

EXAMINATION 4 VERSION B
"Perfect and Imperfect Competition"
November 29, 2023

INSTRUCTIONS: This exam is closed-book, closed-notes. Simple calculators are permitted, but graphing calculators, calculators with alphabetical keyboards, cell phones, and wireless devices are NOT permitted. Numerical answers, if rounded, must be correct to at least 3 significant digits. Point values for each question are noted in brackets. Maximum total points are 100.

I. Multiple choice: Please circle the one best answer to each question. [1 pt each, 14 pts total]

(1) In a perfectly competitive market, buyers view the outputs of different firms as

- a. perfect squares.
- b. differentiated products.
- c. perfect complements.
- d. perfect substitutes.

(2) Suppose the motor oil industry is *perfectly competitive* and the price of a bottle of motor oil is \$25. Then any firm in this market believes its marginal revenue is

- a. zero.
- b. more than \$25.
- c. exactly equal to \$25.
- d. less than \$25.

(3) Firm #1 and Firm #2 both make antifreeze for automobiles. Suppose that for some reason at current levels of output, Firm #1 has marginal cost of \$15 per gallon and Firm #2 has marginal cost of \$10 per gallon. Total industry costs can be reduced, while maintaining the same total output, if

- a. Firm #1 produces more antifreeze and Firm #2 produces less.
- b. Firm #1 produces less antifreeze and Firm #2 produces more.
- c. Both firms shut down.
- d. Total industry costs cannot be reduced by reallocating the same total output.

(4) Suppose the price of a calculator is \$6 and the price of a flashdrive is \$3. If the economy is perfectly competitive, then these prices indicate that the *economy's* opportunity cost of a calculator is

- a. 1/2 of a flashdrive.
- b. 1/3 of a flashdrive.
- c. 1 flashdrive.
- d. 2 flashdrives.
- e. 3 flashdrives.

(5) If all markets in the economy are perfectly competitive, then the slope of every consumer's budget line is

- a. one.
- b. zero.
- c. greater than the slope of the economy's production possibility curve.
- d. less than the slope of the economy's production possibility curve.
- e. equal to the slope of the economy's production possibility curve.

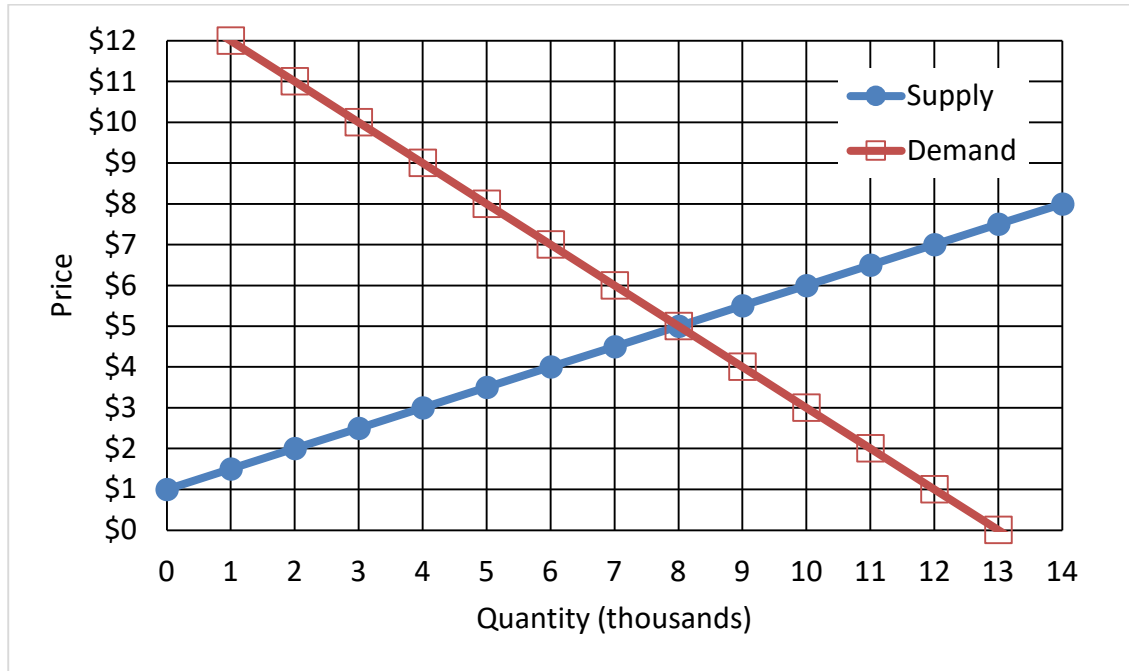
(6) A monopoly expects that if it increases its output, this will cause the price to

- a. increase.
- b. decrease.
- c. stay the same.
- d. cannot be determined from information given.

- (7) An industry is a natural monopoly if
- one firm owns all the key natural resources required to produce the product.
 - each firm's average cost curve slopes down.
 - the industry became a monopoly without government interference.
 - the only seller in the market sells a natural or "green" product.
- (8) If a profit-maximizing firm faces a downward sloping demand curve for its product, it will set a price
- less than marginal cost.
 - equal to marginal cost.
 - greater than marginal cost.
 - less than or greater than marginal cost, depending on the elasticity of demand.
- (9) Economists are opposed to monopolies because monopolies
- make people buy things that people don't really want.
 - advertise too much.
 - create unhealthy concentration of social power.
 - set prices that exclude some buyers who are willing to pay the marginal cost.
 - make the rich richer, and the poor poorer.
 - All of the above.
- (10) Perfect price discrimination is impractical because a monopolist
- is not really interested in maximizing profit.
 - faces downward-sloping demand.
 - cannot know how much each customer is willing to pay for the product.
 - always has a marginal cost greater than anyone's willingness to pay.
- (11) A cartel must face the problem that each member firm will want to cheat on the cartel agreement by
- increasing output beyond its quota.
 - producing less than its quota of output.
 - raising its price higher than the cartel's agreed price.
 - none of the above.
- (12) Which of the following is *not* illegal under U.S. antitrust laws?
- Mergers that lessen competition.
 - Cartels.
 - Predatory pricing.
 - Being a monopoly.
 - All of the above are illegal.
- (13) The Cournot model of oligopoly predicts that as the number of firms decreases in an industry, the market price
- approaches zero.
 - approaches marginal cost.
 - approaches the monopoly price.
 - remains constant.
- (14) If the products of different firms are "differentiated," then each firm
- faces horizontal (perfectly elastic) demand.
 - takes price as given.
 - faces upward-sloping demand.
 - faces downward-sloping demand.

II. Problems: Insert your answer to each question in the box provided. Use margins and graphs for scratch work. Only the answers in the boxes will be graded. Work carefully—partial credit is not normally given for questions in this section.

(1) [Efficiency of competition: 16 pts] The following graph shows the market for snow shovels.



Suppose only 6000 shovels were produced for some unknown reason.

- a. How much would consumers be willing to pay for a 6001st shovel?
- b. By how much would the shovel industry's total costs increase from producing a 6001st shovel?
- c. If the 6001st shovel were produced, would total surplus *increase*, *decrease*, or *remain constant*?
- d. By how much?

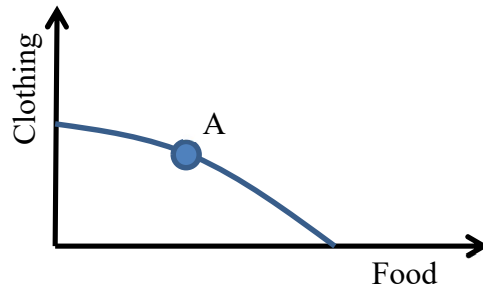
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Alternatively, suppose 12,000 shovels were produced for some unknown reason.

- e. How much were consumers willing to pay for the 12,000th shovel?
- f. How much would the shovel industry's total cost decrease from NOT producing the 12,000th shovel?
- g. If the 12,000th shovel were NOT produced, would total surplus *increase*, *decrease*, or *remain constant*?
- h. By how much?

\$
\$
\$

(2) [Economy-wide efficiency: 16 pts] The graph below shows a country's production possibility curve. The country is currently at point A, where the slope equals $-1/3$.



- a. What is this **country's** opportunity cost of a unit of food?
- b. What is this **country's** opportunity cost of a unit of clothing?

units of clothing
units of food

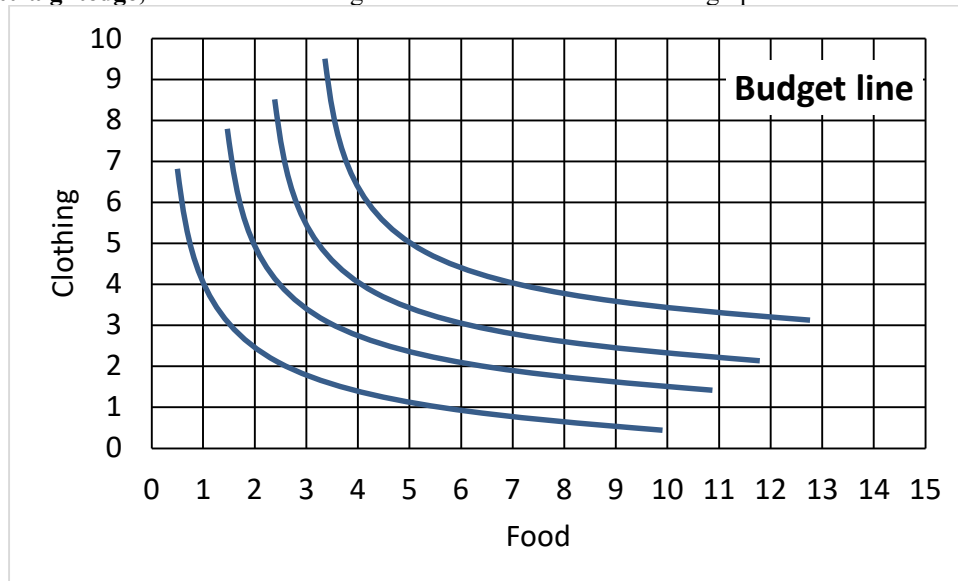
Assume this country's economy is in competitive equilibrium in all markets and the price of a unit of food is \$2.

- c. What must be the price of a unit of clothing?

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Caitlin is a consumer in this economy. She has an income of \$30.

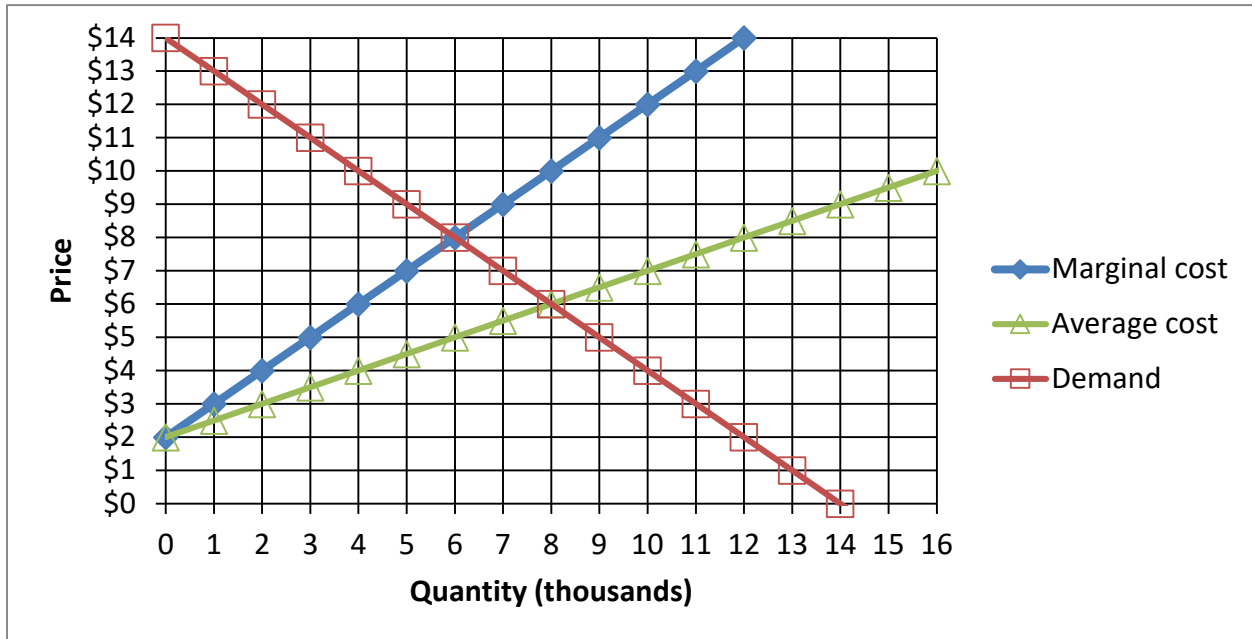
- d. **Using a straightedge**, draw Caitlin's budget line in the indifference-curve graph below.



- e. What is **Caitlin's** opportunity cost of a unit of food?
- f. What is **Caitlin's** opportunity cost of a unit of clothing?
- g. How many units of clothing will Caitlin choose to purchase?
- h. At **Caitlin's** chosen bundle, what is her marginal rate of substitution—that is, the $|\text{slope}|$ of her indifference curve? (Give a number.)

units of clothing
units of food
units of clothing

(3) [Monopoly: 12 pts] Crash Bang Roller Rink is the only roller rink in town, so it enjoys a local monopoly. Its marginal cost, average cost, and demand curves are shown below.



Assume that the roller rink must charge the same price on every admission sold.

- Using a straightedge, draw and label the roller rink's marginal revenue curve.
- Compute the roller rink's profit-maximizing quantity.
- Compute the price that the roller rink would charge.
- Compute the roller rink's profits.
- Compute consumer surplus.
- Compute the social deadweight loss from the roller rink's monopoly pricing.

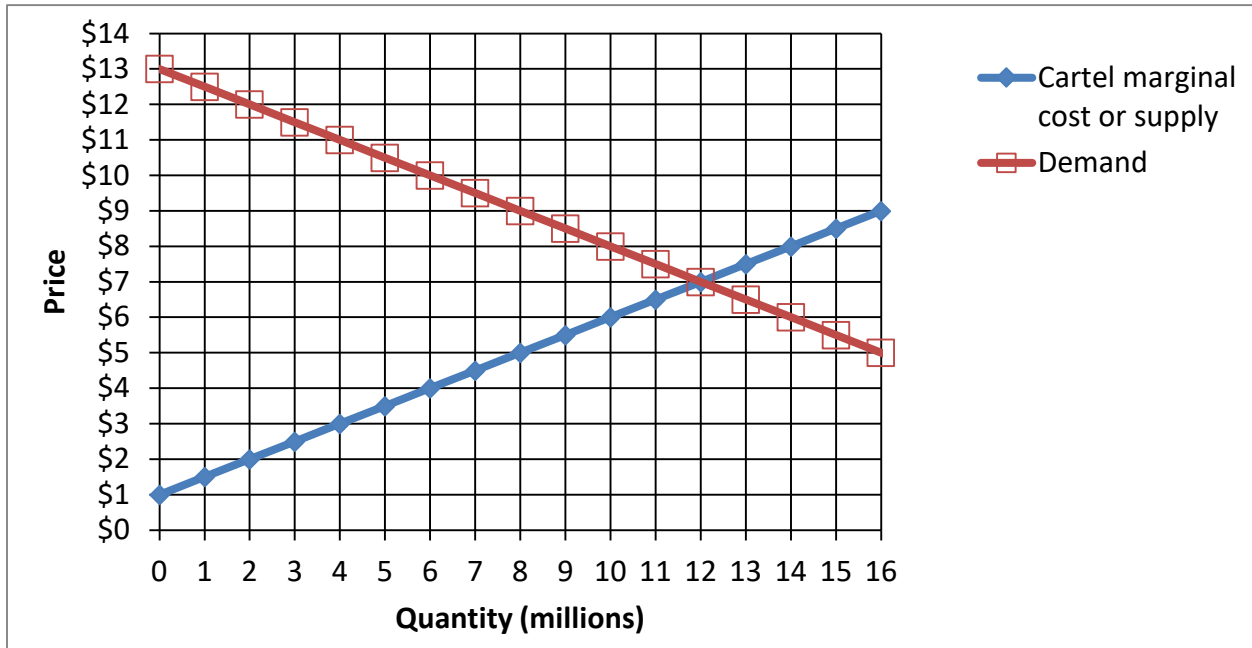
	thousand
\$	
\$	thousand
\$	thousand
\$	thousand

(4) [Monopoly price discrimination: 6 pts] Suppose the Nutcracker Ballet sells tickets to both children and adults. The Ballet's manager believes the elasticity of demand by children is -7 , and the elasticity of demand by adults is -3 . Assume the Ballet's marginal cost of providing a ticket is $\$12$.

- To maximize profit, which group should get the **lower** price?
- Compute the profit-maximizing ticket price for children.
- Compute the profit-maximizing ticket price for adults.

\$
\$

(5) [Competition versus collusion: 16 pts] Suppose a small group of firms produce citric acid, a food additive. The graph below shows the demand curve and the joint marginal cost or supply curve of the group of firms.



First, assume the firms *compete* with each other, each maximizing its own profit while taking the market price as given.

a. What will be the equilibrium market quantity?

	million
b. If output increased by one more unit at any firm, total costs would increase by how much?	\$
c. What will be the equilibrium market price?	\$

Second, alternatively assume the firms *collude* with each other, setting price jointly as a cartel to maximize the sum of their profits.

d. *Using a straightedge*, draw and label the colluding firms' marginal revenue curve.

e. What total quantity will the firms produce?

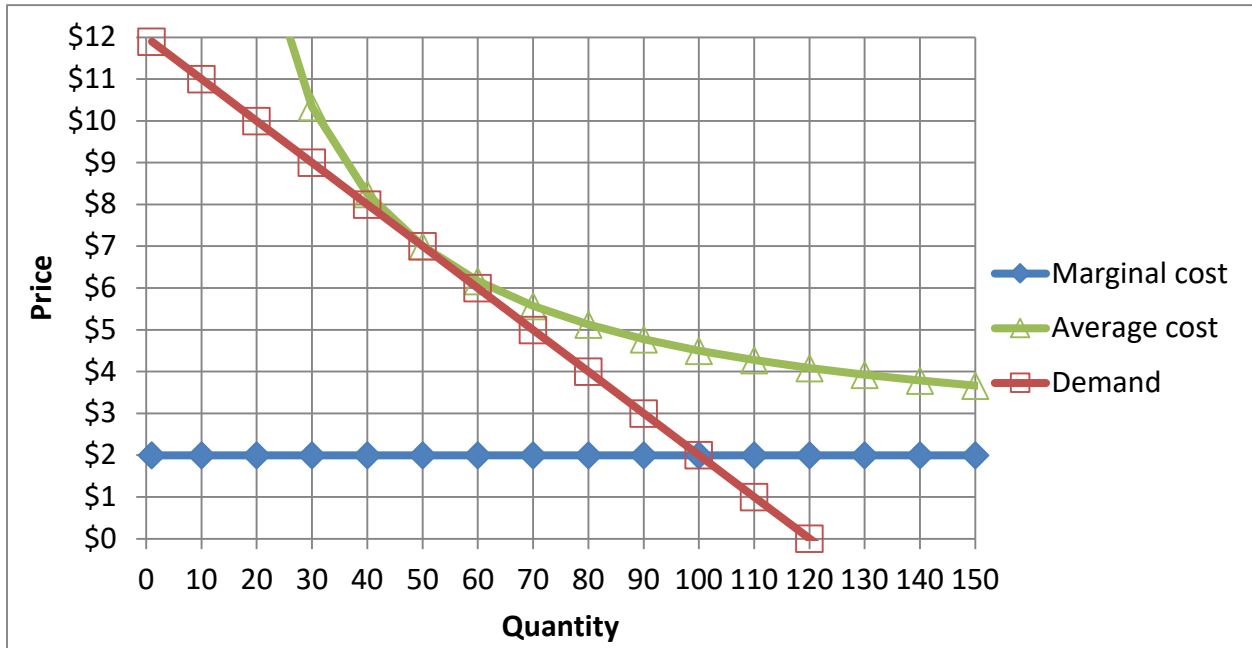
f. If output increased by one more unit at any firm, total costs would increase by how much?

g. What price will the firms jointly set?

h. Compute the social deadweight loss from collusion.

	million
	\$
	\$
	\$ million

(6) [Monopolistic competition: 18 pts] Katrina sells ice cream cones from a stand in the park. The graph below shows her cost curves and demand curve.



a. Although there are other ice cream stands in the park, Katrina’s demand curve slopes down. Does that indicate that consumers view ice cream from different stands as *perfect substitutes* or *differentiated products*?

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First suppose that Katrina sets a price of \$4, for some unknown reason.

- b. How many ice cream cones will Katrina sell?
- c. Will Katrina make a *profit* or a *loss* ?
- d. How much?

ice cream cones
\$

Now suppose that Katrina sets a price to maximize her profit.

- e. *Using a straightedge*, draw and label Katrina’s marginal revenue curve.
- f. How many ice cream cones will Katrina sell?
- g. What price will Katrina set?
- h. What is Katrina’s marginal cost?
- i. What is Katrina’s profit?

ice cream cones
\$
\$
\$

III. Critical thinking: Write a one-paragraph essay answering *one* question below (your choice). [4 pts]

- (1) Suppose a Christmas tree stand sells 20 trees per hour if it sets a price of \$50, but it sells 21 trees per hour if it sets a price of \$49. Compute the marginal revenue of the 21st tree. Show your work and circle your final answer.
- (2) Which company is more likely to price its products above marginal cost—Microsoft or Dell Computer? Why?

Please circle the question you are answering. Write your answer below. Full credit requires correct economic reasoning, legible writing, good grammar including complete sentences, and accurate spelling.

[end of exam]