

## Unit 4, Lesson 23

### Activity 1

#### Andrea's Software Business

Andrea has developed a computer software program that she calls *The Homework Helper*. She has programmed in assignments, group projects, and textbook readings for all her classes, as well as relevant Web sites and related on-line research resources. Her program notifies her when assignments are due and exams are coming up, and it also reminds her of school activities, parties, dates for sending in college applications, and birthdays of friends and relatives. And it plays her favorite songs while she works. Ten of Andrea's friends have told her that they would each be willing to pay her \$56 if she would set up and adapt her program for them. Andrea could use a little extra money and would like to help out her friends (but maybe not all of them). She is also interested in starting a small computer consulting business and thinks this would be a good way to begin.

**Total Fixed Costs:** Andrea already paid \$60 to her city for a license to operate a small business. Therefore, no matter how many software programs she sells (zero to ten), she has *fixed costs* of \$60.

**Total Variable Costs:** Andrea estimates that some costs, including the cost of disks and paying herself an hourly wage for her time, will change depending on how many programs she decides to produce. She considers her wages to be a cost (an opportunity cost) because if she produces software, she gives up similar wages that she could earn in another job. Andrea's estimates of her *variable costs* are shown in the third column in Activity 2. For example, if she produces no software, she has no variable costs. For one program, her variable costs would be \$45. Her variable costs for two programs would be a total of \$85, and so on.

**Total Costs:** Andrea's *total costs* for producing different quantities of software are the sum of her fixed costs and variable costs. For example, if she produces no software, she has total costs of \$60, because her fixed costs are \$60 and her variable costs are \$0. If she produces nine software programs, her total costs are \$450 (\$60 fixed costs plus \$390 variable costs).

**Marginal Costs:** Andrea's *marginal costs* are the costs of producing one more software program. Another way of saying this is that marginal costs are how much total costs (or total variable costs) change when she produces one more software program. For example, if Andrea produces no software, her total costs are \$60. If she produces one software program, her total costs go up to \$105. Therefore, the marginal cost, or additional cost, of producing one software program is \$45 (\$105

minus \$60). Can you explain why the marginal cost of the tenth software program is \$75?

**Price:** Andrea's ten friends have indicated that they are willing to pay her \$56 each for her software program. Therefore, the price for each program is \$56.

**Total Revenue:** *Total revenue* is the amount of money a business takes in from selling a good or service. Therefore, it is the selling price times the amount sold. For example, if Andrea sells nine software programs at a price of \$56 each, her total revenue is \$504 (nine times \$56).

**Marginal Revenue:** *Marginal revenue* is the additional revenue Andrea would take in if she sold one more software program. For example, if she sells no software, her total revenue is \$0. If she sells one program her total revenue is \$56. Therefore, the marginal revenue of selling one software program is \$56 (\$56 minus 0). Do you notice a relationship between marginal revenue and price in this example?

**Profit:** *Profit* is defined as a firm's total revenues minus its total costs. If total costs are greater than total revenues, the firm makes losses. For example, if Andrea produces no software, she has losses of \$60 because her total revenue is \$0 and her total costs are \$60.

**Directions:** Your goal is to help Andrea decide exactly how many software programs to produce and sell to make the most profit possible. Use the information provided to:

- fill in all the blank spaces in the chart on Activity 2, and
- answer the questions on Activity 2 below the chart.

The first column on the chart lists the number of software programs that Andrea is considering selling, ranging from zero to 10. The other columns show the various costs, revenues, and profits or losses she would make depending on how many programs she decides to sell.

When you have finished Activity 2, think about the following *Rules for Economic Decision Making*.

#### RULES FOR ECONOMIC DECISION MAKING:

- *General rule for Andrea to make the most profit: If the marginal revenue of producing one more program is greater than the marginal cost, she should produce it! If the marginal cost is greater than the marginal revenue, she should not produce it.*
- *General rule for making decisions: If the marginal benefits of doing something are greater than the marginal costs, do it! If the marginal costs are greater than the marginal benefits, don't do it.*

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### Activity 2

#### Andrea's Software Business: Do the Math

Number of Programs	Total Fixed Costs	Total Variable Costs	Total Costs	Marginal Costs	Price	Total Revenue	Marginal Revenue	Profit (or Loss)
0	\$60	\$0	\$60	---	---	0	---	-\$60 (loss)
1		\$45	\$105	\$45	\$56	\$56	\$56	
2		\$85		\$40				
3	\$60	\$120					\$56	-\$12 (loss)
4		\$150						
5		\$185			\$56			
6	\$60	\$225						\$51 (profit)
7		\$270					\$56	
8		\$325			\$56			
9		\$390	\$450			\$504		
10		\$465		\$75				

A. How many software programs should Andrea sell to make the most profit? \_\_\_\_\_  
 What would her profit be? \_\_\_\_\_

What is the marginal revenue for this number of programs? \_\_\_\_\_  
 The marginal cost? \_\_\_\_\_

B. If Andrea sold one more software program than your answer to Part A, what would her profit be? \_\_\_\_\_

What is the marginal revenue for this number of programs? \_\_\_\_\_  
 The marginal cost? \_\_\_\_\_