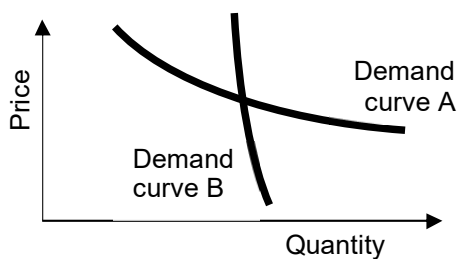


**EXAMINATION 2 VERSION A**  
**"Applications of Supply and Demand"**  
**October 13, 2021**

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, 12 pts total]

- (1) Which demand curve below is *less* elastic?
- Demand curve A.
  - Demand curve B.
  - Both have the same elasticity because they pass through the same point.
  - Cannot be determined from information given.



- (2) The units of measure for the price elasticity of demand for beef are
- pounds per dollar.
  - dollars per pound.
  - percent.
  - The elasticity is a pure number and has no units of measure.
- (3) It takes time for consumers to adjust their lifestyles to changes in gasoline prices. Therefore, the long-run demand for gasoline is
- more elastic than the short-run demand.
  - less elastic than the short-run demand.
  - just as elastic as the short-run demand.
  - Elasticity of demand is not related to time for adjustment.

- (4) If the quantity supplied of some good, such as paintings by Edvard Munch (1863-1944), is exactly the same, regardless of the price, then the supply is
- elastic.
  - perfectly elastic.
  - inelastic.
  - perfectly inelastic.
  - cannot be determined from information given.

- (5) Suppose a hurricane forces oil refineries in Texas and Louisiana to shut down for a while. Oil is traded internationally, so this would cause the price of oil in Europe to
- remain constant.
  - rise.
  - fall.
  - Cannot be determined from information given.

- (6) Suppose there is a change in government policy affecting the automobile industry. Which of the following outcomes would pass the *compensation test of Kaldor and Hicks*?
- Producers gain \$10 billion while consumers lose \$20 billion.
  - Producers gain \$20 billion while consumers lose \$10 billion.
  - Producers gain \$10 billion while consumers gain \$20 billion.
  - Both (b) and (c).
  - All of the above.

(7) Suppose the price of gold were higher 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.

(8) Suppose the price of watermelons is \$5 in Kansas City and the cost of shipping a watermelon between Des Moines and Kansas City is \$2. Markets are *in equilibrium* if the price of melons in Des Moines is

- a. \$1.
- b. \$4.
- c. \$8.
- d. \$10.

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

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

(10) The Federal tax on gasoline is 18.4 cents per gallon. This is an example of

- a. an *ad valorem* tax.
- b. an excise or per-unit tax.
- c. a price control.
- d. a subsidy.

(11) 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.

(12) The number of pedometers actually sold would increase if the government enacted a

- a. a tax on pedometers.
- b. a quota on sellers of pedometers.
- c. a subsidy for pedometers.
- d. a price floor (or legal minimum price) for pedometers.
- e. all of the above.
- f. none of the above.

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**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) [Calculating elasticities: 2 pts] Suppose that if the price of electricity is 10 cents per kilowatt-hour, the typical household uses 20 kilowatt-hours per day; but if the price is 20 cents per kilowatt-hour, the typical household uses 12 kilowatt-hours per day. Compute the price elasticity of demand for electricity using the “arc-elasticity” formula.

(2) [Cross-price elasticity of demand: 8 pts] Use the information given below to determine whether each pair of goods (in *italics*) are substitutes or complements. Also compute the cross-price elasticity of demand. (Full credit requires correct sign.)

	Substitutes or complements?	Computed cross-price elasticity
a. The price of <i>air fares</i> rises by 20%, causing the quantity of <i>hotel rooms</i> gotten to decrease by 5%.		
b. The price of <i>orange juice</i> rises by 25%, causing the quantity of <i>apple juice</i> purchased to rise by 5%.		

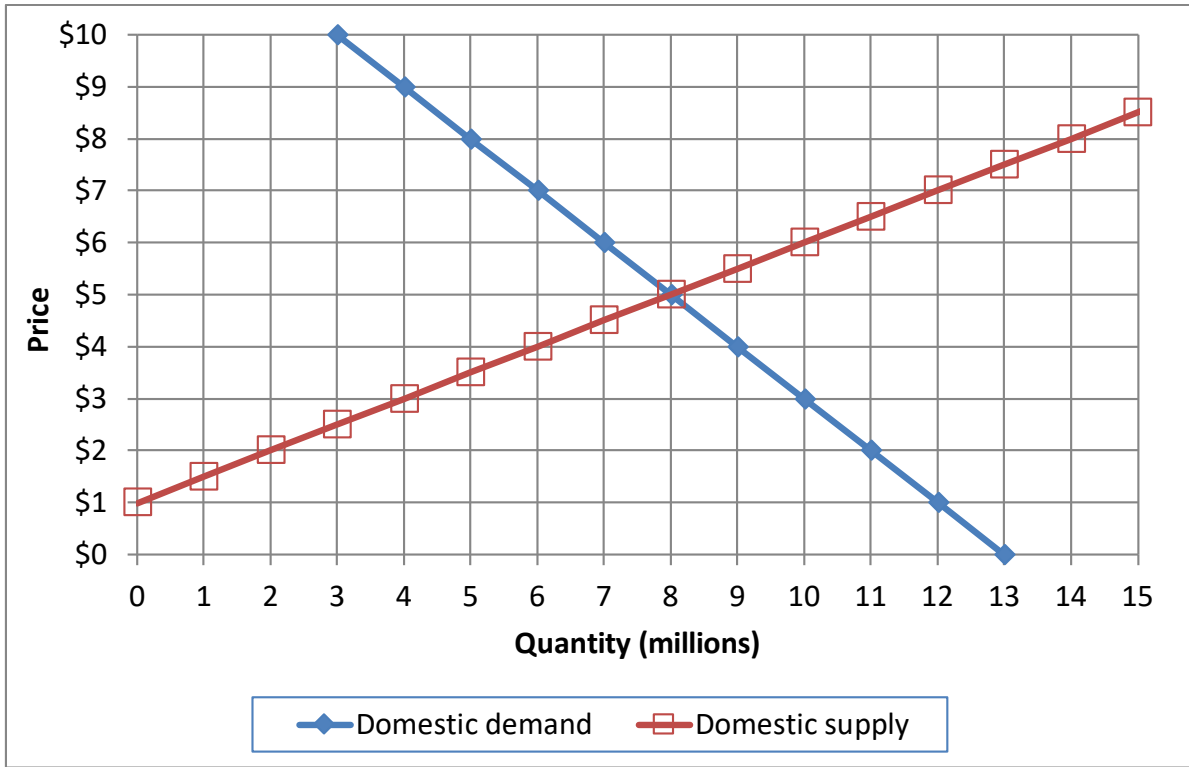
(3) [Using price elasticity of demand: 10 pts] Suppose the natural gas utility *raises* its price by 5%. Suppose the price elasticity of demand for natural gas is -0.6. Assume everything else affecting demand for natural gas remains constant.

a. According to the information above, is demand for natural gas <i>elastic, inelastic, or unitary-elastic</i> ?	
b. As the price rises, will the amount of natural gas consumed <i>increase, decrease, or remain constant</i> ?	
c. ... by approximately how much?	%
d. Will the total revenue received by the gas utility <i>increase, decrease, or remain constant</i> ?	
e. ... by approximately how much?	%

(4) [Using income elasticities: 10 pts] Suppose the income elasticity of demand for fresh fish is 2.5. Now suppose consumers' incomes *rise* by 4%. Assume the price of fresh fish does not change.

a. According to the information above, is fresh fish a <i>necessary good, an inferior good, or a luxury (or superior) good</i> ?	
b. As income rises, will the quantity of fresh fish demanded <i>increase, decrease, or remain constant</i> ?	
c. ... by about how much?	%
d. Will consumer spending on fresh fish, as a fraction of a consumer's total budget, <i>increase, decrease, or remain constant</i> ?	
e. ... by about how much?	%

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



a. At first, international trade in teeshirts 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 teeshirts turns out to be \$ 7.

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

c. How many?

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

e. By how much?

f. Does producer surplus in this country *increase* or *decrease* from international trade in teeshirts?

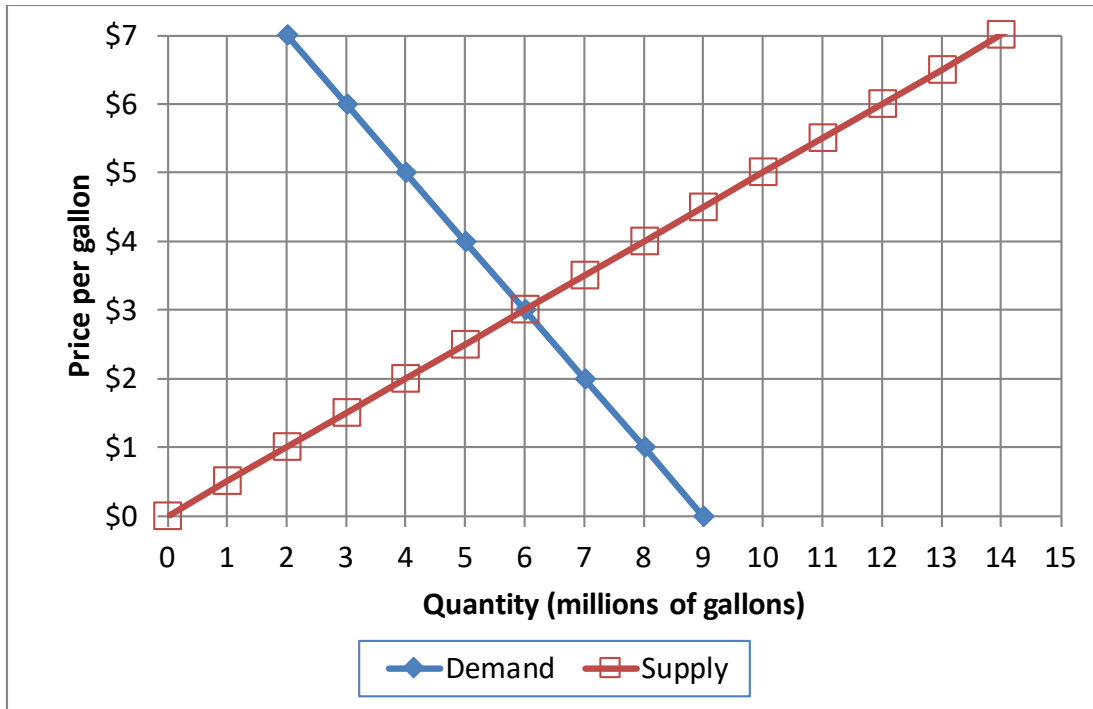
g. By how much?

h. Does total social welfare in this country *increase* or *decrease* from international trade in teeshirts?

i. By how much?

	million
	million
\$	million
	million
\$	million
	million
\$	million

(6) [Welfare analysis of market controls: 18 pts] The following graph shows the market for milk.



a. Find the equilibrium price without government intervention.

\$
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Suppose the government imposes a price floor (or legal minimum price) of \$ 5. No milk may be sold for a price less than the price floor.

b. How much milk will actually be sold?

millions of gallons
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c. Will there be *excess demand*, *excess supply*, or *neither*?

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d. How much?

millions of gallons
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e. Does producer surplus *increase*, *decrease*, or *remain constant* because of the price floor, as compared to the market without government intervention? (Assume optimistically that milk is sold by those producers who have the lowest cost.)

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f. By how much?

\$	million
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g. Does consumer surplus *increase*, *decrease*, or *remain constant* because of the price floor, as compared to the market without government intervention?

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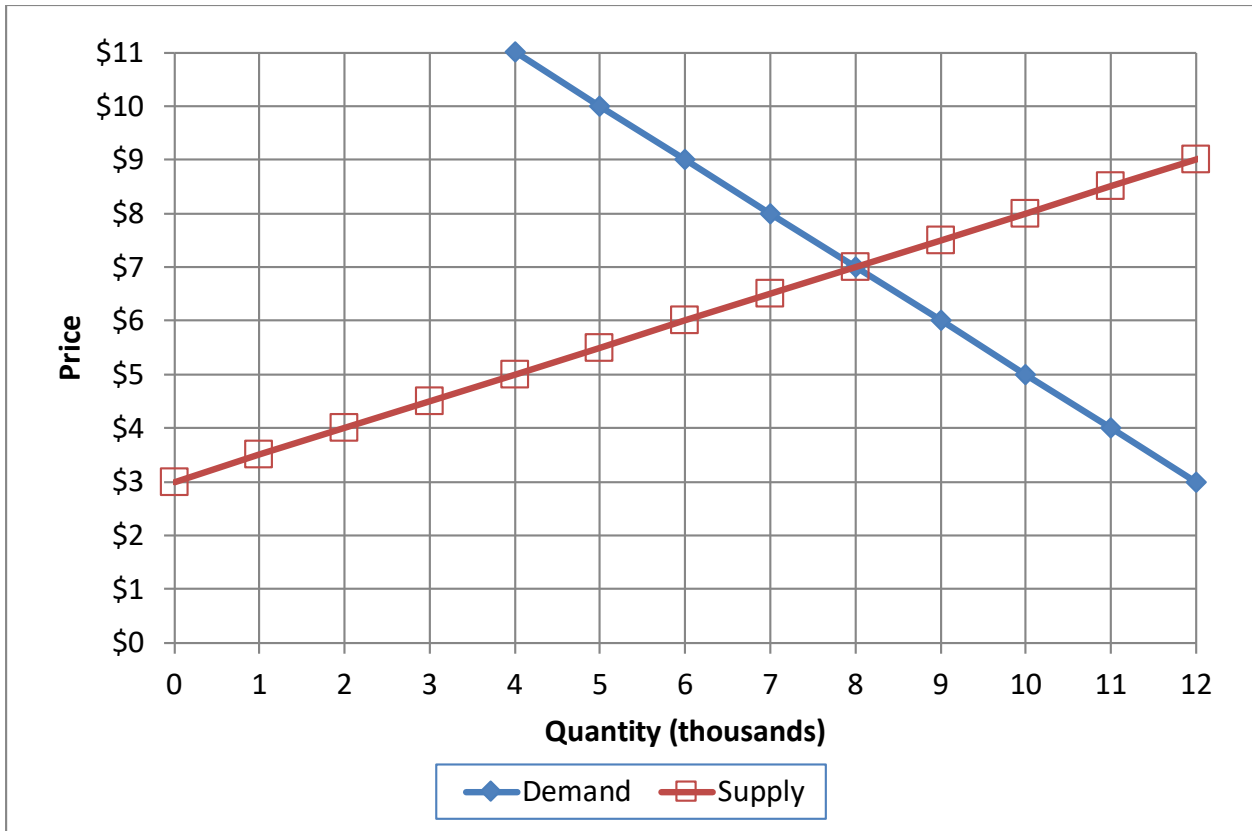
h. By how much?

\$	million
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i. Compute the deadweight social loss caused by the price floor.

\$	million
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(7) [Welfare analysis of tax or subsidy: 18 pts] The graph below shows the market for leaf rakes.



Suppose the government imposes an excise tax of \$3 per rake.

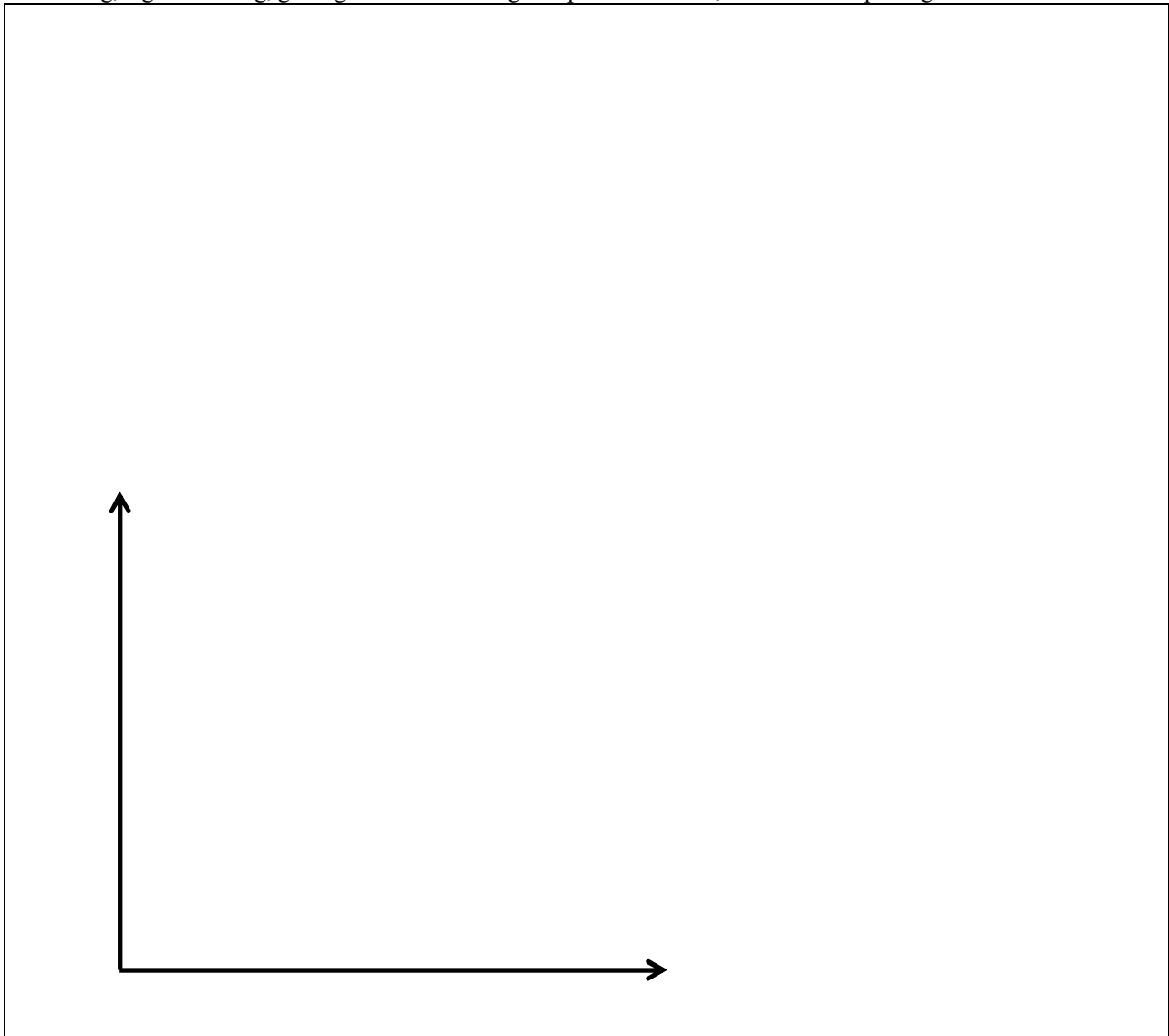
- Compute the equilibrium quantity sold.
- Compute the equilibrium net price received by sellers (excluding the tax).
- Compute the equilibrium total price paid by buyers (including the tax).
- Does producer surplus *increase, decrease, or remain constant* because of the tax?
- By how much?
- Does consumer surplus *increase, decrease, or remain constant* because of the tax?
- By how much?
- Compute the total tax revenue collected by the government.
- Compute the deadweight social loss caused by the tax.

	thousand
\$	per rake
\$	per rake
\$	thousand
\$	thousand
\$	thousand
\$	thousand

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

- (1) A study<sup>1</sup> found that when tobacco cigarette prices increased by 10 percent, use of marijuana by young people *decreased* by about 12 percent. (Ignore the graph below.)
  - a. Does this imply that marijuana and tobacco cigarettes are *substitutes* or *complements*? Why?
  - b. Compute the cross-price elasticity of demand for marijuana with respect to the price of cigarettes.
  
- (2) Suppose the government imposed maximum prices on smoke alarms. Would this action tend to increase the number of homes that have smoke alarms? Explain why or why not, using a supply-and-demand graph of the market for smoke alarms. Label both axes and all curves.

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]

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<sup>1</sup> Frank J. Chaloupka, Rosalie Liccardo Pacula, Matthew C. Farrelly, Lloyd D. Johnston, Patrick M. O'Malley, "Do Higher Cigarette Prices Encourage Youth to Use Marijuana?" NBER Working Paper No. 6939, February 1999.