

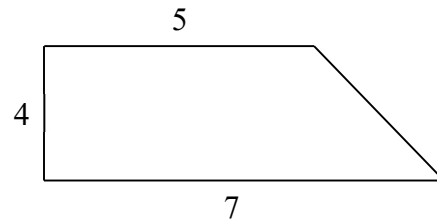
**EXAMINATION 1 VERSION A**  
**"Competitive Supply and Demand"**  
**February 16, 2023**

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, 17 pts total]

- (1) In economics, *rational behavior* means
- a. using math to make decisions.
  - b. ignoring "soft" concerns like friendships and charity.
  - c. doing the best one can with what one has.
  - d. making sacrifices today for a better future.
  - e. maximizing one's income.

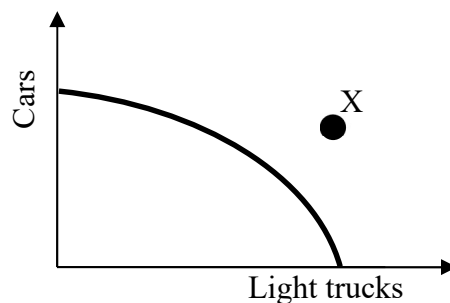
- (6) The area of the trapezoid below equals
- a. 20.
  - b. 24.
  - c. 28.
  - d. 35.
  - e. 140.



- (2) Amelia buys a ticket to a concert for \$100. When she arrives at the concert hall, she discovers that scalpers are willing to pay \$200 for her ticket. Her *opportunity cost* of attending the concert is now
- a. \$0.
  - b. \$100.
  - c. \$200.
  - d. \$300.

- (3) A breakfast café charges \$3.00 for one pancake, \$4.00 for two pancakes, and \$4.50 for three pancakes. What is the marginal cost of the *second* pancake?
- a. \$0.50.
  - b. \$1.00.
  - c. \$2.00.
  - d. \$4.00.

- (7) The graph below shows the production possibility curve for some factory. The combination of outputs represented by point X
- a. is feasible and efficient.
  - b. is feasible but not efficient.
  - c. is infeasible.
  - d. cannot be determined from information given.



- (4) Rational choice implies pursuing an activity until the marginal benefit of the last unit
- a. is as high as possible above 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.
- (5) "The price of houses will fall next year" is an example of
- a. a positive statement.
  - b. a normative statement.
  - c. both of the above.
  - d. none of the above.

- (8) Economic or physical capital includes
- bank accounts.
  - shares of stock in corporations.
  - bonds.
  - all of the above.
  - none of the above.

The next three questions refer to the following information. Farm X can produce 10 units of tomatoes or 20 units of peppers per acre. Farm Y can produce 30 units of tomatoes or 30 units of peppers per acre.

(9) What is Farm X's opportunity cost of a unit of tomatoes?

- 1 unit of peppers.
- 2 units of peppers.
- 20 units of peppers.
- 2 units of tomatoes.

(10) What is Farm Y's opportunity cost of a unit of tomatoes?

- 1 unit of peppers.
- 2 units of peppers.
- 10 units of peppers.
- 30 units of tomatoes.

(11) Which farm has a comparative advantage in tomatoes?

- Farm X.
- Farm Y.
- Both farms.
- Neither farm.

(12) The Law of One Price means

- a good cannot be resold.
- all sellers are required by law to quote the same price.
- the buyer and the seller in each transaction must agree on a price.
- efficient markets eliminate price dispersion.
- the total quantity buyers want to buy is negatively related to the price.

(13) If the price of milk falls, and nothing else affecting the demand for milk changes, then this will cause

- the demand curve for milk to rotate clockwise until it becomes upward-sloping.
- a movement along the demand curve for milk, up and to the left.
- a movement along the demand curve for milk, down and to the right.
- the demand curve for milk to shift left.
- the demand curve for milk to shift right.

(14) As the price of gasoline rises, consumers are buying fewer large sport-utility vehicles, because gasoline and SUVs are

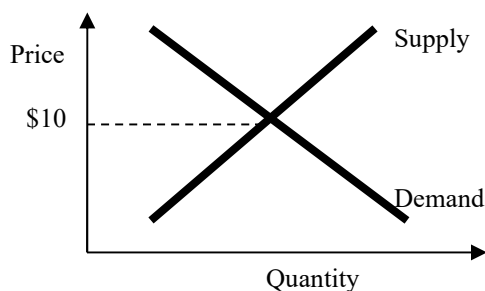
- substitute goods.
- complementary goods.
- inferior goods.
- normal goods.

(15) As consumers' incomes rise, they typically go to more music concerts, because concerts are

- a substitute good.
- a complementary good.
- an inferior good.
- a normal good.

(16) Consider the supply-and-demand diagram below. If for some reason the price were \$7, then

- the price would fall.
- the price would rise.
- the demand curve would shift left.
- the supply curve would shift right.



(17) In February, the price of roses rises and the quantity sold increases. This could be caused by a

- rightward shift in the demand for roses.
- rightward shift in the supply of roses.
- leftward shift in the demand for roses.
- leftward shift in the supply of roses.

**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) [Percent change, midpoint formula: 2 pts] Suppose bus fare in City A is \$2 and bus fare in City B is \$3. Compute the percent difference using the midpoint method, to the nearest tenth of a percentage point.

	%
--	---

(2) [Percent change of product: 4 pts] Consumer spending on gasoline equals the price paid times the quantity purchased. Suppose the price of gasoline increases by 8 percent and the quantity purchased decreases by 2 percent.

a. Does spending on gasoline *increase* or *decrease*?

	%

b. By approximately how much?

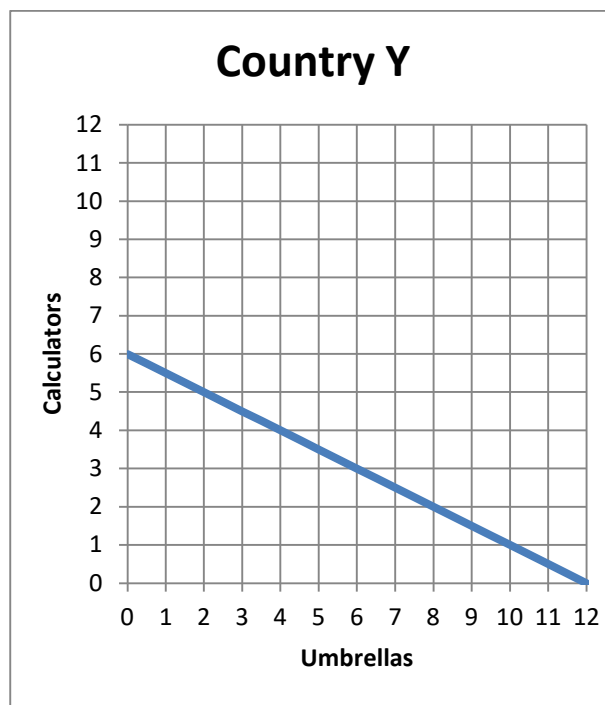
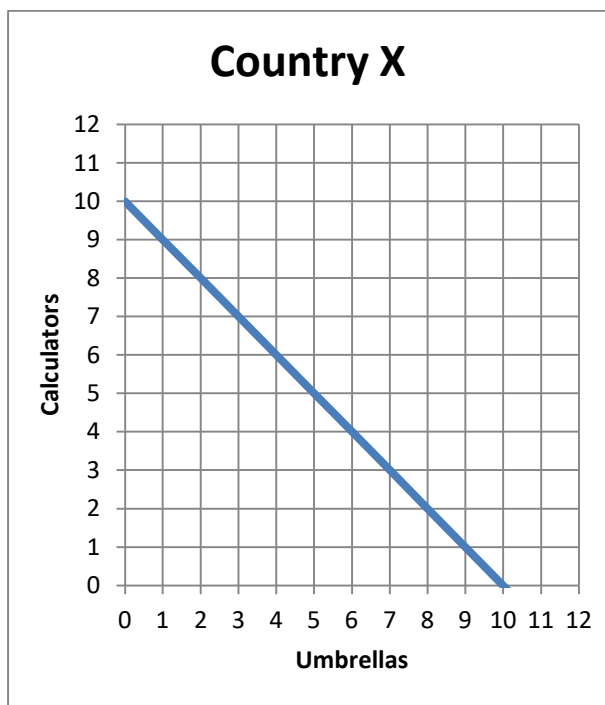
(3) [Production functions: 7 pts] A work crew reroofs houses. Complete the table by computing the work crew's average product and marginal product and placing your answers in the unshaded cells of the third and fourth columns below. Then answer the question below.

<i>Number of workers</i>	<i>Houses reroofed per month</i>	<i>Average Product</i>	<i>Marginal Product</i>
0 workers	0 houses		
			houses per worker
3 workers	6 houses	houses per worker	
			houses per worker
6 workers	18 houses	houses per worker	
			houses per worker
9 workers	36 houses	houses per worker	

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

--

(4) [Comparative advantage, gains from trade: 17 pts] Country X and Country Y can each produce calculators and umbrellas. 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 an umbrella?
- What is Country Y's opportunity cost of producing an umbrella?
- What is Country X's opportunity cost of producing a calculator?
- What is Country Y's opportunity cost of producing a calculator?
- Which country has a comparative advantage in producing umbrellas?
- Which country has a comparative advantage in producing calculators?

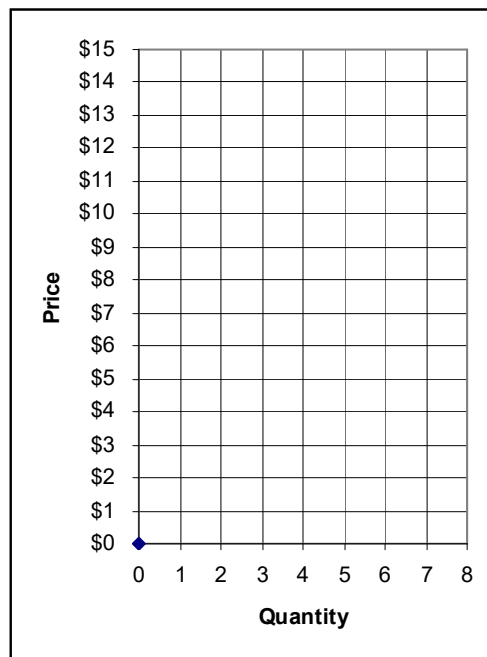
	calculators
	calculators
	umbrellas
	umbrellas

g. [3 pts] Fill in the blanks: *Both* countries can consume combinations of products *outside* their individual production possibility curves if \_\_\_\_\_ exports *four* umbrellas to \_\_\_\_\_, which exports \_\_\_\_\_ calculators 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**.

(5) [Market equilibrium: 12 pts] Suppose seven buyers and seven sellers engage in a market similar to the exercise we did in class. Each buyer may buy at most one unit and each seller may sell at most one unit, but no one is forced to trade. Assume that buyers and sellers are each trying to maximize their personal surplus (or “gains from trade”). Surplus for each buyer equals the buyer's value of the good minus the price paid. Surplus for each seller equals the price received minus the seller's cost of the good. Surplus of persons who do not trade are zero. Buyers' values and sellers' costs are given in the following table.

Buyer	Value	Seller	Cost
Bob	\$14	Sue	\$ 1
Barb	\$13	Steve	\$ 2
Ben	\$12	Sam	\$ 3
Bailey	\$12	Sven	\$ 4
Brian	\$11	Sarina	\$ 9
Betty	\$ 1	Sean	\$14
Bert	\$ 1	Sally	\$15



Suppose with some experience, the market settles on a single price. All trades are made at that price. (Hint: use the graph at right for scratch work.)

- a. If the price were \$2, would there be *excess demand*, *excess supply*, or *neither*?

Now consider the market equilibrium.

- b. What is the equilibrium price? Give an answer to the nearest whole dollar.
- c. How many units of the good will be sold in this market?
- d. Compute the total revenue received by sellers (which equals the total spending by buyers).
- e. Compute the combined total surplus (or gains from trade) of all buyers and sellers. (Check your answer carefully! No partial credit for being "close"!)
- f. Who enjoys higher surplus in this particular market, the *buyers* or the *sellers*? Or is buyers' total surplus *equal* to sellers' total surplus?

\$	
	units
\$	
\$	

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

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

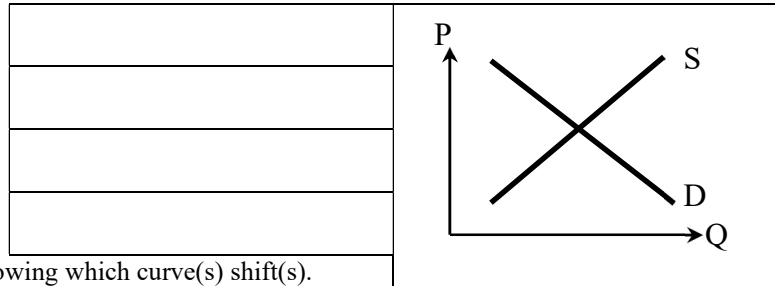
Does demand shift *left*, shift *right*, or remain *unchanged* ?

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).



b. Consider the market for **ketchup**. Suppose the price of tomatoes rises. (Ketchup is made from tomatoes.)

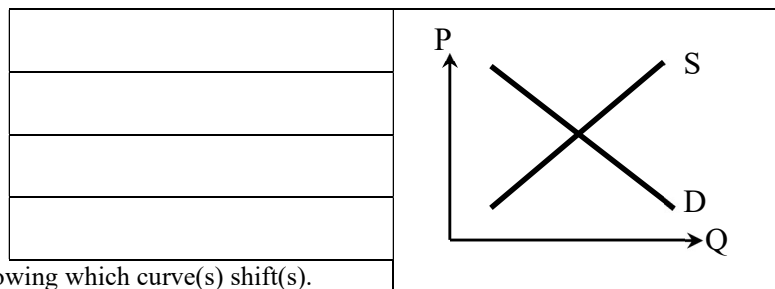
Does demand shift *left*, shift *right*, or remain *unchanged* ?

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 **orange juice**. Suppose consumers begin shifting from fruit juices to water due to high sugar content in fruit juices. Simultaneously, a blight attacks orange trees.

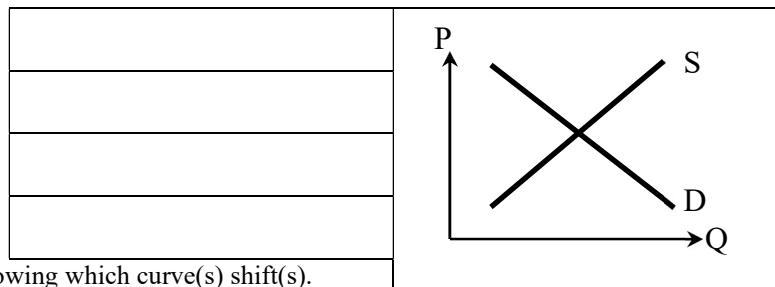
Does demand shift *left*, shift *right*, or remain *unchanged* ?

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

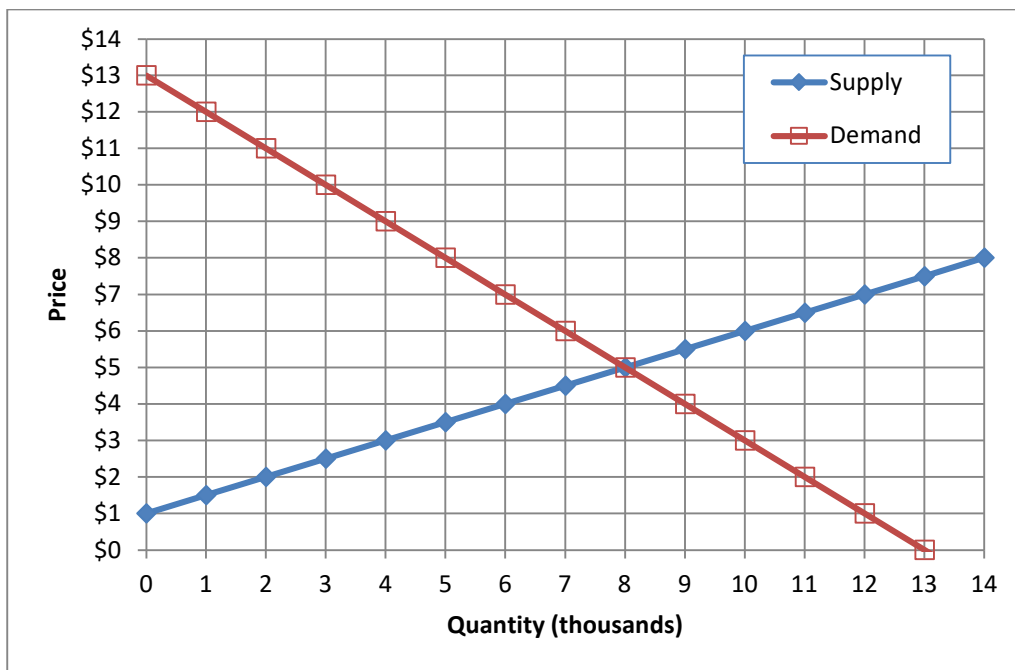
Does the equilibrium price *increase*, *decrease*, or *cannot be determined* ?

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) [Consumer surplus, producer surplus: 22 pts] The market for cantaloupes is depicted in the graph below.



Suppose the price in this market were \$6 for some reason.

- a. Would there be *excess demand*, *excess supply*, or *neither*?
- b. How much?
- c. Would the price tend to *rise*, *fall*, or remain *constant*?

thousand

Now suppose the market is in equilibrium.

- d. What is the equilibrium price?
- e. What is the equilibrium quantity?
- f. How much are consumers willing to pay for the 3 thousandth cantaloupe?
- g. How much consumer surplus do they enjoy for the 3 thousandth cantaloupe?
- h. What is the marginal cost to producers of the 4 thousandth cantaloupe?
- i. How much producer surplus do they enjoy for the 4 thousandth cantaloupe?
- j. Compute total consumer surplus.
- k. Compute total producer surplus.

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

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

- (1) Why are restaurant meals expensive on Valentine's Day and cheap the day after? Justify your answer using a supply-and-demand graph, labeling all axes and curves.
- (2) Consider the following statement. "They are building too many hotels in this city. All the hotels will be half full, so they will raise their prices just to stay profitable. In the end, the consumer will suffer from higher prices." Does this argument make sense? Why or why not? Justify your answer using a supply-and-demand graph, labeling all axes and 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]