1. Voda Reservoir is a profit-maximizing firm and the only producer of bottled water in a country. Currently, Voda Reservoir is earning negative economic profit.

A. Draw a correctly labeled graph for Voda Reservoir and show each of the following.

i. The profit-maximizing quantity, labeled Q_M

ii. The profit-maximizing price, labeled P_M

iii. The average total cost curve consistent with Voda Reservoir earning negative economic profit, labeled ATC

iv. The area of deadweight loss, shaded completely

B. Suppose the government requires Voda Reservoir to produce the socially optimal quantity of bottled water. On your graph in part A, show the socially optimal quantity of bottled water, labeled Q_S.

C. Suppose instead the government grants a per-unit subsidy to Voda Reservoir. What will happen to Voda Reservoir's profit-maximizing quantity of bottled water? Explain.

D. Suppose new producers have entered the bottled-water market and Voda Reservoir continues to operate in the bottled-water market. Will the demand for Voda Reservoir's bottled water become more elastic, become less elastic, or stay the same as new producers enter the market?

E. Voda Reservoir hires workers in a perfectly competitive labor market.

i. If the demand for bottled water increases, what will happen to Voda Reservoir's demand for labor? Explain.

ii. The government implements a new regulation that increases the minimum age required for a worker to be employed in a bottled-water factory. What will happen to the market wage in the short run? Explain.

1. Soja Farm is a typical profit-maximizing firm that produces and sells soybeans in a constant-cost, perfectly competitive market that is in long-run equilibrium. The market equilibrium price of soybeans is $14 per bushel.

(a) Draw correctly labeled side-by-side graphs for the soybean market and for Soja Farm, and show each of the following.

(i) The market equilibrium price and quantity, labeled $14 and Q_M, respectively
(ii) Soja Farm's profit-maximizing price and quantity, labeled P_F and Q_F, respectively
(iii) Soja Farm's average total cost curve consistent with a long-run equilibrium, labeled ATC

(b) If Soja Farm is the only firm in the market that chooses to increase its price of soybeans to $15 per bushel, will Soja Farm's total revenue increase by $1, remain the same, or decrease to $0 ? Explain.

(c) Soybeans are used as an input in the production of tofu. Tofu now becomes a more popular food option among consumers. On your graphs in part (a), show the short-run effect of the increased popularity of tofu on each of the following.

(i) The new market equilibrium price and quantity of soybeans, labeled P_2 and Q_2, respectively
(ii) Soja Farm's new profit-maximizing quantity, labeled Q*

(d) Given the increase in popularity of tofu in part (c), what will happen to the number of firms in the soybean market in the long run? Explain.

(e) Suppose a 25% increase in the market price of quinoa causes a 5% decrease in the quantity demanded of quinoa and a 10% increase in the quantity demanded for tofu.

(i) Is the demand for quinoa elastic, inelastic, or unit elastic? Explain using numbers.
(ii) Calculate the cross-price elasticity of demand between quinoa and tofu. Show your work.

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.

1. Arzeye Pharma has a patent, a legal barrier to entry, on its newly developed eye treatment that cures common eye problems. Arzeye Pharma is currently earning positive economic profit and is producing the profit-maximizing quantity of eye treatments.

(a) Draw a correctly labeled graph for Arzeye Pharma and show each of the following.

(i) The profit-maximizing quantity of eye treatments, labeled Q^*
(ii) The profit-maximizing price, labeled P^*
(iii) The average total cost curve consistent with positive economic profit, labeled ATC
(iv) The area representing consumer surplus, shaded completely

(b) Suppose Arzeye Pharma wants to charge a price that maximizes its total revenue rather than its profit.

(i) On your graph in part (a), show the revenue-maximizing quantity, labeled Q_R.
(ii) At quantity Q_R identified in part (b)(i), is the demand for eye treatments elastic, inelastic, or unit elastic?

(c) Suppose now that Arzeye Pharma engages in perfect price discrimination.

(i) On your graph in part (a), show the lowest price that Arzeye Pharma would charge, labeled P_2.
(ii) What would happen to consumer surplus? Explain.

(d) Suppose instead that Arzeye Pharma's patent expires. Will the demand for Arzeye Pharma's treatment become more elastic, become less elastic, or not change? Explain.

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.

1. A firm has a patent on a new carbon-capture technology, making it the only producer of that device. The firm is currently earning a positive economic profit and is producing the profit-maximizing level of output.

   (a) Draw a correctly labeled graph for the firm and show each of the following.

   (i) The quantity of carbon-capture devices produced by the firm, labeled Q_M
   (ii) The price charged by the firm, labeled P_M
   (iii) The area representing consumer surplus, shaded completely

   (b) The government is considering different options to regulate the firm.

   (i) Suppose the government is considering taxing the firm. Could using a per-unit tax change the firm's output to the socially optimal quantity? Explain.
   (ii) Instead, suppose the government imposes a price ceiling so that the firm produces the socially optimal quantity. On your graph in part (a), label the quantity and price after the price ceiling is imposed as Q_C and P_C.
   (iii) At the price and the quantity identified in part (b)(ii), is the firm earning positive economic profit? Explain.

   (c) Assume the government decides not to regulate the firm and instead the firm produces the quantity of output that maximizes total revenue.

   (i) If the firm now increases its output by one unit, would marginal revenue be positive, negative, or zero? Explain.
   (ii) Starting at the total-revenue-maximizing quantity, if the firm reduces the price by 10%, would the quantity demanded increase by less than 10%, by more than 10%, or by exactly 10% ?

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.

3. In the local market for Good X, there are four individual buyers: Emily, Wu, Omar, and Fernanda. The quantities that each individual buyer would be willing and able to purchase at different prices are included in the table provided.

	Quantity of Good X			
Price	Emily	Wu	Omar	Fernanda
$1	5	4	4	3
$2	4	3	4	3
$3	4	3	3	2
$4	3	2	3	2
$5	3	2	2	1
$6	2	1	2	1
$7	2	1	1	0
$8	1	0	1	0

(a) The local market for Good X has a perfectly elastic supply. Draw a correctly labeled graph for the local market for Good X with a market equilibrium price of $5. Label the equilibrium price as $5, and label the equilibrium quantity for the market with a specific value based on the data provided in the table.

(b) Assume the cost of production increases, which causes the price of Good X to increase from $5 to $7.

(i) Calculate the price elasticity of demand for Good X as the price increases from $5 to $7. Show your work.

(ii) Identify whether the demand for Good X is elastic, inelastic, or unit elastic in that range of prices.

(c) Could Emily's marginal benefit for the second unit of Good X equal $4.50 ? Explain.

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.

STOP

END OF EXAM

1. The government of an island nation grants SkyRunner Airlines exclusive monopoly rights to serve the island. SkyRunner is earning positive economic profits.

(a) Draw a correctly labeled graph for SkyRunner, and show each of the following.

(i) The profit-maximizing quantity of tickets, labeled Q_M
(ii) The profit-maximizing price of a ticket, labeled P_M
(iii) The area representing profits, shaded completely

Now the island's tourist bureau asks the government to consider the following two proposals.

- Proposal I: Set a price ceiling on tickets that eliminates all deadweight loss.
- Proposal II: Eliminate SkyRunner's monopoly rights, which will remove all barriers to entry.

(b) Suppose the government adopts proposal I. On your graph in part (a), indicate the quantity of tickets sold in the short run, labeled Q_C.

(c) Suppose instead the government adopts proposal II. How will each of the following be affected in the long run compared to the market conditions in part (a) ?

(i) The quantity of tickets sold by SkyRunner. Explain.
(ii) The price elasticity of demand for SkyRunner's airline service. Explain.
(iii) SkyRunner's profits
(iv) The deadweight loss in the market. Explain.

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.

1. NCHart is a corporation that has developed and patented a new drug to treat heart disease. There are no substitutes for this drug, giving NCHart a monopoly.

(a) Draw a correctly labeled graph of NCHart making a positive economic profit, and show each of the following.

(i) The profit-maximizing quantity, labeled Q_m
(ii) The profit-maximizing price, labeled P_m

(b) At Q_m from part (a)(i), is demand elastic, unit elastic, or inelastic? Explain using information from the graph.

(c) Instead of maximizing profit, suppose NCHart considers providing the new drug to as many patients as possible as long as it can generate enough revenue to cover its total costs.

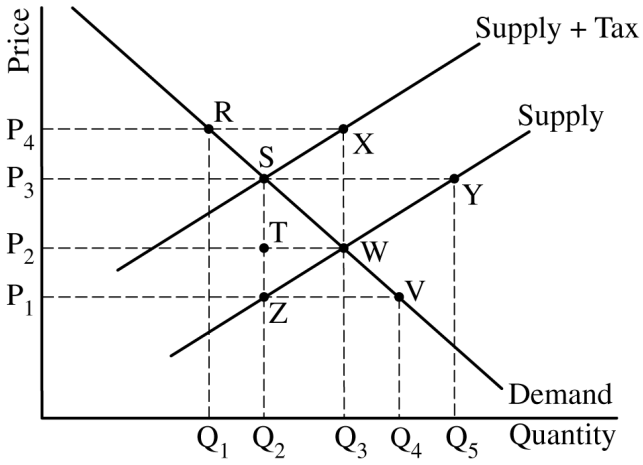
(i) On your graph from part (a), show the quantity that is consistent with this goal, labeled Q_z.
(ii) At Q_z from part (c)(i), is there a deadweight loss? Explain.

(d) NCHart's patent expires next year, and a new firm, TXDrug, is considering whether to Enter this market or Stay Out. NCHart can either produce Q_m or Q_z. The firms independently and simultaneously choose their actions. The first entry in the payoff matrix represents NCHart's payoff and the second entry represents TXDrug's payoff. Both firms have complete information. Use the payoff matrix below to answer the following questions.

		TXDrug: Stay Out	TXDrug: Enter
NCHart	Q_m	\$10, \$0	\$4, \$1
	Q_z	\$0, \$0	–\$2, –\$1

(i) Does TXDrug have a dominant strategy? Explain using strategies and payoffs from the payoff matrix.
(ii) What is the best response for NCHart if TXDrug chooses to Stay Out?
(iii) Identify the Nash equilibrium.

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.



2. Hats are produced in a perfectly competitive industry, and the government imposes a per-unit sales tax on hats.
   (a) Using the labeling from the graph, identify each of the following.
      (i) The after-tax price paid by consumers and the after-tax quantity
      (ii) The area representing the total tax revenue received by the government
   (b) Now assume instead that the demand for hats is perfectly inelastic at Q_3, while the supply and the per-unit tax remain unchanged.
      (i) Will the after-tax price paid by consumers be higher, lower, or the same compared to the price in your answer to part (a)(i) ?
      (ii) Will the total tax revenue received by the government be higher, lower, or the same compared to the tax revenue in your answer to part (a)(ii) ? Explain.
   (c) If the demand for hats remains perfectly inelastic at Q_3 and the per-unit sales tax is reduced, will producer surplus increase, decrease, or stay the same? Explain.

MICROECONOMICS
Section II
Total Time—1 hour
Reading Period—10 minutes
Writing Period—50 minutes

Directions: You are advised to spend the first 10 minutes reading all of the questions and planning your answers. You will then have 50 minutes to answer all three of the following questions. You may begin writing your responses before the reading period is over. It is suggested that you spend approximately half your time on the first question and divide the remaining time equally between the next two questions. Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. Use a pen with black or dark blue ink.

1. In the early twentieth century, limited transportation options and the lack of effective substitutes gave Single Cinema monopoly power in a small town. Assume that Single Cinema is a profit-maximizing firm and currently operates at a negative economic profit in the short run.

   (a) Draw a correctly labeled graph for Single Cinema, and show each of the following.

      (i) The profit-maximizing price and quantity of tickets, labeled as P_m and Q_m, respectively

      (ii) The area representing the negative economic profit, shaded completely

   (b) Explain why Single Cinema continues to operate in the short run despite earning negative economic profit in the short run.

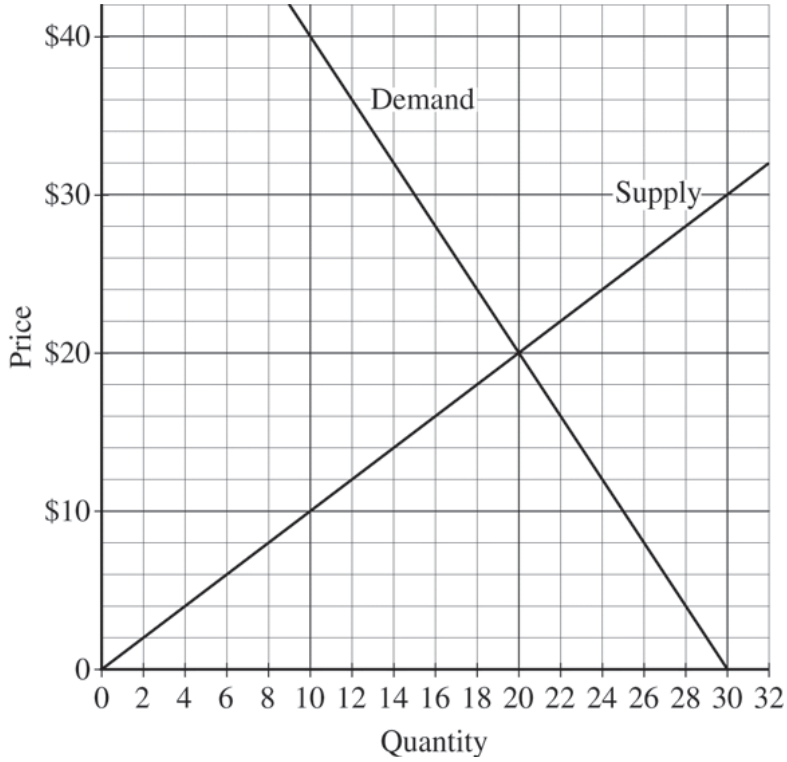
   (c) Would Single Cinema's total revenue increase, decrease, or stay the same if it decides to sell one fewer ticket than Q_m? Explain.

   (d) Single Cinema hires workers in a perfectly competitive labor market with a downward-sloping demand curve. Suppose the number of workers available in the market decreases.

      (i) What will happen to the wage rate? Explain.

      (ii) What will happen to the marginal revenue product of the last worker hired? Explain.

3. The graph below shows the market for widgets. The government is considering intervening in this market.



(a) Calculate the total producer surplus at the market equilibrium price and quantity. Show your work.

(b) If the government imposes a price floor at $16, is there a shortage, a surplus, or neither? Explain.

(c) If instead the government imposes a price ceiling at $12, is there a shortage, a surplus, or neither? Explain.

(d) If instead the government restricts the market output to 10 units, calculate the deadweight loss. Show your work.

(e) Assume the price decreases from $20 to $12.
   (i) Calculate the price elasticity of demand. Show your work.
   (ii) In this price range, is demand perfectly elastic, relatively elastic, unit elastic, relatively inelastic, or perfectly inelastic?

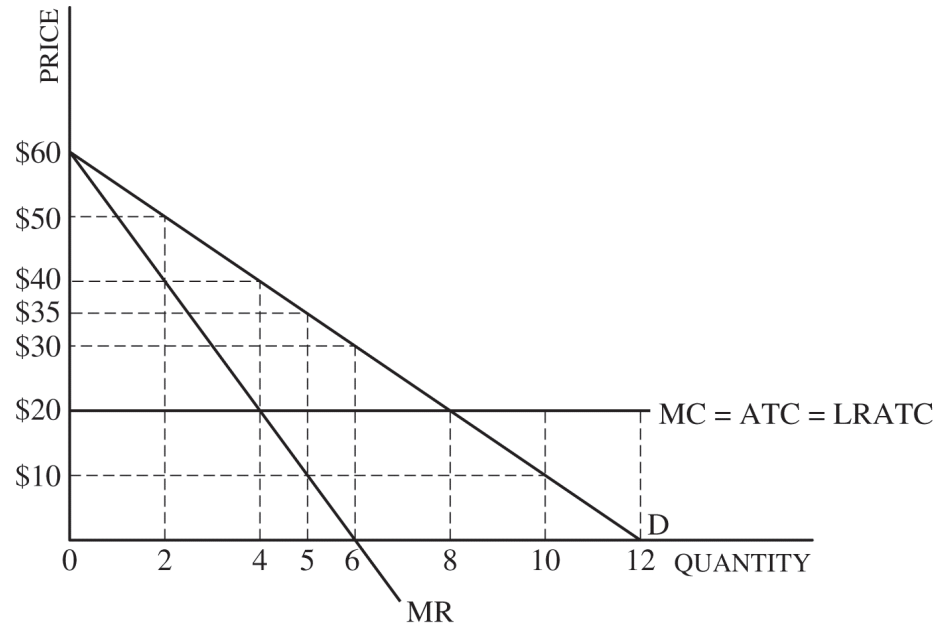
STOP

END OF EXAM

MICROECONOMICS
Section II
Planning time—10 minutes
Writing time—50 minutes

Directions: You have 10 minutes to read all of the questions in this booklet, to sketch graphs, to make notes, and to plan your answers. You will then have 50 minutes to answer all three of the following questions. It is suggested that you spend approximately half your time on the first question and divide the remaining time equally between the next two questions. In answering the questions, you should emphasize the line of reasoning that generated your results; it is not enough to list the results of your analysis. Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. Use a pen with black or dark blue ink.

1. The graph below shows the demand curve (D), marginal revenue curve (MR), marginal cost curve (MC), average total cost curve (ATC), and long-run average total cost curve (LRATC) for a monopolist.



(a) Using the numbers given in the graph, identify each of the following for the profit-maximizing monopolist.

(i) The quantity produced

(ii) The price

(iii) The allocatively efficient quantity

(b) At the profit-maximizing quantity from part (a)(i), is the monopolist experiencing economies of scale? Explain.

3. Assume that gasoline is sold in a competitive market in which demand is relatively inelastic and supply is relatively elastic.

   (a) Draw a correctly labeled graph of the gasoline market. On your graph show the equilibrium price and quantity of gasoline, labeled P_E and Q_E.

   (b) Suppose the government imposes a $2 per unit tax on the producers of gasoline. On your graph from part (a), show each of the following after the tax is imposed.

      (i) The price paid by buyers, labeled P_B

      (ii) The after-tax price received by sellers, labeled P_S

      (iii) The quantity, labeled Q_T

   (c) Using the labeling on your graph, explain how to calculate the total tax revenue collected by the government.

   (d) Will the tax burden fall entirely on buyers, entirely on sellers, more on buyers and less on sellers, more on sellers and less on buyers, or equally on buyers and sellers? Explain.

STOP

END OF EXAM