# EXAMINATION 2 VERSION B
"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 *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.
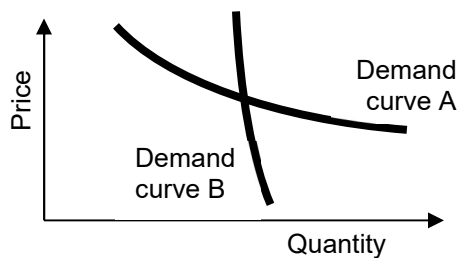
(2) The units of measure for the price elasticity of demand for electricity are
a.   percent.
b.   kilowatt-hours per dollar.
c.   dollars per kilowatt-hour.
d.   The elasticity is a pure number and has no units of measure.

(3) It takes time for consumers to adjust their lifestyles to changes in electricity prices. Therefore, the short-run demand for electricity is
a.   more elastic than the long-run demand.
b.   less elastic than the long-run demand.
c.   just as elastic as the long-run demand.
d.   Elasticity of demand is not related to time for adjustment.

(4) Suppose producers of pencils are willing to sell any number of pencils for 10 cents, so that the supply curve is a horizontal line. Then the supply of pencils is
a.   elastic.
b.   perfectly elastic.
c.   inelastic.
d.   perfectly inelastic.
e.   cannot be determined from information given.

(5) Suppose soybean farms in South America enjoy a big harvest because of good weather. Since soybeans are traded internationally, this would cause the price of soybeans in the U.S. to
a.   remain constant.
b.   rise.
c.   fall.
d.   Cannot be determined from information given.

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

(7) Suppose the price of silver were higher in Chicago than in New York, initially. Arbitrage would then *tend to*
a.   raise the price of silver in both cities.
b.   lower the price of silver in both cities.
c.   raise the price of silver in New York and lower the price in Chicago.
d.   raise the price of silver in Chicago 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 *out of equilibrium* if the price of melons in Des Moines is
a. $1.
b. $4.
c. $5.
d. $6.

(9) A quota (or legal maximum quantity) on *selling* 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) Iowa's state sales tax rate is 6%. 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 demand for baby food is -0.2 and the price elasticity of supply is 5.0. If a subsidy is given for baby food,
a.   producers will enjoy most of the subsidy.
b.   consumers will enjoy most of the subsidy.
c.   producers and consumers will each enjoy half of the subsidy.
d.   Answer depends on which side receives the check from the government.

(12) The number of motorcycles actually sold would decrease if the government enacted a
a.   a tax on motorcycles.
b.   a quota (or legal maximum quantity) on sellers of motorcycles.
c.   a price ceiling (or legal maximum price) for motorcycles.
d.   a price floor (or legal minimum price) for motorcycles.
e.   all of the above.
f.   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) [Calculating elasticities: 2 pts] Suppose that if the price of Brand X apple cider is $3, a store sells 70 bottles per day, but if the price is $5, the same store sells only 10 bottles per day. Compute the price elasticity of demand for Brand X apple cider at that store 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 *ice cream* falls by 50%, causing the quantity of *frozen yogurt* purchased to decrease by 5%		
b. The price of *gasoline* rises by 30%, causing the quantity of *SUVs* sold to decrease by 12%.		

(3) [Using price elasticity of demand: 10 pts] Suppose an internet entertainment service *raises* its price by 4%. Suppose the price elasticity of demand for this service is -2.5. Assume everything else affecting demand for the service remains constant.

a. According to the information above, is demand for this service *elastic, inelastic,* or *unitary-elastic*?

b. As the price rises, will the number of customers *increase*, *decrease*, or remain *constant*?

c. ... by approximately how much?   %

d. Will the total revenue received by the service *increase*, *decrease*, or remain *constant*?

e. ... by approximately how much?   %

(4) [Using income elasticities: 10 pts] Suppose the income elasticity of demand for potatoes is 0.4. Now suppose consumers' incomes *rise* by 5%. Assume the price of potatoes does not change.

a. According to the information above, are potatoes a *necessary good*, an *inferior good*, or a *luxury (or superior) good*?

b. As income rises, will the quantity of potatoes demanded *increase*, *decrease*, or remain *constant*?

c. ... by about how much?   %

d. Will consumer spending on potatoes, as a fraction of a consumer's total budget, *increase*, *decrease*, or remain *constant*?

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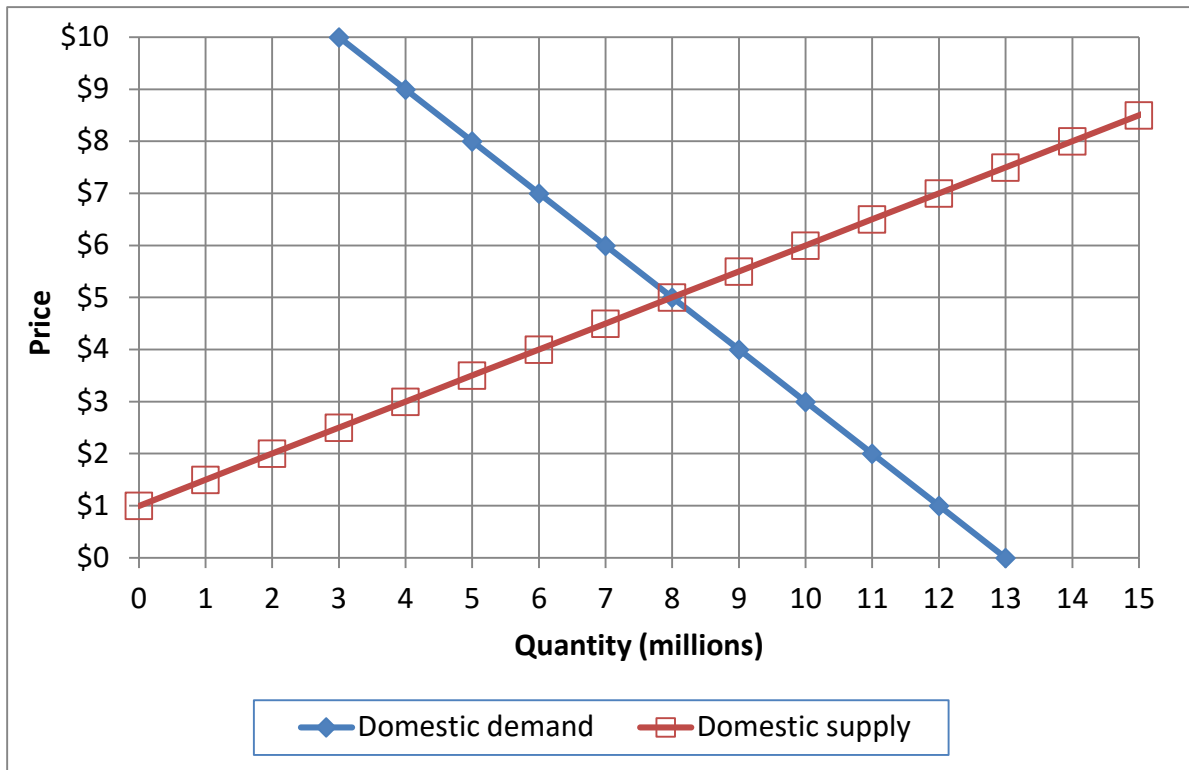
a. At first, international trade in teeshirts is not permitted. Find the equilibrium price without international trade.

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Then this industry is opened to international trade and the international price of teeshirts turns out to be **$ 3.**

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

c. How many?

	million

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

e. By how much?

$	million

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

g. By how much?

$	million

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

i. By how much?

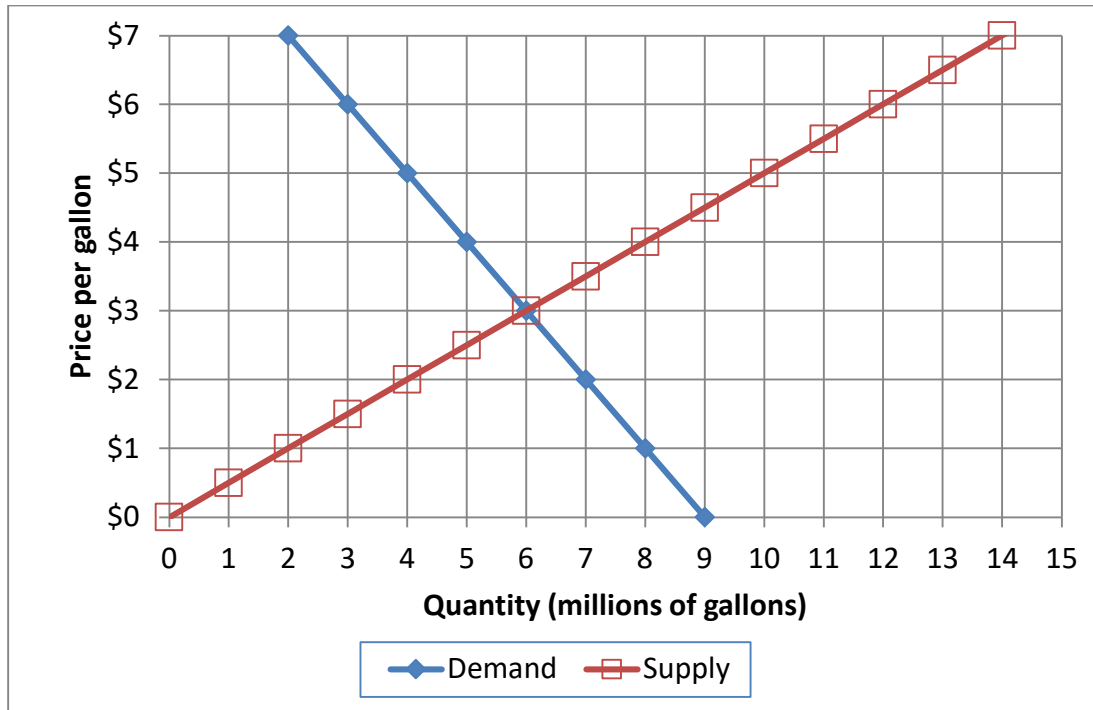| $	million

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

a. Find the equilibrium price without government intervention.

$

Suppose the government imposes a price ceiling (or legal maximum price) of **$ 2**. No milk may be sold for a price more than the price ceiling.

b. How much milk will actually be sold?

millions of gallons

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

d. How much?

millions of gallons

e. Does producer surplus *increase, decrease,* or *remain constant* because of the price ceiling, as compared to the market without government intervention?

f. By how much?

$ million

g. Does consumer surplus *increase, decrease,* or *remain constant* because of the price ceiling, as compared to the market without government intervention? (Assume optimistically that milk is purchased by those consumers who have the highest willingness-to-pay.)
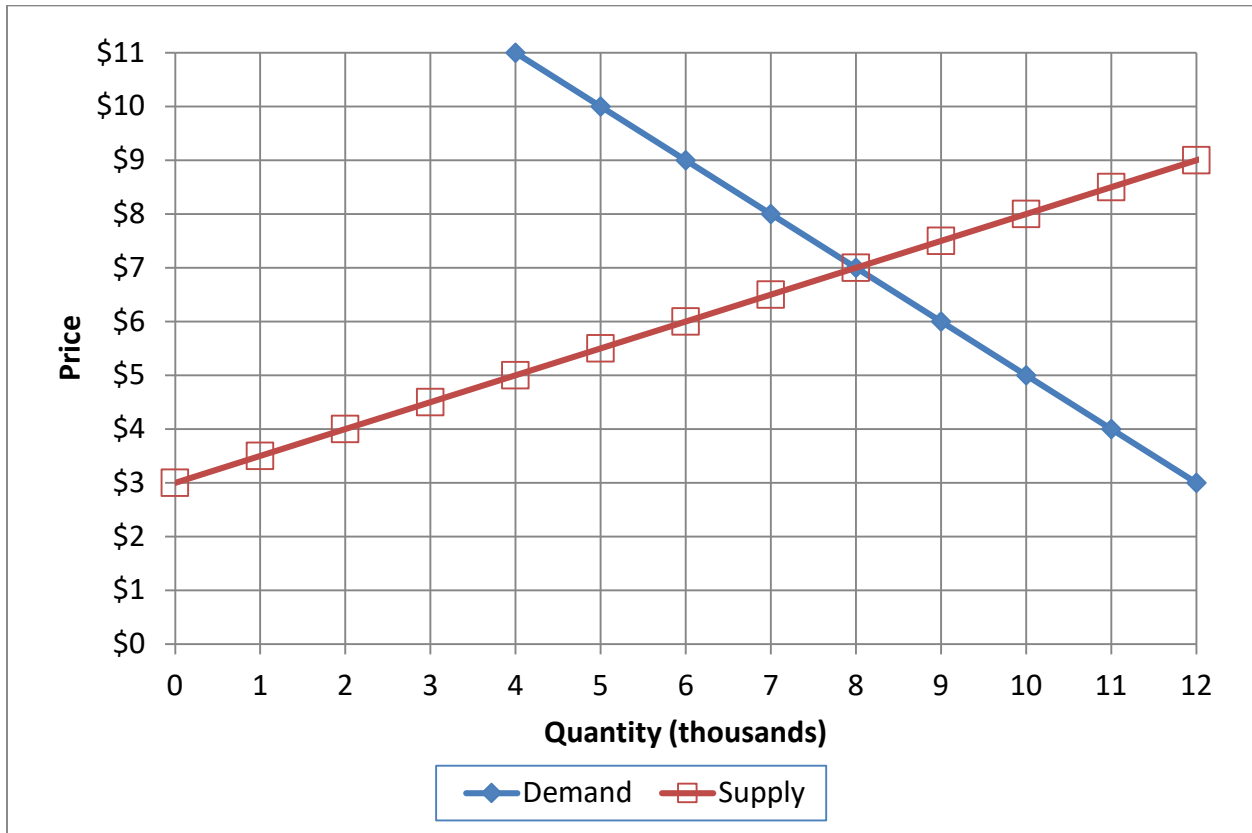
h. By how much?

$ million

i. Compute the deadweight social loss caused by the price ceiling.

$ million

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

Suppose the government offers a **subsidy of $ 3** per leaf rake.

a. Compute the equilibrium quantity sold.

b. Compute the equilibrium total price received by sellers (including the subsidy).

c. Compute the equilibrium net price paid by buyers (excluding the subsidy).

d. Does producer surplus *increase, decrease,* or *remain constant* because of the subsidy?

e. By how much?

f. Does consumer surplus *increase, decrease,* or *remain constant* because of the subsidy?

g. By how much?

h. Compute the direct cost of the subsidy to the government—that is, the amount that the government will have to pay buyers and sellers.

i. Compute the deadweight social loss caused by the subsidy.

	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[1] 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.
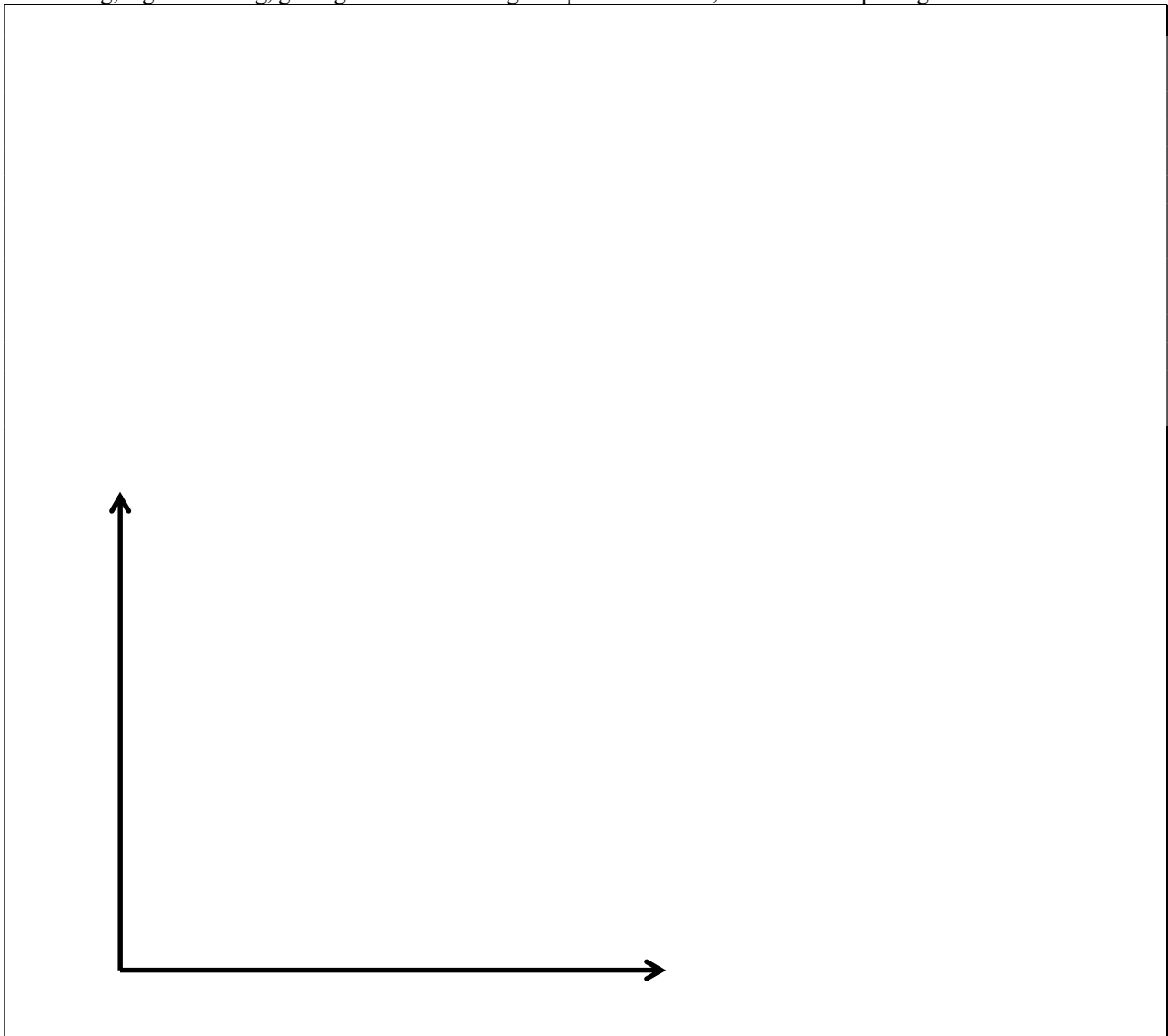
[end of exam]

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[1] 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.