Quiz 3

answers

Instructions: You have 50 minutes to complete this exam. For the short-answer questions, please support your answers by showing your work and writing out complete explanations for any claims you make. Good luck!

1 . We have the following information on the cost structure of a firm at its current level of production:

Q	Fixed costs	Variable costs	Total costs	average variable costs	average total costs
	10	50			30

In the table, Q represents the quantity produced and the other variables are as usual. Using this information, what must be true at the firm current level of production:

a. $Q = 2$

b. $Q = 1$

c. Average variable costs are 20

a. Total costs are 90

a. $Q = 4$

2. Kramerica Industries is a monopoly in a market with demand curve given by $P = 18 - 2Q$, where P is the price and Q is the quantity. The firm's marginal cost is given by the equation $MC = 2Q$. Let Q^* and P^* be, respectively, the firm's profit-maximizing quantity and price. Then, using the information above, Q^* and P^* are:

a. $Q^* = 3$, $P^* = \$12$

b. $Q^* = 4.5$, $P^* = \$9$

c. $Q^* = 8$, $P^* = \$2$

d. $Q^* = 2.25$, $P^* = \$9.75$

e. $Q^* = 4$, $P^* = \$10$

3. Which of the following is true?

a. The output such that marginal revenue equals zero is the output that maximizes a monopolist's total revenue.

b. If a monopolist's profit maximizing quantity and price are denoted as Q^* and P^*, respectively, then at Q^*, the monopolist's marginal revenue is greater than P^*.

c. If a monopolist's profit maximizing quantity and price are denoted as Q^* and P^*, then Q^* and P^* will lie on the inelastic portion of the market demand curve.

d. All of the above.

e. None of the above.

The following three questions use the graph below. The graph represents the cost structure of a firm in a perfectly competitive market.
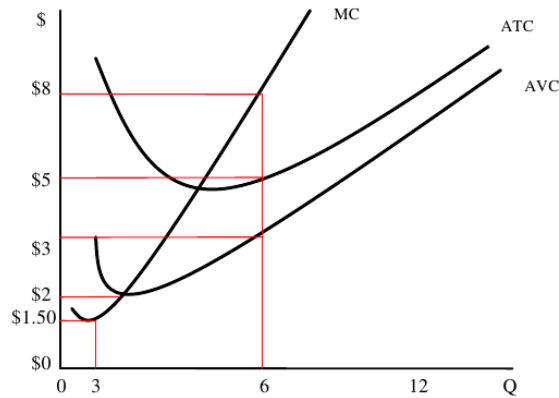
4. If the equilibrium price in the market is $8, then which of the following is true:

    a. The firm makes profits of $18

    b.   The firm makes profits of $12

    c.   The firm makes losses of $12

    d.   The firm makes losses of $3

    e.   The firm makes profits of $30

5. If the firm were to shut down, what would be its losses in the short run?

    a. $30

    b. $18

    c. $12

    d. $3

    e. $2

6. If the equilibrium price is $1.50 then which of the following is true:

    a.   The marginal revenue of the firm is downwards sloping

    b.   The firm's optimal decision is to sell three units of the good

    c.   The firm will make positive profits.

    d.   The firm will make zero economic profit.

    e. The firm's optimal decision is to sell zero units of the good

7.   Hank's Flooring installs hardwood floors using machines (i.e. flooring staplers, air compressors, etc) and labor. Suppose that if the company uses K units of capital and L units of labor, it can install q square feet of flooring in one hour, where $q = K * \sqrt{L}$. A unit of labor costs \$25, while a unit of capital costs \$5.

In the short-run, the firm has a fixed number of machines, $K = 5$. This number can't be changed in the short-run.

a.   For an output of q square feet of flooring installed per hour, how many units of labor does he need?
For an output of q, he must hire $L = \frac{q^2}{25}$ units of labor.

b.   Based on your answer to part a, write down the equation for Hank's total cost function.
His total cost of output q is $TC = q^2 + 25$.

c.   Suppose that the market for hardwood flooring installation is perfectly competitive, with a market price of \$7 per square foot. What quantity of flooring will Hank install each hour to maximize his profit? What is this profit?
Hank will set price equal to marginal cost, or $7 = 2q$, $q = 3.5$. (answers that could not figure out the equation for marginal cost correctly will receive full credit if it is clear the approach is correct.)

d.   Assuming free entry and exit, explain what will happen to the equilibrium price in this market in the long-run.
Hank's profit is $3.5 * 7 - 25 - 3.5^2 = -\$12.75$ per hour. Since firms are losing money, there will be exit until $MC = ATC$, or until $p = \$10$.

8.   Skywalker Farms supplies water to the town of Mos Eisley (they are "the water company", i.e. a monopoly supplier). Given their infrastructure of pipes, treatment centers, etc, the marginal cost of supplying one gallon of water is only $.50 (and is constant), though maintaining their infrastructure has a daily fixed cost of $75,000. Mos Eisley's daily demand for gallons of water is $P = 20 - \frac{1}{1000}Q$.

a. Solve for Skywalker Farm's profit-maximizing price. What daily profit do they earn when they charge this price?

Skywalker Farms will charge a price of $10.25 (selling a quantity of 9,750 gallons of water), and earns a profit of $20,062.50.

b. Emperor Palpatine, in a rare burst of populism, suggests regulating Skywalker Farms by capping the price they are allowed to charge at $9/gallon of water. What profit will Skywalker Farms earn at this price?

We saw in part a that Skywalker Farms would like to charge a price of $10. Here, they are prohibited from doing so by the government, and must charge a price of only $9. At this price, the quantity demanded is 11,000, and so their profits are $18,500.

c.   You are hired as a consultant to advise the Galactic Empire on this matter. Explain in words why such a price ceiling might be a good idea (i.e. could such a price ceiling be welfare-improving?).

A monopolist has an incentive to decrease the amount of output sold relative to what would be efficient (where willingness to pay as measured by the demand curve equals marginal cost). This results in a deadweight loss. A price ceiling dampens this incentive, increasing the amount of output produced, and decreasing the amount of deadweight loss.