

Answer the questions in the spaces provided on the question sheets. If you run out of room for an answer, continue on the back of the page. Be succinct. Longer answers don't increase your chance of being right, but increase your chance of saying something wrong. **Show how you got your answers in mathematical questions**

Name: _____

1. Say whether the propositions are True or False. If they are False, justify.

(a) The fundamental cause of monopolies is barriers to entry.

Solution: True.

(b) Like competitive firms, monopolists charge a price equal to marginal cost.

Solution: False. Monopolists charge a price **higher** than marginal cost.

(c) When a firm operates with excess capacity, it must be in a monopolistically competitive market.

Solution: False. In a perfectly competitive market firms may be operating with excess capacity in the short-run, and firms in monopolistic markets may also operate in excess capacity in the short or long-run.

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2. Suppose that you are a monopolist in the market of a specific video game. Your inverse demand curve and cost function are the following:

$$P = 80 - \frac{Q}{2}$$

$$C(Q) = 400 + \frac{Q^2}{2}$$

- (a) Derive the Marginal Cost (MC) and the Marginal Revenue (MR) functions

Solution:

$$TR = P \times Q = \left(80 - \frac{Q}{2}\right)Q = 80Q - \frac{Q^2}{2}$$

$$MR = \frac{dTR}{dQ} = 80 - Q$$

$$MC = \frac{dC(Q)}{dQ} = Q$$

- (b) Plot a graph with the **demand curve**, the **marginal revenue** curve and the **marginal cost** curves. Label carefully all intercepts of all curves and indicate them with the labels D, MR and MC, respectively.

Solution:

- (c) Derive the equilibrium price and quantity for that monopolist problem.

Solution:

Profit maximization implies $MR = MC$:

$$80 - Q = Q$$

$$Q^* = 40$$

To get the price, we go back to the demand curve:

$$P^* = 80 - \frac{40}{2} = 60$$

- (d) What is your profit?

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Solution:

Profit is total revenue minus total cost:

$$\begin{aligned} profit &= TR - TC = \\ &= P \times Q - 400 - \frac{Q^2}{2} \end{aligned}$$

Since $P^* = 60$ and $Q^* = 40$:

$$profit = 60 \times 40 - 400 - \frac{40^2}{2} = \$1,200$$

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- (e) Plot the graph with the demand, MC and MR curves again and indicate the consumer surplus (CS), producer surplus (PS) and deadweight loss (DWL).

Solution:

- (f) Calculate the values of the consumer surplus (CS), the producer surplus (PS) and the deadweight loss (DWL).

Solution:

We need to find two values: the cost when $MR = MC$ and the quantity when $MC = D$.

$$MR = MC \implies 80 - Q = Q \implies Q = 40$$

$$MC = D \implies Q = 80 - \frac{Q}{2} \implies Q = \frac{160}{3}$$

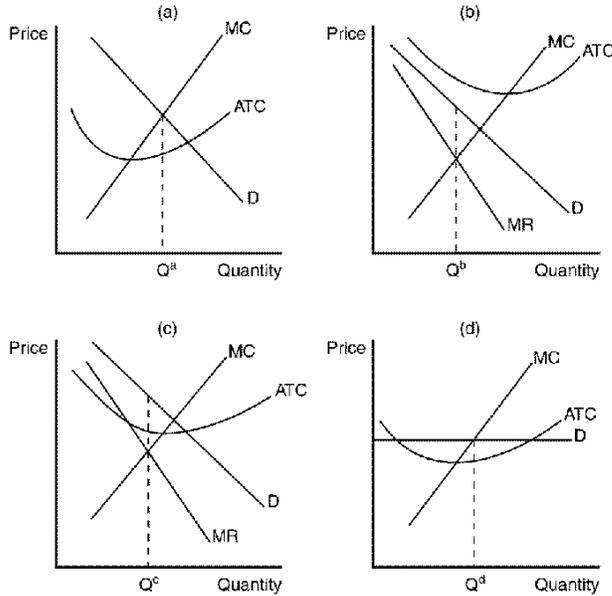
$$CS = \frac{(80 - 60) \times 40}{2} = \$400$$

$$DWL = \frac{20 \times (\frac{160}{3} - 40)}{2} = \frac{400}{3} \approx \$133.33$$

$$PS = \frac{80 \times \frac{160}{3}}{2} - 400 - \frac{400}{3} = \$1,600$$

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3. Consider the four graphs below and answer the items that follow. In all items, your answer may be that **more than one or none** of the graphs satisfies the question. **Justify your answer in all items.**



- (a) Which of the graphs shown would be consistent with a profit maximizing firm in a monopolistically competitive market that is earning a positive profit?

Solution: The correct answer is Graph (c).

In graph (a) the firm's choice is such that $P = MC$, whereas in monopolistically competitive markets $P > MC$.

In graph (b), the firm is maximizing profit ($MR = MC$), but at that point $P < ATC$. The firm is, thus, losing money (or having a negative profit).

In graph (c), the firm is maximizing profit ($MR = MC$), and at that point $P > ATC$. The firm is, thus, having a positive profit.

In graph (d), demand is perfectly elastic, which is consistent with a firm in a perfectly competitive market.

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- (b) Which of the graphs shown would be consistent with a firm in a monopolistically competitive market that is doing its best but still losing money?

Solution: The correct answer is Graph (b), as justified above.

- (c) Which of the graphs depicts a monopolistically competitive firm in long-run equilibrium?

Solution: None of the graphics above depicts such situation. In the long-run equilibrium the demand curve must be tangent to the ATC curve, and the quantity produced must be at that tangent point.