Chapter 8 Project

Production, Costs, and Industry Structure

Purpose

In this chapter, you have learned the sources of the costs of producing a product. Costs depend on the amount of resources needed to produce the product, shown by the production function, and the costs of those resources, shown by the cost function. You have also learned to identify all costs of production, both explicit and implicit, and use them to make an economic decision.

The purpose of this exercise is to help show you how a firm would look at the inputs of its production and cost functions to make an economic decision.

Directions

This exercise has two parts. In the first, you will begin with a production function for a grocery delivery service and link it to its cost function. In the second, you will identify the explicit and implicit costs of production and find the accounting and economic profit in order to make an economic decision.

Part 1 - Production Function to Cost Function

Suppose Ben is starting a grocery delivery company, which takes grocery orders from customers, goes to the grocery store, buys the groceries, and delivers them to the customers' homes. Employees will receive orders from customers on a cell phone, for which he pays $5 per day for service. To make deliveries to customers, he will rent a delivery van, which seats 2 people for $75 per day. He plans on hiring between 1 and 6 employees to take the orders, do the grocery shopping, and make the deliveries. He will pay each worker $100 in wages per day. Create a table for the different levels of labor and output, leaving room for extra columns, given the following output levels: 1 employee produces 4 units, 2 employees produce 9 units, 3 employees produce 13 units, 4 employees produce 16 units, 5 employees produce 18 units, and 6 employees produce 19 units.

1. Find the marginal product of labor and enter it into the third column of your table. Where is the point of diminishing returns? Explain the conditions that would lead to diminishing returns for this business.
2. Identify the fixed and variable costs.
3. Complete your table by finding variable cost, total cost, marginal cost, average variable cost, and marginal cost for each level of output.
4. Explain how marginal cost influences average variable and average total cost.
5. If Ben charges $24 per delivery, will he earn a profit? How can you tell?

Part 2 - Finding Economic and Accounting Profit

Suppose Penny, the owner of Penny's Pie Factory, sells 1,000 pies per month for $20 per pie. She pays $1,600 in wages each month to each of her 2 part-time employees. Butter, flour, sugar, eggs, fruits, chocolate, and other pie ingredients cost her $4,000 per month. Her utilities and taxes average $600 per month. She owns the kitchen, the mixers, and ovens that the Pie Factory uses, but she could rent them to someone else for $1,000 per month if she wasn't using the kitchen and equipment for herself. A large bakery has offered her $90,000 per year ($7,500 per month) if she will close her factory and come manage their pie department.

1. What are Penny's monthly explicit costs?
2. What are Penny's monthly implicit costs?
3. Calculate Penny's monthly total revenue.
4. Calculate Penny's accounting profit per month.
5. Calculate Penny's economic profit per month.
6. Suppose that Penny's next best alternative was to close the pie shop and go back to college to finish her chemical engineering degree, and chemical engineers have a starting salary of $80,000 per year with potential to grow to $120,000 with 10 years of experience. How would this affect Penny's calculations?

Checklist

Part 1

- ☐ Find the marginal product for each unit of labor.
- ☐ Identify the point of diminishing marginal returns.
- ☐ Find all cost values in the table.

Part 2

- ☐ Find the economic profit.
- ☐ Find the accounting profit.