

Answers (Practice on Competitive Markets)

Question 1

- a. perfectly elastic (horizontal)
- b. marginal revenue; average revenue
- c. price; quantity; total revenue; output; the *change* in total revenue; the *change* in output
- d. fixed cost

Question 2

- a. average variable costs
- b. shut down and exit the industry
- c. reduce
- d. equal; maximized
- e. greater than; increase

Question 3

- a. AVC
- b. ATC ; AVC
- c. ATC ; enter

Question 4

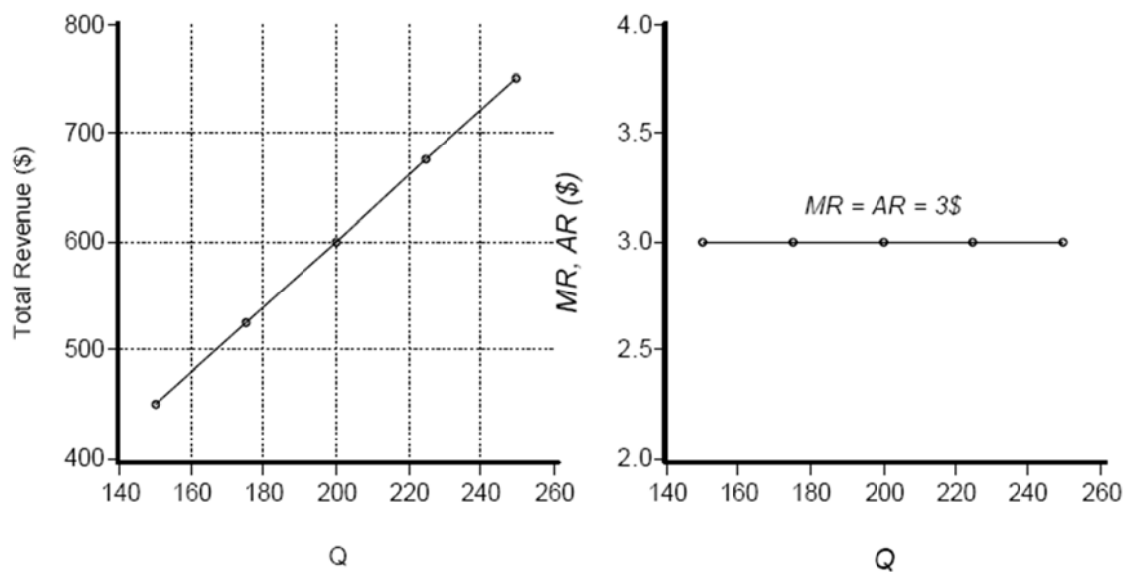
- a. Let the equilibrium market price be p^* . Any firm that tried to charge a higher price would make no sales whatsoever, since consumers would simply make their purchases from other (lower-price) sellers.
- b. Each firm can sell as much as it wants at the price p^* . Thus selling at a lower price would not increase sales but would reduce profits. So no firm has the incentive to charge any price below p^* .
- c. Each individual firm is very small relative to the market. Thus for any change in output that is realistic for the firm, there would be no significant or noticeable effect on the *industry* level of output and thus no significant effect on the market price. Thus, each firm sees that it can sell any reasonable amount at the given market price.

Question 5

- a. The completed table is shown below. Recall that total revenue is equal to price times quantity.

Price (\$)	Quantity	Total Revenue (\$)	Average Revenue (\$)	Marginal Revenue (\$)
3	150	450	$450/150 = 3$	
3	175	525	$525/175 = 3$	$75/25 = 3$
3	200	600	$600/200 = 3$	$75/25 = 3$
3	225	675	$675/225 = 3$	$75/25 = 3$
3	250	750	$750/250 = 3$	$75/25 = 3$

- b. See the table above. Average revenue is equal to total revenue divided by quantity. Marginal revenue is equal to the change in total revenue divided by the change in quantity; it is computed using the change from one row to the next.
- c. A perfectly competitive firm is a price taker. It can sell any amount at the given market price, which in this case is \$3. Since every unit it sells is sold at the price of \$3, it follows that its average revenue is \$3 but also its marginal revenue is \$3.
- d. See the figure below. Note that the vertical scales on the two diagrams are different, though both are measured in dollars. The slope of the TR curve is the change in total revenue divided by the change in quantity, $\Delta TR/\Delta Q$. This is marginal revenue and is equal to 3.



Question 6

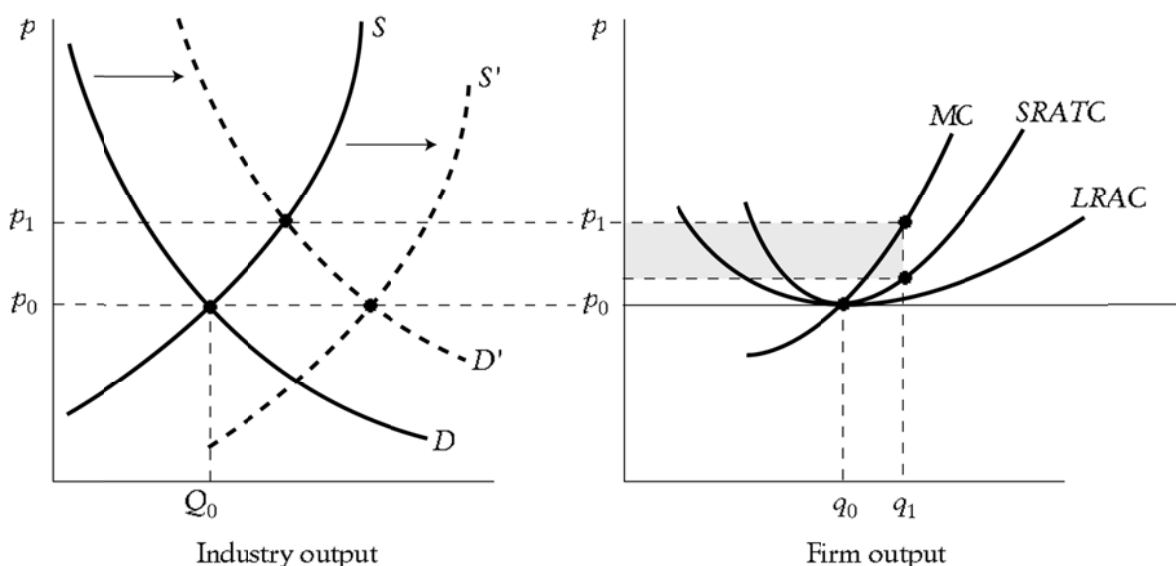
- a. The completed table is shown below. The firm's supply curve is determined by its *MC* curve above the minimum of the *AVC* curve. Profits are determined by the difference between price and average *total cost*, *ATC*.

Price (\$)	Firm's Output	Is Price > <i>ATC</i> ?	Is Price > <i>AVC</i> ?	Profits Positive?
3	Do not produce	No	No	No profits
4	130 units	No	Price = <i>AVC</i>	Negative profits
5	145 units	No	Yes	Negative profits
6	155 units	No	Yes	Negative profits
7	165 units	Yes	Yes	Positive profits
8	175 units	Yes	Yes	Positive profits
9	185 units	Yes	Yes	Positive profits
10	195 units	Yes	Yes	Positive profits

- b. The firm shuts down when the market price falls below the minimum of the *AVC* curve. In this case, when the price falls below \$4, the firm will shut down. The reason is that when $\text{price} < \text{AVC}$, the firm cannot cover even its variable costs, and so the firm is better off to close down rather than produce and increase its losses.
- c. The firm's supply curve is its *MC* curve above the minimum point of *AVC*. There will be no production when $\text{price} < \text{AVC}$, for the reason given in part (b). For prices above *AVC*, profit maximization requires the firm to produce until marginal revenue (which equals market price) is equal to marginal cost. Thus the *MC* curve above the *AVC* curve is the firm's supply curve.

Question 8

- a. The diagrams are shown below. The left-hand diagram shows the initial industry equilibrium at price p_0 and quantity Q_0 .



- b. The right-hand diagram above shows a typical firm when the industry is in long-run equilibrium. The typical firm is producing q_0 units of output. It is not only earning zero economic profits ($p = \text{SRATC}$), but it also has no unexploited economies of scale—that is, it is at the minimum of its *LRAC* curve.

- c. See the diagram above. The increase in demand for barley shifts the demand curve to D' and raises the short-run equilibrium price to p_1 . The increase in market price causes each firm to increase its own output along its MC curve, to output q_1 for the typical firm shown. The profits at this new high price are shown by the shaded area.
- d. The positive profit in part (c) leads other firms to enter this industry. As new barley farmers enter the industry, the industry supply curve shifts to the right and reduces the equilibrium market price. Entry continues until existing firms are not making any economic profits. As long as technology has not changed, firms' cost curves do not shift and so supply shifts eventually to S' , where the market price has returned to p_0 . At this point, the typical firms are again making zero economic profits. (The assumption of a constant-cost industry ensures that the change in scale of the industry does not lead to changes in the firms' cost curves.)

