# EXAMINATION 3 VERSION B
"Choices Underlying Supply and Demand"
November 2, 2018

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, 10 pts total]

(1) 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 energy.
d.   a decrease in the price of energy.
e.   an increase in the price of other goods.
f.   a decrease in the price of other goods.
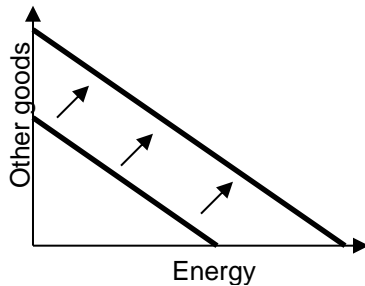
(2) The shape and position of a person's indifference curves depend on
a.   the prices they face in the market.
b.   their preferences for different bundles.
c.   their income.
d.   all of the above.

(3) What is wrong with the indifference-curve graph below?
a.   It violates the assumption that consumers do the best they can with what they have.
b.   It violates the Law of One Price.
c.   It violates the assumption of diminishing marginal rates of substitution.
d.   It violates the assumption that "more is better" from the consumer's perspective.
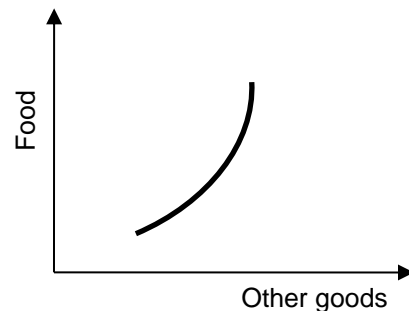
(4) The Springfield City Swimming Pool is now open 10 hours a day. Suppose a study shows that in the current situation, the marginal benefit of keeping the pool open is $20 per hour, and the marginal cost is $50. If these numbers are accurate, then Springfield would be better off
a.   keeping the City Pool open more hours.
b.   keeping the City Pool open fewer hours.
c.   making no change in the City Pool hours.
d.   Cannot be determined from information given.

(5) Production of electric cars is increasing. An increase in the number of electric cars produced by each company is called a change at the
a.   extensive margin.
b.   intensive margin.
c.   marginal product.
d.   marginal revenue.

(6) Which of the following is an economic cost but not an accounting cost?
a.   The opportunity cost of the business owner's time spent running the business.
b.   Wages paid to workers.
c.   Payments for electricity, raw materials, and supplies.
d.   Lease payments for equipment and buildings.
e.   All of the above.

(7) A cost that you cannot avoid no matter what action you take is called
a.   a variable cost.
b.   a sunk cost.
c.   an average cost.
d.   an opportunity cost.
e.   a marginal cost.

(8) The formula for discounting shows that the present discounted value of a payment to be received in the future is *greater*
a.   the shorter the wait until the payment is received.
b.   the longer the wait until the payment is received.
c.   Present discounted value is not affected by the time until payment.
d.   Cannot be determined from the information given.

(9) New firms enter an industry because they hope to
a.   enjoy economic profit.
b.   increase consumer surplus.
c.   drive down the market price.
d.   drive down the profits of existing firms.
e.   all of the above.

(10) *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) [Budget line: 12 pts] Aaron's weekly budget for gasoline and sandwiches is depicted in the **budget line** below.
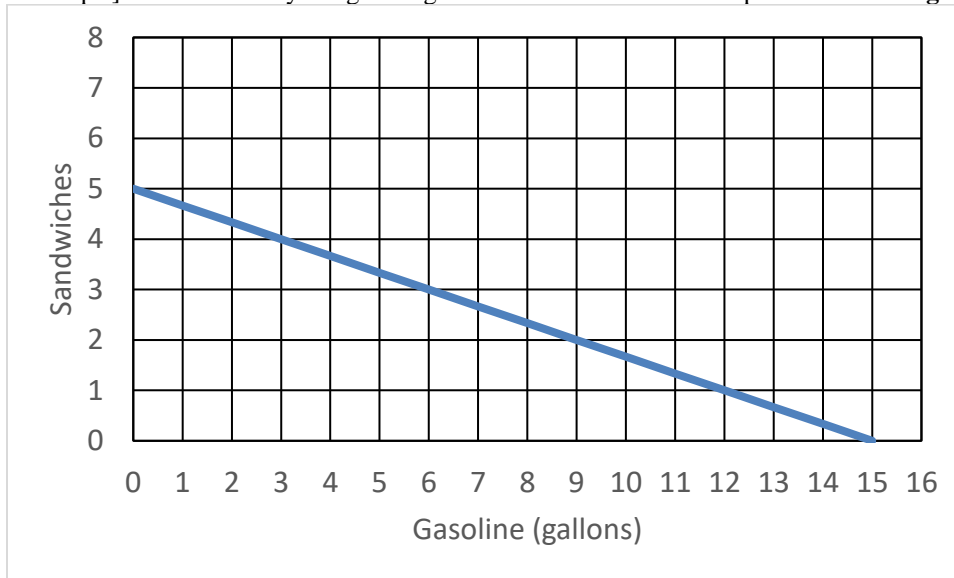
Determine whether the following combinations of goods are *exactly affordable, affordable with money left over,* or *not affordable* for Aaron.

a. 4 sandwiches and 3 gallons of gasoline.

b. 6 sandwiches and 2 gallons of gasoline.

c. 2 sandwiches and 6 gallons of gasoline.

Suppose that Aaron spends all his income on sandwiches and gasoline.

d. What is Aaron's opportunity cost of a sandwich?

gallons of gasoline

Aaron's weekly income is **$ 30**.

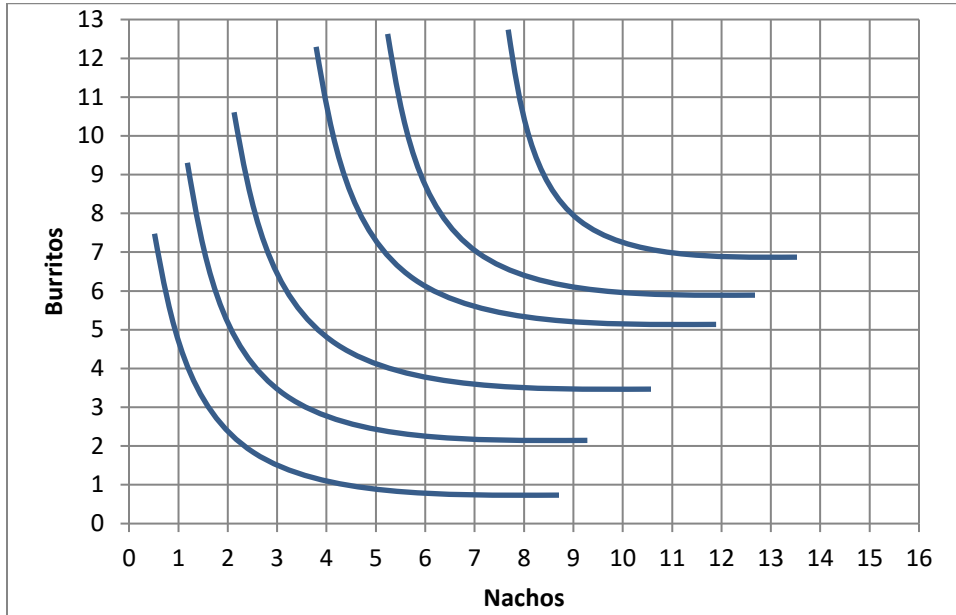e. What must be the price of sandwiches?

$

f. What must be the price of a gallon of gasoline?

$

(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?
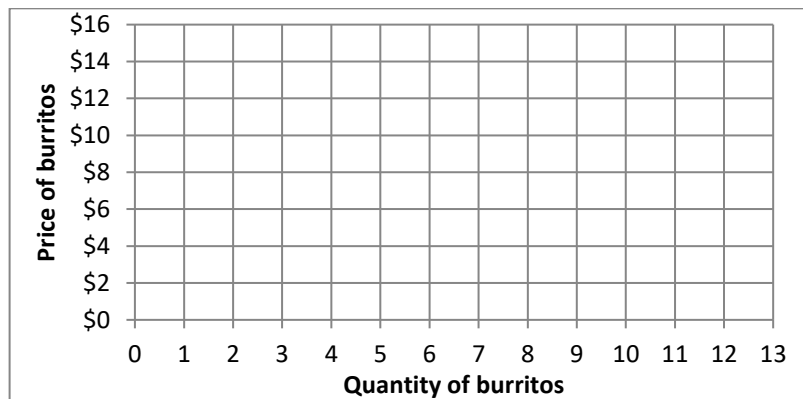
burritos

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 city government is considering building a bike trail. The following are cost and benefit estimates according to the length of the bike trail.

Miles	Total cost	Total benefit	Marginal cost per mile	Marginal benefit per mile
0	$ 0	$0		
			$ thousand	$ thousand
2	$40 thousand	$180 thousand		
			$ thousand	$ thousand
4	$90 thousand	$280 thousand		
			$ thousand	$ thousand
6	$150 thousand	$320 thousand		
			$ thousand	$ thousand
8	$230 thousand	$340 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 bike trail be? (Answer must be 0, 2, 4, 6, or 8).

miles

(4) [Business revenue and cost—definitions: 3 pts] Insert the appropriate term from the list below in each box. The same term may be entered in more than one box.

Total revenue   *Average revenue*   *Marginal revenue*
*Total cost*   *Average cost*   *Marginal cost*

a. Increase in total revenue from producing and selling another unit of output.

b. Change in cost divided by change in output.

c. Total cost divided by the quantity of output.

(5) [Discounting: 4 pts] Answer the following questions, assuming the interest rate is **10 %.**
a. Suppose a particular project will *cost* a firm $3000 today, but will bring $1500 in revenue one year from today, and $2000 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

(6) [Short-run cost curves and supply: 20 pts] ABC Manufacturing Company makes a small part used in automobiles. ABC 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.
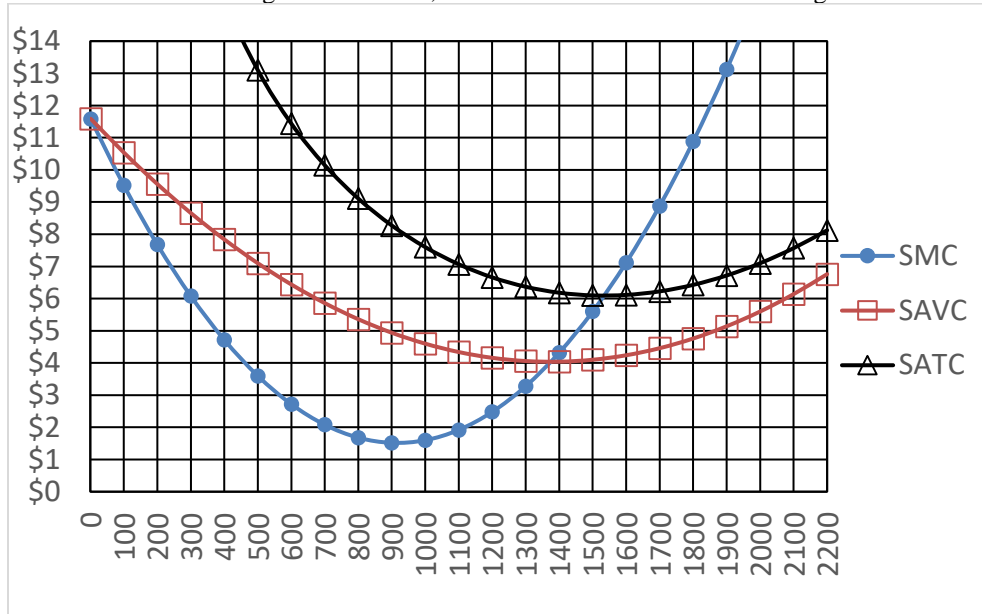
Suppose the company were currently producing 1500 parts for some unknown reason.

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 700 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 700 to 701 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 $11. 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 $11?

_____

i. Suppose the price of parts is $2. 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 $2?

_____

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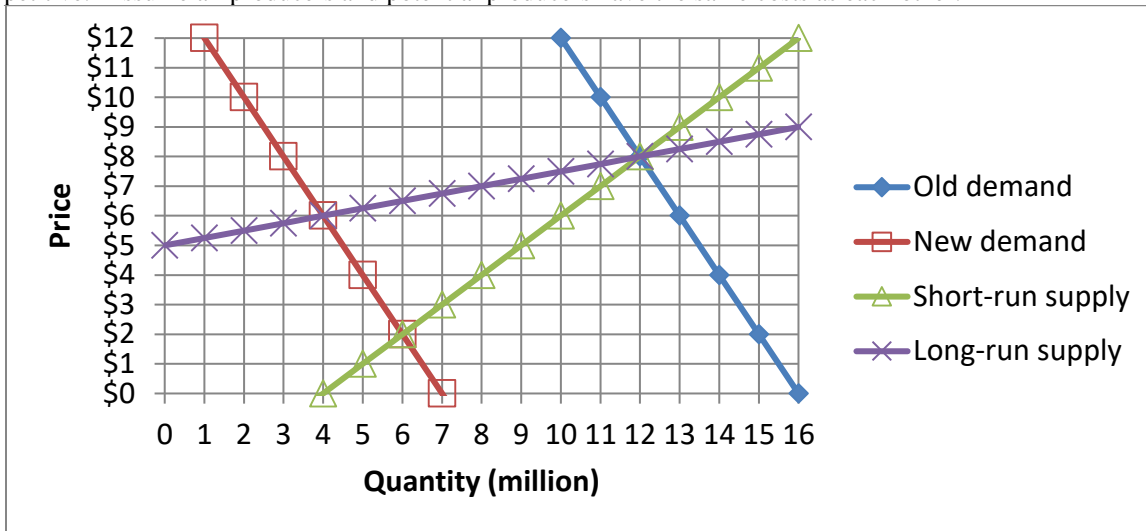
Initially the market is in long-run equilibrium, with the demand curve given by "old demand" and the short-run supply curve given by "short-run supply" as shown in the graph.

a. What is the initial equilibrium price?

$

b. What is the initial equilibrium quantity?

million pairs

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

$

Suppose that mittens suddenly become unpopular, 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 pairs

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

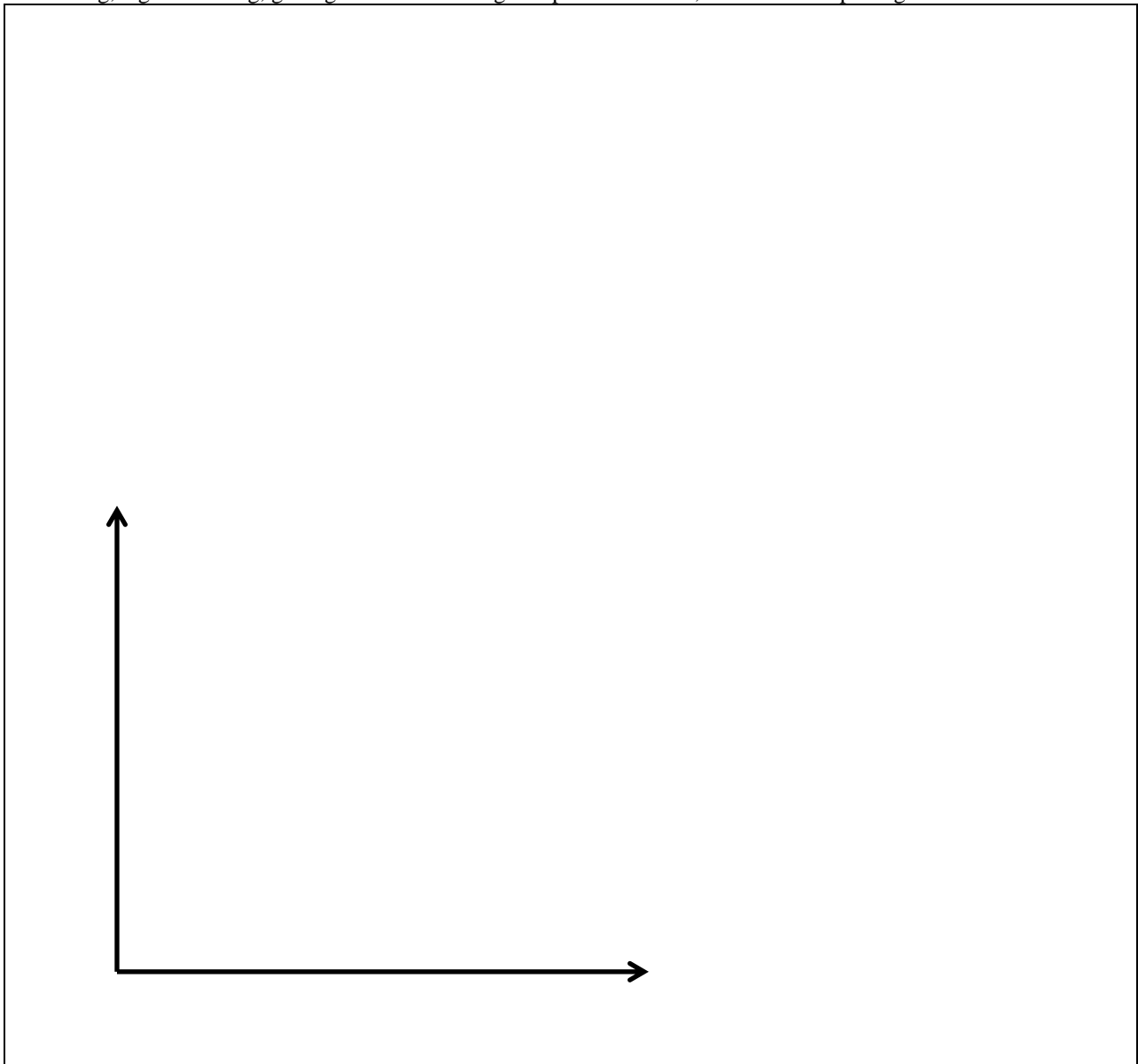Now, consider the **long-run** market response to this demand shift.

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 pairs

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) Consider the following statement. "To maximize profit, a business should keep its costs as low as possible. So it should always operate at the output level where its average cost is lowest, regardless of the product price." Do you agree or disagree? Justify your answer using a graph of the business's cost curves.

(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 value of any sunk costs.* (Ignore the graph.)

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]