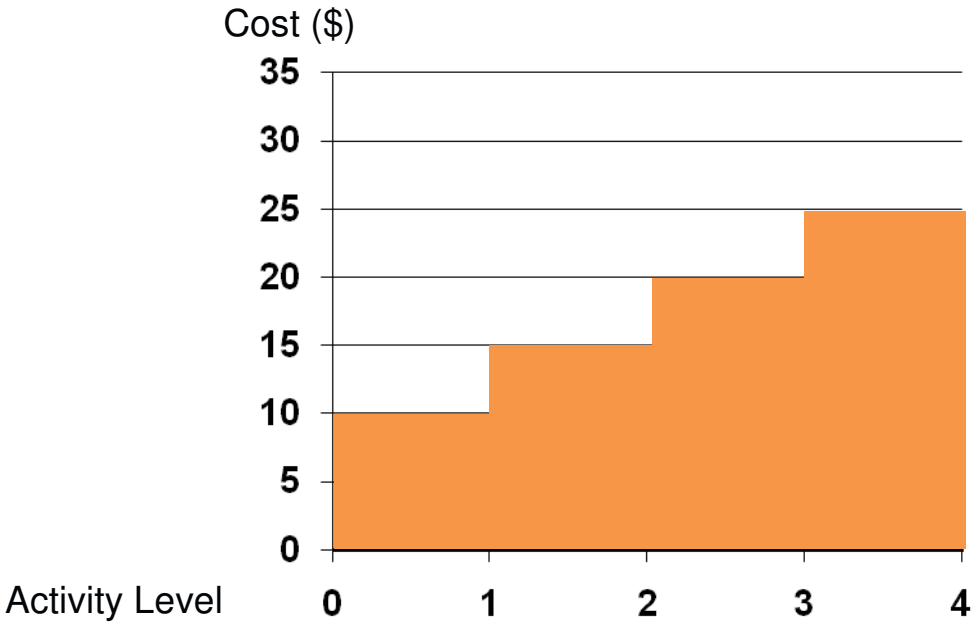
Also known as mixed costs



Step Costs

Costs that increase in total with steps when the volume changes to a particular level.

Also known as semifixed costs.



Components of Product Costs

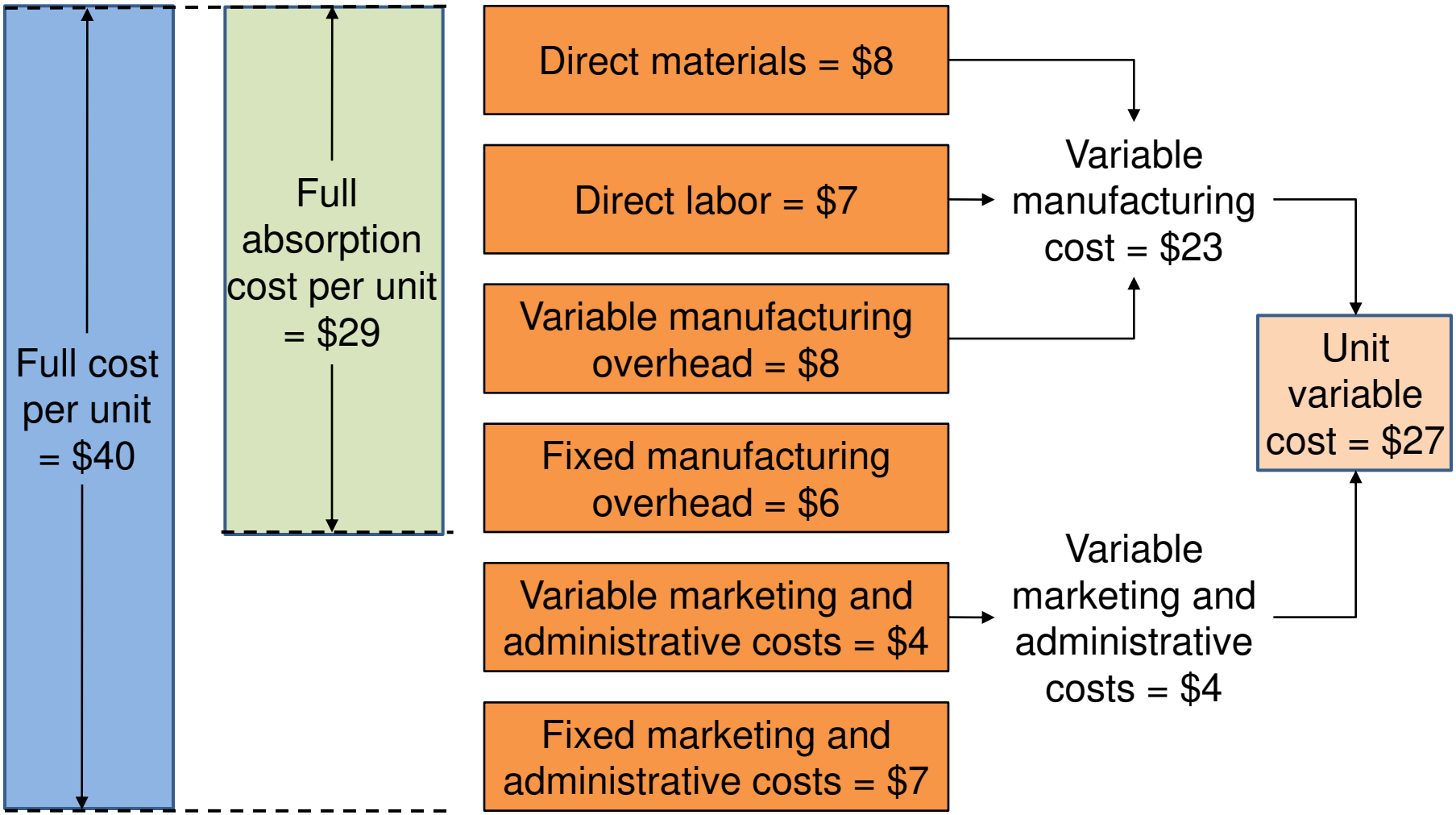
LO 2-6 Identify the components of a product's costs.

Full cost:
The sum of all costs of manufacturing and selling a unit of the product

Full absorption cost:
The sum of all variable and fixed costs of manufacturing a unit of the product

Variable cost:
The sum of all variable costs of manufacturing and selling a unit of the product

Components of Product Costs



Making Cost Information Useful

LO 2-7 Understand the distinction between financial and contribution margin income statements.

Full absorption costing:

- Required by GAAP
- Used for:
  - Financial purposes
  - External reporting

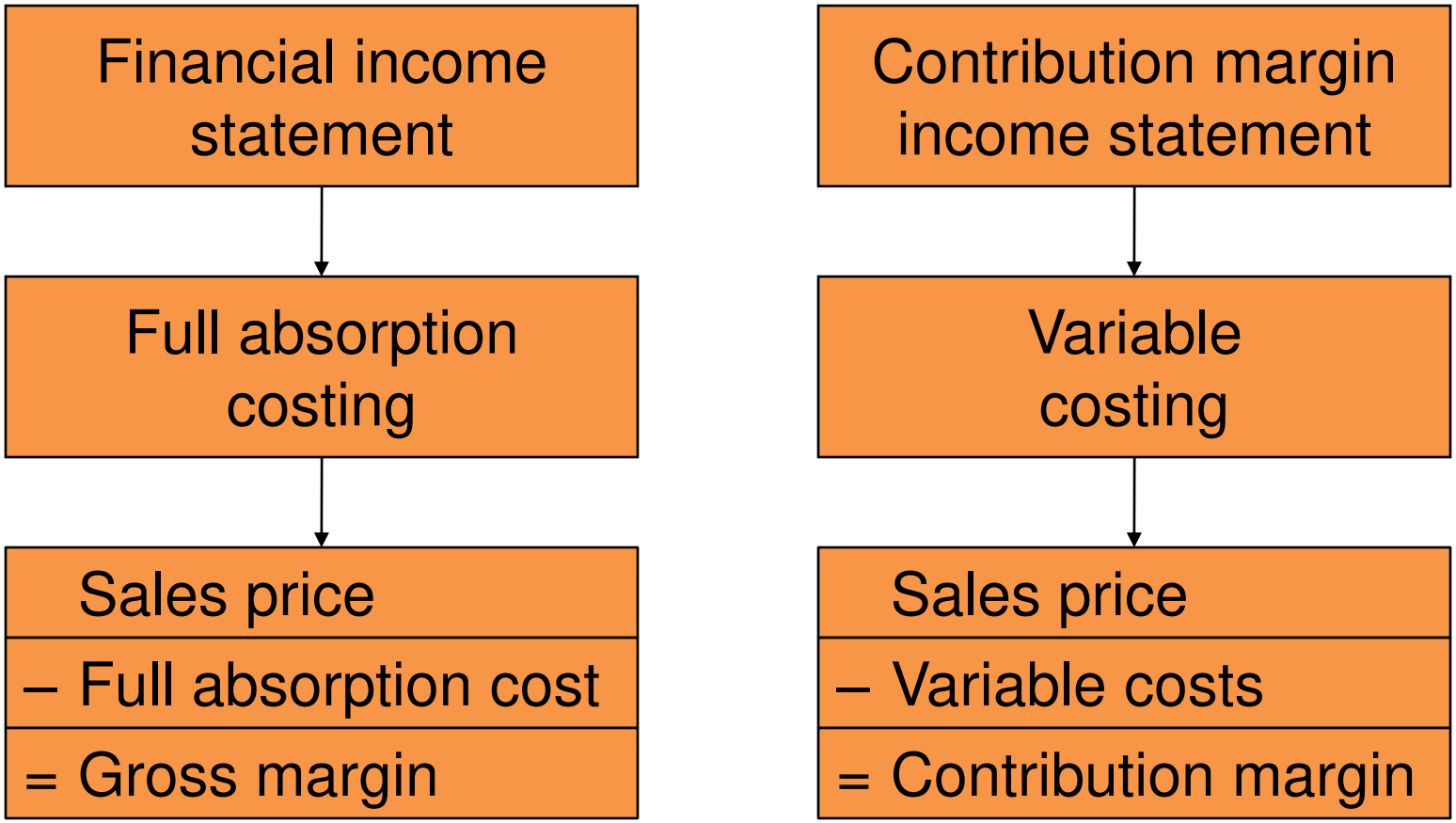
Variable costing:

- Used for:
  - Managerial purposes
  - Internal decision making

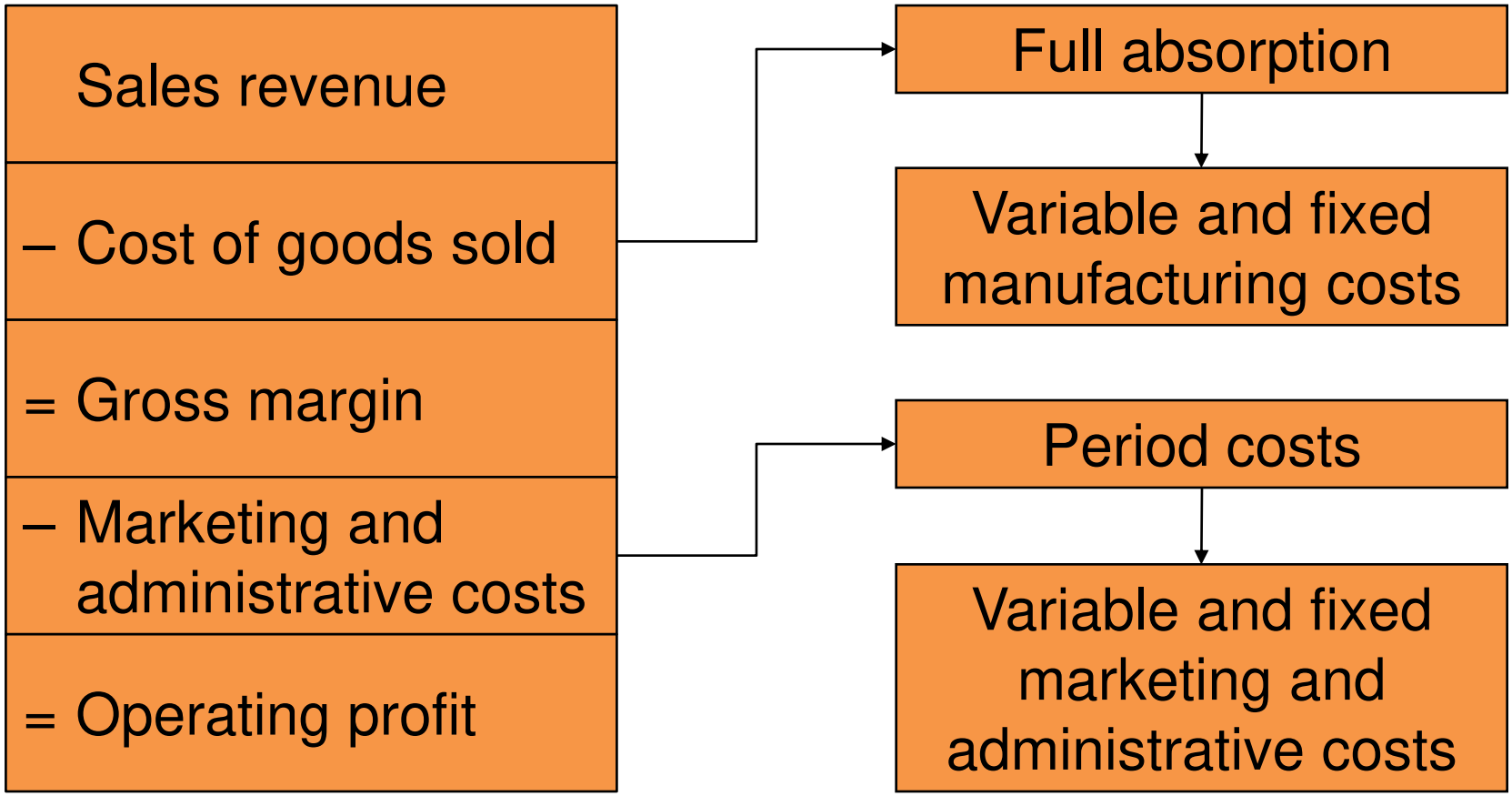
Sales revenue
– Cost of goods sold
= Gross margin

Sales revenue
– Variable costs
= Contribution margin

Making Cost Information Useful



Income Statement: Full Absorption Costing



Income Statement: Variable Costing

Sales revenue
– Variable costs
= Contribution margin
– Fixed costs
= Operating profit

Variable costs → Variable manufacturing costs and variable marketing and administrative costs

Fixed costs → Fixed manufacturing costs and fixed marketing and administrative costs

End of Chapter 2

Student Name:
Class:

Exercise 02-41

MONROE FABRICATORS

Part a.

Beginning direct materials inventory	
Transferred In	
Transferred Out	
Ending direct materials inventory	

Part b.

Cost of goods manufactured	
Beginning work-in-process inventory	
Ending work-in-process inventory	
Total Manufacturing cost	

Part c.

Total manufacturing cost	
Direct materials used	
Manufacturing overhead	
Direct labor	

Part d.

Gross margin	
Cost of goods sold	
Sales revenue	

Given Data E02-41:

MONROE FABRICATORS

Direct materials inventory, January 1	$	7,800
Direct materials inventory, December 31	a.	?
Work-in-process inventory, January 1		8,100
Work-in-process inventory, December 31		11,400
Finished goods inventory, January 1		5,700
Finished goods inventory, December 31		900
Purchases of direct materials		48,300
Cost of goods manufactured during the year		163,350
Total manufacturing cost	b.	?
Cost of goods sold		168,150
Gross margin		147,750
Direct labor	c.	?
Direct materials used		43,800
Manufacturing overhead		41,400
Sales revenue	d.	?

Student Name:
Class:

Exercise 02-46

MADRID CORPORATION

Direct Materials		
Direct Labor		
Variable Manufacturing Overhead		
Variable Manufacturing Costs		
Variable Marketing and Administrative Cost		
Unit Variable Cost		
Fixed Manufacturing overhead:		
Full-absorption Cost		
Fixed Marketing and Administrative Cost		
Full Cost of Making and Selling Product		

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Given Data E02-46:

MADRID CORPORATION

Information provided by accounting system:		
Sales price (per unit)	$	900
Fixed costs (for the month)		
Marketing and administrative	$	108,000
Manufacturing overhead	$	162,000
Variable costs (per unit)		
Marketing and administrative	$	18
Direct materials	$	270
Manufacturing overhead	$	60
Direct labor	$	165
Units produced and sold (for the month)		1,800

Student Name:
Class:

Problem 02-54

CHELSEA, INC.

a. Total Prime Cost Computation

Direct materials	
Prime Cost	

b. Total Conversion Cost Computation

Conversion Cost	

c. Total Manufacturing Costs Computation

Total Manufacturing Costs	

d. Cost of Goods Manufactured Calculation

Cost of Goods Manufactured	

e. Cost of Goods Sold Calculation

Cost of Goods Sold	

Given Data P02-54:

CHELSEA, INC.

Information provided by accounting records:

Direct materials inventory, May 1	$	9,000
Direct materials inventory, May 31		7,500
Work-in-process inventory, May 1		4,500
Work-in-process inventory, May 31		3,000
Finished goods inventory, May 1		27,000
Finished goods inventory, May 31		36,000
Direct materials purchased during May		120,000
Direct labor costs, May		96,000
Manufacturing overhead, May		126,000

Student Name:
Class:

Problem 02-56

COLUMBIA PRODUCTS

a. Computations

1. Variable Manufacturing Cost

Variable Manufacturing Cost	

2. Full Unit Cost

Full Unit Cost	

3. Variable Cost per Unit

Variable Cost	

4. Full Absorption Cost per Unit

Full Absorption Cost	

5. **Prime Cost per Unit**

Prime Cost	

6. **Conversion Cost per Unit**

Conversion Cost	

7. **Profit Margin per Unit**

Profit Margin	

8. **Contribution Margin per Unit**

Contribution Margin	

9. **Gross Margin per Unit**

Gross Margin	

b. **If the number of units decreases from 1,200 to 800, which is within the relevant range, will the *fixed manufacturing cost* per unit increase, decrease, or remain the same? Explain.**

Given Data P02-56:

COLUMBIA PRODUCTS		
Information provided by accounting system:		
Sales price (per unit)	$	448
Manufacturing costs:		
Fixed overhead (for the month)	$	50,400
Direct labor (per unit)		35
Direct materials (per unit)		112
Variable overhead (per unit)		70
Marketing and administrative costs:		
Fixed costs (for the month)	$	67,500
Variable costs (per unit)		14

Student Name:
Class:

Integrative Case 2-69

Tunes2Go
Drive Systems Division (DSD)

a. This year's income statement

	Baseline (status quo)	Rent Equipment	Difference	Change
Sales Revenue				
Operating costs:				
Variable				
Fixed (cash expenditures)				
Equipment depreciation				
Other depreciation				
Loss from equipment write-off				
Operating profit (before taxes)				

b. Next year's income statement

	Baseline (status quo)	Rent Equipment	Difference	
Sales Revenue				
Operating costs:				
Equipment rental				
Variable				
Fixed cash expenditures				
Equipment depreciation				
Other depreciation				
Operating profit				

c. Would you rent the new equipment? Why or why not?

Given Data IC2-69:

Tunes2Go Drive Systems Division (DSD)	
Cost of existing automated testing equipment	$ 3,000,000
No salvage value	
Annual rental charge for new testing machine	$ 690,000
Percentage increase in DSD's annual revenue	7%
Percentage decrease in fixed cash expenditures	6%
Revenue and expense estimates without new machine:	
Sales revenue	$ 4,800,000
Variable operating costs	600,000
Fixed operating costs	2,250,000
Equipment depreciation	450,000
Other depreciation	375,000