

**EXAMINATION 4 VERSION A**  
**“Perfect and Imperfect Competition”**  
**November 26, 2018**

INSTRUCTIONS: This exam is closed-book, closed-notes. Simple calculators are permitted, but graphing calculators, calculators with alphabetical keyboards, wireless devices and mobile phones 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, 8 pts total]

(1) A firm that takes price as given believes its marginal revenue from selling one more unit will be

- greater than the price of that unit.
- equal to the price of that unit.
- less than the price of that unit.
- equal to zero.

(2) Suppose the marginal cost producing of a car is \$10,000 but the marginal benefit to consumers of another car is \$15,000. Then producing one more car will

- decrease total surplus by \$15,000.
- decrease total surplus by \$10,000.
- decrease total surplus by \$5,000.
- increase total surplus by \$15,000.
- increase total surplus by \$10,000.
- increase total surplus by \$5,000.
- have no effect on total surplus.

(3) Suppose that for some reason, at current levels of output, Firm A's marginal cost is \$4 and Firm B's marginal cost is \$10. If one unit of output is shifted from Firm A to Firm B, then total industry costs will

- increase by \$4.
- increase by \$6.
- remain unchanged.
- decrease by \$4.
- decrease by \$6.

(4) An industry is a natural monopoly if

- the industry became a monopoly without government interference.
- the only seller in the market sells a natural or "green" product.
- one firm owns all the key natural resources required to produce the product.
- a firm's average cost is negatively related to its quantity.

(5) Suppose a car dealer with market power is selling five cars per day at \$10,000 each. If it cuts the price to \$9,000, it can sell one more car (that is, six cars per day). Marginal revenue for the sixth car is thus

- \$10,000.
- \$9,000.
- \$5,000.
- \$4,000.

(6) Economists are opposed to monopolies because monopolies

- 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.
- make people buy things that people don't really want.
- advertise too much.
- All of the above.

(7) A cartel must face the problem that each member firm will want to cheat on the cartel agreement by

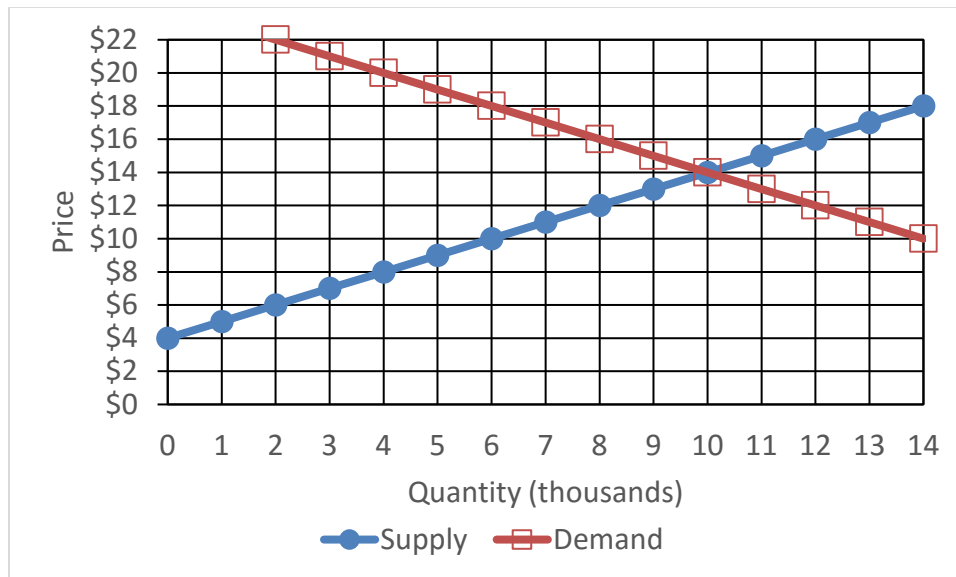
- producing less than its quota of output.
- raising its price higher than the cartel's agreed price.
- increasing output beyond its quota.
- none of the above.

(8) Entry into the ethnic restaurant business is practically free, but each restaurant's cuisine is somewhat unique. Therefore, a sensible economic model for ethnic restaurants is

- monopoly.
- joint-profit-maximizing cartel.
- monopolistic competition.
- perfect competition.

**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: 12 pts] The following graph shows the market for basketballs.



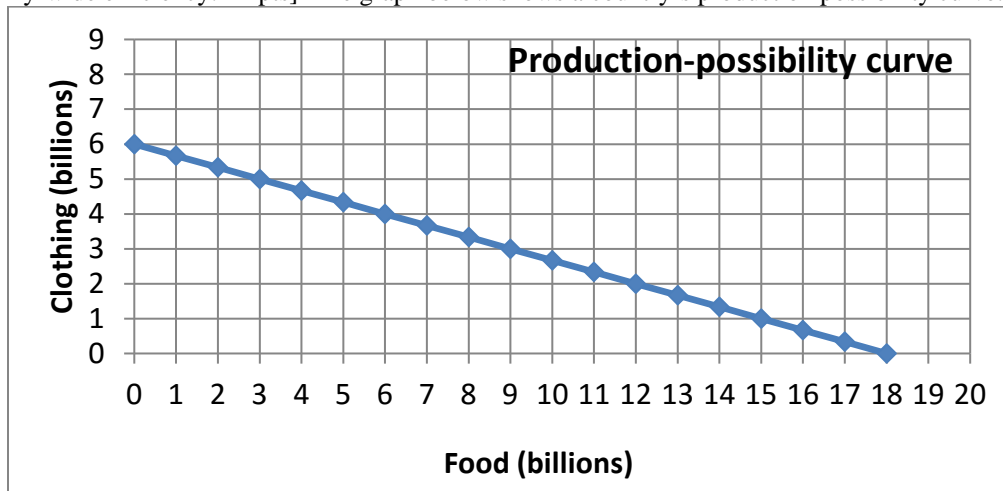
Suppose only 4 thousand basketballs were being produced for some unknown reason.

- |   |    |
|---|----|
| a. How much would consumers be willing to pay for a 4001st basketball?                                  | \$ |
| b. By how much would the basketball industry's total costs increase from producing a 4001st basketball? | \$ |
| c. By how much would total social surplus increase from producing a 4001st basketball?                  | \$ |

Alternatively, suppose the market for basketballs is in competitive equilibrium at 10 thousand basketballs.

- |   |    |
|---|----|
| d. How much were consumers willing to pay for the 10,000th basketball?                                | \$ |
| e. How much did the basketball industry's total cost increase from producing the 10,000th basketball? | \$ |
| f. By how much would total social surplus increase from producing a 10,001st basketball?              | \$ |

(2) [Economy-wide efficiency: 14 pts] The graph below shows a country's production possibility curve.



- 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

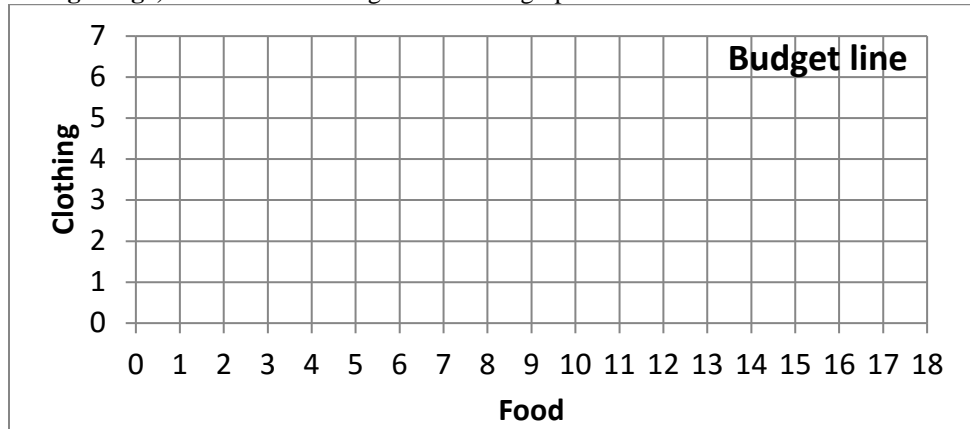
Assume this country's economy is in competitive equilibrium in all markets and the price of a unit of food is \$5.

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

\$
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Ariana is a consumer in this economy. She has an income of \$60.

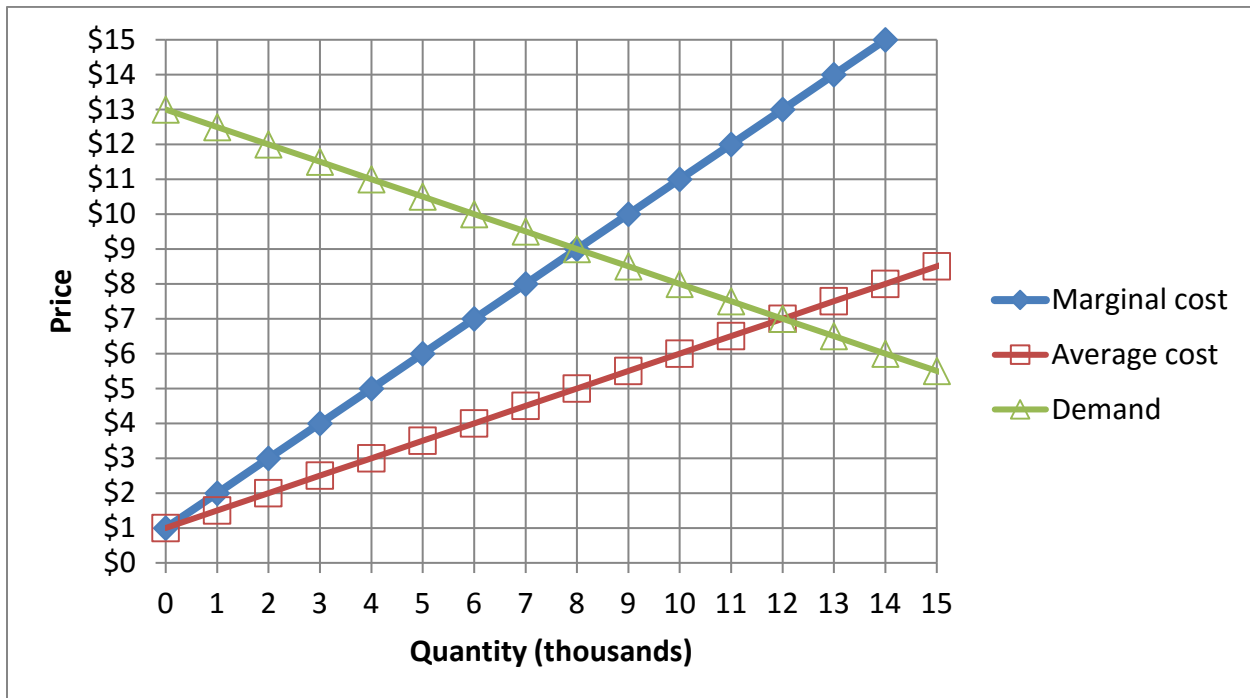
- d. **Using a straightedge**, draw Ariana's budget line in the graph below.



- e. What is **Ariana's** opportunity cost of a unit of food?
- f. What is **Ariana's** opportunity cost of a unit of clothing?
- g. Sketch an indifference curve tangent to Ariana's budget line. What is the slope of that indifference curve (that is, Ariana's marginal rate of substitution) at the tangency point?

units of clothing
units of food

(3) [Monopoly, price discrimination: 22 pts] Suppose an ice rink is the only one in town, so it enjoys monopoly power. The graph below shows the ice rink's monthly demand, marginal cost, and average cost curves.



First, suppose the ice rink must charge the same admission price to everyone.

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

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

Second, suppose the ice rink can somehow charge a different admission price to each person, equal to the maximum price that person is willing to pay. In other words, suppose *perfect price discrimination* is possible.

- Compute the ice rink's profit-maximizing quantity.
- Compute the ice rink's revenue.
- Compute the ice rink's profit.
- Compute consumer surplus.
- Compute the social deadweight loss from this pricing scheme.

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

(4) [Monopoly price discrimination: 4 pts] Suppose the Nutcracker ballet sells tickets to both children and adults. The ballet believes the elasticity of demand by children is  $-6$ , and the elasticity of demand by adults is  $-2$ . Assume the ballet's marginal cost of a ticket is \$15.

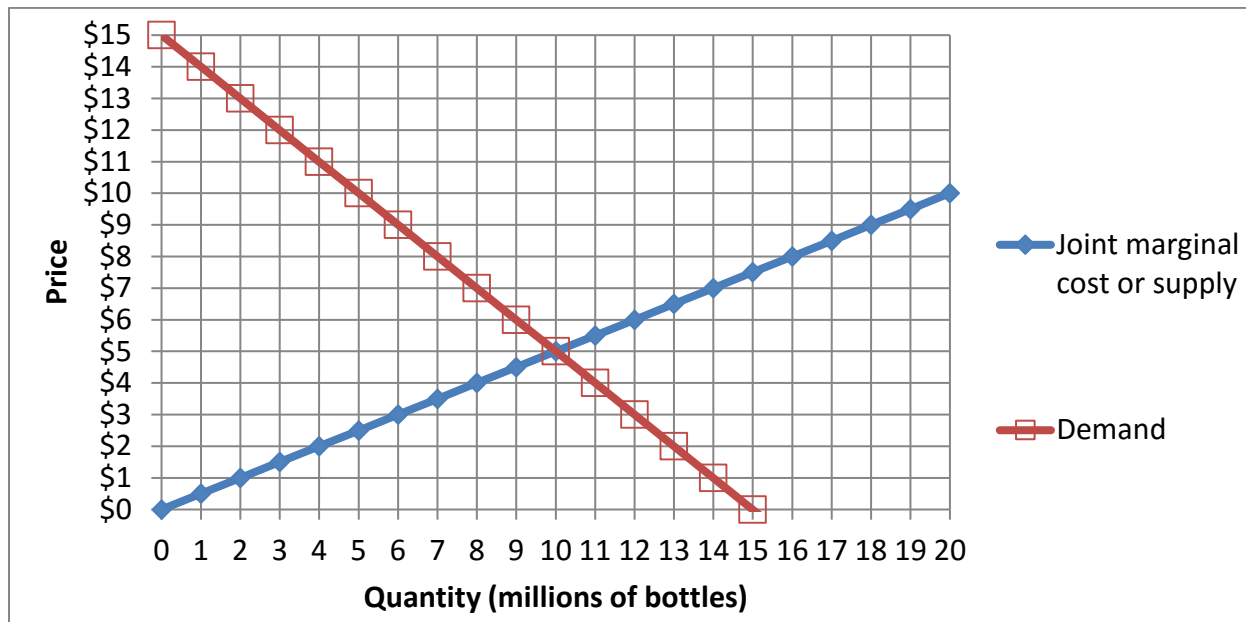
a. Compute the profit-maximizing ticket price for children.

\$
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b. Compute the profit-maximizing ticket price for adults.

\$
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(5) [Competition versus collusion: 16 pts] Suppose a small group of firms produce vitamins. The graph below shows the demand curve for vitamins, 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
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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?

\$
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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?

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

\$
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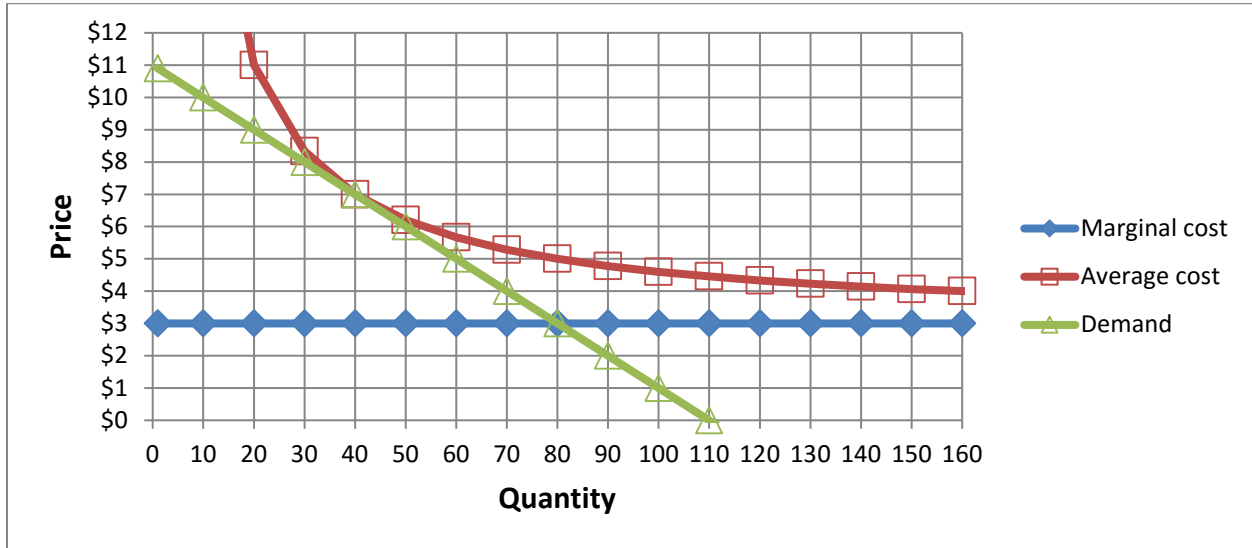
g. What price will the firms jointly set?

\$
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h. Compute the deadweight loss from collusion.

\$	million
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(6) [Monopolistic competition: 20 pts] Ben sells sandwiches from a food truck downtown. The graph below shows his cost curves and demand curve.



a. Although there are other food trucks downtown, Ben's demand curve slopes down. Does that indicate that consumers view sandwiches from different food trucks as *perfect substitutes* or *differentiated products*?

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First suppose that Ben sets a price of \$3, for some unknown reason.

b. How many sandwiches will he sell?

sandwiches
\$

c. Will Ben make a *profit* or a *loss* ?

d. How much?

Now suppose that Ben sets a price to maximize his profit.

e. *Using a straightedge*, draw and label Ben's marginal revenue curve.

f. How many sandwiches will Ben sell?

g. What price will Ben set?

h. What is Ben's marginal cost?

i. What is Ben's average cost?

sandwiches
\$
\$
\$

j. Ben clearly has market power because his demand curve slopes down. So why does he have zero economic profit, unlike a monopolist? Give the most plausible explanation.

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

- (1) Give three situations we have studied where the price paid by consumers does NOT equal the marginal cost of production. For each situation, indicate (a) whether the consumers' price is *greater* than or *less* than marginal cost, and (b) whether *too much* is produced or *too little*, compared to the economically-efficient outcome.
- (2) Which firm is more likely to have market power—a grocery store in a big city or a grocery store in a small town? 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]