

Question 1

Duke Inc. produces sausages in three production departments—Mixing, Casing, and Packaging. In the Mixing Department, meats are prepared and ground and then mixed with spices. The spiced meat mixture is then transferred to the Casing Department, where the mixture is force-fed into casings and then hung and cured in climate-controlled smoking chambers. In the Packaging Department, the cured sausages are sorted, packed, and labeled. The company uses the weighted-average method in its process costing system. Data for September for the Casing Department follow:

<u>Percent Completed</u>				
	<u>Units</u>	<u>Mixing</u> <u>(Transferred in)</u>	<u>Materials</u>	<u>Conversion</u>
Work in process inventory, September 1.....	2	100%	90%	80%
Work in process inventory, September 30...	5	100%	80%	70%

<u>Dollar amount (\$)</u>			
	<u>Mixing</u> <u>(Transferred in)</u>	<u>Materials</u>	<u>Conversion</u>
Work in process inventory, September 1.....	\$1,670	\$90	\$605
Cost added during September.....	\$81,460	\$6,006	\$42,490

During September, 50 units were completed and transferred to the Packing Department.

Required:

- (a) Determine the equivalent units for September for Mixing (Transferred in), Materials, and Conversion costs.
- (b) Compute the cost per equivalent unit for Mixing (Transferred in), Materials, and Conversion Costs.
- (c) Compute the total costs (in dollar amount) of ending inventory on September 30 for Casing Department.

Answers to Question 1:

Weighted-Average Method

1. Computation of equivalent units in ending inventory:

	<i>Mixing</i>	<i>Materials</i>	<i>Conversion</i>
Units transferred to the next department .	50.0	50.0	50.0
Ending work in process:			
Mixing: 5 unit × 100% complete.....	<u>5.0</u>		
Materials: 5 unit × 80% complete.....		<u>4.0</u>	
Conversion: 5 unit × 70% complete....			<u>3.5</u>
Equivalent units of production	<u>55.0</u>	<u>54.0</u>	<u>53.5</u>

2. Costs per equivalent unit:

	<i>Mixing</i>	<i>Materials</i>	<i>Conversion</i>
Cost of beginning work in process inventory	\$ 1,670	\$ 90	\$ 605
Cost added during the period	<u>81,460</u>	<u>6,006</u>	<u>42,490</u>
Total cost.....	\$83,130	\$6,096	\$43,095
Equivalent units of production	55.0	54.0	53.5
Cost per equivalent unit	\$1,511.5	\$112.9	\$805.5

3. Cost for ending inventory

	<i>Mixing</i>	<i>Materials</i>	<i>Conversion</i>	<i>Total</i>
Ending work in process inventory:				
Equivalent units of production.....	5.0	4.0	3.5	
Cost per equivalent unit .	\$1,511.5	\$112.9	\$805.5	
Cost of ending work in process inventory.....	\$7,557.5	\$451.6	\$2,819.3	\$10,828.4

Question 2

Collyer Products, Inc. has a Valve Division that manufactures and sells regular valves:

Capacity in units	100,000 units
Selling price to outside customers per unit.....	\$30
Variable costs per unit sold to outside customers.....	\$16
Fixed cost per unit (based on capacity).....	\$9

The company has a Pump Division that could use this valve in one of its pumps. The Pump Division is currently purchasing 10,000 regular valves per year from an outside supplier at a price of \$29 per valve.

Required:

- (a) Assume that the Valve Division has enough capacity to handle all of the Pump Division's needs. There is no deduction in the costs for the internally-transferred units. What is the Valve Division's lowest acceptable transfer price? What is the Pump Division's highest acceptable transfer price of the regular valves?
- (b) Assume that the Valve Division is selling all of the valves it can produce at the capacity to outside customers (i.e., produces 100,000 units and sells all the products to outside customers). Also, assume that the \$3 variable selling expenses can be avoided if the valves are sold internally to Pump Divisions, due to reduced selling costs. What is the Valve Division's lowest acceptable transfer price? What is the Pump Division's highest acceptable transfer price of the regular valves?
- (c) Assume that the Valve Division is selling all of the regular valves it can produce at the capacity to outside customers (i.e., produces 100,000 units and sells all the products to outside customers). Also, assume that the Pump Division needs 10,000 *special high-pressure valves* per year (not the 10,000 regular valves per year as stated above). The Valve Division's variable costs to manufacture and ship the special valves to Pump Division would be \$20 per unit. To produce these 10,000 special valves, the Valve Division would have to reduce its production and sales of the regular valves from 100,000 units per year to 70,000 units per year. What is the Valve Division's lowest acceptable transfer price for the special valves?

Answers to Question 2:

(a)

Lowest acceptable price For Valve Division: \$16

Highest transfer price for the Pump Division = 29

(b)

Lowest transfer price = \$ (16-3) + \$(30-16) X 10,000/10,000 =\$27

Highest transfer price =\$29

(c)

Lowest transfer price = \$ 20 + \$(30-16) X 30,000/10,000 =\$62

(key: \$3 is a useless number and students should not deduct it from \$16 when calculating the opportunity cost)

Question 3

Fistman Corporation has a Parts Division that does work for other Divisions in the company as well as for outside customers. The company's Machine Products Division has asked the Parts Division to provide it with 10,000 special parts each year. The special parts would require \$15.00 per unit in variable production costs.

The Machine Products Division has a bid from an outside supplier for the special parts at \$29.00 per unit. In order to have time and space to produce the special part, the Parts Division would have to cut back production of another part-the H56 that it presently is producing. The H56 sells for \$32.00 per unit, and requires \$19.00 per unit in variable production costs. Packaging and shipping costs of the H56 are \$3.00 per unit. Packaging and shipping costs for the new special part would be only \$1.00 per unit. The Parts Division is now producing and selling 40,000 units of the H56 each year. Production and sales of the H56 would drop by 20% if the new special part is produced for the Machine Products Division.

Required:

- a. What is the range of transfer prices within which both the Divisions' profits would increase as a result of agreeing to the transfer of 10,000 special parts per year from the Parts Division to the Machine Products Division?
- b. Is it in the best interests of Fistman Corporation for this transfer to take place? Explain.

Answers to Question 3:

a. From the perspective of the Parts Division, profits would increase as a result of the transfer if and only if:

Transfer price > Variable cost + Opportunity cost

The opportunity cost is the contribution margin on the lost sales, divided by the number of units transferred:

Opportunity cost = $[(\$32.00 - \$19.00 - \$3.00) \times 8,000] / 10,000 = \8.00

* $20\% \times 40,000 = 8,000$

Therefore, Transfer price > $(\$15.00 + \$1.00) + \$8.00 = \24.00 .

From the viewpoint of the Machine Products Division, the transfer price must be less than the cost of buying the units from the outside supplier. Therefore, Transfer price < \$29.00.

Combining the two requirements, we get the following range of transfer prices: \$24.00 < Transfer price < \$29.00.

b. Yes, the transfer should take place. From the viewpoint of the entire company, the cost of transferring the units within the company is \$24.00, but the cost of purchasing the special parts from the outside supplier is \$29.00. Therefore, the company's profits increase on average by \$5.00 for each of the special parts that is transferred within the company, even though this would cut into production and sales of another product.

Question 4

The Coletti Cleaning Brigade Company provides housecleaning services to its clients. The company uses an activity-based costing system for its overhead costs. The company has provided the following data from its activity-based costing system.

Activity Cost Pool	Total Cost	Total Activity
Cleaning	\$302,993	43,100 hours
Job support	79,100	5,000 jobs
Client support.....	3,348	180 clients
Other.....	<u>150,000</u>	Not applicable
Total	<u>\$535,441</u>	

The "Other" activity cost pool consists of the costs of idle capacity and organization-sustaining costs.

One particular client, the Tubman family, requested 26 jobs during the year that required a total of 104 hours of housecleaning. For this service, the client was charged \$1,420.

Required:

- Using the activity-based costing system, compute the customer margin for the Tubman family. Round off all calculations to the nearest whole cent.
- Assume the company decides instead to use a traditional costing system in which ALL costs are allocated to customers on the basis of cleaning hours. Compute the margin for the Tubman family. Round off all calculations to the nearest whole cent.

Answers to Question 4:

a. The first step is to compute activity rates:

	Total Cost	Total Activity	Activity Rates
Cleaning	\$302,993	43,100 hours	\$7.03 per hour
Job support	\$79,100	5,000 jobs	\$15.82 per job
Client support.....	\$3,348	180 clients	\$18.60 per client

The customer margin for the family is computed as follows:

Client charges.....		\$1,420.00
Costs:		
Cleaning	\$731.12	
Job support	411.32	
Client support.....	18.60	1,161.04
Customer margin.....		<u>\$258.96</u>

Computations for costs:

Cleaning: 104 hours x \$7.03 per hour = \$731.12

Job support: 26 jobs x \$15.82 per job = \$411.32

Client support: 1 client x \$18.60 per client = \$18.60

b. The margin if all costs are allocated on the basis of cleaning hours:

Predetermined overhead rate = $\$535,441 \div 43,100 \text{ hours} = \12.42 per hour

Client charges.....	\$1,420.00
Allocated costs*	<u>1,291.68</u>
Customer margin.....	<u>\$128.32</u>

* 104 hours \times \$12.42 per hour = \$1,291.68

Question 5

John Fleming, chief administrator for Valley View Hospital, is concerned about the costs for tests in the hospital's lab. Mr. Fleming has evaluated the costs in the hospital's lab for the past month. The following information is available:

- Two types of tests are performed in the lab: blood tests and smears tests. During the past month, 1,800 blood tests and 2,400 smears tests were performed in the lab.
- Small glass plates are used in both types of tests. During the past month, the hospital purchased 12,000 plates at a cost of \$28,200. 1,500 of these plates were unused at the end of the month; no plates were on hand at the beginning of the month.
- During the past month, 1,150 hours of labor time were recorded in the lab at a cost of \$13,800.
- The lab's variable overhead cost last month totaled \$7,820.

Valley View Hospital has never used standard costs. By searching industry literature, however, Mr. Fleming have determined the following nation-wide standard costs for hospital labs:

Plates: Two plates are required per lab test. These plates have a standard cost of \$2.50 each.

Labor: Each blood test should require 0.3 hours to complete, and each smear test should require 0.15 hours to complete. The standard cost of the lab time is \$14 per hour.

Overhead: Overhead cost is based on direct labor-hours. The standard rate for variable overhead is \$6 per hour.

Required:

- (a) Compute the materials price variance and the materials quantity variance for the plates for the past month. Please indicate whether these variances are favorable or unfavorable.
- (b) For labor cost in the lab, please calculate the labor rate variance and labor efficiency variance. Please indicate whether these variances are favorable or unfavorable.
- (c) For overheads, please calculate the variable overheads' rate variance and efficiency variance. Please indicate whether these variances are favorable or unfavorable.

Answers to Question 5:

(a) Materials price variance and quantity variance

The standard quantity of plates allowed for tests performed during the month would be:

Blood tests.....	1,800
Smears.....	<u>2,400</u>
Total.....	4,200
Plates per test.....	<u>x 2</u>
Standard quantity allowed	<u>8,400</u>

AQp x AP	= 28,200	→	(1,800) F [Price]
AQp x SP	12,000 x 2.5 = 30,000	→	3,750 [Inventory]
AQu x Sp	10,500 x 2.5 = 26,250	→	5,250 UF [Quantity]
SQu x SP	(4,200 x 2) x 2.5 = 21,000	→	

(b) The standard hours allowed for tests performed during the month would be:

Blood tests: 0.3 hour per test × 1,800 tests.....	540 hours
Smears: 0.15 hour per test × 2,400 tests	<u>360</u> hours
Total standard hours allowed	<u>900</u> hours

AH x AR	1,150 x AR = 13,800	→	(2,300) F [Rate]
AH x SR	1,150 x 14 = 16,100	→	3,500 UF [Efficiency]
SH x SR	900 x 14 = 12,600	→	

(c). the variances can also be computed in the following:

AH x AR			= 7,820	→	920 UF [Rate]
AH x SR	1,150	x 6	= 6,900	→	1,500 UF [Efficiency]
SH x SR	900	x 6	= 5,400	→	
					<hr/>

Question 6

Policastro Corporation produces two intermediate products, A and B, from a common input. Intermediate product A can be further processed into end product X. Intermediate product B can be further processed into end product Y. The common input is purchased in batches that cost \$71 each and the cost of processing a batch to produce intermediate products A and B is \$10. Intermediate product A can be sold as is for \$29 or processed further for \$14 to make end product X that is sold for \$39. Intermediate product B can be sold as is for \$45 or processed further for \$29 to make end product Y that is sold for \$91.

Required:

- Assuming that no other costs are involved in processing potatoes or in selling products, how much money does the company make from processing one batch of the common input into the end products X and Y? Show your work.
- Should each of the intermediate products, A and B, be sold as is or processed further into an end product? Explain.

Answers to Question 6:

- Analysis of the profitability of the overall operation:

Combined final sales value (\$39 + \$91)	\$130
Less costs of producing the end products:	
Cost of common input.....	\$71
Cost of processing common input.....	10
Cost of further processing product A.....	14
Cost of further processing product B	29
	124
Profit (loss).....	\$6

- Analysis of sell or process further:

	X	Y
Final sales value after further processing.....	\$39	\$91
Less sales value at split-off point.....	<u>29</u>	<u>45</u>
Incremental revenue from further processing	10	46
Less cost of further processing.....	14	29
Profit (loss) from further processing	<u>(\$4)</u>	<u>\$17</u>
	Don't process further	Process further

Question 7 (standard cost variance)

Flandro Company uses a standard cost system and sets predetermined overhead rates on the basis of direct labor-hours. The following data are taken from the company's budget for the current year:

Denominator activity (direct labor-hours)	5,000
Variable MOH	\$25,000
Fixed MOH	\$59,000

The standard cost card for the company's only product is given below:

Direct materials, 3 yards at \$4.40 per yard	\$13.20
Direct labor, 1 hour at \$12 per hour	\$12.00
MOH, 140% of direct labor cost	\$16.80
Standard cost per unit	<u>\$42.00</u>

During the year, the company produced 6,000 units of product and incurred the following costs:

Materials purchased, 24,000 yards at \$4.80 per yard	\$115,200
Materials used in production (in yards)	18,500
Direct labor cost incurred, 5,800 hours at \$13 per hour	\$75,400
Variable manufacturing overhead cost incurred	\$29,580
Fixed manufacturing overhead cost incurred	\$60,400

Requirement:

(1) **Redo the standard cost card by detailing the variable and fixed overhead cost element.**

1. Direct materials, 3 yards × \$4.40 per yard	\$13.20
Direct labor, 1 DLH × \$12.00 per DLH.....	12.00
Variable manufacturing overhead	?
Fixed manufacturing overhead	?
Standard cost per unit	<u>\$42.00</u>

(2) **The variance analysis for direct materials and direct labor.**

(a): The price variance and quantity variance for DM:

(b): The rate variance and efficiency variance for DL:

(3) **The variance analysis for manufacturing overhead cost**

(a) : the rate and efficiency variance for variable MOH:

(b): the budget variance and volume variance for fixed MOH:

Answers to Question 7:

1. Direct materials, 3 yards × \$4.40 per yard	\$13.20
Direct labor, 1 DLH × \$12.00 per DLH	12.00
Variable manufacturing overhead, 1 DLH × \$5.00 per DLH* ...	5.00
Fixed manufacturing overhead, 1 DLH × \$11.80 per DLH**	11.80
Standard cost per unit	<u>\$42.00</u>

* \$25,000 ÷ 5,000 DLHs = \$5.00 per DLH.

** \$59,000 ÷ 5,000 DLHs = \$11.80 per DLH.

2.

AQp x AP	24,000	x 4.8	= 115,200	→	9,600 UF [Price]
AQp x SP	24,000	x 4.4	= 105,600	→	24,200 [Inventory]
AQu x Sp	18,500	x 4.4	= 81,400	→	2,200 UF [Quantity]
SQu x SP	(6,000 x 3)	x 4.4	= 79,200	→	

AH x AR	5,800	x 13	= 75,400	→	5,800 UF [Rate]
AH x SR	5,800	x 12	= 69,600	→	(2,400) F [Efficiency]
SH x SR	(6,000 x 1)	x 12	= 72,000	→	

3 (a). Variance analysis for variable overhead.

AH x AR		= 29,580	→	580 UF [Rate]
AH x SR	5,800	x 5 = 29,000	→	(1,000) F [Efficiency]
SH x SR	(6,000 x 1)	x 5 = 30,000	→	

3 (b). Budget variance and volume variance for fixed MOH

Actual FOH		= 60,400	→	1,400 UF [Budget]
Budgeted FOH		= 59,000	→	(11,800) F [Volume]
FOH applied to WIP	(6,000 x 1) x 11.8	= 70,800	→	
			→	

Question 8

(a) First-stage distribution of costs for ABC Costing

Finkel & Robbins PLC, a consulting firm, uses an activity-based costing in which there are three activity cost pools. The company has provided the following data concerning its costs and its activity based costing system:

Costs:

Wages and salaries	\$560,000
Travel expenses	140,000
Other expenses	<u>160,000</u>
Total	<u>\$860,000</u>

Distribution of resource consumption:

	Activity Cost Pools			Total
	Working On Engagements	Business Development	Other	
Wages and salaries	40%	30%	30%	100%
Travel expenses	55%	35%	10%	100%
Other expenses	15%	45%	40%	100%

The "Other" activity cost pool consists of the costs of idle capacity and organization-sustaining costs that are not assigned to any activity.

Required:

How much cost, in total, would be allocated to the Working On Engagements activity, Business Development activity, and Other activity cost pool?

Answers to Question 8a:

All three parts can be answered using a first-stage allocation of costs.

	Working On Engagements	Business Development	Other	Total
Wages and salaries	\$224,000	\$168,000	\$168,000	\$560,000
Travel expenses	77,000	49,000	14,000	140,000
Other expenses	<u>24,000</u>	<u>72,000</u>	<u>64,000</u>	<u>160,000</u>
Total	<u>\$325,000</u>	<u>\$289,000</u>	<u>\$246,000</u>	<u>\$860,000</u>

(b) Second-stage allocation of ABC Costing

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Other	<u>150,000</u>	Not applicable
Total	<u>\$535,441</u>	

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Required:

- Using the activity-based costing system, compute the customer margin for the Tubman family. Round off all calculations to the nearest whole cent.
- Assume the company decides instead to use a traditional costing system in which ALL costs are allocated to customers on the basis of cleaning hours. Compute the margin for the Tubman family. Round off all calculations to the nearest whole cent.

Answers to Question 8b:

- a. The first step is to compute activity rates:

	Total Cost	Total Activity	Activity Rates
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Costs:		
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Customer margin		<u>\$258.96</u>

Computations for costs:

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b. The margin if all costs are allocated on the basis of cleaning hours:

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Client charges.....	\$1,420.00
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Customer margin.....	<u>\$128.32</u>

* 104 hours \times \$12.42 per hour = \$1,291.68