

FINAL EXAMINATION VERSION A

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 200.

I. Multiple choice: Please circle the one best answer to each question. [1 pt each, 27 pts total]

(1) The assumption in economics that people are *rational* implies that people

- a. ignore "soft" concerns like friendships and charity.
- b. do the best they can with what they have.
- c. make sacrifices today for a better future.
- d. maximize their income.
- e. use math to make decisions.

(2) Ana buys a ticket to a concert for \$25. When she arrives at the venue, she discovers that scalpers are willing to pay \$100 for her ticket. Her *opportunity cost* of attending the concert is now

- a. \$25.
- b. \$75.
- c. \$100.
- d. \$125.

(3) Rational choice implies pursuing an activity until the marginal benefit of the last unit

- a. is much greater than its marginal cost.
- b. begins to exceed its marginal cost.
- c. begins to fall below its marginal cost.
- d. is much less than its marginal cost.

(4) Some people believe there is excess demand in the housing market. If they are right, then the price of houses can be expected to

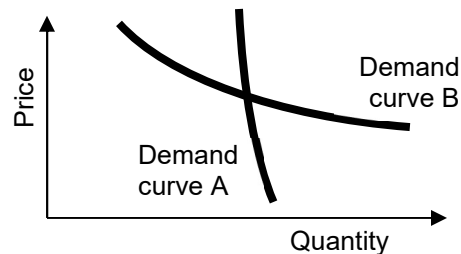
- a. rise.
- b. fall.
- c. remain constant.
- d. Price movements are not related to excess demand.

(5) In spring, the price of winter coats decreases and the quantity sold also decreases. This could be caused by a

- a. rightward shift in the demand for winter coats.
- b. rightward shift in the supply for winter coats.
- c. leftward shift in the demand of winter coats.
- d. leftward shift in the supply of winter coats.

(6) Which demand curve below is *more* 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.



(7) It takes time for consumers to adjust their lifestyles to changes in electricity prices. Therefore, the long-run demand for electricity is

- a. more elastic than the short-run demand.
- b. less elastic than the short-run demand.
- c. just as elastic as the short-run demand.
- d. Elasticity of demand is not related to time for adjustment.

(8) Suppose the price of gold were lower in New York than in Los Angeles, initially. Arbitrage would then *tend to*

- a. raise the price of gold in both cities.
- b. lower the price of gold in both cities.
- c. raise the price of gold in New York and lower the price in Los Angeles.
- d. raise the price of gold in Los Angeles and lower the price in New York.

(9) A quota (or legal maximum quantity) on *buying* ivory would cause its price to

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

(10) Suppose the price elasticity of supply for apartment rentals is 0.3 and the price elasticity of demand is -1.0. If the city imposes a tax on apartment rentals,

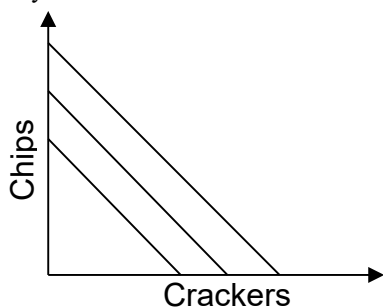
- a. sellers (landlords) will pay most of the tax.
- b. buyers (renters) will pay most of the tax.
- c. sellers and buyers will each pay half of the tax.
- d. Answer depends on which side is legally required to remit the tax to the government.

(11) A change in the number of people who buy organic vegetables is called a change at the

- a. extensive margin.
- b. intensive margin.
- c. marginal product.
- d. marginal revenue.

(12) The indifference-curve graph below shows Beth's preferences. The graph reveals that, for Beth, chips and crackers are

- a. perfect squares.
- b. perfect substitutes.
- c. perfect complements.
- d. perfectly elastic.



(13) A firm's total cost divided by its total output by definition equals the firm's

- a. total revenue.
- b. average revenue.
- c. marginal revenue.
- d. total cost.
- e. average cost.
- f. marginal cost.

(14) The slope of a firm's total revenue curve by definition equals the firm's

- a. total cost.
- b. average cost.
- c. marginal cost.
- d. total revenue.
- e. average revenue.
- f. marginal revenue.

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

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

(16) If consumers view the products of different firms as *perfect substitutes*, they will

- a. flip a coin to decide which brand to buy.
- b. buy some of each.
- c. choose whichever is cheaper.
- d. stay with their current brand, even if it is a little more expensive.

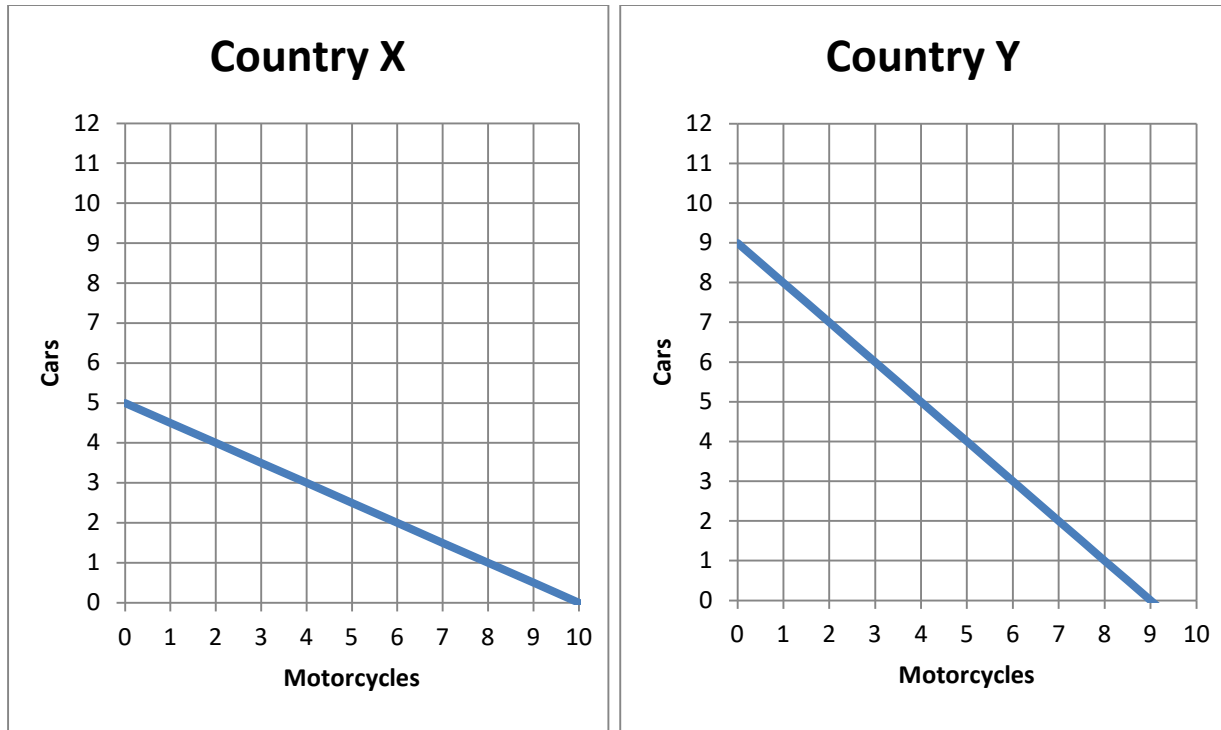
(17) Suppose the price of a calculator is \$6 and the price of a flashdrive is \$2. If the economy is perfectly competitive, then these prices indicate that the *economy's* opportunity cost of a calculator is

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

- (18) A "natural monopoly" is a firm that enjoys
- an exclusive government franchise allowing it alone to sell the product.
 - exclusive ownership of a natural resource essential for producing the product.
 - a downward-sloping average cost curve.
 - patent protection.
- (19) Suppose a hotdog vendor sells 20 hotdogs per hour if the price is \$2, and sells 21 hotdogs if the price is \$1.95. The vendor's marginal revenue of the 21st hotdog is therefore
- \$0.05 .
 - \$0.95 .
 - \$1.00 .
 - \$1.95 .
 - \$2.00 .
 - \$20.00 .
- (20) Cartels are organizations of firms that try to increase their members' profits by
- reducing output.
 - sharing technology.
 - boosting output.
 - increasing advertising.
 - offering discounts and promotional pricing.
- (21) Taco Bell requires you to pay for a burrito before you eat it. Only one person can eat the burrito, of course. So a burrito from Taco Bell is
- a nonrival good.
 - a nonexcludable good.
 - both of the above.
 - none of the above.
- (22) In the western United States, water is scarce. Suppose no one can be prevented from taking water from a particular stream. Unfortunately, if any person takes water, there is less for others. Water from this stream is therefore
- a nonrival good.
 - a nonexcludable good.
 - both of the above.
 - none of the above.
- (23) If one person downloads a particular electronic book, the same e-book can be downloaded by other people. However, everyone who downloads the e-book is forced to pay for it. This e-book is therefore
- a nonrival good.
 - a nonexcludable good.
 - both of the above.
 - none of the above.
- (24) If you watch a solar eclipse, other people can do so at the same time, and no one can make you pay for it. A view of a solar eclipse is therefore
- a nonrival good.
 - a nonexcludable good.
 - both of the above.
 - none of the above.
- (25) When people burn wood in their fireplaces in an urban area, the resulting smoke can cause breathing difficulties for their neighbors with health problems. Burning wood therefore creates
- an external benefit.
 - an external cost.
 - a natural monopoly.
 - an inferior good.
- (26) When my neighbor buys and plants a shade tree, it cools *my* house in the summer. My neighbor buying and planting that tree therefore creates
- an external benefit.
 - an external cost.
 - a common property resource.
 - a superior good.
- (27) Unlike other taxes, a pollution tax
- causes deadweight loss.
 - increases economic efficiency.
 - generates no revenue for the government.
 - affects only producers.

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) [Comparative advantage, gains from trade: 17 pts] Country X and Country Y can each produce cars and motorcycles. They each face a tradeoff between these two products because of limited workforces. Their production possibility curves are shown below.



- What is Country X's opportunity cost of producing a motorcycle?
- What is Country Y's opportunity cost of producing a motorcycle?
- What is Country X's opportunity cost of producing a car?
- What is Country Y's opportunity cost of producing a car?
- Which country has a comparative advantage in producing motorcycles?
- Which country has a comparative advantage in producing cars?

cars
cars
motorcycles
motorcycles

g. [3 pts] Fill in the blanks: *Both* countries can consume combinations of products *outside* their individual production possibility curves if _____ exports *three cars* to _____, which exports _____ motorcycles in return.

h. **Plot** the trade that you propose in part (g) on the graphs above. For each country, plot and label the starting point representing **production before trade**, and the ending point representing **consumption after trade**.

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

a. Consider the market for **sodapop**: Suppose consumers become more interested in avoiding junk food.

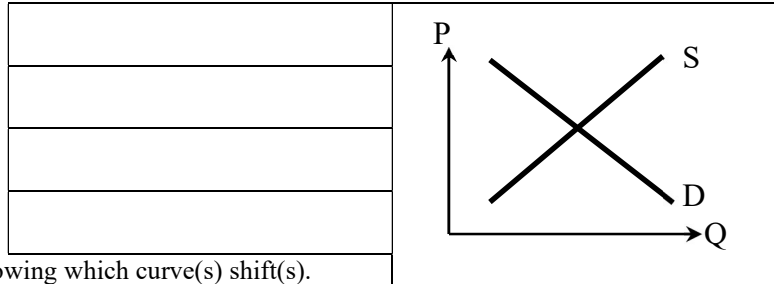
Does demand shift *left*, shift *right*, or remain *unchanged* ?

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 **high-efficiency light bulbs**. Suppose new technology allows these bulbs to be manufactured at much lower cost.

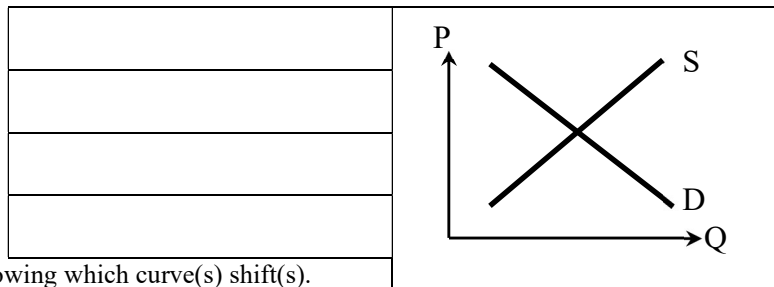
Does demand shift *left*, shift *right*, or remain *unchanged* ?

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 **automobiles**: New technologies lower the cost of making autos. Simultaneously, a boom raises consumers' incomes.

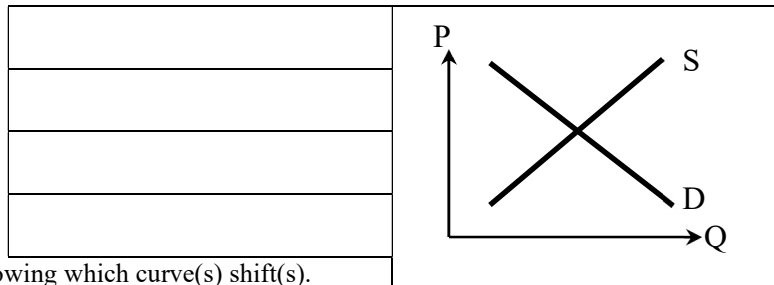
Does demand shift *left*, shift *right*, or remain *unchanged* ?

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).



(3) [Income elasticity of demand: 4 pts] Suppose that when consumers' income rises by 5 percent, the quantity of macaroni-and-cheese dinners purchased falls by 1 percent.

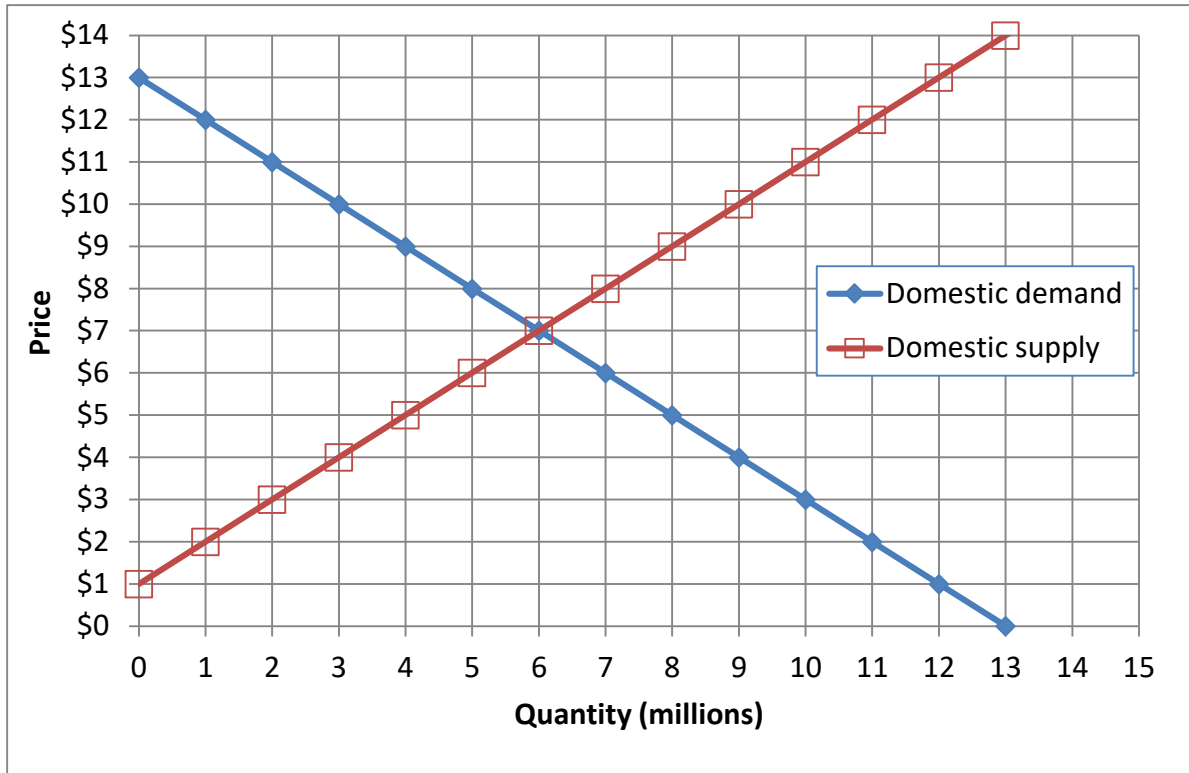
- a. From the information above, are macaroni-and-cheese dinners an *inferior good*, a *necessary good*, or a *luxury (or superior) good*?
- b. Compute the income elasticity of demand for macaroni-and-cheese dinners. (Full credit requires correct sign.)

(4) [Using price elasticity of demand: 10 pts] Suppose the electric company *raises* electricity rates by 5%. Suppose the price elasticity of demand for electricity is -0.6. Assume everything else affecting demand for electricity remains constant.

- a. According to the information above, is demand for electricity *elastic*, *inelastic*, or *unitary-elastic*?
- b. As the price rises, will the amount of electricity used *increase*, *decrease*, or remain *constant*?
- c. ... by approximately how much?
- d. Will the total revenue received by the electric company *increase*, *decrease*, or remain *constant*?
- e. ... by approximately how much?

%
%

(5) [Welfare analysis of international trade: 18 pts] Domestic supply and demand for TV remote controllers in a particular country are shown in the following graph.



a. At first, international trade in TV remotes 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 TV remotes turns out to be \$ 5.

b. Will this country now *export* or *import* TV remotes?

--

c. How many?

million

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

--

e. By how much?

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

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g. By how much?

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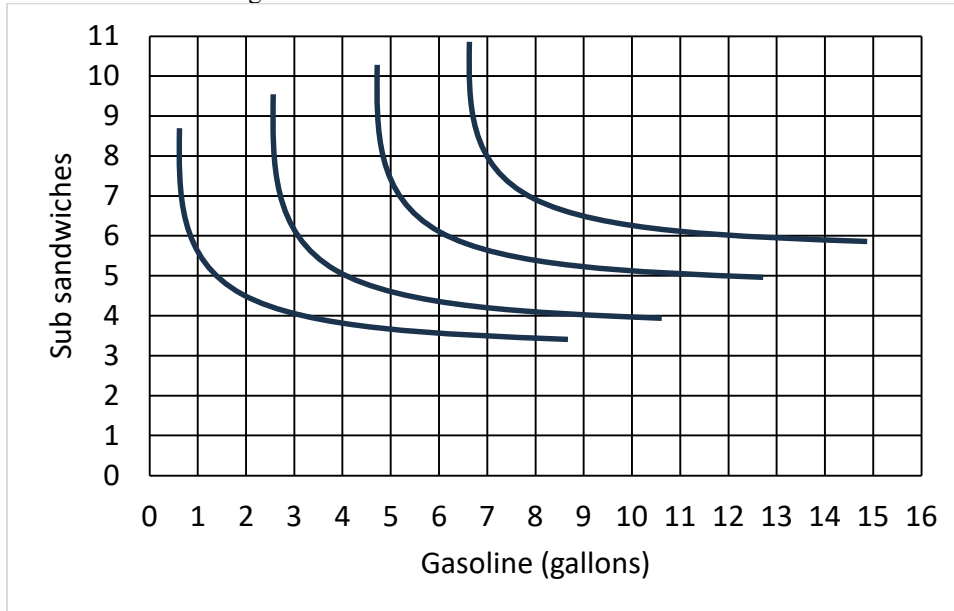
h. Does total social welfare in this country *increase* or *decrease* from international trade in TV remotes?

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i. By how much?

\$	million
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(6) [Consumer choice and demand: 14 pts] The indifference curves in the graph below represent Brittany's preferences for sub sandwiches and gasoline.



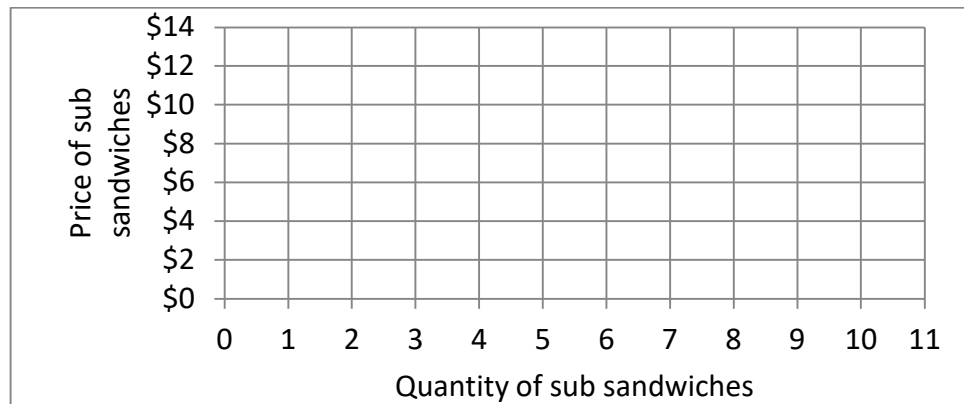
- a. Would Brittany rather have 8 sub sandwiches and 7 gallons of gasoline, or 5 sub sandwiches and 11 gallons of gasoline?
- b. Would Brittany rather have 6 sub sandwiches and 6 gallons of gasoline, or 4 sub sandwiches and 9 gallons of gasoline?

sub sandwiches and	gallons of gasoline .
sub sandwiches and	gallons of gasoline .

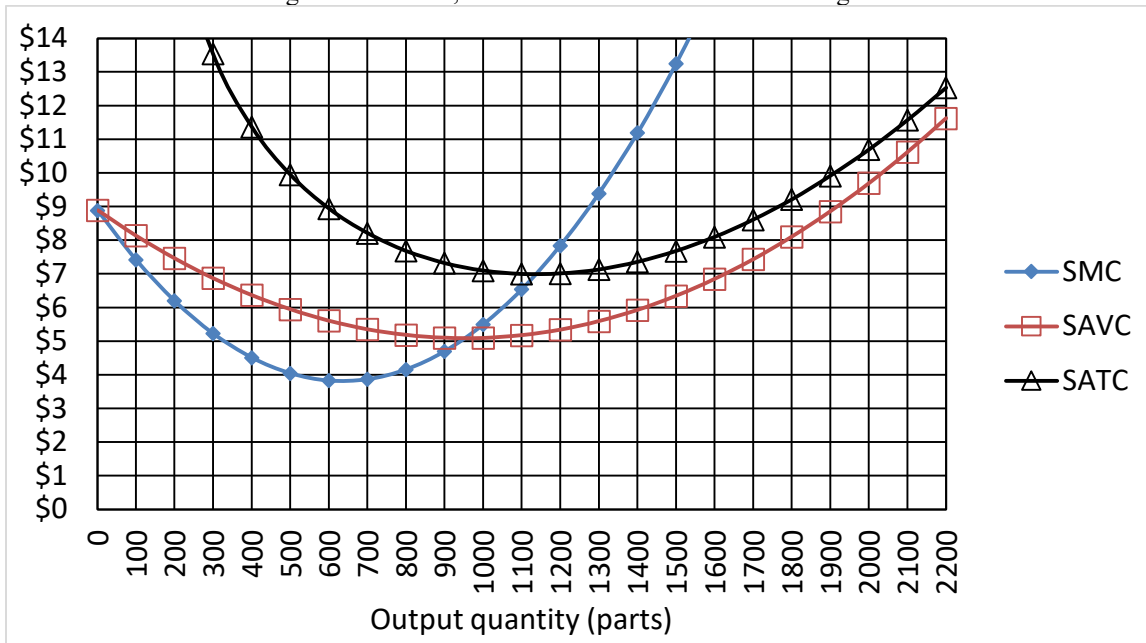
Suppose Brittany has a budget of \$60 to spend on sub sandwiches and gasoline. The price of gasoline is \$4.

- c. **Using a straightedge**, carefully draw Brittany's budget line when the price of sub sandwiches is \$6. Label this budget line "A".
- d. How many sub sandwiches will Brittany buy if the price of sub sandwiches is \$6? sandwiches
- e. **Using a straightedge**, carefully draw Brittany's budget line when the price of sub sandwiches is \$12. Label this budget line "B".
- f. How many sub sandwiches will Brittany buy if the price of sub sandwiches is \$12? sandwiches

g. Plot two points on Brittany's demand curve for sub sandwiches, and sketch her demand curve at right.



(7) [Short-run cost curves and supply: 20 pts] Micro Manufacturing Company makes a small part used in mobile phones. Micro 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.
- b. Compute the company's short-run variable cost, to the nearest thousand dollars.
- c. Compute the company's short-run fixed cost, to the nearest thousand dollars.

\$	thousand
\$	thousand
\$	thousand

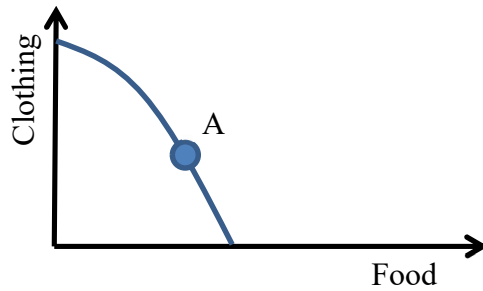
- d. Suppose the company were currently producing 1500 parts for some unknown reason. If the company produced one more part, by how much would its total cost increase? That is, what would be the *change in total cost* as the company increased output from 1500 to 1501 parts? (Give an answer to the nearest 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 \$4. How many parts should the company produce? (Give an answer to the nearest hundred.)
- h. Will the company make a *profit* or a *loss* at a price of \$4?
- i. Suppose the price of parts is \$11. How many parts should the company produce? (Give an answer to the nearest hundred.)
- j. Will the company make a *profit* or a *loss* at a price of \$11?

\$	
\$	
	parts
	parts

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



Production possibilities 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

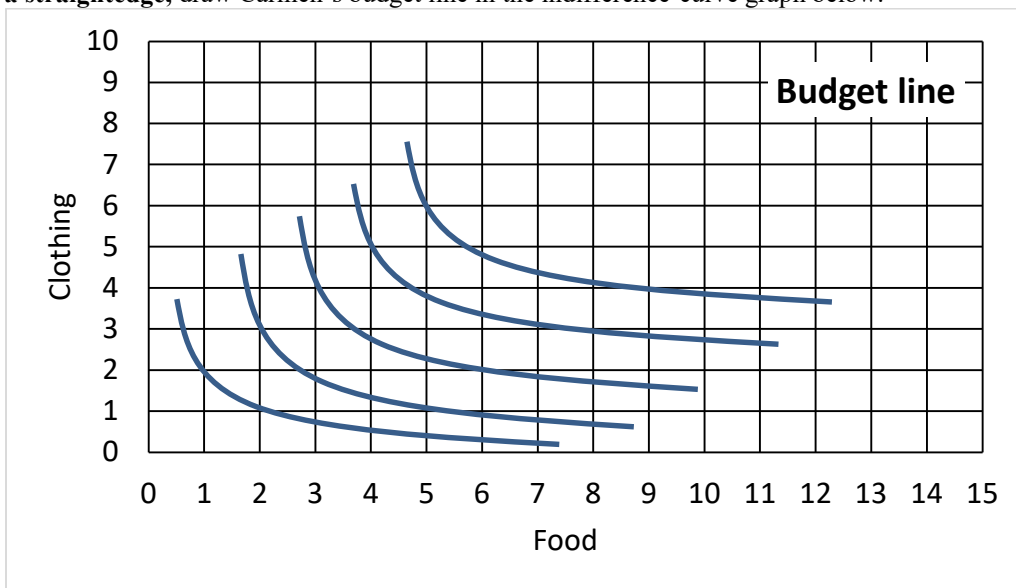
Assume this country's economy is in competitive equilibrium in all markets and the price of a unit of food is \$15.

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

\$

Carmen is a consumer in this economy. She has an income of \$45.

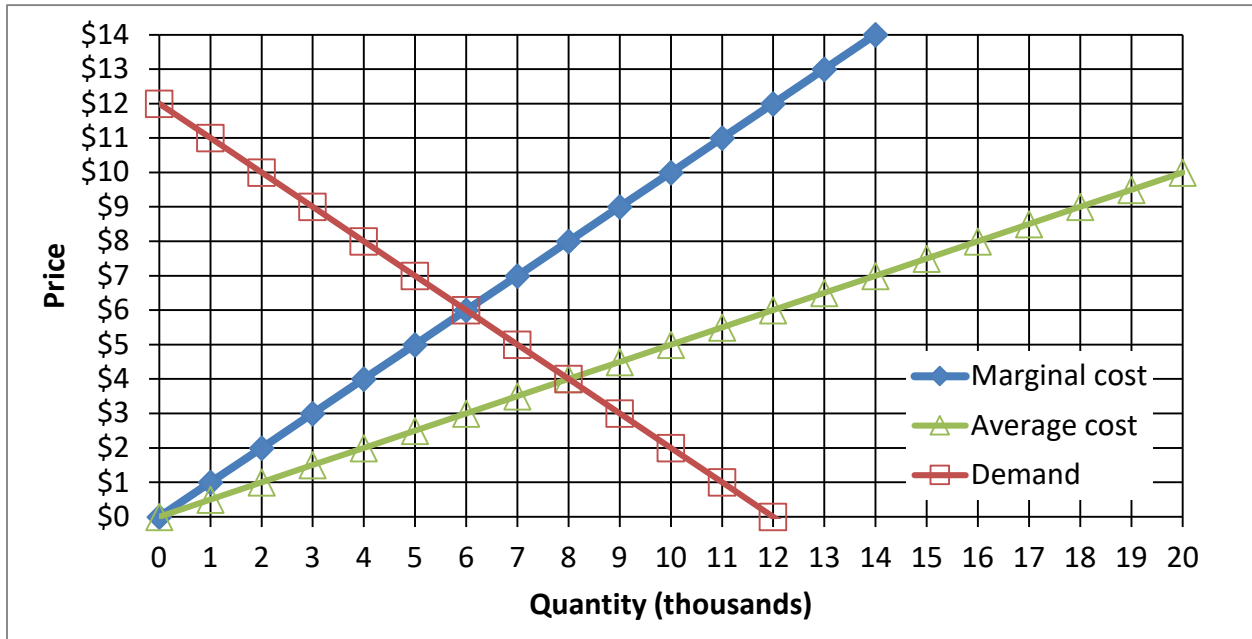
- d. **Using a straightedge**, draw Carmen's budget line in the indifference-curve graph below.



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

units of clothing
units of food
units of food

(9) [Monopoly: 12 pts] Better Putter Mini-golf course is the only mini-golf course in town, so it enjoys a local monopoly. Its marginal cost, average cost, and demand curves are shown below.



Assume that the mini-golf course must charge the same price on every admission sold.

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

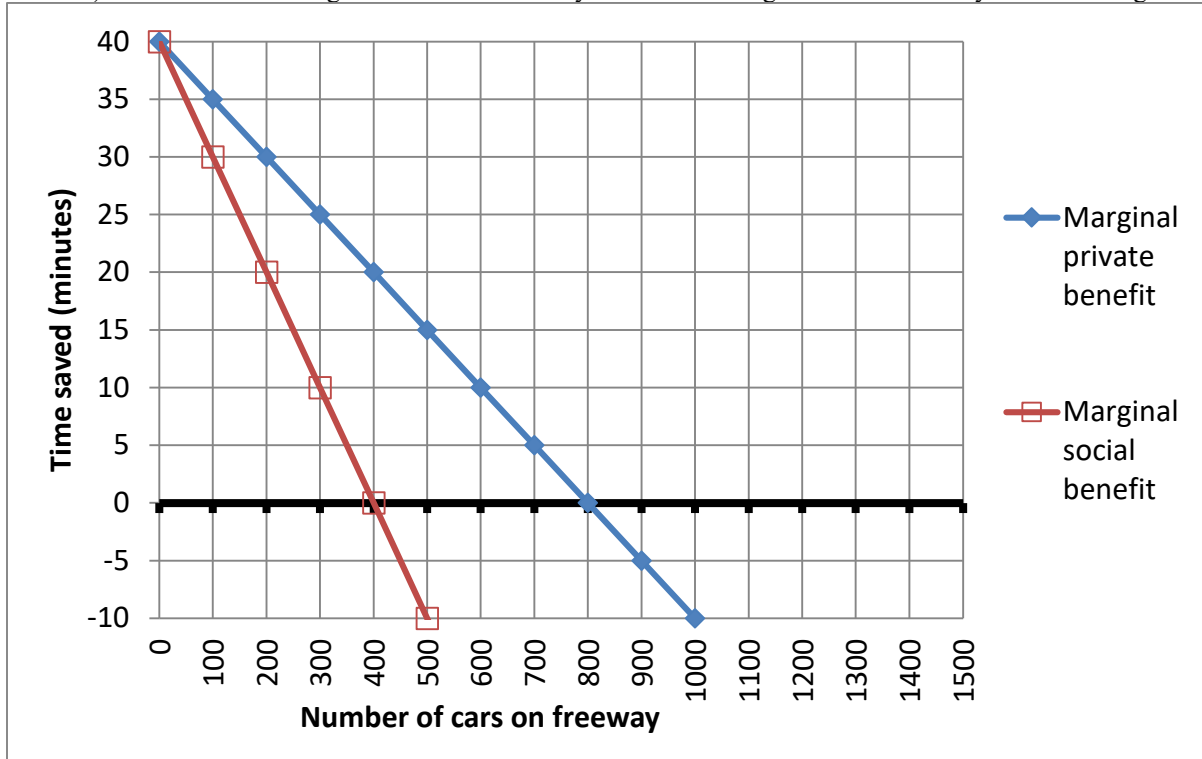
	thousand
\$	
\$	thousand
\$	thousand
\$	thousand

(10) [Nonrival goods: 6 pts] A city government will offer a free outdoor concert series during the summer in a neighborhood park. About **1000** people are likely to enjoy the concerts. Each concert costs **\$4000** to produce. Let Q denote the number of concerts. A typical individual person's marginal benefit from the concert series is given by the following expression: $MB = 10 - 2Q$.

- How many concerts would a typical *individual* pay for, for their private enjoyment?
- Give an expression for the marginal social benefit from the concert series. [Hint: This must be a formula containing one variable: Q .]
- Compute Q^* the socially-optimal number of concerts.

	concerts
MSB =	
	concerts

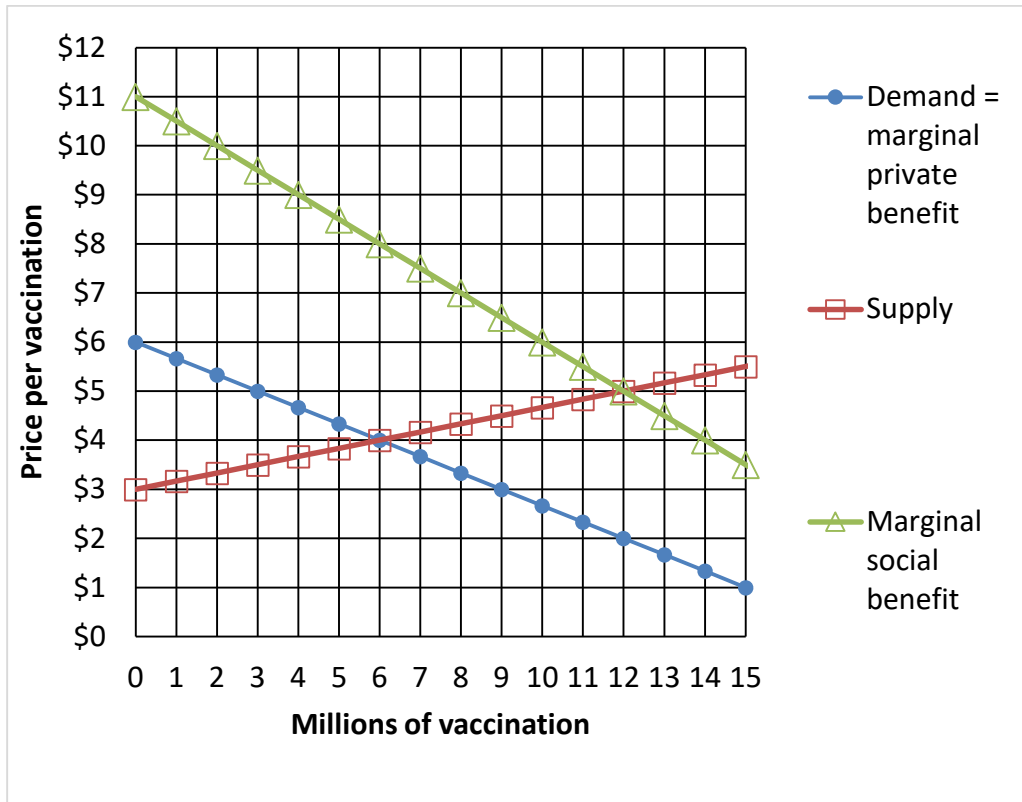
(11) [Common property resources: 6 pts] A certain freeway can easily become congested. It is the quickest route to downtown, but during rush hour, when one car enters the freeway, all the cars already on the freeway slow down a bit. The graph below shows the average time saved by each car when it enters the freeway (“marginal private benefit”), and the change in total time saved by all cars when another car enters the freeway (“marginal social benefit”). Note that the change in total time saved by all cars turns negative as the freeway becomes congested.



- How many cars will enter the freeway if entry onto the freeway is unregulated?
- What is the socially-optimal number of cars on the freeway—that is, the number of cars that maximizes total time saved by all cars on the freeway?
- Suppose a typical driver is willing to pay \$1 for each five minutes saved by entering the freeway. What toll (in dollars) would ensure that the optimal number of cars entered the freeway?

	cars
	cars
\$	

(12) [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 enact a *tax* or a *subsidy*?
- What should be the tax rate or subsidy rate?

\$	
	million
	million
\$	million
\$	per vaccination

(13) [Regulating pollution: 19 pts] Five factories are each producing one unit of pollution per year. The government has determined that total pollution must be reduced to 1 unit per year (a reduction of 4 units). The cost of cleaning up pollution at each factory is given below.

Factory	A	B	C	D	E
Annual cost of cleaning up pollution	\$15	\$35	\$25	\$45	\$5

Command-and-control:

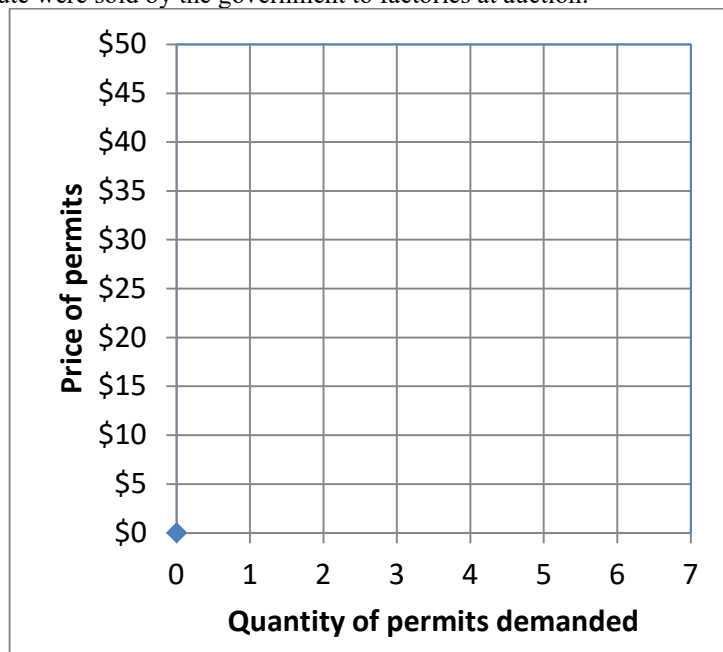
- a. To minimize the total cost of cleaning up, which 4 factories should be commanded to clean up? Give their letters.
- b. What would be the total cost of cleaning up for these 4 factories together?

\$

Now suppose the government does not know each factory’s cost of cleaning up, so the command-and-control approach is infeasible. Consider the following alternative approaches.

Auction: Suppose 1 permit (or waiver) to pollute were sold by the government to factories at auction.

- c. [5 pts] Draw the factories’ demand curve for permits in the graph at right. Be sure to draw correct “stairsteps.”



In this auction, the price starts at \$0 and rises in increments of \$10.

- d. Which factory would win the permit? Give its letter.
- e. What would be the final auction price of a permit to pollute?
- f. What would be the total cost of cleaning up for those 4 factories that did not win permits in the auction?

\$
\$

Pollution fee: Suppose the government imposed a fee for pollution. Factories could either pay the fee or pay the cost of cleaning up.

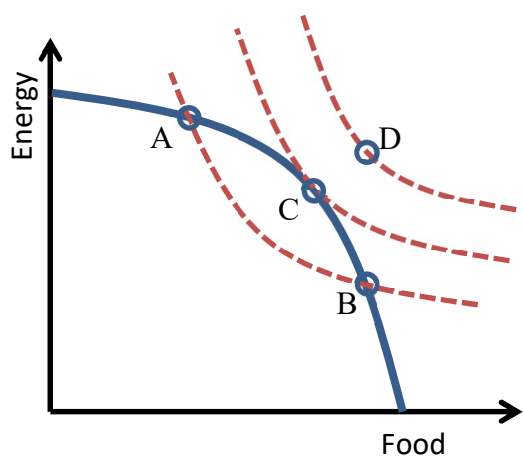
- g. What fee would reduce the amount of pollution to 1 unit: \$0, \$10, \$20, \$30, \$40, \$50, or \$60?
- h. What would be the total cost of cleaning up for those 4 factories that chose not to pay the fee?

\$
\$

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

- (1) The graph below describes the economy of Fredonia. The solid curve is Fredonia's production possibility curve and the dotted curves are indifference curves for a representative consumer. Only two goods are produced in Fredonia—food and energy—but all markets are competitive. Unfortunately, the government of Fredonia has imposed a price floor on energy, raising the price to consumers. So now where is Fredonia's economy—point A, B, C, or D? Why?
- (2) The graph below describes the economy of Fredonia. The solid curve is Fredonia's production possibility curve and the dashed curves are indifference curves for a representative consumer. Both industries are competitive. The food industry causes no externalities but the energy industry causes substantial external costs, so that too much energy is produced compared to the efficient quantity. So where is Fredonia's economy—point A, B, C, or D? 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]