



3. The graph shows the cost and revenue curves for an unregulated, profit-maximizing monopoly.
- Is the firm shown in this graph a natural monopoly? Explain.
  - Using the labeling from the graph, identify the area representing the deadweight loss for this profit-maximizing monopoly.
  - In order to improve resource allocation, the government sets a price that results in the firm earning zero economic profit.
    - Using the labeling from the graph, identify the price and resulting quantity the firm would produce.
    - Will this government policy eliminate the deadweight loss? Explain using labeling from the graph.
  - Instead, the government decides to set a price that results in the socially optimal quantity of output. Will the firm earn positive, negative, or zero economic profit? Explain using labeling from the graph.

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**Begin your response to this question at the top of a new page in the separate Free Response booklet and fill in the appropriate circle at the top of each page to indicate the question number.**

**Question 3: Short****5 points**

|                             |   |                 |
|-----------------------------|---|-----------------|
| <b>(a)</b>                  | State yes and explain that this firm is a natural monopoly because it experiences decreasing average total costs over the entire effective demand for its product.  | <b>1 point</b>  |
| <b>(b)</b>                  | State the area of deadweight loss is equal to <b>ONE</b> of the following areas: <ul style="list-style-type: none"> <li>• bfg</li> <li>• <math>\frac{1}{2} \times (P_5 - P_1) \times (Q_4 - Q_2)</math></li> </ul>  | <b>1 point</b>  |
| <b>(c)(i)</b>               | State the regulated price is $P_3$ and the regulated quantity is $Q_3$ .  | <b>1 point</b>  |
| <b>(ii)</b>                 | State no and explain with <b>ONE</b> of the following. <ul style="list-style-type: none"> <li>• Area cjk is the remaining deadweight loss.</li> <li>• The deadweight loss is reduced by area bfjc but is not eliminated completely.</li> <li>• <math>P_3</math> is greater than (or not equal to) marginal cost at <math>Q_3</math>.</li> <li>• <math>Q_3</math> is less than (or not equal to) the socially optimal quantity <math>Q_4</math>.</li> </ul>  | <b>1 point</b>  |
| <b>Total for part (c)</b>   |   | <b>2 points</b> |
| <b>(d)</b>                  | State the firm will earn negative economic profit and explain with <b>ONE</b> of the following: <ul style="list-style-type: none"> <li>• At the socially optimal quantity, <math>Q_4</math>, average total cost (<math>P_2</math>) is greater than price (<math>P_1</math>).</li> <li>• At the socially optimal quantity, <math>Q_4</math>, the area of negative economic profit is <math>P_1P_2dg</math>.</li> <li>• At the socially optimal quantity, <math>Q_4</math>, the area of negative economic profit is <math>(P_2 - P_1) \times Q_4</math>.</li> </ul> | <b>1 point</b>  |
| <b>Total for question 3</b> |   | <b>5 points</b> |