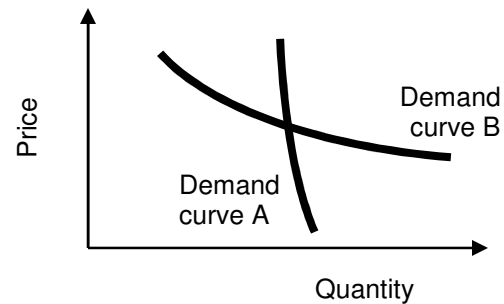


FINAL EXAMINATION VERSION B
May 2012

INSTRUCTIONS: This exam is closed-book, closed-notes. Simple calculators are permitted, but graphing calculators or calculators with alphabetical keyboards are NOT permitted. Cell phones or other wireless devices are NOT permitted. Point values for each question are noted in brackets. Points will be subtracted for illegible writing or incorrect rounding. Maximum total points are 200.

I. Multiple choice: Circle the one best answer to each question. [1 pt each, 22 pts total]

- (1) In economics, *rational behavior* means
- a. making sacrifices today for a better future.
 - b. maximizing one's income.
 - c. using math to make decisions.
 - d. ignoring "soft" concerns like friendships and charity.
 - e. doing the best one can with what one has.
- (2) "If the gasoline tax is raised, people will use less gasoline" is an example of
- a. a positive statement.
 - b. a normative statement.
 - c. both of the above.
 - d. none of the above.
- (3) The *law of one price* means that
- a. each buyer will pay only once for a good.
 - b. all buyers will pay roughly the same price.
 - c. the prices of different goods—like cell phones and bicycles—will gradually converge to each other.
 - d. each buyer will pay her or his own price.
- (4) Which demand curve below is *less* elastic?
- a. Demand curve A.
 - b. Demand curve B.
 - c. Both have the same elasticity because they pass through the same point.
 - d. Cannot be determined from information given.



- (5) Some estimates show that rich people spend a slightly *smaller fraction* of their income on clothing than poor people do. If this is true, then the income elasticity of demand for clothing must be
- a. negative.
 - b. exactly zero.
 - c. between zero and one.
 - d. exactly one.
 - e. greater than one.
- (6) Suppose the price of apples in Des Moines is \$1.50 per pound and the cost of shipping apples between Des Moines and Milwaukee is \$0.40 per pound. Markets are *out of equilibrium* if the price of apples in Milwaukee is
- a. \$1.00 per pound.
 - b. \$1.40 per pound.
 - c. \$1.50 per pound.
 - d. \$1.80 per pound.

(7) Suppose the supply of silver is plentiful today but is expected to be very scarce in the future. Speculation through buying and holding inventories will tend to

- lower the price of silver today and raise it in the future.
- raise the price of silver today and in the future.
- lower the price of silver today and in the future.
- raise the price of silver today and lower it in the future.
- have no effect on prices because speculators want a price difference to make money.

(8) A quota on *selling* fireworks would cause the price of fireworks to

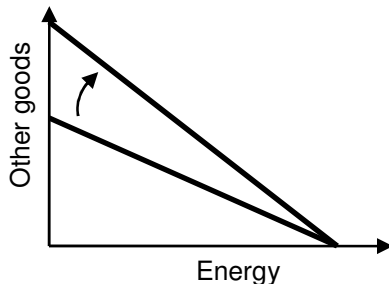
- rise.
- fall.
- rise or fall, depending on the shapes of the demand and supply curves.
- remain constant.

(9) Suppose the price elasticity of demand for hearing aids is -1.0 and the price elasticity of supply is 5.0. If the government offers a subsidy for hearing aids,

- Sellers and buyers each enjoy half of the benefit.
- Sellers will enjoy most of the benefit.
- Buyers will enjoy most of the benefit.
- Answer depends on which side is legally designated to receive the subsidy check from the government.

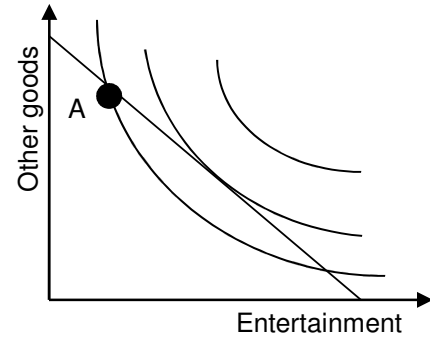
(10) In the graph below, the rotation of the budget line could be caused by

- an increase in income.
- a decrease in income.
- an increase in the price of energy.
- a decrease in the price of energy.
- an increase in the price of other goods.
- a decrease in the price of other goods.



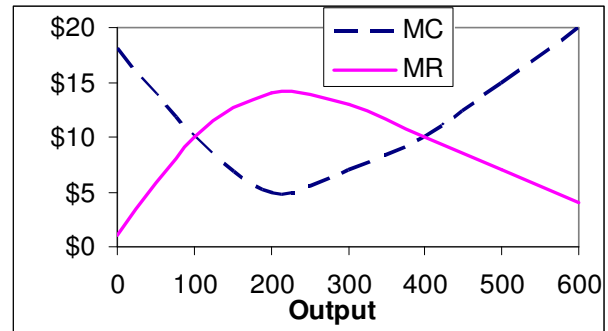
(11) Carl's indifference-curve diagram is shown below. The straight line represents Carl's budget line and the curved lines represent his indifference curves. If Carl is currently at point A, he could be made better off without exceeding his budget by

- buying more other goods and less entertainment.
- buying more entertainment and fewer other goods.
- either (a) or (b).
- Carl cannot be made better off by changing his purchases.



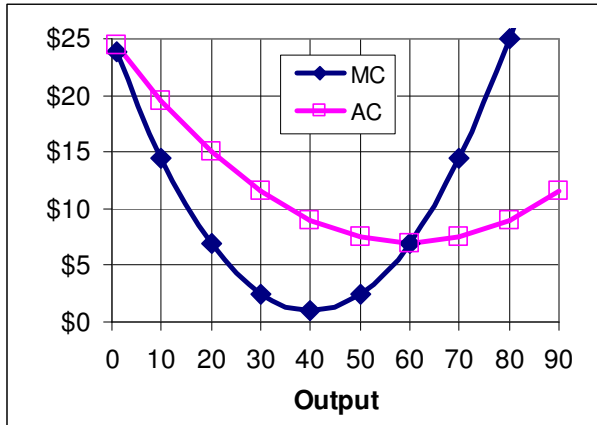
(12) Consider the graph below of a firm's marginal cost (MC) and marginal revenue (MR) curves. Suppose this firm is currently producing 400 units of output. It can increase its profit by

- increasing its output level.
- decreasing its output level.
- increasing or decreasing its output level.
- It cannot increase its profit by changing its output level.



(13) ABC Company is a small firm in a big market and therefore takes the market price as given. Its marginal cost (MC) and average cost (AC) curves are shown below. To maximize profit, ABC Company should set its output at

- 20 units.
- 40 units.
- 60 units.
- 80 units.
- Cannot be determined without knowing market price.



(14) Price equals average cost in a competitive industry in long-run equilibrium because

- business owners have a sense of fairness.
- individual firms adjust their output levels using the rule "price equals average cost" to maximize profit.
- consumers refuse to pay more than what is reasonable.
- positive profits encourage entry of new firms while negative profits encourage existing firms to leave the industry.
- the threat of government regulation causes firms to hold prices down.

(15) Suppose there is a change in government policy affecting the automobile industry. Which of the following outcomes would be a *Pareto improvement*?

- Producers gain \$10 billion while consumers gain \$20 billion.
- Producers gain \$10 billion while consumers lose \$20 billion.
- Producers gain \$20 billion while consumers lose \$10 billion.
- Both (a) and (c).
- All of the above.

(16) Suppose that for some reason, at current levels of output, Firm A's marginal cost is \$10 and Firm B's marginal cost is \$4. 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.

(17) Suppose a sandwich stand sells 10 sandwiches per hour if the price is \$5, and sells 11 sandwiches if the price is lowered to \$4.75. The stand's marginal revenue of the 11th sandwich is therefore

- \$0.25 .
- \$2.25 .
- \$2.50 .
- \$4.75 .
- \$5.00 .
- \$10.00 .

(18) A monopolist always sets price

- above marginal cost.
- below marginal cost.
- equal to marginal cost.
- cannot be determined from the information given.

(19) Economists are opposed to monopolies because they

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

(20) Products are said to be "differentiated" if

- one can buy them in fractional amounts.
- consumers do not view them as perfect substitutes.
- they are sold through different retail channels (stores, online, catalogs, etc.)
- different consumers buy different quantities of them.

(21) A factory near creates a loud, unpleasant noise from its production activities that can be heard by neighbors up to a half-mile away. The factory's noise thus creates

- a. an external benefit.
- b. an external cost.
- c. a common property resource.
- d. an inferior good.

(22) A large city park is spacious and never crowded, so one person using the park does not interfere with others using it. Moreover, the city has no easy way to charge admission to the park. Therefore the park is

- a. a rival good.
- b. an excludable good.
- c. both of the above.
- d. none of the above.

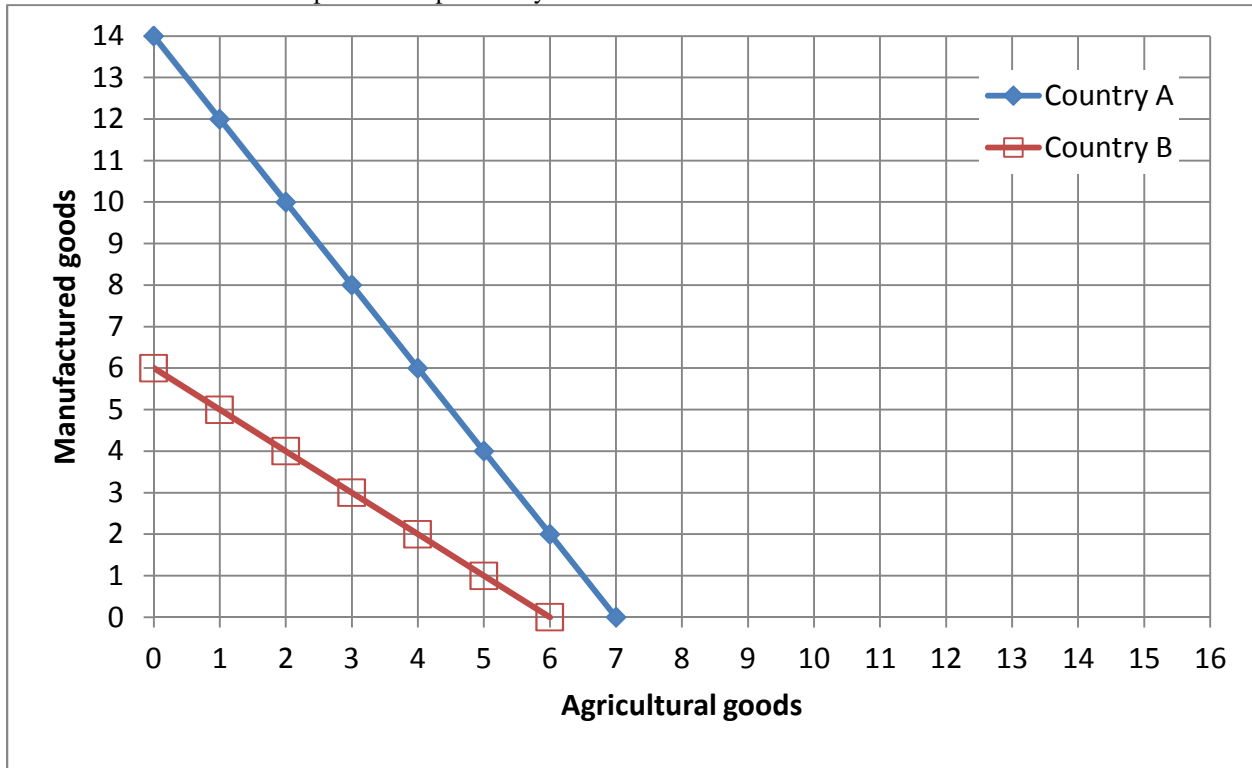
II. Problems: Insert your answer to each question in the box provided. Use margins and graphs for scratch work. Only the answers in the boxes will be graded. Work carefully—partial credit is not normally given for questions in this section.

(1) [Production functions: 7 pts] A work crew plows parking lots. Complete the table by computing the work crew's average product and marginal product and placing your answers in the unshaded cells of the third and fourth columns below. Then answer the question below.

<i>Number of workers</i>	<i>Number of parking lots plowed</i>	<i>Average Product</i>	<i>Marginal Product</i>
0 workers	0 parking lots		
			parking lots per worker
4 workers	20 parking lots	parking lots per worker	
			parking lots per worker
8 workers	32 parking lots	parking lots per worker	
			parking lots per worker
12 workers	36 parking lots	parking lots per worker	

Is the work crew's production function characterized by *diminishing returns* to their labor input? Answer "yes" or "no."

(2) [Comparative advantage, gains from trade: 17 pts] Country A and Country B each produce manufactured goods and agricultural goods. They each face a tradeoff between these two products because their workforces and other resources are limited. Their production possibility curves are shown below.



- [2 pts] What is Country A's opportunity cost of a unit of manufactured goods?
- [2 pts] What is Country B's opportunity cost of a unit of manufactured goods?
- [2 pts] What is Country A's opportunity cost of a unit of agricultural goods?
- [2 pts] What is Country B's opportunity cost of a unit of agricultural goods?
- [2 pts] Which country has a comparative advantage in producing manufactured goods?
- [2 pts] Which country has a comparative advantage in producing agricultural goods?
- [3 pts] Fill in the blanks: *Both* countries can consume combinations of manufactured goods and agricultural

	units of agricultural goods
	units of agricultural goods
	units of manufactured goods
	units of manufactured goods

goods *outside* their individual production possibility curves if _____ produces and

exports **three** units of manufactured goods for _____, which produces

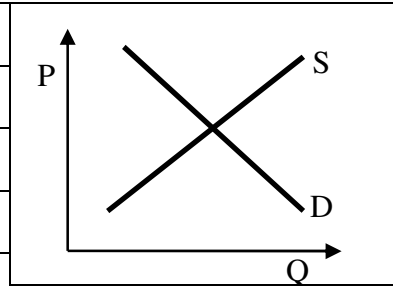
_____ units of agricultural goods in return.

- [2 pts] **Plot** the trade that you propose in part (g) on the graph above. For each producer, plot the starting point representing **production before trade**, and the ending point representing **consumption after trade**.

(3) [Shifts in demand and supply: 15 pts] Analyze each of the following markets according to the accompanying imaginary scenario.

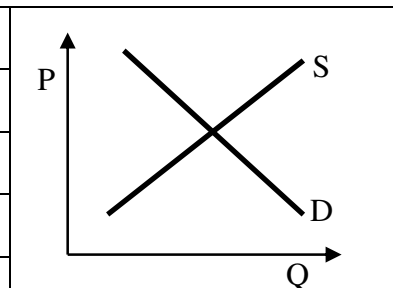
a. Consider the market for **pizza**. Suppose the price of mozzarella cheese (an important ingredient in pizza) rises.

- Does demand shift *left*, shift *right*, or remain *unchanged* ?
- Does supply shift *left*, shift *right*, or remain *unchanged* ?
- Does the equilibrium price *increase*, *decrease*, or *cannot be determined* ?
- Does the equilibrium quantity *increase*, *decrease*, or *cannot be determined* ?
- Sketch a graph of this scenario at right, showing which curve(s) shift(s).



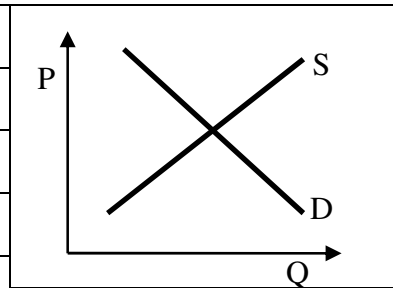
b. Consider the market for **Brussels sprouts**. Suppose a new government study is published, showing that eating Brussels sprouts every day can prevent cancer.

- Does demand shift *left*, shift *right*, or remain *unchanged* ?
- Does supply shift *left*, shift *right*, or remain *unchanged* ?
- Does the equilibrium price *increase*, *decrease*, or *cannot be determined* ?
- Does the equilibrium quantity *increase*, *decrease*, or *cannot be determined* ?
- Sketch a graph of this scenario at right, showing which curve(s) shift(s).

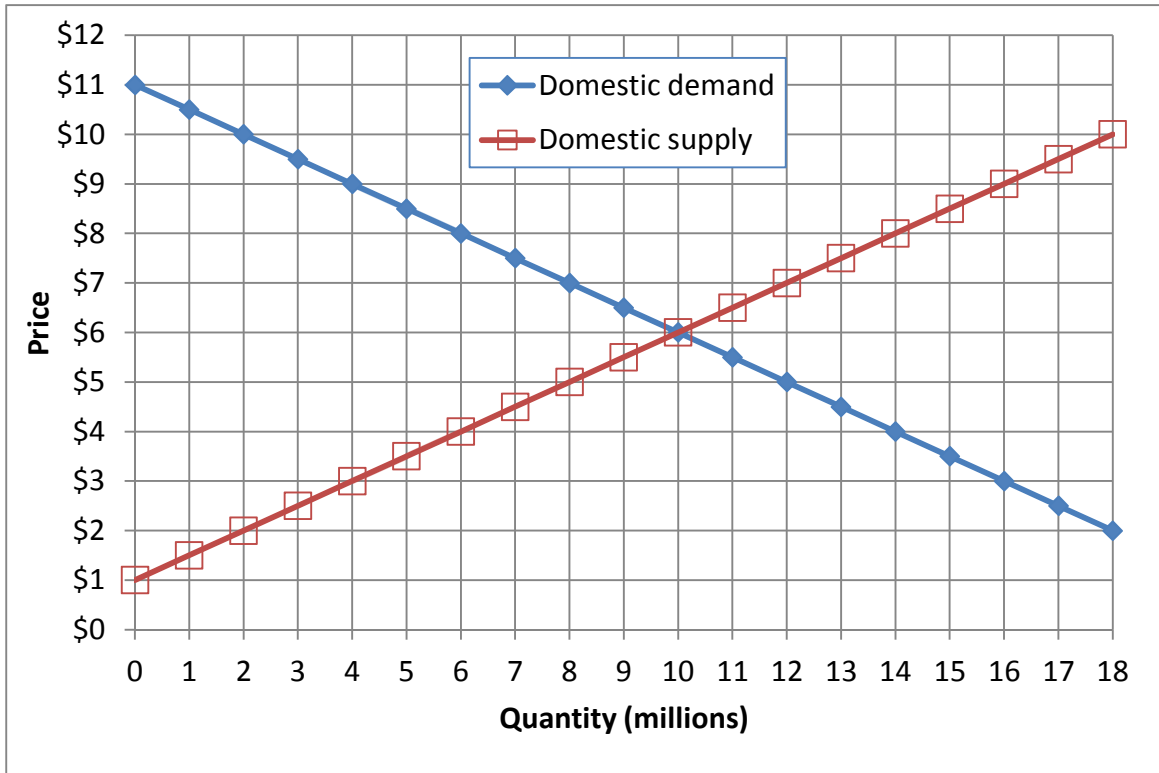


c. Consider the market for **airline tickets**. Suppose the price of jet fuel rises. At the same time, a recovery raises consumers' incomes.

- Does demand shift *left*, shift *right*, or remain *unchanged* ?
- Does supply shift *left*, shift *right*, or remain *unchanged* ?
- Does the equilibrium price *increase*, *decrease*, or *cannot be determined* ?
- Does the equilibrium quantity *increase*, *decrease*, or *cannot be determined* ?
- Sketch a graph of this scenario at right, showing which curve(s) shift(s).



(7) [Welfare effects of international trade: 18 pts] Domestic supply and demand for sweatshirts in a particular country are given by the following diagram.



a. At first, international trade in sweatshirts is not permitted. Find the equilibrium price without international trade.

\$	
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Then this industry is opened to international trade and the international price of sweatshirts turns out to be \$9.

b. Will this country now *export* or *import* sweatshirts?

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c. How many?

	million
--	---------

d. Does consumer surplus in this country *increase* or *decrease* from international trade in sweatshirts?

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e. By how much?

\$		million
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f. Does producer surplus in this country *increase* or *decrease* from international trade in sweatshirts?

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g. By how much?

\$		million
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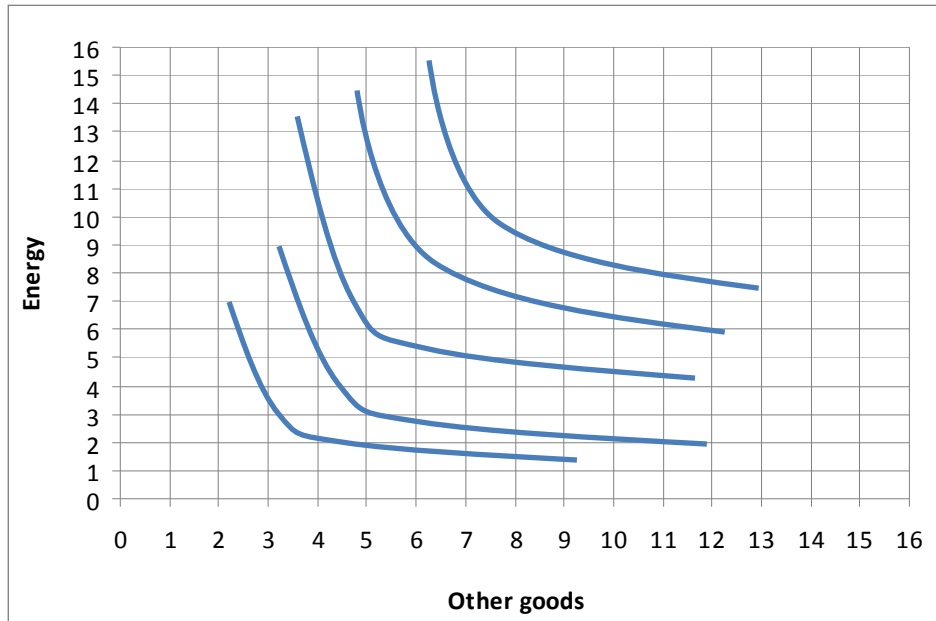
h. Does total social welfare in this country *increase* or *decrease* from international trade in sweatshirts?

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i. By how much?

\$		million
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(8) [Consumer choice and demand: 16 pts] The indifference curves in the graph below represent Eric’s preferences for energy and other goods.



- a. Would Eric rather have 6 units of energy and 5 units of other goods, or 2 units of energy and 11 units of other goods?
- b. Would Eric rather have 9 units of energy and 6 units of other goods, or 11 units of energy and 4 units of other goods?

units of energy and	units of other goods
units of energy and	units of other goods

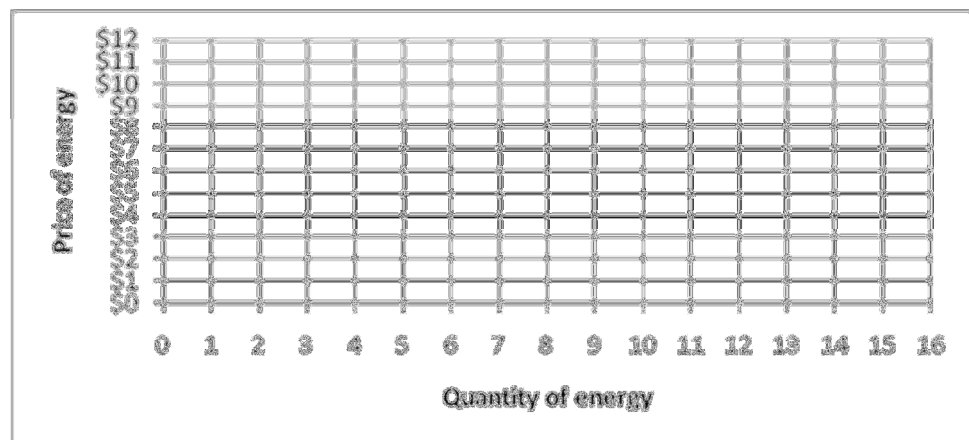
Suppose Eric has a budget of \$80 to spend on energy and other goods. The price of other goods is \$10.

- c. **Using a straightedge**, carefully draw Eric’s budget line when the price of energy is \$5. Label this budget line “A”.
- d. How much energy will Eric buy if the price of energy is \$5?
- e. **Using a straightedge**, carefully draw Eric’s budget line when the price of energy is \$10. Label this budget line “B”.
- f. How much energy will Eric buy if the price of energy is \$10?

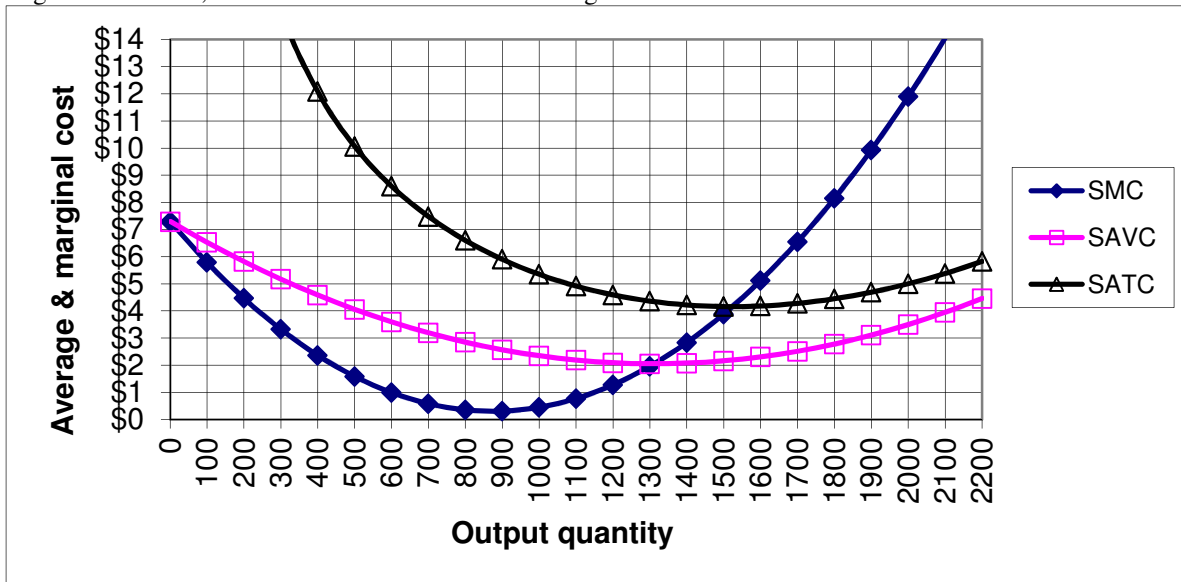
	units of energy
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	units of energy
--	--------------------

- g. Plot two points on Eric’s demand curve for energy, and sketch his demand curve at right.



(9) [Short-run cost curves and supply: 24 pts] Micro Technologies Company makes computer parts. It is a small company in a big market, and therefore takes its output price as given. In the short run, the company faces daily cost curves as shown in the following diagram. Here, SMC denotes short-run marginal cost, SAVC denotes short-run average variable cost, and SATC denotes short-run average total cost.



Suppose the company were currently producing 500 parts for some unknown reason.

a. Compute the company's short-run total cost, to the nearest thousand dollars.

\$	thousand
\$	thousand
\$	thousand

b. Compute the company's short-run variable cost, to the nearest thousand dollars.

\$	thousand
----	----------

c. Compute the company's short-run fixed cost, to the nearest thousand dollars.

\$	thousand
----	----------

d. Suppose the company were currently producing 1800 parts for some unknown reason. If the company produced one more part, by how much would its total cost increase? That is, what would be the *change in total cost* as the company increased output from 1800 to 1801 parts? (Give an answer to the nearest dollar.)

\$

e. What is the company's break-even price—that is, the lowest price at which the company can avoid losses? (Give an answer to the nearest dollar.)

\$

f. What is the company's shut-down price—that is, the lowest price at which it will remain in operation in the short run? (Give an answer to the nearest dollar.)

\$

g. Suppose the price of parts is \$1. How many parts should the company produce? (Give an answer to the nearest hundred.)

	parts
--	-------

h. Will the company make a *profit* or a *loss* at a price of \$1?

--

i. Suppose the price of parts is \$5. How many parts should the company produce? (Give an answer to the nearest hundred.)

	parts
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j. Will the company make a *profit* or a *loss* at a price of \$5?

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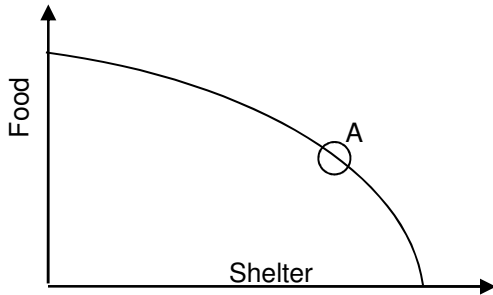
k. Suppose the price of parts is \$3. How many parts should the company produce? (Give an answer to the nearest hundred.)

	parts
--	-------

l. Will the company make a *profit* or a *loss* at a price of \$3?

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(10) [Economy-wide efficiency, PP curves: 10 pts] The graph below shows the production possibility (PP) curve for an economy. Suppose the economy is at point A and the slope of the PP curve at that point is -2 .



- a. Starting from point A, if this economy were to produce 60 more units of shelter, it would have to reduce production of food. By how many units?
- b. Starting from point A, if this economy were to produce 60 more units of food, it would have to reduce production of shelter. By how many units?

	units of food
	units of shelter

Suppose the price of shelter is \$ 20 and the price of food is \$ 5. Clearly, some market in this economy is *not* functioning properly.

- c. What is the slope of every consumer's budget line, with shelter on the horizontal axis and food on the vertical axis? [Hint: the slope of the consumer's budget line, with shelter on the horizontal axis and food on the vertical axis, equals the *price of shelter divided by the price of food*.]
- d. What must be the marginal rate of substitution of shelter for food for every consumer in this economy? (Give a number.)
- e. Which of the following is true? Choose one. [Hint: First sketch the typical consumer's indifference curve in the graph above.]
 - (i) People in this economy could be made better off if it produced more shelter and less food.
 - (ii) People in this economy could be made better off if it produced less shelter and more food.
 - (iii) This economy is already producing an efficient mix of outputs.

(11) [Monopoly price discrimination: 10 pts] Suppose a movie theatre sells tickets to both students and the general public. The theatre believes the elasticity of demand by students is -9 , and the elasticity of demand by the general public is -2 .

- a. If the price is increased by 2%, what will be the approximate decrease in tickets sold to students?
- b. If the price is increased by 2%, what will be the approximate decrease in tickets sold to the general public?

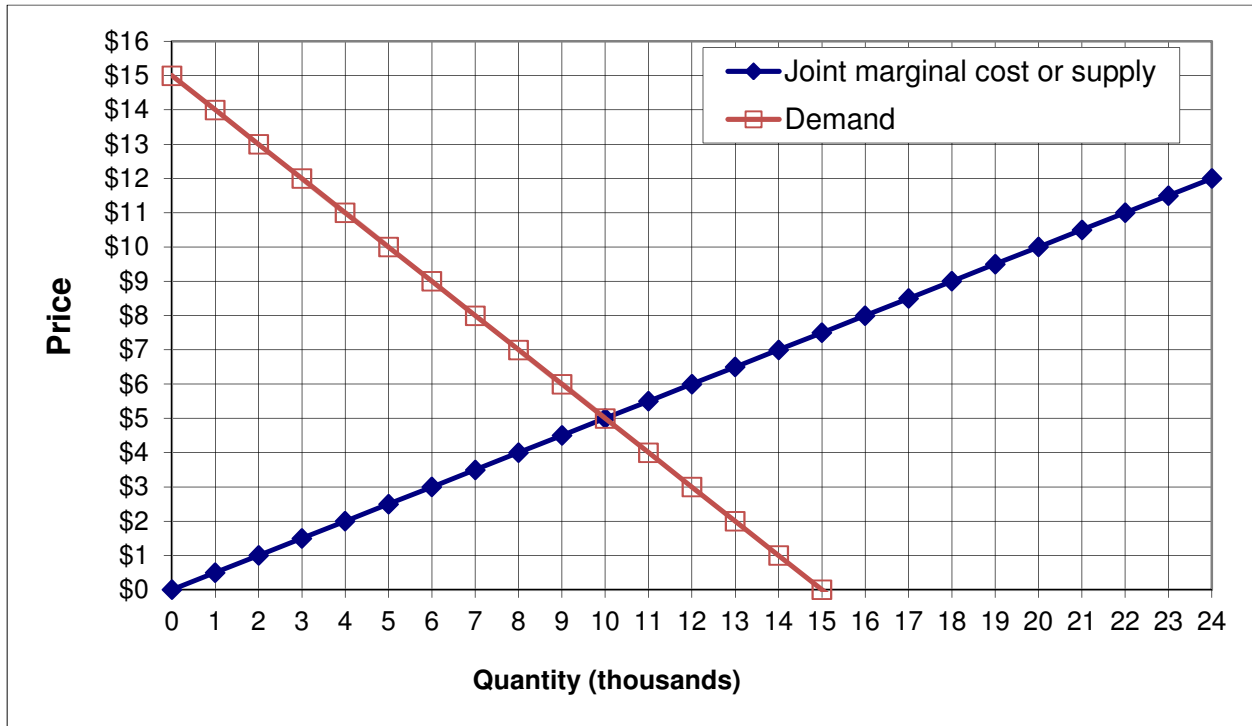
	%
	%

Assume the marginal cost of a seat in the movie theatre is \$ 4.

- c. If the theatre wants to maximize profit, which group will get the higher price?
- d. Compute the profit-maximizing ticket price for students.
- e. Compute the profit-maximizing ticket price for the general public.

	\$
	\$

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

	thousand
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?	\$

Now, 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?

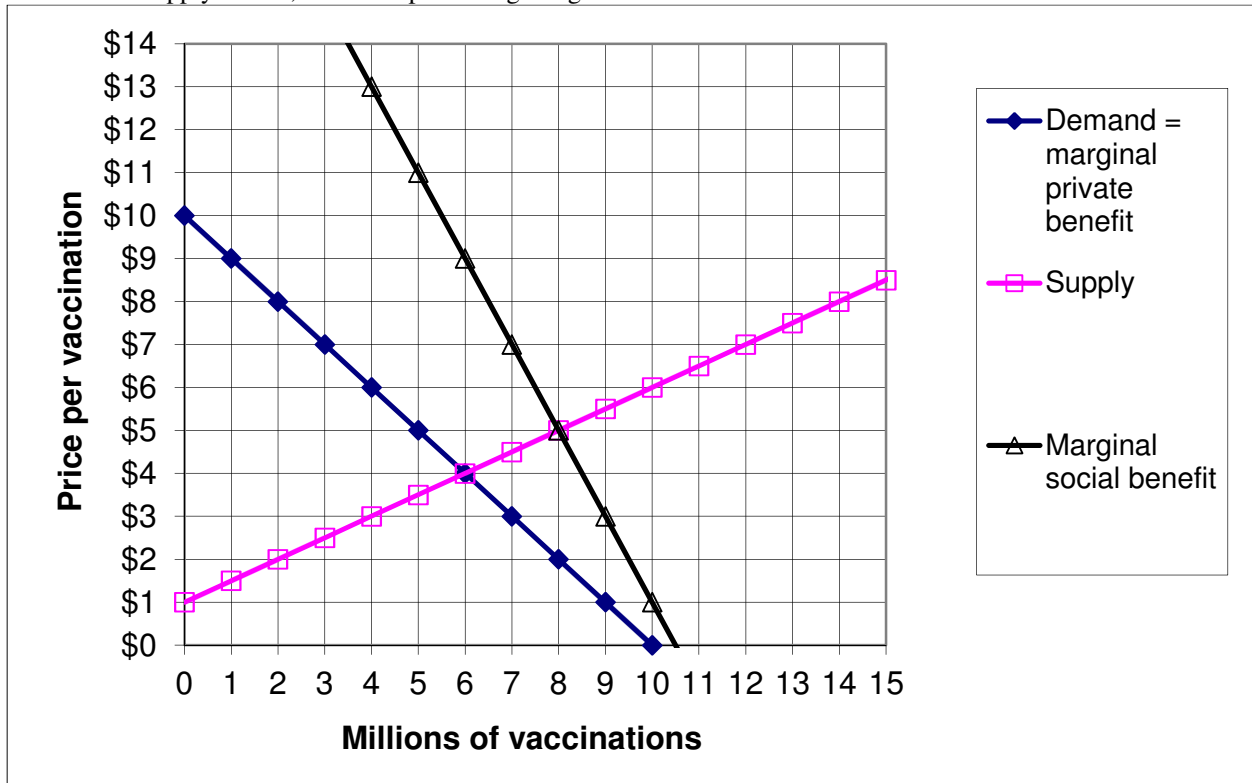
f. If output increased by one more unit at any firm, total costs would increase by how much?

g. What price will the firms jointly set?

h. Compute the deadweight loss from collusion.

	thousand
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 deadweight loss from collusion.	\$ thousand

(13) [Externalities: 12 pts] The graph below shows the market for a particular vaccine. A vaccination protects the purchaser of the vaccine, but also reduces the chances of other people catching the illness. Therefore, in addition to demand and supply curves, a curve representing marginal social benefit is shown.



- Compute the (unregulated) competitive equilibrium price.
- Compute the (unregulated) competitive equilibrium quantity.
- Compute the economically efficient (or socially optimal) quantity.
- Compute the deadweight loss from unregulated competition.
- To eliminate this deadweight loss, should the government impose a *tax* or a *subsidy*?
- What should be the tax rate or subsidy rate?

\$	
	million
	million
\$	million
\$	per vaccination

(14) [Nonrival goods: 4 pts] A village government will offer a free outdoor movie series during the summer in a neighborhood park. About **500** people are likely to enjoy the movies. Each movie costs **\$1000** to show. Let Q denote the number of movies. A typical individual person's marginal benefit from the movie series is given by the following expression (or formula): $MB = 8 - Q$.

- Give an expression (or formula) for the marginal social benefit from the movie series. [Hint: This must be a formula containing one variable: Q .]
- Compute Q^* the socially-optimal number of movies.

$MSB =$
movies

III. Critical thinking: Write a one-paragraph essay answering one question below (your choice). [5 pts]

- (1) Which company is more likely to price its products above marginal cost—Microsoft or Dell Computer? Why?
- (2) You operate a house-painting business in a competitive market, where everyone charges about \$1000 for an average-size house. You know that you can get all the business you can handle if you just put up a few signs. You review your costs last year in order to decide what to do this year. You discover that last year, your average cost per house was about \$800, and your marginal cost per house was about \$1200. So this year, should you expand your business (paint more houses), downsize it (paint fewer houses), or neither (paint the same number of houses)? Justify your answer.

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]