

## Externalities, Income/Substitution Effects, Profits and Costs, Long-Run Competition

*Multiple Choice (MC) questions usually have only one correct answer, although you may be able to defend different answers. Other kinds of questions often have more than one correct answer. Having good reasons for your answers is more important than what your answer is. If you don't understand the meaning of a question, you may write to your own TF, but do not expect him/her to give you answers. The problem set will not be graded, but the way you discuss the problems in your discussion section will affect your discussion-section participation score. You are allowed to work on the problem sets with other students.*

1. Discuss whether the following statements are true or false. Explain each answer.
  - i. In a market with price-taking buyers and sellers, a tax will decrease total welfare.
  - ii. When a good imposes a negative externality on society, a government prohibition on the production and exchange of that good would yield economic efficiency.
  - iii. The Coase Theorem states that externalities can be internalized by private negotiation.
  
2. For each of the following, determine whether the following statements describe a positive externality, a negative externality, or neither:
  - i. Your roommate buys and lights a scented candle in her room, which you can smell throughout your whole apartment.
  - ii. Your uncle buys and smokes cigars around you, increasing your risk of getting lung cancer.
  - iii. Some consumers decide to buy more olive oil, and the market price of olive oil rises as a result. The price increase has a negative effect on other consumers.
  
3. The social value of the internet is greater than the private value because people enjoy each other's social media. The following table shows the marginal private value, marginal private cost, and marginal social value of installing internet service to villages.

<i>Village Number</i>	<i>Marginal Private Value</i>	<i>Marginal Private Cost</i>	<i>Marginal Social Value</i>
1	27	6	34
2	24	10	31
3	21	14	28
4	18	18	25
5	15	22	22
6	12	26	19

- i. What is the equilibrium quantity of output in this market?
  - ii. What is the socially optimal level of output in this market?
  - iii. How large would a subsidy need to be in this market to move the market from the equilibrium level of output to the socially optimal level of output? [Hint: when there's a subsidy, the seller receives more than the buyer pays in market equilibrium.]
  
4. [MC] In the presence of pollution, more abatement increases social surplus whenever
  - a. the level of pollution is greater than zero.
  - b. the amount of abatement is less than the amount of remaining pollution.
  - c. the marginal cost of abatement is less than the marginal benefit of abatement.
  - d. the marginal cost of abatement is greater than the marginal benefit of abatement.

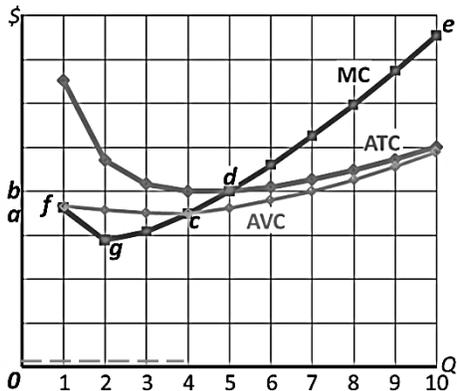
5. It is often argued that higher education creates positive externalities.
  - i. Give some reasons why education may create positive externalities.
  - ii. Draw on a graph the private benefit, the social benefit and the marginal cost.
  - iii. Is the equilibrium without government intervention efficient? If not, how can the government increase social surplus?
  - iv. Draw the effect of a government intervention on the previous graph. Has social welfare increased?
6. True or false:
  - i. The equilibrium in a perfectly competitive market without externalities is always efficient (i.e. it maximizes total surplus).
  - ii. A competitive equilibrium in the presence of externalities is efficient.
  - iii. In a perfectly competitive market without externalities, a subsidy will create a deadweight loss.
  - iv. In a perfectly competitive market with a positive externality, a subsidy will increase social welfare.
7. *[MC]* Suppose you are going to your favorite Boston restaurant, and you are planning to eat 25 chicken wings (your favorite food). There are other kinds of food on the menu as well. Usually, the chicken wings sell at \$1 each, but today the price is \$2 each. What will you do?
  - a. The substitution effect will dominate the income effect, and therefore you will eat fewer chicken wings.
  - b. We cannot say because it depends on whether the substitution effect or the income effect dominates.
  - c. Both the income effect and the substitution effect will motivate you to eat fewer chicken wings.
  - d. It is very likely you will still eat 25 chicken wings because the income effect and the substitution effect will cancel out.

8. Fill in the empty spaces in the table for a firm that produces wine (NA= doesn't apply):

<i>Quantity</i>	<i>VC</i>	<i>TC</i>	<i>AFC</i>	<i>AVC</i>	<i>ATC</i>	<i>MC</i>
0	NA	\$50	NA	NA	NA	NA
1	\$10			\$10	\$60	\$10
2	\$30	\$80				
3			\$16.67	\$20	\$36.67	

9. Are the following statements true or false? Explain each answer.
  - i. Whenever a firm's average variable cost is falling, marginal cost must be falling too.
  - ii. Whenever a firm's average total cost is rising, average variable cost must be rising too.
10. *[MC]* The average variable cost approaches the average total cost as output rises because
  - a. fixed costs are falling.
  - b. total costs are falling.
  - c. marginal costs are above average variable costs.
  - d. average fixed costs are falling.
11. Are the following statements true or false? Explain each answer.
  - i. Producer surplus equals total profits when there are zero fixed costs.
  - ii. In the short run fixed costs are sunk costs.
  - iii. In the long run competitive firms make zero accounting profit.
12. Ana sells 10 cookies for \$10 each. The cost of inputs for each cookie is constant at \$5. However, instead of spending money on those inputs, she could have saved the money in a bank and earned interest of \$15. What is her accounting profit? What is her economic profit?

13. In the free city of Karalis, people only eat Almonds (A) and Blueberries (B). Suppose the price of Almonds suddenly doubles. Describe the income and substitution effects on the demand for Blueberries. [HINT: you need to consider at least two cases].



14. [MC] The donut market is perfectly competitive. The figure on the left shows the costs of a typical donut producer. The letters  $a$  to  $f$  and  $\theta$  are points on the graph. In the short run, the donut producer's supply curve is the curve \_\_\_\_\_.

- $fgcde$
- $\theta acde$
- $\theta bde$
- $gcde$

15. In the graph above, explain possible reasons why

- the donut producer's marginal cost curve is decreasing up to point  $g$ .
- the donut producer's marginal cost curve is increasing from point  $g$  onwards.

16. Suppose Mr. M opened a bakery shop in Commonwealth Avenue, and he paid a \$12.50 rental for this month in advance. Suppose he can produce at most 6 kilograms (kg) of bread. The following table describes his marginal cost function. [Hint: Marginal Cost is decreasing in this example.]

Quantity (kg)	MC (\$)	Fixed Cost	Variable Cost	Total Cost
1	5.00			
2	4.00			
3	3.00			
4	2.50			
5	2.00			
6	1.00			

Fill in the chart, and then answer the questions below. Explain each answer.

- If the price of bread is \$3/kg, how many kilograms should Mr. M produce?
- What is Mr. M's economic profit?
- What should Mr. M do at the end of the month?
- What does the minimum price need to be for him to stay in business?