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EXAMINATION 3 VERSION B
"Choices Underlying Supply and Demand"
April 6, 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, 14 pts total]

(1) A change in the number of people who buy pomegranate juice is called a change at the
a. extensive margin.
b. intensive margin.
c. marginal product.
d. marginal revenue.

(2) In the graph below, the shift in the budget line could be caused by
a. an increase in income.
b. a decrease in income.
c. an increase in the price of food.
d. a decrease in the price of food.
e. an increase in the price of clothing.
f. a decrease in the price of clothing.
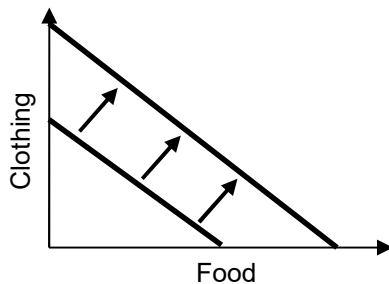
(3) Caitlin's indifference-curve diagram is shown below. The straight line represents Caitlin's budget line and the curved lines represent her indifference curves. If Caitlin is now at point A, she could be made better off without exceeding her budget by
a. buying more other goods and less entertainment.
b. buying more entertainment and fewer other goods.
c. either (a) or (b).
d. Caitlin cannot be made better off by changing her purchases.
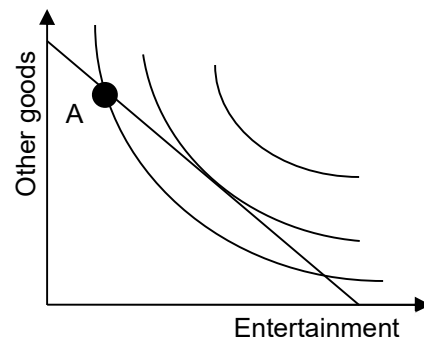
(4) Accounting costs do *not* usually include such economic costs as
a. money paid for electricity, raw materials, and supplies.
b. lease payments.
c. the opportunity cost of the business owner's time spent running the business.
d. wages paid to workers.

(5) Price times a firm's quantity of output equals the firm's
a. total cost.
b. average cost.
c. marginal cost.
d. total revenue.
e. average revenue.
f. marginal revenue.

(6) All money paid by a firm for inputs equals by definition the firm's
a.   total cost.
b.   average cost.
c.   marginal cost.
d.   total revenue.
e.   average revenue.
f.   marginal revenue.

(7) The change in a firm's total revenue divided by the change in its output by definition equals the firm's
a.   total cost.
b.   average cost.
c.   marginal cost.
d.   total revenue.
e.   average revenue.
f.   marginal revenue.

(8) The slope of the firm's total cost 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.

(9) A firm's total cost divided by its total output by definition equals the firm's
a.   total cost.
b.   average cost.
c.   marginal cost.
d.   total revenue.
e.   average revenue.
f.   marginal revenue.

(10) A small firm in a big market maximizes its profit by
a.   adjusting its output quantity so that price equals marginal cost.
b.   shifting its marginal cost curve up or down so that price equals marginal cost at its desired output level.
c.   adjusting its price so that price equals marginal cost.
d.   all of the above.

(11) ABC Company has very small market share 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
a.   20 units.
b.   40 units.
c.   60 units.
d.   80 units.
e.   Cannot be determined without knowing market price.
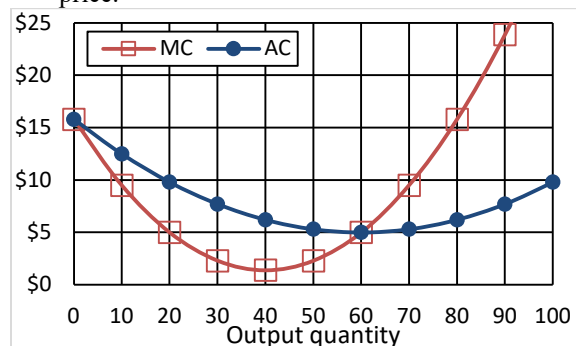
(12) The formula for discounting shows that the present discounted value of $100 to be received in the future is *smaller*
a.   the lower the interest rate (or discount rate).
b.   the higher the interest rate.
c.   Present discounted value is not affected by the interest rate.
d.   Cannot be determined from the information given.

(13) When firms *exit* an industry, this has the effect of shifting the short-run supply curve
a.   to the right.
b.   to the left.
c.   down.
d.   Cannot be determined from information given.

(14) *Price equals marginal cost* in a competitive industry in both short-run and long-run equilibrium because
a.   business owners have a sense of fairness.
b.   individual firms adjust their output levels 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.

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) [Consumer's budget constraint: 10 pts] Alan has **$60** to spend on gas and sandwiches. The price of sandwiches is **$12.** The price of gas is **$4.**
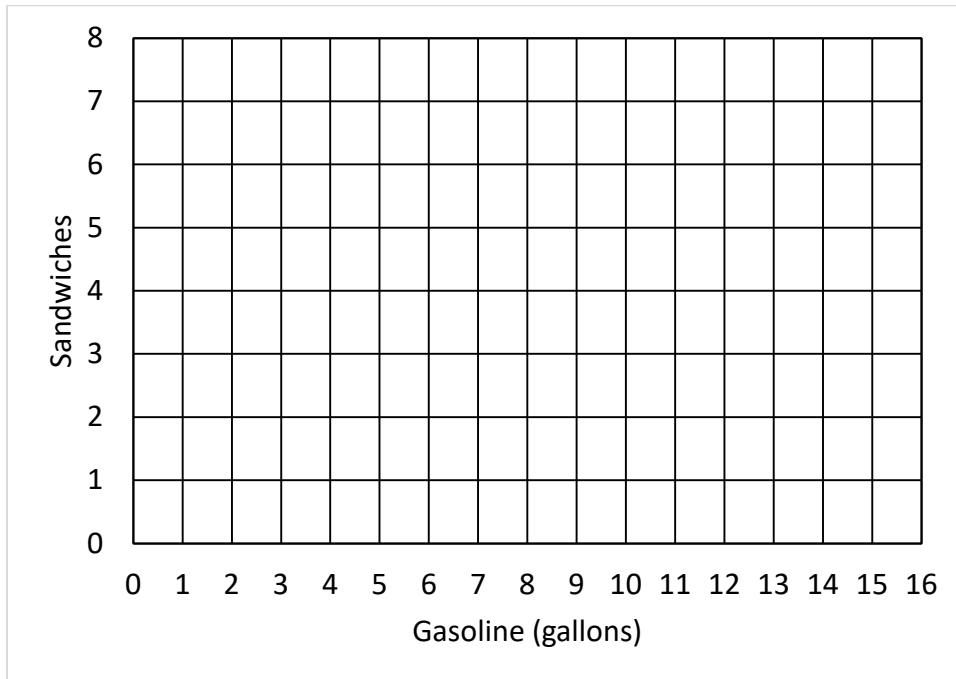
a. **Using a straightedge**, carefully draw Alan's budget line

Determine whether the following combinations of goods are *exactly affordable, affordable with money left over,* or *not affordable* for Alan.

b. 5 sandwiches and 3 gallons of gas.

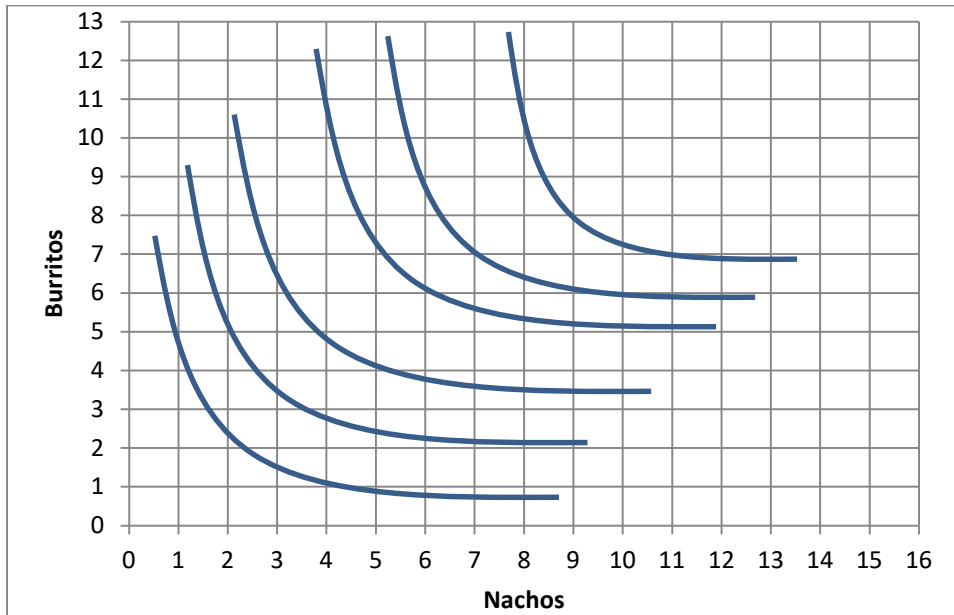c. 3 sandwiches and 6 gallons of gas.

d. 1 sandwich and 9 gallons of gas.

Assume that Alan spends all his income on gas and sandwiches.

e. What is Alan's opportunity cost of a sandwich?

| gallons of gas |

(2) [Consumer choice and demand: 14 pts]   The indifference curves in the graph below represent Beth's preferences for nachos and burritos.

a. Would Beth rather have 2 burritos and 9 nachos, or 4 burritos and 5 nachos?

____ burritos and	____ nachos

b. Would Beth rather have 11 burritos and 4 nachos, or 7 burritos and 7 nachos?

____ burritos and	____ nachos

Suppose Beth has a budget of $60 to spend on burritos and nachos. The price of nachos is $4.

c. **Using a straightedge**, carefully draw Beth's budget line when the price of burritos is $6. Label this budget line "A".

d. How many burritos will Beth buy if the price of burritos is $6?

____ burritos

e. **Using a straightedge**, carefully draw Beth's budget line when the price of burritos is $10. Label this budget line "B".

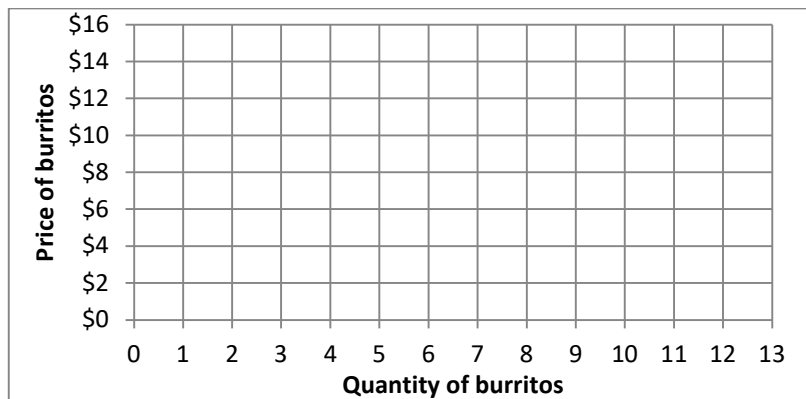f. How many burritos will Beth buy if the price of burritos is $10?

____ burritos

g. Plot two points on Beth's demand curve for burritos, and sketch her demand curve at right.

(3) [Rational choice: 10 pts] The county government is considering building a bicycle and running trail. The following are cost and benefit estimates for trails of different lengths.

Miles	Total cost	Total benefit	Marginal cost per mile	Marginal benefit per mile
0	$ 0	$0		
			$ thousand	$ thousand
5	$100 thousand	$300 thousand		
			$ thousand	$ thousand
10	$180 thousand	$350 thousand		
			$ thousand	$ thousand
15	$350 thousand	$380 thousand		
			$ thousand	$ thousand
20	$540 thousand	$400 thousand		

  a. [4 pts] Compute the marginal cost schedule. Insert your answers above.
  b. [4 pts] Compute the marginal benefit schedule. Insert your answers above.
 c. [2 pts] How long should the trail be? (Answer must be 0, 5, 10, 15, or 20 miles.)

miles

(4) [Discounting: 4 pts] Answer the following questions, assuming the interest rate is **10 %.**
  a. Suppose a particular project will *cost* a firm $1000 today, but will bring $500 in revenue a year from today, and $600 in revenue two years from today. Compute the *net present value* of this project to the nearest whole dollar.

$

  b. Suppose a firm is expected to enjoy $2 million in profit every year, perpetually, beginning a year from today. Compute the value of the firm.

$ million

(5) [Short-run cost curves and supply: 20 pts] XYZ Manufacturing Company makes a small part used in trucks. XYZ 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.
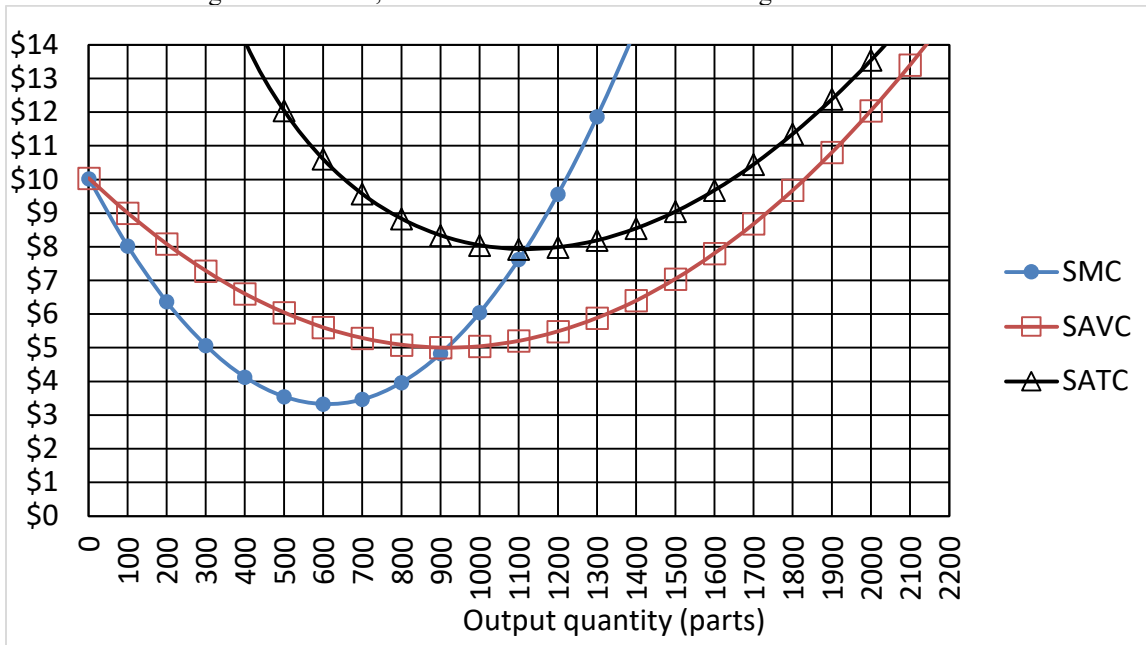
Suppose the company were currently producing 500 parts for some unknown reason.

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

$ _____ thousand

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 1000 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 1000 to 1001 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 $12. 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 $12?

i. Suppose the price of parts is $4. How many parts should the company produce? (Give an answer to the nearest hundred.)

_____ parts

j. Will the company make a *profit* or a *loss* at a price of $4?

(6) [Long-run competitive equilibrium: 24 pts] The graph below shows the market for silly hats, which is competitive. Assume all producers and potential producers have the same costs as each other.
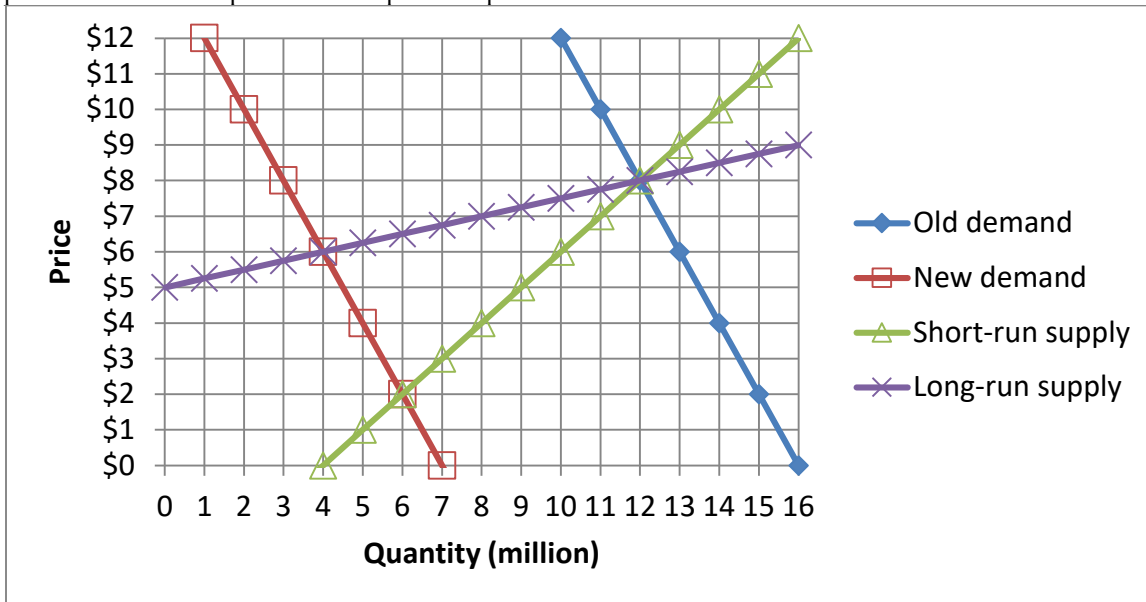
Initially the market is in long-run equilibrium, with the demand curve given by "old demand" and the short-run supply curve given by "short-run supply" as shown in the graph.

a. What is the initial equilibrium price?

$

b. What is the initial equilibrium quantity?

million

c. What is the average cost of production for firms in this industry?

$

Suppose that silly hats go out of style, and the demand shifts to "new demand." Consider the **short-run** market response to this demand shift.

d. What is the new equilibrium price in the short run?

$

e. What is the new equilibrium quantity in the short run?

million

f. Are firms in this industry making economic *profits, losses*, or just *breaking even*?

Now, consider the **long-run** market response to this demand shift.

g. Given your answer to (f) above, will existing firms try to *exit* the industry or will new firms try to *enter* the industry?

h. What is the new equilibrium price in the long run?

$

i. What is the new equilibrium quantity in the long run?

million

j. What is the new long-run average cost of production for firms in this industry?

$

k. Has the number of firms in this industry *increased, decreased*, or remained *constant*?

l. Should this industry be called a *constant-cost* industry, an *increasing-cost* industry, or a *decreasing-cost* industry?

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

(1) You operate a house-painting business in a competitive market, where everyone charges about $2000 to paint an average-size house. You review your costs last year in order to decide what to do this year. You discover that your average cost per house was about $1500, and your marginal cost per house was about $2500. 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.

(2) Your company needs a new computer system. You have just paid $100,000 to have a new system installed by Vendor A, and this money cannot be recovered. However, you will still need to spend $50,000 on training so that your people learn to use the new system. Suddenly, Vendor B offers to sell you an alternative computer system. Vendor B's system will cost only $50,000 to install, and only $25,000 for training. Should you switch to Vendor B's system? Justify your answer, giving the dollar value of any sunk costs.

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]