

How to Study for Chapter 16 Perfect Competition in the Short Run

Chapter 16 introduces the four types of industries and the decision making process for companies in perfect competition. It is a technical chapter and needs to be studied slowly.

1. Begin by looking over the Objectives listed below. This will tell you the main points you should be looking for as you read the chapter.
2. New words or definitions and certain key points are highlighted in italics and in red color. Other key points are highlighted in bold type and in blue color.
3. You will be given an In Class Assignment and a Homework assignment to illustrate the main concepts of this chapter.
4. There are several new words in this chapter. Be sure to spend time on the various definitions. There are also many calculations. Go over each carefully. Be sure you understand how each number was derived (do the calculations for yourself). Then, plot the calculations on graph paper to see how the graphs are derived. Check your graphs against the ones in the text. The calculations of this chapter continue the same case from the calculations of the previous two chapters.
5. Go over the graphs very carefully. They are very important throughout the course.
6. When you have finished the text, the Test Your Understanding questions, and the assignments, go back to the Objectives. See if you can answer the questions without looking back at the text. If not, go back and re-read that part of the text. Then, take the Practice Quiz for Chapter 16.

Objectives for Chapter 16 Perfect Competition in the Short Run

At the end of chapter 16, you will be able to answer the following:

1. What are the characteristics of **“perfect competition”**? **“pure monopoly”**? **“monopolistic competition”**? **“oligopoly”**? **“a cartel”**? **“a contestable market”**?
2. In perfect competition, what is **the demand curve facing the seller**? Why? Draw the graph.
3. Define **“marginal revenue”**.
4. Using the procedures for rational decision-making, explain why a company that is a price taker will produce up to the quantity at which **the marginal revenue equals the marginal cost**.
5. What should a company do if the marginal revenue is greater than the marginal cost? Why? What should a company do if the marginal revenue is less than the marginal cost? Why?
6. On the **graph**, show the marginal revenue, marginal cost, and average total cost. Show the profit-maximizing quantity and the economic profit.
7. Explain the **shutdown rule**. That is, if a company is making economic losses, in the short-run, when should it continue to produce and when should it temporarily shut-down? Give some examples.
8. Explain why grocery stores and restaurants are open late at night, when there are few customers.
9. What is **the supply curve of one seller**? (Remember: this is the curve which tells how much the seller will produce at any given price.)
10. From the supply curve of one seller, how does one derive **the market supply curve**?

Chapter 16 Perfect Competition in the Short-Run (latest revision July 2004)

The goal of a company is to maximize its economic profits. *Economic profits are simply the difference between the total revenues and the total costs of production.* We examined the costs of production first because the principles affecting costs are the same for all companies regardless of the industry they are in. Those principles are based on the law of diminishing marginal returns. This law holds in any company that has a fixed cost. But the revenues are determined differently in different industries. To analyze the way the total revenues are determined, **we group industries into four types. They are classified according to the power a company would have to affect the price of the product.**

Part I: Market Structures

Perfect Competition

There are **four criteria** for an industry to be characterized as perfect competition. Of course, nothing is “perfect”. However, while no industry will exactly meet the four criteria of perfect competition, we can learn much from assuming that such an industry does exist.

(1) To have perfect competition, there must be so many sellers that no one seller can affect the price by himself or herself.

Think of yourself buying gasoline. The price says \$2.20 per gallon. Suppose you ask to see the manager and then make an offer: you will buy only if the price is reduced to \$1.00 per gallon. What will the manager do? The answer is that the manager will laugh and ask you to leave. The manager will not take your offer because there are so many others who will pay \$2.20. These other people are your competitors. You don't think of them as competitors. Indeed, they may even be your friends. You think of them, like yourself, as subject to impersonal market forces. But nonetheless, they are your competitors. And because they are there, you have no influence at all on the price. We say that you are *a price taker*. If we switch the example and make you a seller instead of a buyer, we have the main characteristic of perfect competition. If a seller charged more than \$2.20 per gallon, no one would buy from him or her. The seller would never charge less than \$2.20 because there is no reason to do so.

(2) To have perfect competition, all buyers and all sellers must have perfect information.

Each person knows what the price is, what others are charging, and all relevant features of the product. No one would ever pay \$3.00 for a gallon of gasoline because everyone knows that there are sellers willing to charge \$2.20.

(3) To have perfect competition, there must be easy entry into and exit from the industry.

Any company wanting to leave the industry can do so easily. And there are no barriers preventing entry of any company into the industry to compete with the companies already there.

(4) To have perfect competition, the products of the sellers in the industry must be identical.

One company's product is just the same as another company's product.

Although there are no examples of perfect competition, agriculture is the closest. We will start our analysis the determination of revenues and of the resulting business behaviors with this market structure (Chapters 16 and 17)

Pure Monopoly

Literally, "mono" means one. Therefore, *a pure monopoly is an industry with only one seller*. Such a company should have considerable ability to affect the price that it charges. However, for this to occur, two other characteristics are necessary. *First, there must be high barriers to entry*. If this were not the case, then when the monopoly set a high price and earned high economic profits, new sellers would enter to compete with it. The increased competition would drive down prices, eliminating the economic profits that were being earned. *An industry with one seller, but with no barriers to entry, is known as a contestable market*. Such an industry tends to behave similarly to perfect competition. *Second, the demand for the product needs to be relatively inelastic (i.e., few substitutes)*. If this were not the case, then if the monopoly raised its price, buyers would simply shift to other substitute products. This would limit its ability to raise the price considerably. We will consider pure monopoly after completing our analysis of perfect competition (Chapters 18 and 19).

Monopolistic Competition

If there is one seller but a very elastic demand for the product (because there are many close substitutes), the industry is called monopolistic competition. The monopoly part results from there being one seller of the narrowly defined product. The competition comes from other products that are close substitutes. Most real-world competition takes this form. There is only one Coca-Cola but there are many close substitutes. There is only one MacDonalds but there are many close substitutes. There is only one iMac but there are many close substitutes. In each case, *the company can raise its price and not lose all of its sales because its product is different from the others. However, an increase in price will cause it to lose a considerable portion of its sales because the other products are close substitutes*. This loss of sales limits greatly the power of the company to affect the price. *The first three characteristics of perfect competition are similar for monopolistic competition. There are many sellers. The buyers and sellers have perfect information. And there are no barriers to entry. The difference is the fourth characteristic: in perfect competition, the products are identical whereas in monopolistic competition, the products are differentiated*. Because the products are differentiated, monopolistic competition involves considerable use of advertising. This structure will be analyzed in Chapter 20.

Oligopoly

The final structure of an industry is called oligopoly. "Olig" means "few". In this industry, *there are few sellers. How few is "few"? The answer is "few enough that each seller has an*

ability to affect the price". Usually most oligopolies are dominated by between two and ten companies. Automobiles, steel, tires, cigarettes, accounting firms, and breakfast cereals are among the many examples. Oligopolies are difficult to analyze because each firm, in making a decision, must consider not only the response of the buyers but also the response of the other sellers. Should Ford offer a rebate (lower price) on its cars? The answer depends not only on the way buyers will respond to the rebate but also on Ford's estimate of the response of General Motors, Chrysler, Honda, Toyota, and Nissan.

It would be easier to predict the responses of competitors if the competitors met and discussed their decisions. *Such a meeting of members of an oligopoly to coordinate decisions (especially over the price) is known as a cartel.* Cartels are illegal in the United States; however, some have managed to exist. Examples are the National Collegiate Athletic Association, Major League Baseball, the National Football League, and the National Basketball Association. Agricultural cooperatives are also examples of cartels. On a world basis, there have been cartels in oil, diamonds, and other natural resources. We will analyze cartels in Chapter 21.

If we can imagine measuring **market power (the ability to affect the price of the product one sells)** on a scale of zero to 100 (with 100 being the greatest amount of power), the four market structures would be arranged as follows:

Perfect Competition	Monopolistic Competition	Oligopoly	Cartel	Pure Monopoly
0				100

Notice that pure monopoly does not have a market power of 100 on this imaginary scale. Even if there were only one company, it cannot have total power over the price. Buyers always have the power to not buy the product.

Test Your Understanding

In each case, state whether you believe the industry should be characterized as perfect competition, pure monopoly, monopolistic competition, or oligopoly. STATE YOUR REASONS.

1. Growers of avocados _____
2. Fast-food restaurants _____
3. Automobile Producers _____
4. Television stations _____
5. Computer manufacturers _____

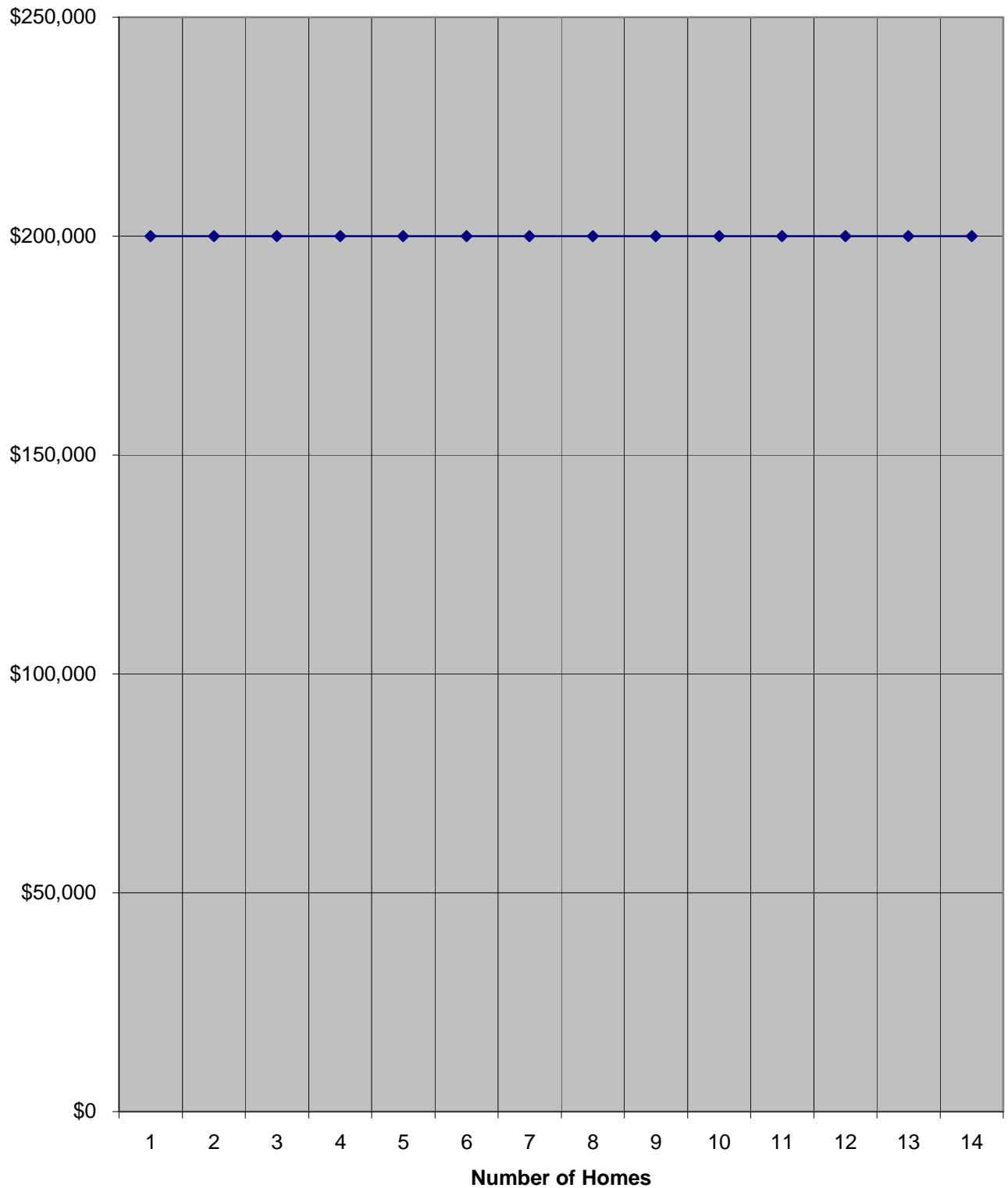
Part II: Perfect Competition

Deciding the Quantity to Produce

We begin our analysis of business behaviors by assuming perfect competition. *As stated above, in perfect competition, each seller is so small in relation to the entire market that he or she cannot affect the price at all.* No industry has all the characteristics of perfect competition. But by studying it, we can gain many important insights into actual business behavior. Let us return to the example of the construction company from the previous two chapters. It would help you if you now have the number set from Chapter 14 in front of you. Assume that the price of homes is \$200,000 per home (we are assuming that homes are identical). Our construction

company can sell as many or as few homes as is desired at that price. The company would never sell for less because it can always get \$200,000 per home. And if it asked for a higher price, it would sell nothing. *The graph below represents the demand as seen by one seller. The horizontal shape means that this demand is perfectly elastic.* The demand is horizontal at the market price of \$200,000.

Marginal Revenue



Remember the procedures for **rational decision-making**. The question is not: how many houses should be produced? Instead, we must consider the choices one-at-a-time. Should we produce and sell the first house? To answer this, we must know the answer to two questions. First, what is the **additional benefit**? The additional benefit (marginal benefit) in this case is the addition to total revenue. Second, what is the addition to total cost? The addition to total cost is, of course, the **marginal opportunity cost**, which was calculated on Page 8 of Chapter 14 and is repeated below. *The addition to total revenue from producing and selling one more home is called the marginal revenue.* We can calculate it as follows:

$$\text{Marginal Revenue} = \frac{\text{Change in Total Revenue}}{\text{Change in Quantity Produced}}$$

Quantity	Total Revenue	Marginal Revenue	Marginal Cost
1	\$200,000	\$200,000	\$160,000
2	400,000	200,000	140,000
3	600,000	200,000	120,000
4	800,000	200,000	140,000
5	1,000,000	200,000	160,000
6	1,200,000	200,000	180,000
7	1,400,000	200,000	200,000
8	1,600,000	200,000	220,000
9	1,800,000	200,000	240,000
10	2,000,000	200,000	260,000
11	2,200,000	200,000	280,000
12	2,400,000	200,000	300,000
13	2,600,000	200,000	320,000
14	2,800,000	200,000	340,000

The total revenue is simply the price (\$200,000) times the quantity. The marginal revenue is the change in the total revenue from producing and selling each additional home (that is, the change from \$200,000 to \$400,000, the change from \$400,000 to \$600,000, and so forth).

Notice that, in perfect competition, the marginal revenue is always equal to the price. Every time we sell another home, we sell it for \$200,000. This adds \$200,000 to our total revenue. We can **graph the marginal revenue**. It looks the same as the graph on the previous page --- a horizontal line at a price of \$200,000.

Should we produce and sell the first house? This house adds \$200,000 to our total revenue and \$160,000 to our total cost. Since it adds \$40,000 to our profits, it would seem desirable to produce this house. Should we produce the second house? It adds \$200,000 more to our total revenue and \$140,000 to our total cost. Therefore, it increases our total profits by \$60,000. We should produce it. Should we produce the third house? It adds \$200,000 more to our total revenue and \$120,000 to our total cost. Therefore, it adds \$80,000 to our total profits. We should produce it. By the same reasoning, we should produce homes #4, #5, and #6. Each house

adds more to our total revenue than to our total cost. Should we produce home #7? This house adds \$200,000 to our total revenue and \$200,000 to our total cost. It adds nothing to our total profit but also subtracts nothing from it. We will include it in (doing so allows us to use continuous lines in our graph, as you will see soon).

Should we produce house #8? This house adds another \$200,000 to our total revenues but adds \$220,000 to our total cost. Therefore, it **reduces** our total profit by \$20,000. We should **NOT** produce this house. At this point, we can stop the analysis. We conclude that we will maximize our total profits if we produce 7 houses.

We can summarize the argument. *If the marginal revenue is greater than the marginal cost, we can increase total profits by producing more. If the marginal revenue is less than the marginal cost, we can increase our total profits by producing less. We maximize our total profits by producing that quantity at which the marginal revenue equals the marginal cost.*

We can also show this on our **graph** by drawing marginal revenue on the graph of the cost curves that you drew in Chapter 14. The profit is maximized at the quantity for which the marginal revenue crosses the marginal cost (7). This is shown in the graph on the next page.

Since we have maximized this profit, how much total profit did we earn? From the number set, this calculation is easy. The total revenue is \$1,400,000. The total cost is \$1,280,000. Therefore, the economic profit is \$120,000 (\$1,400,000 - \$1,280,000). *Remember that this means that the owners earned an income from this business equal to the income that could have been earned in the next best alternative plus an additional \$120,000.* However, our graph does not include either total revenue or total cost. To be able to read total profit from this graph, we need to convert it:

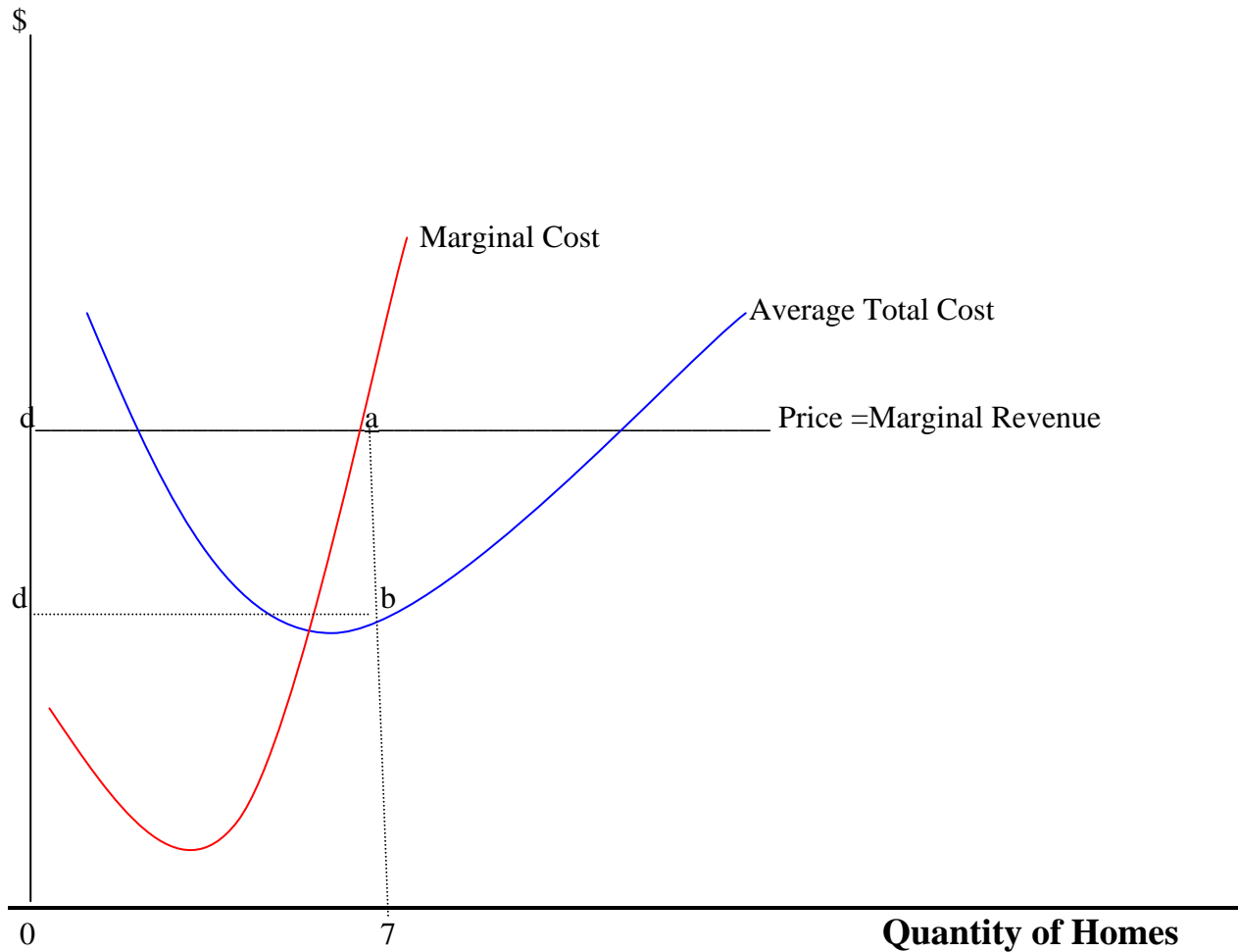
$$\text{Total Profit} = (\text{Profit Per Unit}) \times (\text{Quantity Produced})$$

Since the *profit per unit is equal to the price minus the average total cost*, this converts to:

$$\text{Total Profit} = (\text{Price} - \text{Average Total Cost}) \times \text{Quantity}$$

The price is \$200,000 per house. On average, it cost us \$182,857 to produce each house (see the calculation of the average total cost of 7 homes on Page 17 of Chapter 14). Therefore, on each house we earned a profit of \$17,143 (\$200,000 - \$182,857). The quantity is 7 homes. Since we earned \$17,143 on each of the 7 houses, the economic profit is equal to 7 times \$17,143 or \$120,000. This is also shown in the graph on the next page. The price is given by Point a. The average total cost is given by Point b. **Point a minus Point b represents the profit per unit.** The total economic profit is calculated by multiplying the profit per unit times the quantity of houses. **Therefore, the total economic profit is shown by the area of the rectangle abcd.**

PROFIT MAXIMIZING QUANTITY



Explanation. In perfect competition, the price is equal to the marginal revenue. In the example of the construction company, both are equal to \$200,000. The company maximizes its profits by producing that quantity for which the marginal revenue (in black) equal the marginal cost (in red). This is Point a and shows that the profit maximizing quantity is 7. The average total cost of producing quantity 7 (\$182,857) is shown by Point b. The price minus the average total cost (Point a minus Point b) is the profit per house. With the numbers, this is \$200,000 minus \$182,857 equals \$17,143. The profit per house times the number of houses equals the **total economic profits**. \$17,143 times 7 equals \$120,000 of economic profits. This is shown by the **rectangle abcd**.

Test Your Understanding

Go back to the case of the orange grove. You calculated the marginal cost and the average total cost for this company in Chapter 14. Assume that the company sells its product in perfect competition at a market price of **\$0.60 per pound**. Using the principles described in the reading, the profit-maximizing quantity is _____ and the economic profit is \$_____. **SHOW ALL**

CALCULATIONS

Quantity	Total Revenue	Marginal Revenue	Marginal Cost (Repeats from Chapter 14)
10,000			
40,000			
90,000			
130,000			
160,000			
180,000			
192,000			
198,000			
200,000			

On a graph, re-draw the average total cost and the marginal cost as they were drawn in Chapter 14. Then, draw the marginal revenue, based on the above calculations. Show on the graph the profit-maximizing quantity and the economic profits or losses

The Shutdown Decision

In perfect competition, the price is set in the market. No one company can have any influence over the price. Let us assume that the demand for houses falls (because buyers' incomes fall) and, as a result, the market price now falls to \$160,000 per house. In this case, the marginal revenue will also be \$160,000, for the reasons given above. Since we produce up to that quantity at which the marginal revenue and the marginal cost are equal, how many houses will the company now choose to produce? Check the numbers below. The marginal cost is repeated from Chapter 14. **The total revenue is calculated as the price (\$160,000) times the quantity. The marginal revenue is the change in the total revenue from producing and selling each additional house.**

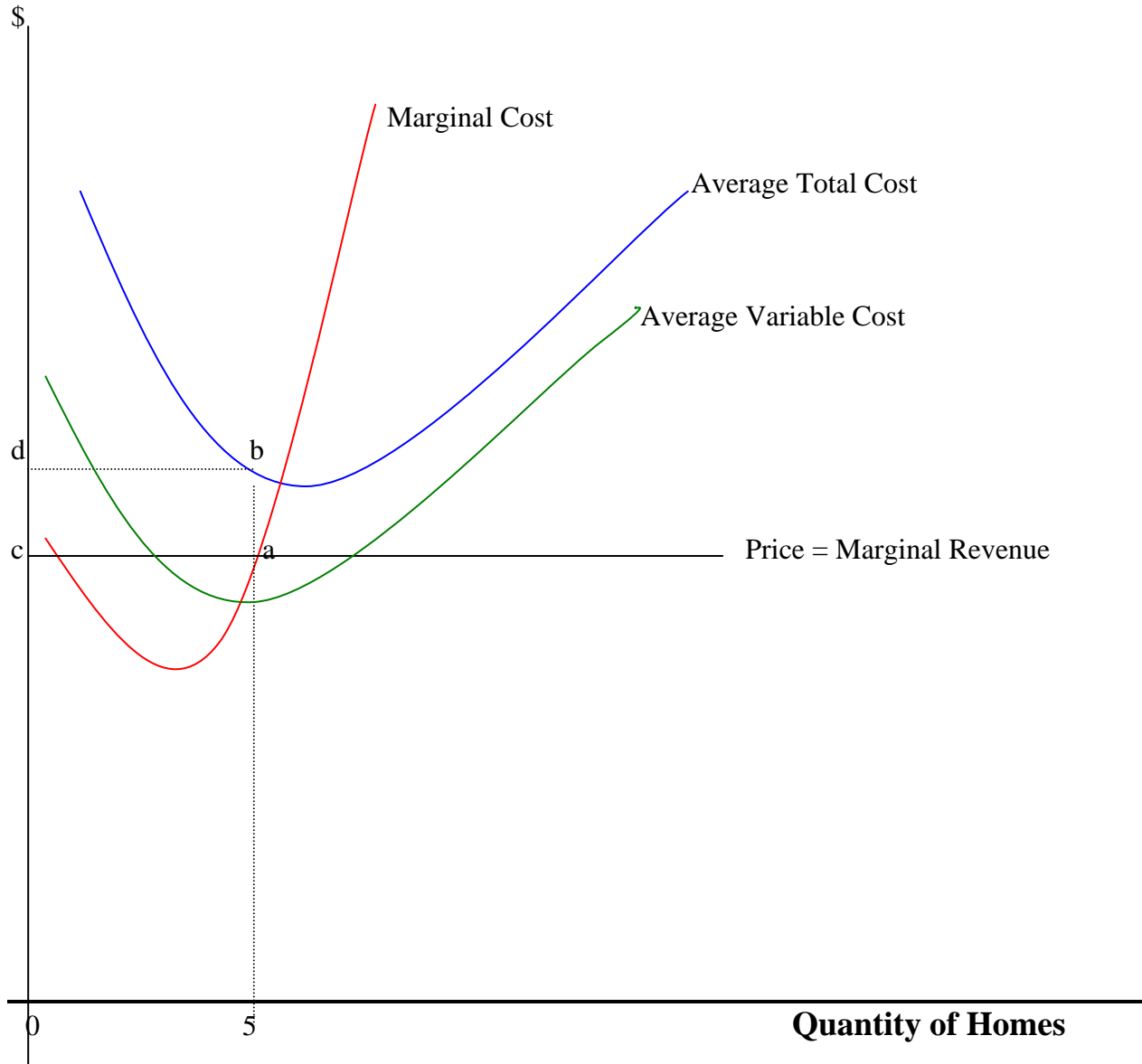
Quantity	Total Revenue	Marginal Revenue	Marginal Cost
1	\$160,000	\$160,000	\$160,000
2	320,000	160,000	140,000
3	480,000	160,000	120,000
4	640,000	160,000	140,000
5	800,000	160,000	160,000
6	960,000	160,000	180,000
7	1,120,000	160,000	200,000
8	1,280,000	160,000	220,000
9	1,440,000	160,000	240,000
10	1,600,000	160,000	260,000
11	1,760,000	160,000	280,000
12	1,920,000	160,000	300,000
13	2,080,000	160,000	320,000
14	2,240,000	160,000	340,000

If the marginal revenue is \$160,000, the company will now produce only 5 houses (where the marginal revenue of \$160,000 equals the marginal cost). Beyond that, each house will add less to total revenue than to total cost and economic profits will fall. What is the new economic profit? We can calculate it in two ways. First, the total revenue is \$800,000 ($\$160,000 \times 5$). The total cost is \$900,000 (see the numbers in Chapter 14). Thus, there is an **economic loss** of \$100,000. Or second, the price is \$160,000. Subtracting the average total cost of \$180,000 (see Chapter 14) tells us that the profit per house is $-\$20,000$ ($\$160,000 - \$180,000$). Since there are 5 houses produced, the total profit is $-\$100,000$ ($\$20,000 \times 5$). On the graph, this is shown by the shaded rectangle abcd. (See the graph on the next page.) Point a tells us the price (\$160,000). Point b tells us the average total cost (\$180,000). When we multiply by the quantity produced (5), we get the area of the rectangle abcd ($-\$100,000$). Since the average total cost is above the price, we know that there is an economic loss. **The company's owners will earn \$100,000 less than they would have earned in their next best alternative.** There is no quantity it could produce and earn an economic profit.

Since the company is earning an economic loss, should it continue to produce at all? The answer is "yes". Remember that we are still in the short-run. This means that at least one of the costs is fixed and must be paid even if nothing is produced. If you choose to shut down (produce nothing), what is its economic profit? The answer is $-\$180,000$. The reason is that the fixed cost (\$180,000) must be paid even if it produces nothing. (See the numbers on Page 14 of Chapter 14) The company is better off losing \$100,000 than losing \$180,000. **In any decision, the only factors relevant are those that are changed by the decision.** If the company produces 5 houses, the total revenue is \$800,000. If it produces zero houses, the total revenue is zero. Therefore, total revenue is relevant to the decision. If the company produces 5 houses, the total variable cost is \$720,000 (see the numbers on Page 11 of Chapter 14). If it produces zero houses, the total variable cost is zero. Therefore, total variable cost is relevant to the decision. But if the company produces 5 houses, the total fixed cost is \$180,000. If it produces zero houses, the total fixed cost is still \$180,000. Therefore **total fixed cost is NOT relevant to your decision.** (Remember that you lose the implicit costs and also must pay the interest to the bank, even if you do not produce.)

We can summarize. To maximize economic profits, produce the quantity for which the marginal revenue equals the marginal cost. If there is an economic profit, there is nothing more for you to do. But if there is an economic loss, in the short-run, produce that quantity if the total revenue is greater than or equal to the total variable cost. Shut down if the total revenue is less than the total variable cost. Alternatively, we can describe this on a per house basis. If there is an economic loss, in the short-run, produce that quantity if the price is greater than or equal to the average variable cost. Shut down if the price is less than the average variable cost.

PRODUCING WITH ECONOMIC LOSSES



Explanation. In perfect competition, the price is equal to the marginal revenue. In the example of the construction company, both are equal to \$160,000. The company maximizes its profits by producing the quantity for which the marginal revenue (in black) equals the marginal cost (in red). This is Point a and shows that the profit maximizing quantity is 5. The average total cost of producing 5 houses (\$180,000) is shown by Point b. The price minus the average total cost is the profit per house. With these numbers, this is \$160,000 minus \$180,000 equals minus \$20,000. The profit per house times the number of houses equals the total economic profits. Minus \$20,000 times 5 equals minus \$100,000 (**economic loss**). This is shown by the rectangle **abcd**. **The company should continue to produce in the short-run, even at a loss, as long as the price is greater than or equal to the average variable cost.**

Test Your Understanding

1. Go back to the case of the orange grove once again. Assume that the company now sells its product in perfect competition at a market price of **\$0.40 per pound**. Using the principles described in the reading, the profit-maximizing quantity is _____ and the economic profit is \$_____. **SHOW ALL CALCULATIONS**

Quantity	Total Revenue	Marginal Revenue	Marginal Cost
10,000			
40,000			
90,000			
130,000			
160,000			
180,000			
192,000			
198,000			
200,000			

Use the principles of Chapter 16 to answer the following question: since the company is making an economic loss, should it continue to produce in the short-run or should it shut down? Why?

Examples of the Shutdown Decision

There are many examples of the shutdown rule. (1) If you walk into a grocery store at 3.00 in the morning, you will see only a few customers. Surely, the store could never be earning a profit with this small number of customers. So why are they open? **The answer is that they believe they will earn enough revenue to cover their variable costs.** The variable costs are very low. The cost of the building is fixed. Since the workers are there anyway to stock the shelves, the labor is fixed as well. The lights and heat or air conditioning would be on for the workers to stock shelves. There are very few variable costs of being open at 3.00 in the morning: some extra computer time, bags, and so forth. As long as the revenue is expected to cover these low costs, it pays to be open. (The same principle explains why restaurants are open all night, when there are few customers.) There is no consideration of closing down permanently. At 3.00 in the afternoon, the store will be crowded.

(2) Airlines often fly on Saturdays with planes that seem basically empty. Why would an airline company make a flight with 50 passengers in a plane with 150 seats? The answer again is that the airline believes the total revenues will cover the variable costs. The main cost is the cost of the airplane and this is fixed. If the airplane flies at all, the fuel becomes fixed (the plane does not need more fuel if there is one extra passenger) as does the movie. The crew has to be paid for so many hours of flying per month, so their cost is fixed. There are few variable costs (meals, extra fuel, ticket processing, and so forth). As long as the revenue is expected to cover these low variable costs, it pays to make the flight, even with only 50 passengers. Of course, if all flights had this small number of passengers, the company would be in financial trouble. But on Sundays, the planes will be jammed. So again there is no consideration of closing down permanently.

(3) In international trade, countries that are members of the World Trade Organization (such as the United States) are expected to have low tariffs (taxes) on the products of other countries. In order to qualify for these low tariffs, countries are expected to follow certain rules. One of these rules is that there should be no **dumping**. **One definition of dumping is selling products in**

another country at a price below the cost of production. If a country does this, the other country is allowed to impose tariffs. There have been many complaints by American companies of dumping by foreign companies. Most of these complaints have been found to be not valid. But one that was found to be valid was a complaint against Japanese producers of steel. As a result, the United States imposed tariffs against steel products from Japan. Why would Japanese steel companies sell steel in the United States at a price below the average total cost of production? The answer, again, is that the revenues were covering the variable costs. But what was unique about this example is that, **at the same market price of steel, the Japanese companies were selling steel in the United States (at a loss) while the American steel companies were shutting down. Since a company will shut down if the revenue does not cover the variable costs, this tells us is that the variable costs must be higher for American steel companies than for Japanese steel companies.** The difference results from the way the two countries consider labor. **In the United States, labor is a variable cost.** When sales fall, workers are laid-off. **In Japan, labor is a fixed cost.** In steel companies, workers are hired for life (actually to age 60). If sales fall, the workers will be paid anyway, even if there is no work for them. Therefore, in Japan, the only variable costs are the costs of the natural resources (coal and iron). As long as the total revenue covers these costs, it pays for the steel companies to continue production. In the United States, the total revenues must cover the costs of the natural resources and the labor; otherwise, the steel companies will shut down.

Test Your Understanding (Answer this question before reading the answer)

Suppose that the market price now falls to \$120,000 because buyers' incomes fall even more. Recalculate the total revenues and the marginal revenues. You get the numbers below. The marginal cost is repeated from Chapter 14.

Quantity	Total Revenue	Marginal Revenue	Marginal Cost
1	\$120,000	\$120,000	\$160,000
2	240,000	120,000	140,000
3	360,000	120,000	120,000
4	480,000	120,000	140,000
5	600,000	120,000	160,000
6	720,000	120,000	180,000
7	840,000	120,000	200,000
8	960,000	120,000	220,000
9	1,080,000	120,000	240,000
10	1,200,000	120,000	260,000
11	1,320,000	120,000	280,000
12	1,440,000	120,000	300,000
13	1,560,000	120,000	320,000
14	1,680,000	120,000	340,000

How many houses should the company produce now?

Answer to Test Your Understanding

If we look for the point where marginal revenue equals the marginal cost, it would appear that the company should produce 3 homes. But this is not so. If it did, the economic profit would be $(\$120,000 - \$200,000) \times 3 = -\$240,000$. But the company never has to lose \$240,000. If it just shuts down, it can reduce the economic loss to \$180,000. It has avoided all variable costs; it

loses just the fixed cost that must be paid. The total revenue (\$360,000) is less than the total variable cost (\$420,000). Alternatively, the price (\$120,000) is less than the average variable cost (\$140,000). Therefore, if the price of homes is \$120,000, the company should shut down in the short-run and not produce any homes. *In this example, the company should continue to produce as long as the market price is at least \$140,000. (To explain why, see the calculation of average variable cost on Page 11 of Chapter 14.) At any price below \$140,000, it should shut down.*

Test Your Understanding

1. Consider again the case of the same orange grove. Assume that the company now sells its product in perfect competition at a market price of **\$0.30 per pound**. Using the principles described in the reading, the profit-maximizing quantity is _____ and the economic profit is \$_____. **SHOW ALL CALCULATIONS**

Quantity	Total Revenue	Marginal Revenue	Marginal Cost
10,000			
40,000			
90,000			
130,000			
160,000			
180,000			
192,000			
198,000			
200,000			

Use the principles of Chapter 16 to answer the following question: since the company is making an economic loss, should it continue to produce in the short-run or should it shut down? Why?

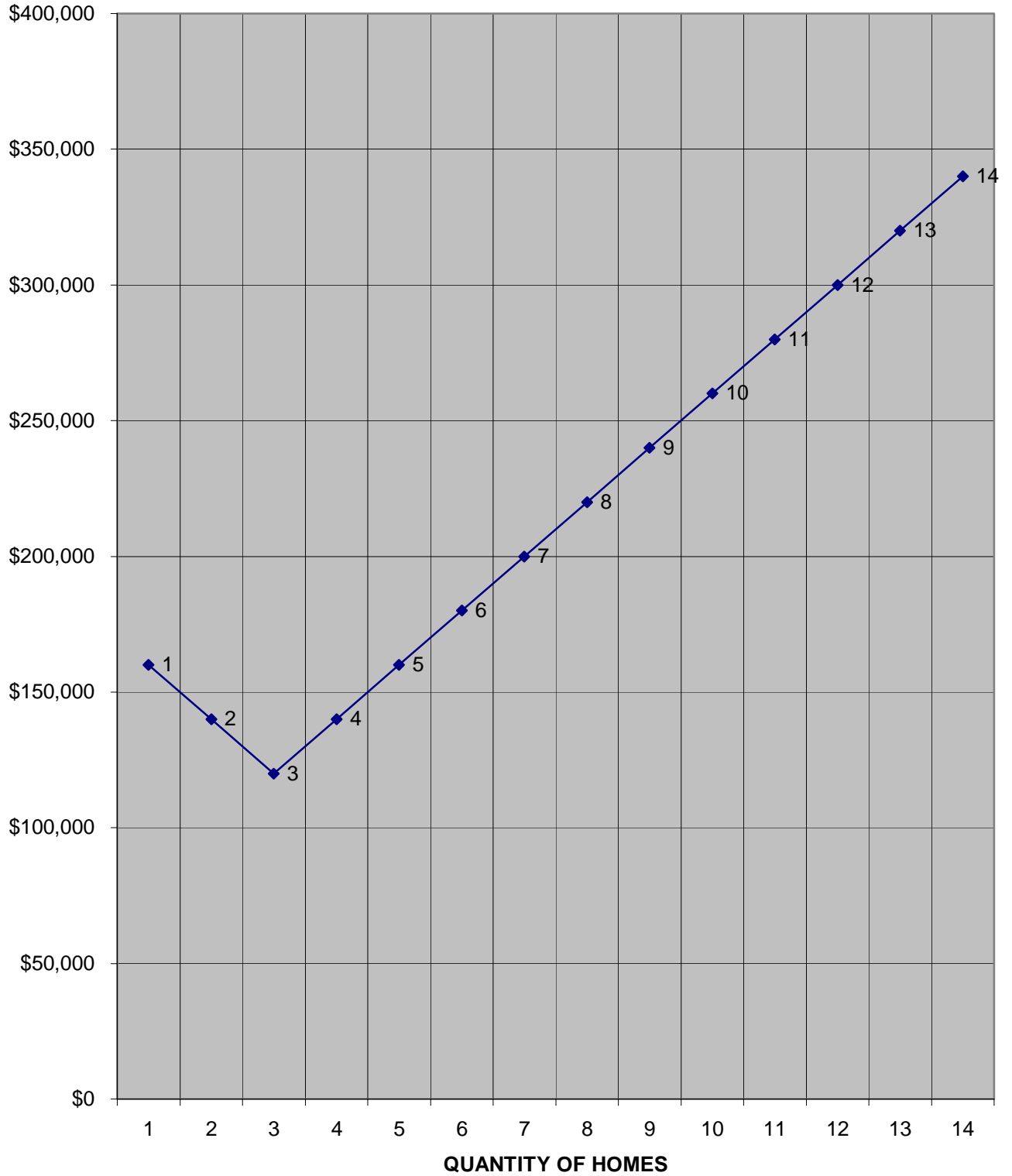
The Short Run Supply Curve

Examine **the marginal cost curve** on the next page (repeated from Page 9 of Chapter 14). Point 7 tells us that, if the price is \$200,000 per house, the construction company will produce 7 houses, as we calculated above. Point 5 tells us that at the price of \$160,000 per house, the company will produce 5 houses, as we also calculated above. Point 6 tells us that, if the price is \$180,000 per house, the company will produce 6 houses (where the marginal revenue of \$180,000 equals the marginal cost). And point 4 tells us that, at the price of \$140,000, the company will produce 4 houses. Point 3 does not tell us how many houses will be produced at the price of \$120,000. We know that, at this price, they company will produce zero houses. At points 1 and 2, the company will also produce zero houses. **As long as the price is below the average variable cost (that is, below \$140,000), it will produce zero houses.**

Now let us examine the effects of prices higher than \$200,000. At a price of \$220,000, the company will produce 8 homes. (The marginal revenue of \$220,000 will equal the marginal cost at this quantity. Check this with the numbers on Page 6 above.) This is shown by point 8. At a price of \$240,000, the company will produce 9 houses. This is shown by point 9. At a price of \$260,000, the company will produce 10 houses. This is shown by point 10. And so forth. *Each point on the marginal cost curve tells us how many houses will be produced at that given price.* "The quantity produced at each possible price" is the definition of "**supply**". Therefore, *the short-run supply curve for one seller is the marginal cost curve, but only the part above*

average variable cost. Below that point, the company will produce zero houses.

SHORT RUN SUPPLY CURVE



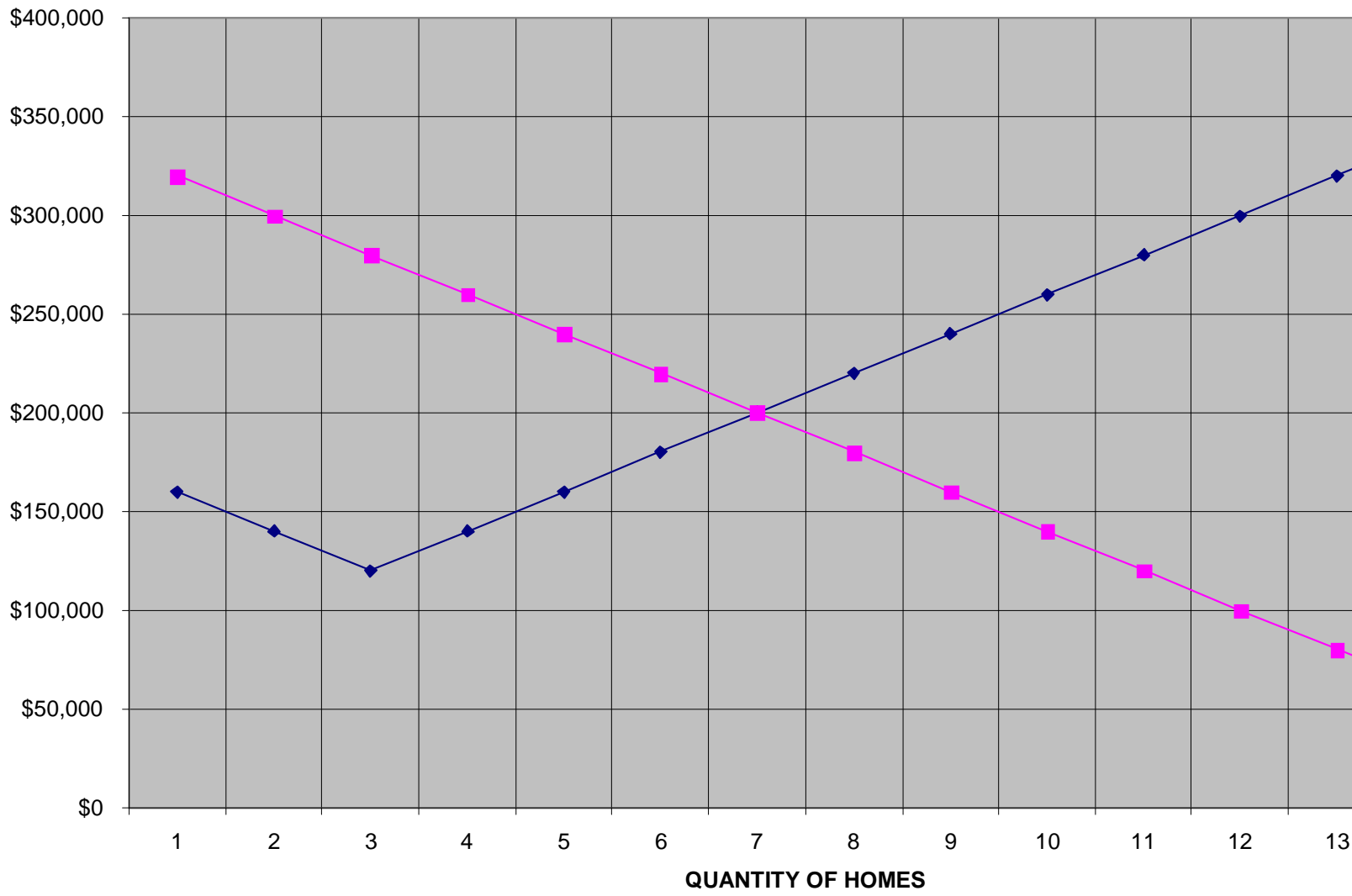
To obtain the short-run supply for the entire industry, all we need to do is add up the quantity each company will produce at every possible price. For simplicity, let us assume that there are **1000 companies** and that they are all identical. Examine the industry short-run supply curve below. It is the same supply curve as was given when we first introduced the concept of supply back in Chapter 6.

Price	Supply of One Company	Industry Supply	Demand
\$140,000	4	4,000	10,000
\$160,000	5	5,000	9,000
\$180,000	6	6,000	8,000
\$200,000	7	7,000	7,000
\$220,000	8	8,000	6,000
\$240,000	9	9,000	5,000
\$260,000	10	10,000	4,000
\$280,000	11	11,000	3,000
\$300,000	12	12,000	2,000
\$320,000	13	13,000	1,000
\$340,000	14	14,000	0

Notice that the industry supply is upward sloping. This results from the fact that marginal cost is upward sloping. Marginal cost is upward sloping as a result of the law of diminishing marginal returns. Each additional house will cost more to produce; therefore the price must rise to make it desirable for it to be produced.

In the graph on the next page, the short-run industry supply curve is shown along with the demand curve for houses. This market demand was given when we first introduced the concept of demand in Chapter 4 and is repeated in the table above. The intersection shows that the equilibrium price is \$200,000 per home and the equilibrium quantity is 7,000 homes. Review Chapter 6 on equilibrium. You will see that, at that point, the equilibrium price was \$200,000 and the equilibrium quantity was 7,000. Now, we know why.

EQUILIBRIUM



Test Your Understanding

Go back to the case of the orange grove once again. Fill-in the following table. Assume that there are 1000 orange groves and that they are identical. (Remember, in your answer, at some point the company may shut down.)

Price	Supply of One Grove	Industry Supply	Quantity Demanded
\$0.30			200,000,000
\$0.40			190,000,000
\$0.60			180,000,000
\$1.00			170,000,000
\$2.00			120,000,000
\$6.00			80,000,000

The equilibrium price is \$_____ and the equilibrium quantity of oranges is _____.

Practice Quiz for Chapter 16

For questions 1 to 4, choose

- a. perfect competition b. pure monopoly c. monopolistic competition d. oligopoly
- An industry with many sellers all producing the same product, perfect information, and low barriers to entry
 - An industry with only one seller but with many close substitute products and low barriers to entry
 - An industry with few sellers
 - An industry with one seller, no close substitutes, and high barriers to entry
 - For a company in perfect competition, the **demand curve facing the seller** is
 - perfectly elastic
 - perfectly inelastic
 - relatively inelastic
 - unit elastic
 - If the **marginal revenue is greater than the marginal cost**, a profit maximizing company should
 - produce more
 - produce less
 - stop producing, because it is producing just the right amount
 - On using the graph, the **economic profit** is calculated as
 - (price – average total cost) times quantity
 - (price – marginal cost) times marginal revenue
 - (average total cost – marginal cost) times price
 - (total revenue – total cost) times quantity
 - If a company is making **economic losses**, in the short-run, it should continue to produce as long as the price is greater than the
 - average total cost
 - average fixed cost
 - average variable cost
 - marginal cost
 - The **short-run supply curve for one seller** is its
 - marginal cost above average variable cost
 - average total cost above marginal cost
 - marginal revenue above marginal cost
 - average total cost above average fixed cost
 - A market with one or a few sellers but with no barriers to entry is called
 - a cartel
 - a contestable market
 - pure monopoly
 - perfect competition

Answers: 1. A 2. C 3. D 4. B 5. A 6. A 7. A 8. C 9. A 10. B