

CHAPTER 7

Incremental Analysis

Learning Objectives

1. Describe management's decision-making process and incremental analysis.
2. Analyze the relevant costs in accepting an order at a special price.
3. Analyze the relevant costs in a make-or-buy decision.
4. Analyze the relevant costs and revenues in determining whether to sell or process materials further.
5. Analyze the relevant costs to be considered in repairing retaining, or replacing equipment.
6. Analyze the relevant costs in deciding whether to eliminate an unprofitable segment or product.

ANSWERS TO QUESTIONS

1. The following steps are frequently involved in management's decision-making process:

- (1) Identify the problem and assign responsibility.
- (2) Determine and evaluate possible courses of action.
- (3) Make a decision.
- (4) Review results of the decision.

LO1 BT: C Difficulty: Easy TOT: 2 min. AACSB: None AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

2. My roommate is incorrect. Accounting contributes to the decision-making process at Steps 2 and 4. Prior to the decision, accounting provides relevant revenue and cost data for each course of action. Following the decision, internal reports are prepared to show the actual impact of the decision.

LO1 BT: C Difficulty: Easy TOT: 2 min. AACSB: None AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

3. Disagree. Incremental analysis involves the identification of financial data that change under alternative courses of action.

LO1 BT: C Difficulty: Easy TOT: 2 min. AACSB: None AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

4. In incremental analysis, the important point to consider is whether costs will differ (change) between the two alternatives. As a result, sometimes (1) variable costs do not change under the alternative courses of action and (2) fixed costs do change.

LO1 BT: C Difficulty: Easy TOT: 2 min. AACSB: None AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

5. The relevant data in deciding whether to accept an order at a special price are the incremental revenues to be obtained compared to the incremental costs of filling the special order.

LO2 BT: C Difficulty: Easy TOT: 2 min. AACSB: None AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

6. The manufacturing costs that are relevant in the make-or-buy decision are those that will change if the parts are purchased.

LO3 BT: C Difficulty: Easy TOT: 2 min. AACSB: None AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

7. Opportunity cost is the potential benefit that is lost when one course of action is chosen rather than an alternative course of action. Opportunity cost is relevant in a make-or-buy decision when the facilities used to make the part can be used to generate additional income.

LO3 BT: C Difficulty: Easy TOT: 2 min. AACSB: None AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

8. The decision rule in a decision to sell a product or to process it further is: Process further as long as the incremental revenue from the additional processing exceeds the incremental processing costs.

LO4 BT: K Difficulty: Easy TOT: 2 min. AACSB: None AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

9. Joint products are products that are produced from a single raw material and a common production process. An accounting issue related to joint products is how to allocate the joint costs incurred during the production process that creates the joint products.

LO4 BT: K Difficulty: Easy TOT: 2 min. AACSB: None AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

10. Joint costs are irrelevant to a sell-or-process-further decision because they are sunk costs and will not change whether the decision is to sell the existing product or process it further. Therefore, joint costs are ignored in this decision.

LO4 BT: K Difficulty: Easy TOT: 2 min. AACSB: None AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

11. A sunk cost is a cost that cannot be changed by any present or future decision. Sunk costs, such as the book value of an old piece of equipment, therefore, are not relevant in a decision to retain or replace equipment.

LO5 BT: C Difficulty: Easy TOT: 2 min. AACSB: None AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

Questions Chapter 7 (Continued)

12. Net income will be lower if an unprofitable product line is eliminated when the product line is producing a positive contribution margin and its fixed costs cannot be avoided or reduced.

LO6 BT: C Difficulty: Easy TOT: 2 min. AACSB: None AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

SOLUTIONS TO EXERCISES

EXERCISE 7.2

(a)

	Reject Order	Accept Order	Net Income Increase (Decrease)
Revenues (\$4.80 x 5,000)	\$ -0-	\$24,000	\$24,000
Materials (\$0.50* x 5,000)	-0-	(2,500)	(2,500)
Labor (\$1.50** x 5,000)	-0-	(7,500)	(7,500)
Variable overhead (\$1.00*** x 5,000)	-0-	(5,000)	(5,000)
Cost of equipment rental		(6,000)	(6,000)
Net income	<u>\$ -0-</u>	<u>\$ 3,000</u>	<u>\$ 3,000</u>

*(\$10,000 ÷ 20,000) **(\$30,000 ÷ 20,000) ***(\$20,000 ÷ 20,000)

[Net inc. effect: \$24,000 - \$2,500 - \$7,500 - \$5,000 - \$6,000 = \$3,000]

[Net inc. effect: Incr. rev. - Incr. mat. - Incr. labor - Incr. VOH - Cost of equip. rent. = Net inc. incr.]

- (b) As shown in the incremental analysis, Gruden should accept the special order because incremental revenue exceeds incremental expenses by \$3,000.

EXERCISE 7.2 (Continued)

- (c) It is assumed that sales of the golf discs in other markets would not be affected by this special order. If other sales were affected, Gruden would have to consider the lost sales in making the decision. Second, if Gruden is operating at full capacity, it is likely that the special order would be rejected.

LO2 BT: AN Difficulty: Easy TOT: 15 min. AACSB: Analytic AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

EXERCISE 7.3

(a)

	Reject Order	Accept Order	Net Income Increase (Decrease)
Revenues (15,000 x \$7.60)	\$0	\$114,000	\$114,000
Cost of goods sold	0	78,000 (1)	(78,000)
Operating expenses	<u>0</u>	<u>31,800 (2)</u>	<u>(31,800)</u>
Net income	<u>\$0</u>	<u>\$ 4,200</u>	<u>\$ 4,200</u>

- (1) **Variable cost of goods sold = \$2,600,000 x 70% = \$1,820,000.**
Variable cost of goods sold per unit = \$1,820,000 ÷ 350,000 = \$5.20
Variable cost of goods sold for the special order = \$5.20 x 15,000
= \$78,000.

[(\$2,600,000 x 70% = \$1,820,000); (\$1,820,000 ÷ 350,000 = \$5.20); (15,000 x \$5.20 = \$78,000)]

[(CGS x Var. cost % = Var. CGS); (Var. CGS ÷ No. units sold = Var. CGS/unit); (Spec. order units x Var. CGS/unit = Var. CGS for spec. order)]

- (2) **Variable operating expenses = \$840,000 x 80% = \$672,000**
\$672,000 ÷ 350,000 = \$1.92 per unit
15,000 x \$1.92 = \$28,800
\$28,800 + \$3,000 = \$31,800

[(\$840,000 x 80% = \$672,000); (\$672,000 ÷ 350,000 = \$1.92); ((15,000 x \$1.92) + \$3,000 = \$31,800)]

[(Oper. exp. x Var. cost % = Var. oper. exp.); (Var. oper. exp. ÷ No. units sold = Var. oper. exp./unit); ((Spec. order units x Var. oper. exp./unit) + Add'l. ship. costs = Var. oper. exp. for spec. order)]

- (b) **As shown in the incremental analysis, Moonbeam Company should accept the special order because incremental revenues exceed incremental expenses by \$4,200.**

LO2 BT: AN Difficulty: Easy TOT: 15 min. AACSB: Analytic AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

EXERCISE 7.4

	Reject Order	Accept Order	Net Income Increase (Decrease)
Revenues	<u>\$0</u>	<u>\$1,187,500 (1)</u>	<u>\$1,187,500</u>
Variable costs:			
Direct materials	0	500,000	(500,000)
Direct labor	0	187,500	(187,500)
Variable overhead	<u>0</u>	<u>250,000</u>	<u>(250,000)</u>
Total variable costs	<u>0</u>	<u>937,500</u>	<u>(937,500)</u>
Net income	<u>\$0</u>	<u>\$ 250,000</u>	<u>\$ 250,000</u>

- (1) [(\$2.00 + \$0.75 + \$1.00 + \$1.00) x 250,000]

Klean Fiber should accept the Army's offer since it is expected to increase net income by \$250,000.

LO2 BT: AN Difficulty: Easy TOT: 10 min. AACSB: Analytic AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

[((\$2.00 + \$0.75 + \$1.00 + \$1.00) x 250,000) - \$500,000 - \$187,500 - \$250,000 = \$250,000]

(Incr. rev. – Incr. DM – Incr. DL – Incr. VOH = Incr. net inc.)

EXERCISE 7.5

(a)

	<u>Make</u>	<u>Buy</u>	<u>Net Income Increase (Decrease)</u>
Direct materials (30,000 x \$4.00)	\$120,000	\$ 0	\$ 120,000
Direct labor (30,000 x \$5.00)	150,000	0	150,000
Variable overhead costs (\$150,000 x 70%)	105,000	0	105,000
Fixed manufacturing costs	45,000	45,000	0
Purchase price (30,000 x \$12.95)	0	388,500	(388,500)
Total annual cost	<u>\$420,000</u>	<u>\$433,500</u>	<u>\$ (13,500)</u>

$[(30,000 \times \$4) + (30,000 \times \$5) + (\$150,000 \times 70\%) - (30,000 \times \$12.95) = (\$13,500)]$

(DM to make + DL to make + VOH to make – Purch. price = Net inc. decr. if buy)

(b) No, Pottery Ranch should not purchase the finials. As indicated by the incremental analysis, it would cost the company \$13,500 more to purchase the finials.

EXERCISE 7.5 (Continued)

(c) Yes, by purchasing the finials, a total cost saving of \$6,500 is expected to result as shown below.

	<u>Make</u>	<u>Buy</u>	<u>Net Income Increase (Decrease)</u>
Total annual cost (above)	\$420,000	\$433,500	\$(13,500)
Opportunity cost	20,000	0	20,000
Total cost	<u>\$440,000</u>	<u>\$433,500</u>	<u>\$ 6,500</u>

LO3 BT: AN Difficulty: Easy TOT: 15 min. AACSB: Analytic AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

EXERCISE 7.6

(a) 1.

	<u>Make</u>	<u>Buy</u>	<u>Net Income Increase</u>
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			<u>(Decrease)</u>
Direct materials	\$1,000,000	\$ -0-	\$ 1,000,000
Direct labor	800,000	-0-	800,000
Variable overhead	120,000	-0-	120,000
Fixed overhead	600,000	195,000	405,000
Purchase price	0	2,300,000	(2,300,000)
Total annual cost	<u>\$2,520,000</u>	<u>\$2,495,000</u>	<u>\$ 25,000</u>

Yes. The offer should be accepted as net income is expected to increase by \$25,000.

(\$1,000,000 + \$800,000 + \$120,000 + \$405,000 - \$2,300,000 = \$25,000)

(Incr. DM to make + Incr. DL to make + Incr. VOH to make + Incr. FOH to make - Purch. price = Incr. in net inc. if buy)

2.

	<u>Make</u>	<u>Buy</u>	<u>Net Income Increase (Decrease)</u>
Direct materials	\$1,000,000	\$ 0	\$ 1,000,000
Direct labor	800,000	0	800,000
Variable overhead	120,000	0	120,000
Fixed overhead	600,000	600,000	0
Opportunity cost	375,000	0	375,000
Purchase price	0	2,300,000	(2,300,000)
Totals	<u>\$2,895,000</u>	<u>\$2,900,000</u>	<u>\$ (5,000)</u>

EXERCISE 7.6 (Continued)

No. The offer should not be accepted as net income is expected to be \$5,000 less.

(\$1,000,000 + \$800,000 + \$120,000 + \$375,000 - \$2,300,000 = (\$5,000))

(Incr. DM to make + Incr. DL to make + Incr. VOH to make + Opp. Cost - Purch. price = Net inc. decr. if buy)

(b) Qualitative factors include the possibility of laying off those employees that produced the robot and the resulting poor morale of the remaining employees, maintaining quality standards, timeliness of delivery, and controlling the purchase price in the future.

LO3 BT: E Difficulty: Easy TOT: 15 min. AACSB: Analytic AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

EXERCISE 7.7

	<u>Make Sails</u>	<u>Buy Sails</u>	<u>Net Income Increase (Decrease)</u>
(a)			

Direct materials	\$100	\$ 0	\$ 100
Direct labor	80	0	80
Variable overhead	25	0	25
Purchase price	<u>0</u>	<u>250</u>	<u>(250)</u>
Total unit cost	<u>\$205</u>	<u>\$250</u>	<u>\$ (45)</u>

Riggs should be making the sails, because it could save \$45 per unit or \$54,000. The president was including the fixed overhead cost in the calculation. Variable overhead = Total overhead (\$90) – Fixed overhead (\$78,000 ÷ 1,200) = \$25. This amount has been allocated, so Riggs will incur the cost whether or not it makes the sails. This is an example of an irrelevant cost, because it does not differ between the two alternatives.

(\$100 + \$80 + \$25 - \$250 = (\$45))

(Incr. DM to make + Incr. DL to make + Incr. VOH to make – Purch. price = Net inc. decr. if buy)

EXERCISE 7.7 (Continued)

- (b) The best decision would be to rent out the space as shown below. The differential savings would be \$77,000 – \$54,000 = \$23,000.

	Per Unit	Make Sails	Buy Sails	Net Income Increase (Decrease)
(Based on 1,200 units)				
Manufacturing cost	\$205	\$246,000	\$ 0	\$ 246,000
Purchase price	\$250	0	300,000	(300,000)
Opportunity cost		77,000	0	77,000
Total annual cost		<u>\$323,000</u>	<u>\$300,000</u>	<u>\$ 23,000</u>

- (c) Qualitative factors to consider would be (1) whether Riggs will be able to exercise control over the future price of the product (2) whether Riggs will be able to exercise control over the quality of the product (3) whether delivery will be timely and (4) the potential for interruptions in the supply of the product.

LO3 BT: E Difficulty: Easy TOT: 20 min. AACSB: Analytic AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

EXERCISE 7.8

	Make IMC2	Buy IMC2	Net Income Increase (Decrease)
Direct materials	\$ 65.00	\$ 0	\$ 65.00
Direct labor	45.00	0	45.00
Material handling	6.50	0	6.50
Variable overhead	72.00*	0	72.00
Fixed overhead	48.00**	48.00	0.00
Purchase price	0	200.00	(200.00)
Total unit cost	<u>\$236.50</u>	<u>\$248.00</u>	<u>\$ (11.50)</u>

*Variable overhead = 60% x (\$126.50 – \$6.50)

**Fixed overhead = 40% x (126.50 – \$6.50)

The component should not be purchased from the outside vendor, as the per unit cost would be \$11.50 greater than if the company made it.

[\$65.00 + \$45.00 + \$6.50 + (60% x (\$126.50 - \$6.50)) + (40% x (\$126.50 - \$6.50)) – (\$200.00 + \$48.00) = (\$11.50)

(Incr. DM/unit to make + Incr. DL/unit to make + Mat. handling/unit to make + Incr. VOH/unit to make + FOH/unit – (Purch. price/unit + FOH/unit) = Net loss/unit if buy)

EXERCISE 7.8 (Continued)

- (b) In order for Innova to make an accurate decision, it would have to know the opportunity cost of manufacturing the other product. As determined in (a), purchasing the product from outside would cost \$11,500 more ($1,000 \times \11.50). Innova would have to increase their contribution margin by more than \$11,500 through the manufacture of the other product, before it would be economical for it to purchase the IMC2 from the outside vendor.
- (c) Qualitative factors to consider would be (1) quality of the component (2) on-time delivery, (3) timeliness of delivery, and (4) reliability of the vendor.

LO3 BT: E Difficulty: Easy TOT: 20 min. AACSB: Analytic AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

EXERCISE 7.9

	<u>Sell (Basic Kit)</u>	<u>Process Further (Stage 2 Kit)</u>	<u>Net Income Increase (Decrease)</u>
Sales per unit	<u>\$30</u>	<u>\$36</u>	<u>\$ 6</u>
Costs per unit			
Direct materials	\$16	\$ 8 (1)	\$ 8
Direct labor	<u>0</u>	<u>9 (2)</u>	<u>(9)</u>
Total	<u>\$16</u>	<u>\$17</u>	<u>\$(1)</u>
Net income per unit	<u>\$14</u>	<u>\$19</u>	<u>\$ 5</u>

- (1) The cost of materials decreases because Anna can make two Stage 2 Kits from the materials for a basic kit.
- (2) The total time to make the two kits is one hour at \$18 per hour or \$9 per unit.

Anna should carry the Stage 2 Kits. The incremental revenue, \$6, exceeds the incremental processing costs, \$1. Thus, net income is expected to increase by processing the kits further.

LO4 BT: AN Difficulty: Easy TOT: 12 min. AACSB: Analytic AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

[Net inc. effect: $\$6 + (\$8 - \$9) = \5]

[Net inc. effect: $\text{Incr. in USP} + (\text{DM cost savings/unit} - \text{DL incr./unit}) = \text{Net inc. incr./unit}$]

EXERCISE 7.10

(a) Sales (\$60,000 + \$15,000 + \$55,000)	\$ 130,000
Joint costs	<u>(100,000)</u>
Net income	<u>\$ 30,000</u>

(b) Sales (\$190,000 + \$35,000 + \$215,000)	\$ 440,000
Joint costs	(100,000)
Additional costs (\$100,000 + \$30,000 + \$150,000)	<u>(280,000)</u>
Net income	<u>\$ 60,000</u>

(c)			
	<u>Product 10</u>	<u>Product 12</u>	<u>Product 14</u>
Incremental revenue ⁽¹⁾	\$ 130,000	\$ 20,000	\$ 160,000
Incremental costs	<u>(100,000)</u>	<u>(30,000)</u>	<u>(150,000)</u>
Incremental profit (loss)	<u>\$ 30,000</u>	<u>\$(10,000)</u>	<u>\$ 10,000</u>

⁽¹⁾Sales value after further processing – Sales value @ split-off point

Products 10 and 14 should be processed further and Product 12 should be sold at the split-off point.

[(Product 10: \$130,000 - \$100,000 = \$30,000); (Product 12: \$20,000 - \$30,000 = \$(10,000)); (Product 14: \$160,000 - \$150,000 = \$10,000)]

[(Product 10: Incr. rev – Incr. costs = Incr. profit); (Product 12: Incr. rev. – Incr. costs = Incr. loss); (Product 14: Incr. rev. – Incr. costs = Incr. profit)]

(d) Sales (\$190,000 + \$15,000 + \$215,000)	\$ 420,000
Joint costs	(100,000)
Additional costs (\$100,000 + \$150,000)	<u>(250,000)</u>
Net income	<u>\$ 70,000</u>

Net income is estimated to be \$10,000 (\$70,000 – \$60,000) higher in (d) than in (b) because Product 12 is not processed further, thereby increasing overall profit \$10,000.

LO4 BT: AN Difficulty: Easy TOT: 15 min. AACSB: Analytic AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

SOLUTIONS TO PROBLEMS

PROBLEM 7.1

(a)

	<u>Reject Order</u>	<u>Accept Order</u>	<u>Net Income Increase (Decrease)</u>
Revenues (10,000 x \$28)	\$0	\$280,000	\$ 280,000
Var. Cost of goods sold	0	220,000 (1)	(220,000)
Var. Selling and administrative expenses	<u>0</u>	<u>22,500 (2)</u>	<u>(22,500)</u>
Net income	<u>\$0</u>	<u>\$ 37,500</u>	<u>\$ 37,500</u>

- (1) Variable CGS = \$3,600,000 – \$960,000 = \$2,640,000;
 $\$2,640,000 \div 120,000 \text{ units} = \$22.00 \text{ per unit};$
 $10,000 \times \$22.00 = \$220,000.$

[(\\$3,600,000 - \\$960,000 = \\$2,640,000); ($\$2,640,000 \div 120,000 = \22); ($\$22 \times 10,000 = \$220,000$)]
 [(Tot. CGS – Fixed CGS = Var. CGS); (Var. CGS ÷ No. units produced = Var. CGS/unit); (Var. CGS/unit x No. units in spec. order = Spec. order Var. CGS)]

- (2) Variable S&A expenses = \$405,000 – \$225,000 = \$180,000;
 $\$180,000 \div 120,000 \text{ units} = \$1.50 \text{ per unit};$
 $10,000 \times (\$1.50 + \$0.75) = \$22,500.$

[(\\$405,000 - \\$225,000 = \\$180,000); ($\$180,000 \div 120,000 = \1.50); ($10,000 \times (\$1.50 + \$0.75) = \$22,500$)]
 [(Tot. S&A exp. – Fixed S&A = Var. S&A exp.); (Var. S&A exp. ÷ No. units produced = Var. S&A exp./unit); (No. units in spec. order x (Var. S&A exp./unit + Ship. exp./unit) = Spec. order var. S&A exp.)]

- (b) Yes, the special order should be accepted because net income is expected to increase by \$37,500.

- (c) Unit selling price = \$22.00 (variable manufacturing costs) + \$2.25 (\$1.50 + \$0.75) variable selling and administrative expenses + \$5.00 net income = \$29.25.

- (d) Nonfinancial factors to be considered are: (1) possible effect on domestic sales, (2) possible alternative uses of the unused factory capacity, and (3) ability to meet customer's schedule for delivery without increasing costs.

LO2 BT: E Difficulty: Simple TOT: 25 min. AACSB: Analytic AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

PROBLEM 7.2

(a)

	<u>Make CISCO</u>	<u>Buy CISCO</u>	<u>Net Income Increase (Decrease)</u>
Direct materials (8,000 x \$4.80)	\$38,400	\$ 0	\$38,400
Direct labor (8,000 x \$4.30)	34,400	0	34,400
Indirect labor (8,000 x \$0.43)	3,440	0	3,440
Utilities (8,000 x \$0.40)	3,200	0	3,200
Depreciation	3,000	900	2,100
Property taxes	700	200	500
Insurance	1,500	600	900
Purchase price	0	80,000	(80,000)
Freight and inspection (8,000 x \$0.35)	0	2,800	(2,800)
Receiving costs	<u>0</u>	<u>1,300</u>	<u>(1,300)</u>
Net income	<u>\$84,640</u>	<u>\$85,800</u>	<u>\$ (1,160)</u>

[Net inc. effect: (8,000 x \$4.80) + (8,000 x \$4.30) + (8,000 x \$0.43) + (8,000 x \$0.40) + \$2,100 + \$500 + \$900 – \$80,000 – (8,000 x \$0.35) – \$1,300 = (\$1,160)]

[Net inc. effect: (Units made x DM/unit saved) + (Units made x DL/unit saved) + (Units made x Ind. labor/unit saved) + (Units made x Util./unit saved) + Depr. savings + Prop. tax savings + Ins. savings – Purch. price – (Units purch. x Frt. & inspect./unit) – Rec. costs = Net inc. decr.]

- (b) The company should continue to make CISCO because net income is expected to be \$1,160 less if CISCO were purchased from the supplier.
- (c) The decision would be different. Because of the opportunity cost of \$3,000, net income is expected to be \$1,840 higher if CISCO is purchased as shown below:

	<u>Make CISCO</u>	<u>Buy CISCO</u>	<u>Net Income Increase (Decrease)</u>
Total annual cost	\$84,640	\$85,800	\$(1,160)
Opportunity cost	<u>3,000</u>	<u>0</u>	<u>3,000</u>
Net income	<u>\$87,640</u>	<u>\$85,800</u>	<u>\$ 1,840</u>

PROBLEM 7.2 (Continued)

- (d) **Nonfinancial factors include: (1) the adverse effect on employees if CISCO is purchased, (2) how long the supplier will be able to satisfy the Shatner Manufacturing Company's quality control standards at the quoted price per unit, and (3) whether the supplier will deliver the units when they are needed by Shatner.**

LO3 BT: E Difficulty: Moderate TOT: 35 min. AACSB: Analytic AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

PROBLEM 7.3

(a) (1) Table Cleaner Not Processed Further

Sales:		
FloorShine (600,000 ÷ 30) x \$20	\$400,000	
Table Cleaner (300,000 ÷ 25) x \$17	<u>204,000</u>	
Total revenue		\$604,000
Costs:		
CDG	210,000	
Additional costs of FloorShine	<u>240,000</u>	
Total costs		<u>450,000</u>
Gross profit		<u>\$154,000</u>

[(FloorShine: (600,000 ÷ 30) x \$20) + (Table Cleaner (300,000 ÷ 25) x \$17) – (\$210,000 + \$240,000) = \$154,000]
 [(FloorShine sales rev.) + (Table Cleaner sales rev.) – (CDG + Add'l. costs of Floor Shine) = GP]

(2) Table Cleaner Processed Further

Sales:		
FloorShine	\$400,000	
Table Stain Remover (300,000 ÷ 25) x \$14	168,000	
Table Polish (300,000 ÷ 25) x \$14	<u>168,000</u>	
Total revenue		\$736,000
Costs:		
CDG	210,000	
Additional costs of FloorShine	240,000	
TCP	<u>100,000</u>	
Total costs		<u>550,000</u>
Gross profit		<u>\$186,000</u>

[(FloorShine: \$400,000 + (Table Stain Remover: ((300,000 ÷ 25) x \$14)) + (Table Polish: ((300,000 ÷ 25) x \$14)) – (\$210,000 + \$240,000 + \$100,000) = \$186,000]

[(FloorShine sales rev. + (Table Stain Remover sales rev.) + (Table Polish sales rev.) – (CDG + Add'l. costs of FloorShine + TCP) = GP]

- (3) If the table cleaner is processed further overall company profit is expected to be \$32,000 higher. Therefore, management made the wrong decision by choosing to not process table cleaner further.**

PROBLEM 7.3 (Continued)

(b)	Don't Process Table Cleaner Further	Process Table Cleaner Further	Net Income Increase (Decrease)
Incremental revenue	\$204,000	\$336,000	\$132,000
Incremental costs	0	100,000	(100,000)
Totals	<u>\$204,000</u>	<u>\$236,000</u>	<u>\$ 32,000</u>

When trying to decide if the table cleaner should be processed further into TSR and TP, only the relevant data need be considered. All of the costs that occurred prior to the creation of the table cleaner are sunk costs and can be ignored. The decision should be made by comparing the incremental revenue from further processing to the incremental costs.

LO4 BT: AN Difficulty: Moderate TOT: 35 min. AACSB: Analytic AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

PROBLEM 7.4

(a)	Cost	\$120,000
	Accumulated depreciation	<u>(24,000*)</u>
	Book value	96,000
	Sales proceeds	<u>(25,000)</u>
	Loss on sale	<u><u>\$ 71,000</u></u>

***\$120,000 ÷ 5 years = \$24,000**

[$\$120,000 - (\$120,000 \div 5) - \$25,000 = \$71,000$]

[Cost – Accum. depr. – Sales proceeds = Loss on sale]

(b) (1)		<u>Retain Old Elevator</u>
	Revenues (\$240,000 x 4 yrs.)	\$960,000
	Less costs:	
	Variable costs (\$35,000 x 4)	\$140,000
	Fixed costs (\$23,000 x 4)	92,000
	Selling & administrative	116,000*
	Depreciation	<u>96,000</u>
	Net income	<u>444,000</u>
		<u><u>\$516,000</u></u>
	*((\$29,000 x 4)	

(2)		<u>Replace Old Elevator</u>
	Revenues	\$960,000
	Less costs:	
	Variable costs (\$10,000 x 4)	\$ 40,000
	Fixed costs (\$8,500 x 4)	34,000
	Selling and administrative	116,000
	Depreciation	<u>160,000</u>
	Operating income	<u>350,000</u>
	Less: Loss on old elevator	<u>71,000</u>
	Net income	<u><u>\$539,000</u></u>

[$\$960,000 - ((\$10,000 \times 4) + (\$8,500 \times 4) + (\$29,000 \times 4) + (\$40,000 \times 4)) - \$71,000 = \$539,000$]

[Rev. – ((VC x No. of yrs.) + (FC x No. of yrs.) + (S&A exp. x No. of yrs.) + (Ann. depr. x No. of yrs.) – Loss on old elevator = Net inc.]

PROBLEM 7.4 (Continued)

(c)	Retain <u>Old Elevator</u>	Replace <u>Old Elevator</u>	Net Income Increase (Decrease)
Variable operating costs	\$140,000	\$ 40,000	\$ 100,000
Fixed operating costs	92,000	34,000	58,000
New elevator cost		160,000	(160,000)
Salvage on old elevator		(25,000)	25,000
Totals	<u>\$232,000</u>	<u>\$209,000</u>	<u>\$ 23,000</u>

(d) MEMO

TO: Ron Richter

FROM: Student

SUBJECT: Relevant Data for Decision to Replace Old Elevator

When deciding whether or not to replace any old equipment, the analysis should only include cost data relevant to the replacement decision. The \$71,000 loss that would be experienced if we replace the old elevator with the newer model is related to a sunk cost, namely the cost of the old elevator. Sunk costs are irrelevant in decision making.

The loss occurs when comparing the book value of the old elevator to the cash proceeds that would be received. The book value of \$96,000 would be deducted as depreciation expense over the next four years if the elevator were retained. If the elevator is replaced with the newer model, the book value will be expensed in the current year, less the cash proceeds received on disposal. Therefore, the \$96,000 book value will be expensed under either alternative, making it irrelevant.

LO5 BT: S Difficulty: Moderate TOT: 40 min. AACSB: Analytic AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis

PROBLEM 7.5

	<u>Division I</u>	<u>Division II</u>
(a)		
Sales	<u>\$250,000</u>	<u>\$200,000</u>
Variable costs		
Cost of goods sold	140,000	172,800
Selling and administrative	<u>30,000</u>	<u>36,000</u>
Total variable expenses	<u>170,000</u>	<u>208,800</u>
Contribution margin	<u>\$ 80,000</u>	<u>\$ (8,800)</u>

[(Div. I: \$250,000 – (\$140,000 + \$30,000) = \$80,000); (Div. II: \$200,000 – (\$172,800 + \$36,000) = (\$8,800)]

[(Div. I: Sales – (Var. CGS + Var. S&A) = CM); (Div. II: Sales – (Var. CGS + Var. S&A) = CM)]

(b) (1)
Net Income Increase (Decrease)

Division I	Continue	Eliminate	
Contribution margin (Part a)	<u>\$ 80,000</u>	<u>\$ 0</u>	<u>\$(80,000)</u>
Fixed costs			
Cost of goods sold	60,000	30,000	30,000
Selling and administrative	<u>45,000</u>	<u>22,500</u>	<u>22,500</u>
Total fixed expenses	<u>105,000</u>	<u>52,500</u>	<u>52,500</u>
Income (loss) from operations	<u>\$(25,000)</u>	<u>\$(52,500)</u>	<u>\$(27,500)</u>

[Net inc. effect: -\$80,000 + \$30,000 + \$22,500 = (\$27,500)]

[Net inc. effect: CM decr. + CGS FC saved + S&A FC saved = Net inc. decr.]

(2)

<u>Division II</u>	<u>Continue</u>	<u>Eliminate</u>	<u>Net Income Increase (Decrease)</u>
Contribution margin (Part a)	<u>\$ (8,800)</u>	<u>\$ 0</u>	<u>\$ 8,800</u>
Fixed costs			
Cost of goods sold	19,200	9,600	9,600
Selling and administrative	<u>24,000</u>	<u>12,000</u>	<u>12,000</u>
Total fixed expenses	<u>43,200</u>	<u>21,600</u>	<u>21,600</u>
Income (loss) from operations	<u>\$(52,000)</u>	<u>\$(21,600)</u>	<u>\$30,400</u>

[Net inc. effect: \$8,800 + \$9,600 + \$12,000 = \$30,400]

[Net inc. effect: CM incr. + CGS FC saved + S&A FC saved = Net inc. incr.]

Division II should be eliminated as its negative contribution margin is \$8,800. Income from operations would increase \$30,400 if Division II is eliminated.

Division I should be continued because it is producing positive contribution margin of \$80,000. Income from operations will decrease \$27,500 by discontinuing this division.

PROBLEM 7.5 (Continued)

(c)

BRISLIN COMPANY
CVP Income Statement
For the Quarter Ended March 31, 2022

	Divisions			
	I	III	IV	Total
Sales	<u>\$250,000</u>	<u>\$500,000</u>	<u>\$450,000</u>	<u>\$1,200,000</u>
Variable costs				
Cost of goods sold	140,000	240,000	187,500	567,500
Selling and administrative	<u>30,000</u>	<u>30,000</u>	<u>30,000</u>	<u>90,000</u>
Total variable costs	<u>170,000</u>	<u>270,000</u>	<u>217,500</u>	<u>657,500</u>
Contribution margin	<u>80,000</u>	<u>230,000</u>	<u>232,500</u>	<u>542,500</u>
Fixed costs				
Cost of goods sold (1)	63,200	63,200	65,700	192,100
Selling and administrative (2)	<u>49,000</u>	<u>34,000</u>	<u>24,000</u>	<u>107,000</u>
Total fixed costs	<u>112,200</u>	<u>97,200</u>	<u>89,700</u>	<u>299,100</u>
Income (loss) from operations	<u>\$(32,200)</u>	<u>\$132,800</u>	<u>\$142,800</u>	<u>\$ 243,400</u>

(1) Division's fixed cost of goods sold plus 1/3 of Division II's unavoidable fixed cost of goods sold [$\$192,000 \times (100\% - 90\%) \times 50\% = \$9,600$]. Each division's share is \$3,200.

(2) Division's fixed selling and administrative expense plus 1/3 of Division II's unavoidable fixed selling and administrative expenses [$\$60,000 \times (100\% - 60\%) \times 50\% = \$12,000$]. Each division's share is \$4,000.

(d) Income from operations with Division II of \$213,000 (given) plus incremental income of \$30,400 from eliminating Division II = \$243,400 income from operations without Division II.

(\$213,000 + \$30,400 = \$243,400)

(Inc. from oper. with Div. II + Incremental inc. from eliminating Div. II = Combined inc. from Div. I, III & IV)

LO6 BT: AN Difficulty: Moderate TOT: 40 min. AACSB: Analytic AICPA FC: Measurement Analysis and Interpretation IMA: Decision Analysis