

ESERCIZI

1 STRUCTURING A KEEP-OR-DROP PRODUCT LINE PROBLEM WITH COMPLEMENTARY EFFECTS

Refer to Hickory Company's segmented income statement in **Cornerstone Exercise 23-16**. Assume that dropping the parquet product line would reduce sales of the strip line by 25 percent and sales of the plank line by 20 percent. All other information remains the same.

Required:

1. If the parquet product line is dropped, what is the contribution margin for the strip line? For the plank line?
2. Which alternative (keep or drop the parquet product line) is now more cost effective and by how much?

2 DETERMINING THE OPTIMAL PRODUCT MIX WITH ONE CONSTRAINED RESOURCE

Comfy Fit Company manufactures two types of university sweatshirts, the Swoop and the Rufus, with unit contribution margins of \$5 and \$15, respectively. Regardless of type, each sweatshirt must be fed through a stitching machine to affix the appropriate university logo. The firm leases seven machines that each provide 1,000 hours of machine time per year. Each Swoop sweatshirt requires 6 minutes of machine time, and each Rufus sweatshirt requires 30 minutes of machine time. There are no other constraints.

Required:

1. What is the contribution margin per hour of machine time for each type of sweatshirt?
2. What is the optimal mix of sweatshirts?
3. What is the total contribution margin earned for the optimal mix?

3 DETERMINING THE OPTIMAL PRODUCT MIX WITH ONE CONSTRAINED RESOURCE AND A SALES CONSTRAINT

Comfy Fit Company manufactures two types of university sweatshirts, the Swoop and the Rufus, with unit contribution margins of \$5 and \$15, respectively. Regardless of type, each sweatshirt must be fed through a stitching machine to affix the appropriate university logo. The firm leases seven machines that each provide 1,000 hours of machine time per year. Each Swoop sweatshirt requires 6 minutes of machine time, and each Rufus sweatshirt requires 30 minutes of machine time. A maximum of 50,000 units of each sweatshirt can be sold.

Required:

1. What is the contribution margin per hour of machine time for each type of sweatshirt?
2. What is the optimal mix of sweatshirts?
3. What is the total contribution margin earned for the optimal mix?

4 CALCULATING PRICE BY APPLYING A MARKUP PERCENTAGE TO COST

Integrity Accounting Firm provides various financial services to organizations. Integrity has decided to price its jobs at the total variable costs of the job plus 15 percent. The job for a medium-sized dance club client included the following costs:

Direct materials \$ 5,000

Direct labor (partners and staff accountants) 90,000

Depreciation (using straight-line method) on Integrity's office building 50,000

Required:

Calculate the price charged by Integrity Accounting to the dance club

5 CALCULATING A TARGET COST

Yuhu manufactures cell phones and is developing a new model with a feature (aptly named Don't Drink and Dial) that prevents the phone from dialing an owner-defined list of phone numbers between the hours of midnight and 6:00 a.m. The new phone model has a target price of \$350. Management requires a 10 percent profit on new products.

Required:

1. Calculate the amount of desired profit.
2. Calculate the target cost.

6 MODEL FOR MAKING TACTICAL DECISIONS

The model for making tactical decisions described in the text has six steps. These steps are listed, out of order, below.

Required:

Put the steps in the correct order, starting with the step that should be taken first.

1. Select the alternative with the greatest overall benefit.
2. Identify the costs and benefits associated with each feasible alternative.
3. Assess qualitative factors.
4. Recognize and define the problem.
5. Identify alternatives as possible solutions to the problem.
6. Total the relevant costs and benefits for each alternative.

7 MODEL FOR MAKING TACTICAL DECISIONS

Austin Porter is a sophomore at a small Midwestern university. He is considering whether to continue at this university or to transfer to one with a nationally recognized engineering program. Austin's decision-making process included the following:

- a. He surfed the web to check out the sites of a number of colleges and universities with engineering programs.
- b. Austin wrote to five of the universities to obtain information on their engineering colleges, tuition and room and board costs, the likelihood of being accepted, and so on.
- c. Austin compared costs of the five other schools with the cost of his present school. He totaled the balance in his checking and savings accounts, estimated the earnings from his work-study job, and asked his parents whether or not they would be able to help him out.
- d. Austin's high-school sweetheart had a long heart-to-heart talk with him about their future—specifically, that there might be no future if he left town.
- e. Austin thought that while he enjoyed his present college, its

engineering program
did not have the national reputation that would enable him to get
a good job on
either the East or West Coast. Working for a large company on
the coast was an
important dream of his.

- f. Austin's major advisor agreed that a school with a national reputation would make job hunting easier. However, he reminded Austin that small college graduates had occasionally gotten the kind of jobs that Austin wanted.
- g. Austin had a number of good friends at the university, and they were encouraging him to stay.
- h. A friend of Austin's from high school returned home for a long weekend. She attends a prestigious university and told Austin of the fun and opportunities available at her school. She encouraged Austin to check out the possibilities elsewhere.
- i. A friendly professor outside of Austin's major area ran into him at the student union. She listened to his thinking and reminded him that a degree from this university would easily get him into a good graduate program. Perhaps he should consider postponing the job hunt until he had his master's degree in hand.
- j. Two of the three prestigious universities accepted Austin and offered financial aid. The third one rejected his application.
- k. Austin made his decision.

Required:

Classify the events a through k under one of the six steps of the model for making tactical decisions described in your text.

8 MAKE-OR-BUY DECISION

Zion Manufacturing had always made its components in-house. However, Bryce Component Works had recently offered to supply one component, K2, at a price of \$25 each. Zion uses 10,000 units of Component K2 each year. The cost per unit of this component is as follows:

Direct materials \$12.00
Direct labor 8.25
Variable overhead 3.50
Fixed overhead 2.00
Total \$25.75

Assume that 75 percent of Zion Manufacturing's fixed overhead for Component K2 would be eliminated if that component were no longer produced.

Required:

If Zion decides to purchase the component from Bryce, by how much will operating income increase or decrease? Which alternative is better?

9 SPECIAL-ORDER DECISION

Smooth Move Company manufactures professional paperweights and has been approached by a new customer with an offer to purchase 15,000 units at a per-unit price of \$7.00. The new customer is geographically separated from Smooth Move's other customers, and existing sales will not be affected. Smooth Move normally produces 82,000 units but plans to produce and sell only 65,000 in the coming year. The normal sales price is \$12 per unit. Unit cost information is as follows:

Direct materials \$3.00
 Direct labor 2.25
 Variable overhead 1.15
 Fixed overhead 1.80
 Total \$8.20

If Smooth Move accepts the order, no fixed manufacturing activities will be affected because there is sufficient excess capacity.

Required:

1. What are the alternatives for Smooth Move?
2. Should Smooth Move accept the special order? By how much will profit increase or decrease if the order is accepted?

10 SPECIAL ORDER

Smooth Move Company manufactures professional paperweights and has been approached by a new customer with an offer to purchase 15,000 units at a per-unit price of \$7.00. The new customer is geographically separated from Smooth Move's other customers, and existing sales will not be affected. Smooth Move normally produces 82,000 units but plans to produce and sell only 65,000 in the coming year. The normal sales price is \$12 per unit. Unit cost information is as follows:

Direct materials \$3.00
 Direct labor 2.25
 Variable overhead 1.15
 Fixed overhead 1.80
 Total \$8.20

The customer wants to have its company logo affixed to each paperweight using a label. Smooth Move would have to purchase a special logo labeling machine that will cost \$14,000. The machine will be able to label the 15,000 units and then it will be scrapped (with no further value). No other fixed overhead activities will be affected.

Required:

Should Smooth Move accept the special order? By how much will profit increase or decrease if the order is accepted?

11 KEEP-OR-DROP DECISION

Petoskey Company produces three products: Alanson, Boyne, and Conway. A segmented income statement, with amounts given in thousands, follows:

	Alanson	Boyne	Conway	Total
Sales revenue	\$1,280	\$185	\$300	\$1,765
Less: Variable expenses	1,115	45	225	1,385
Contribution margin	\$ 165	\$140	\$ 75	\$ 380
Less direct fixed expenses:				
Depreciation	(50)	(15)	(10)	(75)
Salaries	(95)	(85)	(80)	(260)
Segment margin	\$ 20	\$ 40	\$ (15)	\$ 45

Direct fixed expenses consist of depreciation and plant supervisory salaries. All depreciation on the equipment is dedicated to the product lines. None of the equipment can be sold. Also, each of the three products has a different supervisor whose position would *remain* if the associated product were dropped.

Required:

Estimate the impact on profit that would result from dropping Conway. Explain why Petoskey should keep or drop Conway.

12 KEEP-OR-DROP DECISION

Refer to the Petoskey Company information provided in **Exercise 11**. In addition, assume that 20 percent of the Alanson customers choose to buy from Petoskey because it offers a full range of products, including Conway. If Conway were no longer available from Petoskey, these customers would go elsewhere to purchase Alanson.

Required:

Estimate the impact on profit that would result from dropping Conway. Explain why Petoskey should keep or drop Conway.

13 SELL AT SPLIT-OFF OR PROCESS FURTHER

Bozo Inc. manufactures two products from a joint production process. The joint process costs \$110,000 and yields 6,000 pounds of LTE compound and 20,000 pounds of HS compound. LTE can be sold at split-off for \$55 per pound. HS can be sold at split-off for \$8 per pound. A buyer of HS asked Bozo Inc. to process HS further into CS compound. If HS were processed further, it would cost \$34,000 to turn 20,000 pounds of HS into 4,000 pounds of CS. The CS would sell for \$45 per pound.

Required:

1. What is the contribution to income from selling the 20,000 pounds of HS at split-off?
2. What is the contribution to income from processing the 20,000 pounds of HS into 4,000 pounds of CS? Should Bozo Inc. continue to sell the HS at split-off or process it further into CS?

14 CHOOSING THE OPTIMAL PRODUCT MIX WITH A CONSTRAINED RESOURCE AND A DEMAND CONSTRAINT

Refer to the Billings Company information provided in **Exercise 23-33**. Also, assume that only 500 units of each product can be sold.

Required:

1. What is the optimal mix of products?
2. What is the total contribution margin earned for the optimal mix?

15 CALCULATING PRICE USING A MARKUP PERCENTAGE OF COST

Grinnell Lake Gift Shop has decided to price the candles that it sells at cost plus 80 percent. One type of carved bear-shaped candle costs \$12, and huckleberry-scented votive candles cost \$1.10 each.

Required:

1. What price will Grinnell Lake Gift Shop charge for the carved bear candle?
2. What price will Grinnell Lake Gift Shop charge for each scented votive candle?

16 TARGET COSTING

H. Banks Company would like to design, produce, and sell versatile toasters for the home kitchen market. The toaster will have four slots that adjust in thickness to accommodate both slim slices of bread and oversized bagels. The target price is \$75. Banks requires that new products be priced such that 25 percent of the price is profit.

Required:

1. Calculate the amount of desired profit per unit of the new toaster.
2. Calculate the target cost per unit of the new toaster.

Aravan Company purchases 4,000 units of Product Beta each year in lots of 400 units per order. The cost of placing one order is \$20, and the cost of carrying one unit of product in inventory for a year is \$4.

Required:

1. How many orders for Product Beta does Aravan place per year?
2. What is the total ordering cost of Beta per year?
3. What is the total carrying cost of Beta per year?
4. What is the total cost of Aravan’s inventory policy for Beta per year?

17 KEEP OR BUY, SUNK COSTS

Heather Alburty purchased a previously owned, two-year-old Grand Am for \$8,900. Since purchasing the car, she has spent the following amounts on parts and labor:

New stereo system	\$1,200	Trick paint
400 New wide racing tires		800
	\$2,400	Total

Unfortunately, the new stereo doesn’t completely drown out the sounds of a grinding transmission. Apparently, the Grand Am needs a considerable amount of work to make it reliable transportation. Heather estimates that the needed repairs include

Transmission overhaul	\$2,000
Water pump	400
Master cylinder work	1,100
Total	\$3,500

In a visit to a used car dealer, Heather has found a one-year-old Neon in mint condition for \$9,400. Heather has advertised and found that she can sell the Grand Am for only \$6,400. If she buys the Neon, she will pay cash, but she would need to sell

Required:

1. In trying to decide whether to restore the Grand Am or to buy the Neon, Heather is distressed because she already has spent \$11,300 on the Grand Am. The investment seems too much to give up. How would you react to her concern?
2. Assuming that Heather would be equally happy with the Grand Am or the Neon, should she buy the Neon, or should she restore the Grand Am?

18 MAKE OR BUY

Blasingham Company is currently manufacturing Part Q108, producing 35,000 units annually. The part is used in the production of several products made by Blasingham. The cost per unit for Q108 is as follows:

Direct materials	\$ 6.00
Direct labor	2.00

Variable overhead	1.50
Fixed overhead	3.50
Total	\$13.00

Of the total fixed overhead assigned to Q108, \$77,000 is direct fixed overhead (the lease of production machinery and salary of a production line supervisor—neither of which will be needed if the line is dropped). The remaining fixed overhead is common fixed overhead. An outside supplier has offered to sell the part to Blasingham for \$11. There is no alternative use for the facilities currently used to produce the part.

Required:

1. Should Blasingham Company make or buy Part Q108?
2. What is the most that Blasingham would be willing to pay an outside supplier?
3. If Blasingham buys the part, by how much will income increase or decrease?

19 MAKE OR BUY

Blasingham Company is currently manufacturing Part Q108, producing 35,000 units annually. The part is used in the production of several products made by Blasingham. The cost per unit for Q108 is as follows:

Direct materials	\$ 6.00
Direct labor	2.00
Variable overhead	1.50
Fixed overhead	3.50
Total	\$13.00

All of the fixed overhead is common fixed overhead. An outside supplier has offered to sell the part to Blasingham for \$11. There is no alternative use for the facilities currently used to produce the part.

Required

1. Should Blasingham Company make or buy Part Q108?
2. What is the most Blasingham would be willing to pay an outside supplier?
3. If Blasingham buys the part, by how much will income increase or decrease?

20 SPECIAL-ORDER DECISION

Rianne Company produces a light fixture with the following unit cost:

Direct materials	\$2
Direct labor	1
Variable overhead	3
Fixed overhead	2
Unit cost	\$8

The production capacity is 300,000 units per year. Because of a depressed housing market, the company expects to produce only 180,000 fixtures for the coming year. The company also has fixed selling costs totaling \$500,000 per year and variable selling costs of \$1 per unit sold. The fixtures normally sell for \$12 each.

At the beginning of the year, a customer from a geographic region outside the area normally served by the company offered to buy 100,000 fixtures for \$7 each. The customer also offered to pay all transportation costs. Since there would be no sales commissions involved, this order would not have any variable selling costs.

Required:

1. Based on a quantitative (numerical) analysis, should the company accept the order?
2. What qualitative factors might impact the decision? Assume that no other orders are expected beyond

the regular business and the special order.

21 MAKE OR BUY, QUALITATIVE CONSIDERATIONS

Hetrick Dentistry Services operates in a large metropolitan area. Currently, Hetrick has its own dental laboratory to produce porcelain and gold crowns. The unit costs to produce the crowns are as follows

	Porcelain	Gold
Raw materials	\$ 70	\$130
Direct labor	27	27
Variable overhead	8	8
Fixed overhead	22	22
Total	\$127	\$187

Fixed overhead is detailed as follows:

Salary (supervisor)	\$26,000
Depreciation	5,000
Rent (lab facility)	32,000

Overhead is applied on the basis of direct labor hours. These rates were computed by using 5,500 direct labor hours.

A local dental laboratory has offered to supply Hetrick all the crowns it needs. Its price is \$125 for porcelain crowns and \$150 for gold crowns; however, the offer is conditional on supplying both types of crowns—it will not supply just one type for the price indicated. If the offer is accepted, the equipment used by Hetrick's laboratory would be scrapped (it is old and has no market value), and the lab facility would be closed. Hetrick uses 2,000 porcelain crowns and 600 gold crowns per year.

Required:

1. Should Hetrick continue to make its own crowns, or should they be purchased from the external supplier? What is the dollar effect of purchasing?
2. What qualitative factors should Hetrick consider in making this decision?
3. Suppose that the lab facility is owned rather than rented and that the \$32,000 is depreciation rather than rent. What effect does this have on the analysis in Requirement 1?
4. Refer to the original data. Assume that the volume of crowns used is 3,400 porcelain and 600 gold. Should Hetrick make or buy the crowns? Explain the outcome.

22 SELL OR PROCESS FURTHER

Zanda Drug Corporation buys three chemicals that are processed to produce two types of analgesics used as ingredients for popular over-the-counter drugs. The purchased chemicals are blended for two to three hours and then heated for 15 minutes. The results of the process are two separate analgesics, depryl and pencol, which are sent to a drying room until their moisture content is reduced to 6 to 8 percent. For every 1,300 pounds of chemicals used, 600 pounds of depryl and 600 pounds of pencol are produced. After drying, depryl and pencol are sold to companies that process them into their final form.

The selling prices are \$12 per pound for depryl and \$30 per pound for pencol. The costs to produce 600 pounds of each analgesic are as follows:

Chemicals	\$8,500
Direct labor	6,735
Overhead	9,900

The analgesics are packaged in 20-pound bags and shipped. The cost of each bag is \$1.30. Shipping costs \$0.10 per pound.

Zanda could process depryl further by grinding it into a fine powder and then molding the powder into tablets. The tablets can be sold directly to retail drug stores as a generic brand. If this route were taken, the revenue received per bottle of tablets would be \$4.00, with 10 bottles produced by every pound of depryl. The costs of grinding and tableting total \$2.50 per pound of depryl. Bottles cost \$0.40 each. Bottles are shipped in boxes that hold 25 bottles at a shipping cost of \$1.60 per box.

Required:

1. Should Zanda sell depryl at split-off, or should depryl be processed and sold as tablets?
2. If Zanda normally sells 265,000 pounds of depryl per year, what will be the difference in profits if depryl is processed further?

23 KEEP OR DROP

AudioMart is a retailer of radios, stereos, and televisions. The store carries two portable sound systems that have radios, tape players, and speakers. System A, of slightly higher quality than System B, costs \$20 more. With rare exceptions, the store also sells a headset when a system is sold. The headset can be used with either system. Variable-costing income statements for the three products follow:

	System A	System B	System C
Sales	\$45,000	\$ 32,500	\$8,000
Less: Variable expenses	20,000	25,500	3,200
Contribution margin	\$25,000	\$ 7,000	\$4,800
Less: Fixed costs*	10,000	18,000	2,700
Operating income	\$15,000	\$(11,000)	\$2,100

The owner of the store is concerned about the profit performance of System B and is considering dropping it. If the product is dropped, sales of System A will increase by 30 percent, and sales of headsets will drop by 25 percent.

Required:

1. Prepare segmented income statements for the three products using a better format.
2. Prepare segmented income statements for System A and the headsets assuming that System B is dropped. Should B be dropped?
3. Suppose that a third system, System C, with a similar quality to System B, could be acquired. Assume that with C the sales of A would remain unchanged; however, C would produce only 80 percent of the revenues of B, and sales of the headsets would drop by 10 percent. The contribution margin ratio of C is 50 percent, and its direct fixed costs would be identical to those of B. Should System B be dropped and replaced with System C?

24 ACCEPT OR REJECT A SPECIAL ORDER

Steve Murningham, manager of an electronics division, was considering an offer by Pat Sellers, manager of a sister division. Pat's division was operating below capacity and had just been given an opportunity to produce 8,000 units of one of its products for a customer in a market not normally served. The opportunity involves a product that uses an electrical component produced by Steve's division. Each unit that Pat's division produces requires two of the components. However, the price that the customer is willing to pay is well below the price that is usually charged; to make a reasonable profit on the order, Pat needs a price concession from Steve's division. Pat had offered to pay full manufacturing cost for the parts. So Steve would know that everything was above board, Pat supplied the following unit cost and price information concerning the special order, excluding the cost of the electrical component:

Selling price	\$ 32
Less costs:	
Direct materials	(17)
Direct labor	(7)
Variable overhead	(2)
Fixed overhead	(3)
Operating profit	\$3

The normal selling price of the electrical component is \$2.30 per unit. Its full manufacturing cost is \$1.85 (\$1.05 variable and \$0.80 fixed). Pat argued that paying \$2.30 per component would wipe out the operating profit and result in her division showing a loss. Steve was interested in the offer because his division was also operating below capacity (the order would not use all the excess capacity).

Required:

1. Should Steve accept the order at a selling price of \$1.85 per unit? By how much will his division's profits be changed if the order is accepted? By how much will the profits of Pat's division change if Steve agrees to supply the part at full cost?
2. Suppose that Steve offers to supply the component at \$2. In offering this price, Steve says that it is a firm offer, not subject to negotiation. Should Pat accept this price and produce the special order? If Pat accepts the price, what is the change in profits for Steve's division?
3. Assume that Steve's division is operating at full capacity and that Steve refuses to supply the part for less than the full price. Should Pat still accept the special order? Explain.

25 COST-BASED PRICING DECISION

Jeremy Costa, owner of Costa Cabinets Inc., is preparing a bid on a job

that requires \$1,800 of direct materials, \$1,600 of direct labor, and \$800 of overhead. Jeremy normally applies a standard markup based on cost of goods sold to arrive at an initial bid price. He then adjusts the price as necessary in light of other factors (e.g., competitive pressure). Last year's income statement is as follows:

Sales	\$130,000
Cost of goods sold	48,100
Gross margin	\$ 81,900
Selling and administrative expenses	46,300
Operating income	\$ 35,600

Required:

1. Calculate the markup that Jeremy will use.
2. What is Jeremy's initial bid price?

26 PRODUCT MIX DECISION, SINGLE CONSTRAINT

Sealing Company manufactures three types of DVD storage units. Each of the three types requires the use of a special machine that has a total operating capacity of 15,000 hours per year. Information on the three types of storage units is as follows:

	Basic	Standard	Deluxe
Selling price	\$9.00	\$30.00	\$35.00
Variable cost	\$6.00	\$20.00	\$10.00
Machine hours required	0.10	0.50	0.75

Sealing Company's marketing director has assessed demand for the three types of storage units and believes that the firm can sell as many units as it can produce.

Required:

1. How many of each type of unit should be produced and sold to maximize the company's contribution margin? What is the total contribution margin for your selection?
2. Now suppose that Sealing Company believes that it can sell no more than 12,000 of the deluxe model but up to 50,000 each of the basic and standard models at the selling prices estimated. What product mix would you recommend, and what would be the total contribution margin?

27 SPECIAL-ORDER DECISION, QUALITATIVE ASPECTS

Randy Stone, manager of Specialty Paper Products Company, was agonizing over an offer for an order requesting 5,000 calendars. Specialty Paper Products was operating at 70 percent of its capacity and could use the extra business; unfortunately, the order's offering price of \$4.20 per box was below the cost to produce the calendars. The controller, Louis Barns, was opposed to taking a loss on the deal. However, the personnel manager, Yatika Blaine, argued in favor of accepting the order even though a loss would be incurred; it would avoid the problem of layoffs and would help to maintain the company's community image. The full cost to produce a calendar follows:

Direct materials	\$1.15
Direct labor	2.00
Variable overhead	1.10
Fixed overhead	1.00
Total	\$5.25

Later that day, Louis and Yatika met over coffee. Louis sympathized with Yatika's concerns and suggested that the two of them rethink the special-order decision. He offered to determine relevant costs if Yatika would list the activities that would be affected by a layoff. Yatika eagerly agreed and came up with the following activities: an increase in the state unemployment insurance rate from 1 percent to 2 percent of total payroll, notification costs to lay off approximately 20 employees, and increased costs of rehiring and retraining workers when the downturn was over. Louis determined that these activities would cost the following amounts:

- Total payroll is \$1,460,000 per year.
- Layoff paperwork is \$25 per laid-off employee.
- Rehiring and retraining is \$150 per new employee.

Required:

1. Assume that the company will accept the order only if it increases total profits. Should the company accept or reject the order? Provide supporting computations.
2. Consider the new information on activity costs associated with the layoff. Should the company accept or reject the order? Provide supporting computations.

28 SELL OR PROCESS FURTHER, BASIC ANALYSIS

Shenista Inc. produces four products (Alpha, Beta, Gamma, and Delta) from a common input. The joint costs for a typical quarter follow:

Direct materials	\$95,000
Direct labor	43,000
Overhead	85,000

The revenues from each product are as follows: Alpha, \$100,000; Beta, \$93,000; Gamma, \$30,000; and Delta, \$40,000.

Management is considering processing Delta beyond the split-off point, which would increase the sales value of Delta to \$75,000. However, to process Delta further means that the company must rent some special equipment that costs \$15,400 per quarter. Additional materials and labor also needed will cost \$8,500 per quarter.

Required:

1. What is the operating profit earned by the four products for one quarter?
2. Should the division process Delta further or sell it at split-off? What is the effect of the decision on quarterly operating profit?

29 PRODUCT MIX DECISION, SINGLE CONSTRAINT

Norton Company produces two products (Juno and Hera) that use the same material input. Juno uses two pounds of the material for every unit produced, and Hera uses five pounds. Currently, Norton has 16,000 pounds of the material in inventory. All of the material is imported. For the coming year, Norton plans to import an additional 8,000 pounds to produce 2,000 units of Juno and 4,000 units of Hera. The unit contribution margin is \$30 for Juno and \$60 for Hera.

Norton Company has received word that the source of the material has been shut down by embargo. Consequently, the company will not be able to import the 8,000 pounds it planned to use in the coming year's production. There is no other source of the material.

Required:

1. Compute the total contribution margin that the company would earn if it could manufacture 2,000 units of Juno and 4,000 units of Hera.
2. Determine the optimal usage of the company's inventory of 16,000 pounds of the material. Compute the total contribution margin for the product mix that you recommend.

30 SELL AT SPLIT-OFF OR PROCESS FURTHER

Eunice Company produces two products from a joint process. Joint costs are \$70,000 for one batch, which yields 1,000 liters of germain and 4,000 liters of hastain. Germain can be sold at the split-off point for \$24 or be processed further, into geraiten, at a manufacturing cost of \$4,100 (for the 1,000 liters) and sold for \$33 per liter.

If geraiten is sold, additional distribution costs of \$0.80 per liter and sales commissions of 10 percent of sales will be incurred. In addition, Eunice's legal department is concerned about potential liability issues with geraiten—issues that do not arise with germain.

Required:

1. Considering only gross profit, should germain be sold at the split-off point or processed further?
2. Taking a value-chain approach (by considering distribution, marketing, and after-the-sale costs), determine whether or not germain should be processed into geraiten.

31 DIFFERENTIAL COSTING

As pointed out earlier in “Here’s the Real Kicker,” Kicker changed banks a couple of years ago because the loan officer at its bank moved out of state. Kicker saw that as an opportunity to take bids for its banking business and to fine-tune the banking services it was using. This problem uses that situation as the underlying scenario but uses three banks: FirstBank, Community Bank, and RegionalOne Bank. A set of representative data was presented to each bank for the purpose of preparing a bid. The data are as follows:

Checking accounts needed: 6

Checks per month: 2,000*

Foreign debits/credits on checking accounts per month: 200

Deposits per month: 300*

Returned checks: 25 per month*

Credit card charges per month: 4,000

Wire transfers per month: 100, of which 60 are to foreign bank accounts

Monthly credit needs (line of credit availability and cost): \$100,000 average monthly usage

*These are overall totals for the six accounts during a month.

Internet banking services? Knowledgeable loan officer?

Responsiveness of bank?

FirstBank Bid:

Checking accounts: \$5 monthly maintenance fee per account

\$0.10 foreign debit/credit

\$0.50 earned for each deposit

\$3 per returned check

Credit card fees: \$0.50 per item

Wire transfers: \$15 to domestic bank accounts, \$50 to foreign bank accounts

Line of credit: Yes, the requested \$100,000 credit line is available, interest charged at prime plus 2 percent, subject to a 6 percent minimum interest rate

Internet banking services? Yes, full online banking available:

\$15 one-time setup fee for each account, \$20 monthly fee for software module

The loan officer assigned to the potential Kicker account had 10 years of experience with medium to large business banking and showed an understanding of the audio industry.

Community Bank Bid:

Checking accounts: No fees for the accounts, and no credits earned on deposits; \$2.00 per returned check

Credit card fees: \$0.50 per item

\$7 per batch processed. Only manual processing was available, and Kicker estimated 20 batches per month

Wire transfers: \$30 per wire transfer

Line of credit: Yes, the requested \$100,000 credit line is available, interest charged at prime plus 2 percent, subject to a 7 percent minimum interest rate

Internet banking services? Not currently, but within the next six months

The loan officer assigned to the potential Kicker account had four years of experience with medium to large business banking, none of which pertained to the audio industry.

RegionalOne Bank Bid:

Checking accounts: \$5 monthly maintenance fee per account to be waived for Kicker
\$0.20 foreign debit/credit
\$0.30 earned for each deposit
\$3.80 per returned check

Credit card fees: \$0.50 per item

Wire transfers: \$10 to domestic bank accounts, \$55 to foreign bank accounts

Line of credit: Yes, the requested \$100,000 credit line is available, interest charged at prime plus 2 percent, subject to a 6.5 percent minimum interest rate

Internet banking services? Yes, full online banking available, one-time setup fee for each account waived for Kicker, \$20 monthly fee for software module

The loan officer assigned to the potential Kicker account had two years of experience with large business banking. Another branch of the bank had expertise in the audio industry and would be willing to help as needed. This bank was the first one to submit a bid.

Required:

1. Calculate the predicted monthly cost of banking with each bank.
2. Suppose Kicker felt that full online Internet banking was critical. How would that affect your analysis from Requirement 1? How would you incorporate the subjective factors (e.g., experience, access to expertise)?

32 MAKE OR BUY: ETHICAL CONSIDERATIONS

Pamela McDonald, chief management accountant and controller for Murray Manufacturing Inc., was having lunch with Roger Branch, manager of the company's power department. Over the past six months, Pamela and Roger had developed a romantic relationship and were making plans for marriage. To keep company gossip at a minimum, Pamela and Roger had kept the relationship very quiet, and no one in the company was aware of it. The topic of the luncheon conversation centered on a decision concerning the company's power department that Larry Johnson, president of the company, was about to make.

Pamela: Roger, in our last executive meeting, we were told that a local utility company offered to supply power and quoted a price per kilowatt-hour that they said would hold for the next three years. They even offered to enter into a contractual agreement with us.

Roger: This is news to me. Is the bid price a threat to my area? Can they sell us power cheaper than we make it? And why wasn't I informed about this matter? I should have some input. This burns me. I think I should give Larry a call this afternoon and lodge a strong complaint.

Pamela: Calm down, Roger. The last thing I want you to do is call Larry. Larry made us all promise to keep this whole deal quiet until a decision had been made. He did not want you involved because he wanted to make an unbiased decision. You know that the company is struggling somewhat, and they are looking for

ways to save money.

Roger: Yeah, but at my expense? And at the expense of my department's workers? At my age, I doubt that I could find a job that pays as well and has the same benefits. How much of a threat is this offer?

Pamela: Jack Lacy, my assistant controller, prepared an analysis while I was on vacation. It showed that internal production is cheaper than buying, but not by much. Larry asked me to review the findings and submit a final recommendation for next Wednesday's meeting. I've reviewed Jack's analysis, and it's faulty. He overlooked the interactions of your department with other service departments. When these are considered, the analysis is overwhelmingly in favor of purchasing the power. The savings are about \$300,000 per year.

Roger: If Larry hears that, my department's gone. Pam, you can't let this happen. I'm three years away from having a vested retirement. And my workers—they have home mortgages, kids in college, families to support. No, it's not right. Pam, just tell him that your assistant's analysis is on target. He'll never know the difference.

Pamela: Roger, what you're suggesting doesn't sound right either. Would it be ethical for me to fail to disclose this information?

Roger: Ethical? Do you think it's right to lay off employees that have been loyal, faithful workers simply to fatten the pockets of the owners of this company? The Murrays already are so rich that they don't know what to do with their money. I think that it's even more unethical to penalize me and my workers. Why should we have to bear the consequences of some bad marketing decisions? Anyway, the effects of those decisions are about gone, and the company should be back to normal within a year or so.

Pamela: You may be right. Perhaps the well-being of you and your workers is more important than saving \$300,000 for the Murrays.

Required:

1. Should Pamela have told Roger about the impending decision concerning the power department? What do you think most corporate codes of ethics would say about this?
2. Should Pamela provide Larry with the correct data concerning the power department? Or should she protect its workers? What would you do if you were Pamela?

33 KEEP OR DROP A DIVISION

Jan Shumard, president and general manager of Danbury Company, was concerned about the future of one of the company's largest divisions. The division's most recent quarterly income statement follows:

Sales	\$3,751,500
Less: Cost of goods sold	2,722,400
Gross profit	\$1,029,100
Less: Selling and administrative expenses	1,100,000
Operating (loss)	\$ (70,900)

Jan is giving serious consideration to shutting down the division because this is the ninth consecutive quarter that it has shown a loss. To help him in his decision, the following additional information has been gathered:

- The division produces one product at a selling price of \$100 to outside parties.
- The division sells 50 percent of its output to another division within the company for \$83 per unit (full manufacturing cost plus 25 percent). The internal price is set by company policy. If the division is shut down, the user division will buy the part externally for \$100 per unit.
- The fixed overhead assigned per unit is \$20.
- There is no alternative use for the facilities if shut down. The facilities and equipment will be sold and the proceeds invested to produce an annuity of \$100,000 per year. Of the fixed selling and administrative

expenses, 30 percent represent allocated expenses from corporate headquarters.

- Variable selling expenses are \$5 per unit sold for units sold externally. These expenses are avoided for internal sales. No variable administrative expenses are incurred.

Required:

1. Prepare an income statement that more accurately reflects the division's profit performance.
2. Should the president shut down the division? What will be the effect on the company's profits if the division is closed?

34 INTERNET RESEARCH, GROUP CASE

Often, websites for major airlines contain news of current special fares and flights. A decision to run a brief "fare special" is an example of a tactical decision. Form a group with one to three other students. Have each member of the group choose one or two airlines and check their websites for recent examples of fare specials. Have the group collaborate in preparing a presentation to the class discussing the types of cost and revenue information that would go into making this type of tactical decision.

SOLUZIONI

Esercizio 1

1. Previous contribution margin of the strip line was \$175,000. A 25 percent decrease in sales implies a 25 percent decrease in total variable costs, so the contribution margin decreases by 25 percent.

New contribution margin for strip = $\$175,000 - 0.25(\$175,000) = \$131,250$.

The reasoning is the same for the plank line, but the decrease is 20 percent.

New contribution margin for plank = $\$80,000 - 0.20(\$80,000) = \$64,000$.

Therefore, if the parquet floor product line were dropped, the resulting total contribution margin for Hickory would equal \$195,250 ($\$131,250 + \$64,000$).

2. Differential

KeepDropAmount to Keep

Contribution margin	\$305,000	\$195,250	\$109,750
Less: Machine rent	(55,000)	(25,000)	(30,000)
Supervision	<u>(30,000)</u>	<u>(25,000)</u>	<u>(5,000)</u>
Total	<u>\$220,000</u>	<u>\$145,250</u>	<u>\$ 74,750</u>

Notice that the contribution margin for the drop alternative equals the new contribution margins of the strip and plank lines ($\$131,250 + \$64,000$). Also, machine rent and supervision remain relevant across these alternatives.

Now the analysis even more heavily favors keeping the parquet line. In fact, company income will be \$74,750 higher if all three flooring product lines are kept as opposed to dropping the parquet line.

Esercizio 2

1. SwoopRufus

Contribution margin per unit	\$ 5	\$ 15
Required machine time per unit ^a	<u>÷ 0.10</u>	<u>÷ 0.50</u>
Contribution margin per hour of machine time	<u>\$ 50</u>	<u>\$ 30</u>

$${}^a 0.10 = \frac{\text{6 minutes per Swoop unit}}{\text{60 minutes}} ; 0.50 = \frac{\text{30 minutes per Rufus unit}}{\text{60 minutes}}$$

2. Since the Swoop sweatshirt yields \$50 of contribution margin per hour of machine time (which is higher than the \$30 contribution margin per hour of machine time for Rufus), all machine time (i.e., 7,000 hours) should be devoted to the production of Swoop sweatshirts.

Units of Swoop = $7,000 \text{ total hours} / 0.10 \text{ hour per Swoop sweatshirt} = 70,000 \text{ units}$

The optimal mix is Swoop—70,000 units and Rufus—0 units.

3. Total contribution margin of optimal mix = $(70,000 \text{ units Swoop}) \$5 = \$350,000$

Note: Cornerstone Exercise 23-19 (as well as Cornerstone 23-6) clearly illustrates a fundamentally important point involving relevant decision making with a constrained resource. The point is that when

making this relevant decision, one should choose the option with the highest contribution margin *per unit of the constrained resource*—even if that option does *not* have the highest contribution margin *per unit*! For instance, in this exercise, Rufus’ contribution margin is three times greater than Swoop’s contribution margin (\$15 > \$5). However, because each Rufus sweatshirt requires *more* than three times as much machine time to produce than each Swoop sweatshirt (.50 machine hour per Rufus sweatshirt > 0.10 machine hour per Swoop sweatshirt), Swoop has a higher contribution margin *per machine hour* than does Rufus (\$50 > \$30).

Esercizio 3

1. SwoopRufus

Contribution margin per unit	\$ 5	\$ 15
Required machine time per unit ^a	<u>÷ 0.10</u>	<u>÷ 0.50</u>
Contribution margin per hour of machine time	<u>\$ 50</u>	<u>\$ 30</u>

$${}^a0.10 = \frac{\text{6 minutes per Swoop unit}}{\text{60 minutes}} \quad ; \quad 0.50 = \frac{\text{30 minutes per Rufus unit}}{\text{60 minutes}}$$

2. Since Swoop yields \$50 of contribution margin per hour of machine time, the first priority is to produce all of the Swoop sweatshirts that the market will take (i.e., demands). Machine time required for maximum amount of Swoop = 50,000 maximum units × 0.10 hours of machine time required per Swoop sweatshirt = 5,000 hours needed to manufacture 50,000 Swoop sweatshirts.

$$\begin{aligned} \text{Remaining machine time for Rufus sweatshirts} &= 7,000 - 5,000 \\ &= 2,000 \text{ hours} \end{aligned}$$

$$\begin{aligned} \text{Units of Rufus to be produced in remaining 2,000 hours} &= \frac{\mathbf{2,000}}{\mathbf{0.5}} \\ &= 4,000 \text{ units} \end{aligned}$$

Now the optimal mix is 50,000 units of Swoop sweatshirts and 4,000 units of Rufus sweatshirts. This mix will precisely exhaust the machine time available.

3. Total contribution margin of optimal mix = (50,000 units Swoop × \$5)
+ (4,000 units Rufus × \$15)
= \$310,000

Esercizio 4

$$\begin{aligned} \text{Price} &= \text{Cost} + \text{Markup Percentage} \times \text{Cost} \\ &= \$95,000 + 0.15(\$95,000) \\ &= \$95,000 + \$14,250 \\ &= \$109,250 \end{aligned}$$

Esercizio 5

1. Desired Profit $= 0.10 \times \text{Target Price}$
 $= 0.10 \times \$350$
 $= \$35$
2. Target Cost $= \text{Target Price} - \text{Desired Profit}$
 $= \$350 - \35
 $= \$315$

EXERCISES

The correct order is 4, 5, 2, 6, 3, and 1.

Esercizio 6

Steps in Austin's decision:

Step 1: *Define the problem.* The problem is whether to continue studying at his present university or to study at a university with a nationally recognized engineering program.

Step 2: *Identify the alternatives.* Events A and B. (Students may want to include event I—possible study for a graduate degree. However, future events indicate that Austin still defined his problem as in step 1 above.)

Step 3: *Identify costs and benefits associated with each feasible alternative.* Events C, E, F, and I. (Students may also list E and F in step 5—they are included here because they may help Austin estimate future income benefits.)

Step 4: *Total the relevant costs and benefits for each feasible alternative.* No specific event is listed for this step, although we can assume that it was done, and that three schools were selected as feasible since event J mentions that two of three applications met with success.

Step 5: *Assess qualitative factors.* Events D, E, F, G, and H.

Step 6: *Make the decision.* Event J is certainly relevant to this. (What did Austin ultimately decide? He decided to stay at SMWU and finish his engineering degree. He also applied for—and won—summer internships with large West coast companies in the aerospace industry. Currently, he's applying for jobs and [Plan B] looking into graduate programs.)

Esercizio 7

	<u>Alternatives</u>		<u>Differential Cost to Make</u>
	<u>Make</u>	<u>Buy</u>	
Direct materials	\$ 12.00	—	\$12.00
Direct labor	8.25	—	8.25
Variable overhead	3.50	—	3.50
Avoidable fixed overhead*	1.50	—	1.50
Purchase cost	—	<u>\$25.00</u>	<u>(25.00)</u>
Total relevant cost	<u>\$25.25</u>	<u>\$25.00</u>	<u>\$ 0.25</u>

*Avoidable fixed overhead is the 75% of fixed overhead that would be eliminated if the component were no longer made in-house. Avoidable fixed overhead is relevant because if Zion makes the component, it will incur the cost, but if the component is purchased, that fixed overhead will not be incurred.

Zion should purchase the component from Bryce because it will save \$2,500 ($\$0.25 \times 10,000$) over making it in-house.

Esercizio 8

1. The two alternatives are (1) to accept the special order or (2) to reject the special order.

2. Direct materials	\$3.00
Direct labor	2.25
Variable overhead	<u>1.15</u>
Total	<u>\$6.40</u>

Relevant manufacturing costs are \$6.40 per unit so the gross profit per unit from the special order is \$0.60 ($\$7.00 - \6.40). The increase in gross profit is \$9,000 ($15,000 \times \0.60). Therefore, the special order should be accepted.

Esercizio 9

In this case, it may be easier to deal with the total costs and revenues of the special order:

Revenue ($\$7.00 \times 15,000$)		\$105,000
Less variable costs:		
Direct materials ($\$3.00 \times 15,000$)	\$45,000	
Direct labor ($\$2.25 \times 15,000$).....	33,750	
Variable overhead ($\$1.15 \times 15,000$)	<u>17,250</u>	(96,000)
Less labeling machine.....		<u>(14,000)</u>
Loss on special order.....		<u>\$ (5,000)</u>

Smooth Move should reject the special order because it will reduce income by \$5,000.

Esercizio 10

If Petoskey drops Conway, overall profit will decrease by \$75,000 as a result of the lost contribution margin ($\$300,000 - \$225,000$). Note that the direct fixed expense for depreciation is a sunk cost and not relevant to the decision (i.e., it will remain unchanged whether Conway is kept or dropped). Therefore, the overall

impact of dropping Conway is that profit decreases by the 75,000 lost contribution margin. As a result, Petoskey should keep Conway because profits are higher with Conway than without Conway.

Esercizio 11

If Petoskey drops Conway, profit will decrease by \$75,000 as a result of the lost contribution margin (\$300,000 – \$225,000). Note that the direct fixed expense for depreciation is a sunk cost and not relevant to the decision (i.e., it will remain unchanged whether Conway is kept or dropped). In addition, Petoskey will avoid the \$80,000 supervisory salary cost if it drops Conway. Finally, if Petoskey drops Conway, 20% of Alanson’s contribution margin, or \$33,000 (i.e., $.20 \times \$165,000$), will also be lost as Conway-loving customers shop elsewhere for Alanson.

Therefore, the overall impact of dropping Conway is that profit decreases by the 75,000 lost Conway contribution margin, increases by the lost Conway supervisory salary of \$80,000, and decreases by the lost Alanson contribution margin of \$33,000, which is a net decrease in profit of \$28,000. Therefore, Petoskey should keep Conway because profits are higher with Conway than without Conway.

Esercizio 12

1. Contribution margin if HS is sold at split-off= $\$8 \times 20,000$
= \$160,000

2. Contribution margin if HS is processed into CS:

Revenue ($\$45 \times 4,000$)	\$180,000
Less further processing cost	<u>34,000</u>
Contribution margin	<u>\$146,000</u>

Bozo should sell HS at split-off; profit from selling at split-off will be \$14,000 higher (\$160,000 – \$146,000) than if it were processed into CS.

Esercizio 13

1. If 500 units of each product can be sold, then the company will first make and sell 500 units of Tahoe (the product with the higher contribution margin per hour of painting department time). This will take 1,500 (500 units \times 3 hours) hours of painting department time, leaving 960 (2,460 – 1,500) hours for Reno production. This time will yield 192 (960/5) units of Reno.

Optimal mix: 192 units Reno, 500 units Tahoe

2. Total contribution margin = $(\$120 \times 192) + (\$75 \times 500) = \$60,540$

Esercizio 14

1. Price of carved bear candle = $\$12.00 + (0.8 \times \$12) = \$21.60$

2. Price of scented votive candle = $\$1.10 + (0.8 \times \$1.10) = \$1.98$

Esercizio 15

1. Desired Profit = $0.25 \times \text{Target Price}$
= $0.25 \times \$75$
= \$18.75
2. Target Cost = Target Price – Desired Profit
= $\$75 - \18.75
= \$56.25

Esercizio 16

1. Orders per year = $\frac{4,000 \text{ units}}{400 \text{ units per order}} = 10 \text{ orders}$
2. Total ordering cost = $\$20 \times 10 = \200
3. Average amount in inventory = $\frac{400 + 0}{2} = 200 \text{ units}$
Total carrying cost = $\$4 \times 200 \text{ units} = \800
4. Total Inventory-Related Cost = Total Ordering Cost + Total Carrying Cost
= $\$200 + \800
= \$1,000

Esercizio 17

1. The amounts Heather has spent on purchasing and improving the Grand Am are irrelevant because these are sunk costs.

2.

<u>Cost Item</u>	<u>Alternatives</u>	
	<u>Restore Grand Am</u>	<u>Buy Neon</u>
Transmission	\$2,000	
Water pump	400	
Master cylinder	1,100	
Sell Grand Am	0	\$ (6,400)
Cost of new car	<u>0</u>	<u>9,400</u>
Total	<u>\$3,500</u>	<u>\$ 3,000</u>

Heather should sell the Grand Am and buy the Neon because it provides a net savings of \$500.

Note: Heather should consider the qualitative factors. If she restores the Grand Am, how much longer will it last? What about increased license fees and insurance on the newer car? Could she remove the stereo and put it in the Neon without greatly decreasing the Grand Am's resale value?

Esercizio 18

1. If the analysis is done using total costs, each variable cost as well as the purchase price will be the unit cost multiplied by 35,000 units. The direct fixed overhead of \$77,000 is avoidable if the part is purchased.

	<u>Make</u>	<u>Buy</u>
Direct materials	\$210,000	\$ 0
Direct labor	70,000	0
Variable overhead	52,500	0
Fixed overhead	77,000	0
Purchase cost	<u>0</u>	<u>385,000</u>
Total relevant costs	<u>\$409,500</u>	<u>\$385,000</u>

Blasingham should purchase the part.

2. Maximum price = $\frac{\$409,500}{35,000} = \11.70 per unit
3. Income would increase by \$24,500 (\$409,500 – \$385,000).

Esercizio 19

1.

	<u>Make</u>	<u>Buy</u>
Direct materials	\$210,000	\$ 0
Direct labor	70,000	0
Variable overhead	52,500	0
Purchase cost	<u>0</u>	<u>385,000</u> (\$11 × 35,000)
Total relevant costs	<u>\$332,500</u>	<u>\$385,000</u>

Blasingham should continue manufacturing the part.

2. Maximum price = $\frac{\$332,500}{35,000} = \9.50 per unit
3. Income would decrease by \$52,500 (\$385,000 – \$332,500).

Esercizio 20

1. If the special order is accepted:

Revenues ($\$7 \times 100,000$)	\$ 700,000
Direct materials ($\$2 \times 100,000$)	(200,000)
Direct labor ($\$1 \times 100,000$).....	(100,000)
Variable overhead ($\$3 \times 100,000$)	(300,000)
Total net benefit.....	<u>\$ 100,000</u>

Fixed overhead and selling costs are irrelevant.

If the special order is rejected, there will be no impact on income. Therefore, the quantitative analysis is \$100,000 in favor of accepting the special order.

2. The qualitative factors are those that cannot be easily quantified. The company is faced with a problem of idle capacity. Accepting the special order would bring production up to near capacity and allow the company to avoid laying off employees. This would also enhance the company's community image.

The special-order price is well below the company's normal price. Will this have a potential impact on regular customers? Considering the fact that the customer is located in a region not usually served by the company, the likelihood of an adverse impact on regular business is not high.

Esercizio 21

1. <u>Cost Item</u>	<u>Make</u>	<u>Buy</u>
Raw materials ^a	\$218,000	\$ 0
Direct labor ^b	70,200	0
Variable overhead ^c	20,800	0
Fixed overhead ^d	58,000	0
Purchase cost ^e	<u>0</u>	<u>340,000</u>
	<u>\$367,000</u>	<u>\$340,000</u>

^a $(\$70 \times 2,000) + (\$130 \times 600)$.

^b $\$27 \times 2,600$.

^c $\$8 \times 2,600$.

^d $\$26,000 + \$32,000$.

^e $(\$125 \times 2,000) + (\$150 \times 600)$.

Net savings by purchasing: $\$367,000 - \$340,000 = \$27,000$.

Hetrick should purchase the crowns rather than make them.

2. Qualitative factors that Hetrick should consider include quality of crowns, reliability and promptness of producer, and reduction of workforce.
3. It reduces the cost of making the crowns to \$335,000, which is less than the cost of buying.

4. <u>Cost Item</u>	<u>Make</u>	<u>Buy</u>
Raw materials.....	\$316,000	\$ 0
Direct labor.....	108,000	0
Variable overhead	32,000	0
Fixed overhead	58,000	0

Purchase cost.....	<u>515,000</u>
<u>\$514,000</u>	<u>\$515,000</u>

Hetrick should produce its own crowns if demand increases to this level because the fixed overhead is spread over more units.

Esercizio 22

1. @ 600 lbs.	<u>Process Further</u>	<u>Sell</u>	<u>Difference</u>
Revenues ^a	\$ 24,000	\$7,200	\$ 16,800
Bags ^b	0	(39)	39
Shipping ^c	(384)	(60)	(324)
Grinding ^d	(1,500)	0	(1,500)
Bottles ^e	<u>(2,400)</u>	<u>0</u>	<u>(2,400)</u>
	<u>\$ 19,716</u>	<u>\$7,101</u>	<u>\$ 12,615</u>

^a600 × 10 × \$4 = \$24,000; \$12 × 600.

^b\$1.30 × (600/20).

^c[(10 × 600)/25] × \$1.60 = \$384; \$0.10 × 600 = \$60.

^d\$2.50 × 600.

^e10 × 600 × \$0.40.

Zanda should process depryl further.

2. $\frac{\$12,615}{600} = \21.025 additional income per pound

$\$21.025 \times 265,000 = \$5,571,625$

Esercizio 23

1.	<u>System A</u>	<u>System B</u>	<u>Headset</u>	<u>Total</u>
Sales	\$ 45,000	\$ 32,500	\$8,000	\$ 85,500
Variable expenses	<u>20,000</u>	<u>25,500</u>	<u>3,200</u>	<u>48,700</u>
Contribution margin	\$ 25,000	\$ 7,000	\$4,800	\$ 36,800
Direct fixed cost*	<u>526^a</u>	<u>11,158^b</u>	<u>1,016^c</u>	<u>12,700</u>
Segment margin	<u>\$ 24,474</u>	<u>\$ (4,158)</u>	<u>\$3,784</u>	\$ 24,100
Common fixed cost				<u>18,000</u>
Operating income				<u>\$ 6,100</u>

^a\$45,000/\$85,500 × \$18,000 = \$9,474; \$10,000 – \$9,474 = \$526.

^b\$32,500/\$85,500 × \$18,000 = \$6,842; \$18,000 – \$6,842 = \$11,158.

^c\$8,000/\$85,500 × \$18,000 = \$1,684; \$2,700 – \$1,684 = \$1,016.

2.	<u>System A</u>	<u>Headset</u>	<u>Total</u>
Sales	\$ 58,500	\$6,000	\$ 64,500
Variable expenses	<u>26,000</u>	<u>2,400</u>	<u>28,400</u>
Contribution margin	\$ 32,500	\$3,600	\$ 36,100
Direct fixed costs	<u>526</u>	<u>1,016</u>	<u>1,542</u>
Segment margin	<u>\$ 31,974</u>	<u>\$2,584</u>	\$ 34,558
Common fixed costs			18,000

Operating income \$ 16,558

System B should be dropped because operating income increases from \$6,100 to \$16,558.

3.	<u>System A</u>	<u>System C</u>	<u>Headset</u>	<u>Total</u>
Sales	\$ 45,000	\$ 26,000	\$7,200	\$ 78,200
Variable expenses	<u>20,000</u>	<u>13,000</u>	<u>2,880</u>	<u>35,880</u>
Contribution margin	\$ 25,000	\$ 13,000	\$4,320	\$ 42,320
Direct fixed costs	<u>526</u>	<u>11,158</u>	<u>1,016</u>	<u>12,700</u>
Segment margin	<u>\$ 24,474</u>	<u>\$ 1,842</u>	<u>\$3,304</u>	\$ 29,620
Common fixed costs				<u>18,000</u>
Operating income				<u>\$ 11,620</u>

Replacing B with C is better than keeping B, but not as good as dropping B without replacement with C because operating income of \$11,620 increases from \$6,100, but is lower than \$16,558.

Esercizio 24

1. Steve should consider selling the part for \$1.85 because his division's profits would increase \$12,800:

	<u>Accept</u>	<u>Reject</u>
Revenues (2 × \$1.85 × 8,000)	\$29,600	\$0
Variable expenses	<u>16,800</u>	<u>0</u>
Total	<u>\$12,800</u>	<u>\$0</u>

Pat's divisional profits would increase by \$18,400:

	<u>Accept</u>	<u>Reject</u>
Revenues (\$32 × 8,000)	\$ 256,000	\$0
Variable expenses:		
Direct materials (\$17 × 8,000)	(136,000)	0
Direct labor (\$7 × 8,000)	(56,000)	0
Overhead (\$2 × 8,000)	(16,000)	0
Component (2 × \$1.85 × 8,000)	<u>(29,600)</u>	<u>0</u>
Total relevant benefits	<u>\$ 18,400</u>	<u>\$0</u>

2. Pat should accept the \$2 price. This price will increase the cost of the component from \$29,600 to \$32,000 (2 × \$2 × 8,000) and yield an incremental benefit of \$16,000 (\$18,400 – \$2,400).

Steve's division will see an increase in profit of \$15,200 (8,000 units × 2 components per unit × \$0.95 contribution margin per component).

3. Yes. At full price, the total cost of the component is \$36,800 (2 × \$2.30 × 8,000), an increase of \$7,200 over the original offer. This still leaves an increase in profits of \$11,200 (\$18,400 – \$7,200). (See the answer to Requirement 1.)

Esercizio 25

1. Markup = $\frac{\$46,300 + \$35,600}{\$130,000} = 0.63$, or 63%

2. Direct materials \$1,800

Direct labor	1,600
Overhead	<u>800</u>
Total cost	\$4,200
Add: Markup	<u>2,646</u>
Initial bid	<u>\$6,846</u>

Esercizio 26

1.	<u>Basic</u>	<u>Standard</u>	<u>Deluxe</u>
Price	\$9.00	\$30.00	\$35.00
Variable cost	<u>6.00</u>	<u>20.00</u>	<u>10.00</u>
Contribution margin	\$3.00	\$10.00	\$25.00
÷ Machine hours	<u>÷0.10</u>	<u>÷0.50</u>	<u>÷0.75</u>
Contribution margin per machine hour	<u>\$30.00</u>	<u>\$20.00</u>	<u>\$33.33</u>

The company should sell only the deluxe unit with contribution margin per machine hour of \$33.33. Sealing can produce 20,000 (15,000/0.75) deluxe units per year. These 20,000 units, multiplied by the \$25 contribution margin per unit, would yield a total contribution margin of \$500,000.

- First, produce and sell 12,000 deluxe units, which would use 9,000 machine hours. Then, produce and sell 50,000 basic units, which would use 5,000 machine hours. Finally, with the remaining 1,000 machine hours, produce 2,000 standard units.

$$\begin{aligned} \text{Total contribution margin} &= (\$3 \times 50,000) + (\$25 \times 12,000) + (\$10 \times 2,000) \\ &= \$470,000 \end{aligned}$$

Esercizio 27

- The company should not accept the offer because the additional revenue is less than the additional costs (assuming fixed overhead is allocated and will not increase with the special order):

Incremental revenue per box	\$4.20
Incremental cost per box	<u>4.25</u>
Loss per box.....	<u>\$(0.05)</u>

$$\text{Total loss: } \$0.05 \times 5,000 = \$250$$

- Costs associated with the layoff:

Increase state UI premiums (0.01 × \$1,460,000)	\$ 14,600
Notification costs (\$25 × 20)	500
Rehiring and retraining costs (\$150 × 20)	<u>3,000</u>
Total.....	<u>\$ 18,100</u>

The order should be accepted. The loss of \$250 on the order is more than offset by the \$18,100 savings by not laying off employees.

Esercizio 28

1. Sales		\$263,000
Costs		<u>223,000</u>
Operating profit		<u>\$ 40,000</u>

2.	<u>Sell</u>	<u>Process Further</u>	<u>Difference</u>
Revenues	\$ 40,000	\$ 75,000	\$ 35,000
Further processing cost	<u>0</u>	<u>23,900</u>	<u>23,900</u>
Operating income (loss)	<u>\$ 40,000</u>	<u>\$ 51,100</u>	<u>\$ 11,100</u>

The company should process Delta further because gross profit would increase by \$11,100 if it were processed further. (Note: Joint costs are irrelevant to this decision because the company will incur them whether or not Delta is processed further.)

Esercizio 29

1. $(\$30 \times 2,000) + (\$60 \times 4,000) = \$300,000$

2.	<u>Juno</u>	<u>Hera</u>
Contribution margin	\$30	\$60
÷ Pounds of material	<u>÷ 2</u>	<u>÷ 5</u>
Contribution margin/pound	<u>\$15</u>	<u>\$12</u>

Norton should make as much of Juno as can be sold and then make Hera.

2,000 units of Juno \times 2 = 4,000 pounds

16,000 pounds – 4,000 pounds = 12,000 pounds for Hera

Hera production = $\frac{12,000}{5} = 2,400$ units

Product mix is 2,000 Juno and 2,400 Hera.

Total contribution margin = $(2,000 \times \$30) + (2,400 \times \$60)$
 = \$204,000

Esercizio 30

1.	<u>Sell</u>	<u>Process Further</u>	<u>Differential Amount to Process Further</u>
Revenues	\$ 24,000	\$ 33,000	\$9,000
Processing cost	<u>—</u>	<u>(4,100)</u>	<u>4,100</u>
Total	<u>\$ 24,000</u>	<u>\$ 28,900</u>	<u>\$4,900</u>

Germain should be processed further as it will increase profit by \$4,900 for every 1,000 liters.

2.	<u>Sell</u>	<u>Process Further</u>	<u>Differential Amount to Process Further</u>
Revenues	\$ 24,000	\$ 33,000	\$ 9,000
Processing cost	<u>—</u>	<u>(4,100)</u>	<u>(4,100)</u>
Distribution cost	<u>—</u>	<u>(800)</u>	<u>(800)</u>

Commissions	—	(3,300)	(3,300)
Total	<u>\$ 24,000</u>	<u>\$ 24,800</u>	<u>\$ (800)</u>

Germain should be processed further as it will increase profit by \$800 for every 1,000 liters. Note that the liability issue was not quantified so it would need to be considered as a qualitative factor, further reducing the attractiveness of making geraiten.

Esercizio 31

1. Monthly cost for FirstBank:

Checking accounts:			
..... Maintenance fees (\$5 × 6)		\$	30
..... Foreign DR/CR (\$0.10 × 200)			20
..... Returned checks (\$3 × 25)			75
..... Earnings on deposits (\$0.50 × 300)			(150)
Credit card fees (\$0.50 × 4,000)			<u>2,000</u>
Wire transfers [(\$15 × 40) + (\$50 × 60)]			3,600
Line of credit charges (0.06/12)(\$100,000)			500
Internet banking charges			<u>20</u>
..... Total monthly charges			<u>\$6,095</u>
One-time Internet setup fees (\$15 × 6 accounts)		\$	<u>90</u>

Monthly cost for Community Bank:

Checking accounts: Returned checks (\$2 × 25)		\$	50
Credit card fees			
..... Per item (\$0.50 × 4,000)			\$2,000
..... Batch processing (\$7 × 20)			<u>140</u>
Wire transfers (\$30 × 100)			3,000
Line of credit charges (0.07/12)(\$100,000)			<u>583</u>
..... Total monthly charges			<u>\$5,773</u>

Monthly cost for RegionalOne Bank:

Checking accounts:			
..... Foreign DR/CR (\$0.20 × 200)		\$	40
..... Returned checks (\$3.80 × 25)			95
..... Earnings on deposits (\$0.30 × 300)			(90)
Credit card fees (\$0.50 × 4,000)			<u>2,000</u>
Wire transfers [(\$10 × 40) + (\$55 × 60)]			3,700
Line of credit charges (0.065/12)(\$100,000)			542
Internet banking charges			<u>20</u>
..... Total monthly charges			<u>\$6,307</u>

Community Bank has the lowest overall monthly fees. On quantitative factors alone, it would be chosen.

2. If the full online banking access were crucial, Community Bank would be eliminated immediately. This leaves FirstBank and RegionalOne Bank. The two sets of monthly costs are similar \$6,095 for FirstBank versus \$6,307 for RegionalOne. Now, the banking relationship, comfort level of Kicker with the loan officer, and confidence in the bank's ability to respond quickly and appropriately to Kicker's needs will be the deciding factors. Additionally, some further negotiation would probably be done—for example, on the interest rate on the line of credit.

Esercizio 32

1. Pamela should not have told Roger about the deliberations concerning the power department because this is confidential information. She had been explicitly told to keep the details quiet but deliberately informed the head of the unit affected by the potential decision. (Standard II: 1) Her revelation may be interpreted as actively or passively subverting the attainment of the organization's legitimate and ethical objectives.
2. The romantic relationship between Pamela and Roger sets up a conflict of interest for this particular decision, and Pamela should have withdrawn from any active role in it. (Standard III: 1) However, she should definitely provide the information she currently has about the cost of eliminating the power department. To not do so would be active subversion of the organization's legitimate and ethical objectives. Moreover, she has the obligation to communicate information fairly and to disclose all relevant information that could reasonably be expected to influence an intended user's understanding. In addition, however, Pamela should discuss the qualitative effects of eliminating the power department. The effects on workers, community relations, reliability of external service, and any ethical commitments the company may have to its workers should all enter into the decision. If I were Pamela, I would communicate the short-term quantitative effects and express my concerns about the qualitative factors. I might also project what the costs of operating internally would be for the next five years and compare that with estimates of the costs of external acquisition.

Esercizio 33

1. Sales ^a	\$	3,751,500
Less: Variable expenses ^b		<u>2,004,900</u>
Contribution margin	\$	1,746,600
Less: Direct fixed expenses ^c		<u>1,518,250</u>
Divisional margin	\$	228,350
Less: Common fixed expenses ^c		<u>299,250</u>
Operating (loss)	\$	<u><u>(70,900)</u></u>

^aBased on sales of 41,000 units

Let X = Units sold

$$\$83X/2 + \$100X/2 = \$3,751,500$$

$$\$183X = \$7,503,000$$

$$X = 41,000 \text{ units}$$

^b \$83/1.25 =	\$66.40	Manufacturing cost
	<u>20.00</u>	Fixed overhead
	\$46.40	Per internal unit variable cost
	<u>5.00</u>	Selling
	<u>\$51.40</u>	Per external unit variable cost

$$\begin{aligned} \text{Variable costs} &= (\$46.40 \times 20,500) + (\$51.40 \times 20,500) \\ &= \$2,004,900 \end{aligned}$$

^cFixed selling and admin: $\$1,100,000 - \$5(20,500) = \$997,500$

Direct fixed selling and admin: $0.7 \times \$997,500 = \$698,250$

Direct fixed overhead: $\$20 \times 41,000 = \$820,000$

Total direct fixed expenses = $\$698,250 + \$820,000 = \$1,518,250$

Common fixed expenses = $0.3 \times \$997,500 = \$299,250$

2.	<u>Keep</u>	<u>Drop</u>
Sales	\$ 3,751,500	\$ —
Variable costs	(2,004,900)	(2,050,000)*
Direct fixed expenses	(1,518,250)	—
Annuity	—	<u>100,000</u>
Total	<u>\$ 228,350</u>	<u>\$(1,950,000)</u>

*\$100 × 20,500 (The units transferred internally must be purchased externally.)

The company should keep the division.

Esercizio 34

Answers will vary.