# EXAMINATION 3 VERSION A
"Choices Underlying Supply and Demand"
November 3, 2017

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, 13 pts total]

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

(2) In the graph below, the rotation of 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.
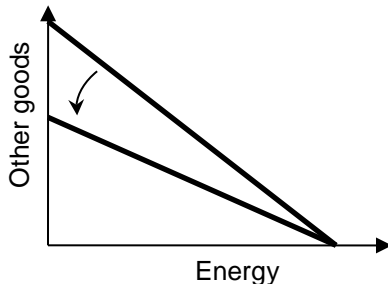
(3) The shape and position of a person's indifference curves depend on
a.   their preferences for different bundles.
b.   their income.
c.   the prices they face in the market.
d.   all of the above.

(4) The indifference-curve graph below shows Beth's preferences. It reveals that, for Beth, coffee and donuts are
a.   perfect squares.
b.   perfect substitutes.
c.   perfect complements.
d.   perfectly elastic.
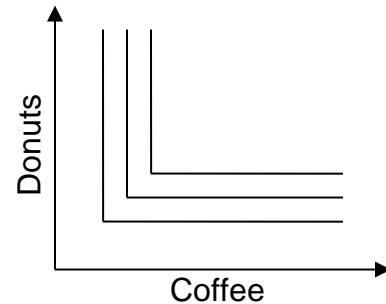
(5) The graph below shows Gotham City's marginal cost (MC) and marginal benefit (MB) of fire stations, in millions of dollars. Gotham City should have
a.   zero fire stations.
b.   20 fire stations.
c.   40 fire stations.
d.   60 fire stations.
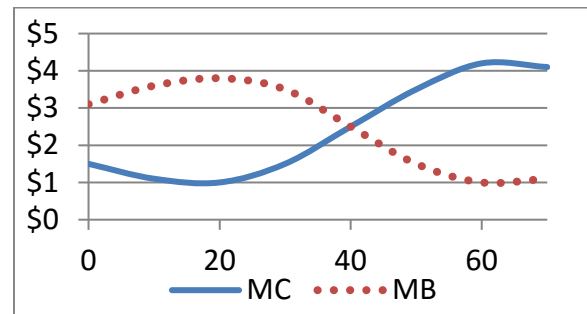
(6) Which is *not* a good reason to believe that business firms maximize profit?
a.   The owners of firms get to keep the profits so they have an incentive to keep profits high.
b.   Maximizing profit is good for society and firms wish to maximize social welfare.
c.   Firms which do not maximize profit are often pushed out of the market by firms that do.
d.   Firms whose managers resist maximizing profit are likely to be taken over by new owners who appoint managers more willing and able to maximize profit.

(7) 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.

(8) At its current level of output, ABC Company's marginal cost is $10, its average cost is $7, and its marginal revenue is $15. If ABC produces and sells one more unit of output, its profit will
a.   increase by $3.
b.   increase by $5.
c.   increase by $8.
d.   increase by $15.
e.   remain constant.

(9) If a firm takes the market price as given, its *marginal revenue* curve is
a.   a downward-sloping line.
b.   a horizontal line.
c.   an upward-sloping line through the origin.
d.   a downward-sloping curve with increasing slope.
e.   an upward-sloping curve with decreasing slope.

(10) In the *short run*, a firm should shut down if its revenue is insufficient to pay even its
a.   accounting cost.
b.   fixed cost.
c.   variable cost.
d.   total cost.

(11) The formula for discounting shows that the present discounted value of a payment to be received in the future is *greater,*
a.   the lower the interest rate (or discount rate).
b.   the longer the wait until the payment is received.
c.   Both (a) and (b).
d.   Neither (a) nor (b).

(12) The short-run supply curve shifts to the left when
a.   new firms enter the industry.
b.   firms exit the industry.
c.   demand becomes more elastic.
d.   cost curves fall.
e.   None of the above.

(13) *Price equals average cost* in a competitive industry in long-run equilibrium because
a.   business owners have a sense of fairness.
b.   individual firms adjust their output levels using the rule "price equals average cost" 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 choice and demand: 16 pts]   The indifference curves in the graph below represent Anna's preferences for cookies and hamburgers.
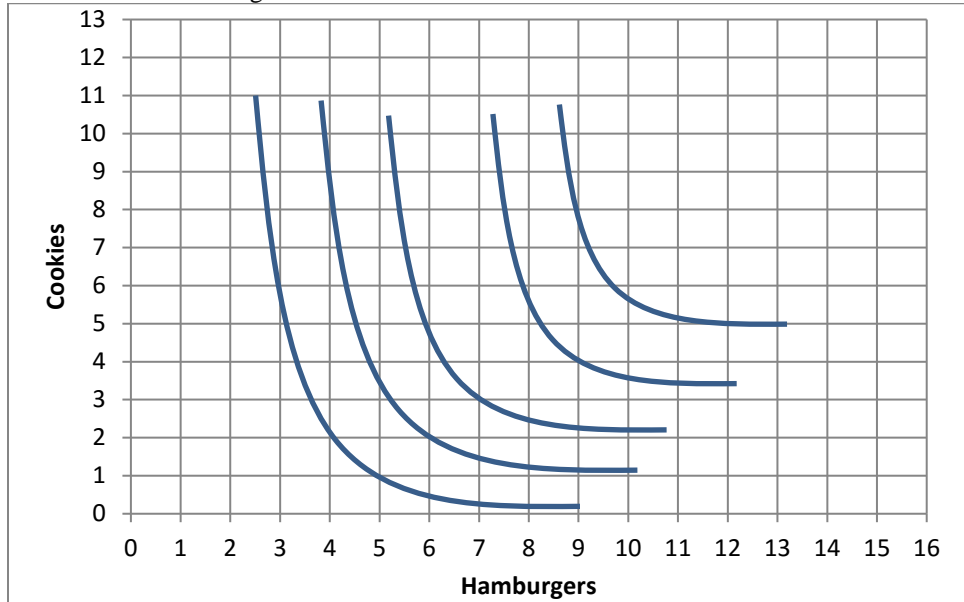
a. Would Anna rather have 4 hamburgers and 9 cookies, or 6 hamburgers and 5 cookies?

b. Would Anna rather have 7 hamburgers and 3 cookies, or 10 hamburgers and 1 cookie?

| hamburgers		cookies
	and	
hamburgers		cookies
	and	

Suppose Anna has a lunch budget of $30 to spend on hamburgers and cookies. The price of cookies is $3.

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

d. How many hamburgers will Anna buy if the price of hamburgers is $6?

	hamburgers

e. **Using a straightedge**, carefully draw Anna's budget line when the price of hamburgers is $3. Label this budget line "B".

f. How many hamburgers will Anna buy if the price of hamburgers is $3?

	hamburgers

g. Plot two points on Anna's demand curve for hamburgers, and sketch her demand curve at right.
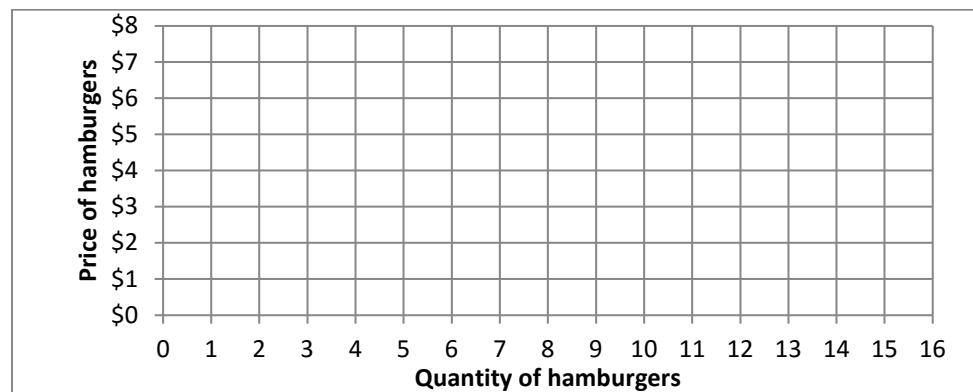
(2) [Rational choice: 10 pts] The state government is considering building a bridge. The following are cost and benefit estimates for bridges of different sizes.

Lanes	Total cost	Total benefit	Marginal cost per lane	Marginal benefit per lane
0	$ 0	$0		
			$ million	$ million
2	$20 million	$40 million		
			$ million	$ million
4	$32 million	$60 million		
			$ million	$ million
6	$40 million	$72 million		
			$ million	$ million
8	$48 million	$76 million		

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 many lanes should the bridge have? (Answer must be 0, 2, 4, 6, or 8).   lanes

(3) [Basic definitions, cost and revenue: 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. Change in cost divided by change in output.

b. Money paid for all inputs purchased or hired.

c. Slope of total revenue curve.

(4) [Discounting: 4 pts] Answer the following questions, assuming the interest rate is **4 %.**

a. Suppose a particular project will *cost* a firm $5000 today, but will bring $2000 in revenue a year from today, and $4000 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 $3 million in profit every year, perpetually, beginning a year from today. Compute the value of the firm.

$ million

(5) [Short-run cost: 26 pts] Acme Manufacturing Company operates a small plant whose daily cost is **$ 120** whether the plant is idle or running. In addition, the company has labor, energy, and materials costs that depend on the amount of output, as shown in the schedule below.

Units of output per day	Cost of labor, energy, and materials	SAVC	SAFC	SATC	SMC
0	$ 0				
					$
5	$40	$	$	$	
					$
10	$60	$	$	$	
					$
15	$120	$	$	$	
					$
20	$240	$	$	$	

a. [4 pts] Compute the company's short-run average variable cost schedule (SAVC). Insert your answers above.
b. [4 pts] Compute the company's short-run average fixed cost schedule (SAFC). Insert your answers above.
c. [4 pts] Compute the company's short-run average total cost schedule (SATC). Insert your answers above.
d. [4 pts] Compute the company's short-run marginal cost schedule (SMC). Insert your answers above.

e. [2 pts] What is Acme's shutdown price? $

f. [2 pts] What is Acme's breakeven price? $

g. [2 pts] If the price of Acme's output is **$ 18**, how many units of output should it   units
    produce to maximize profit in the short run: 0 units, 5 units, 10 units, 15 units, or
    20 units?

h. [2 pts] Will Acme enjoy a *profit* or a *loss* ?

i. [2 pts] How much? $

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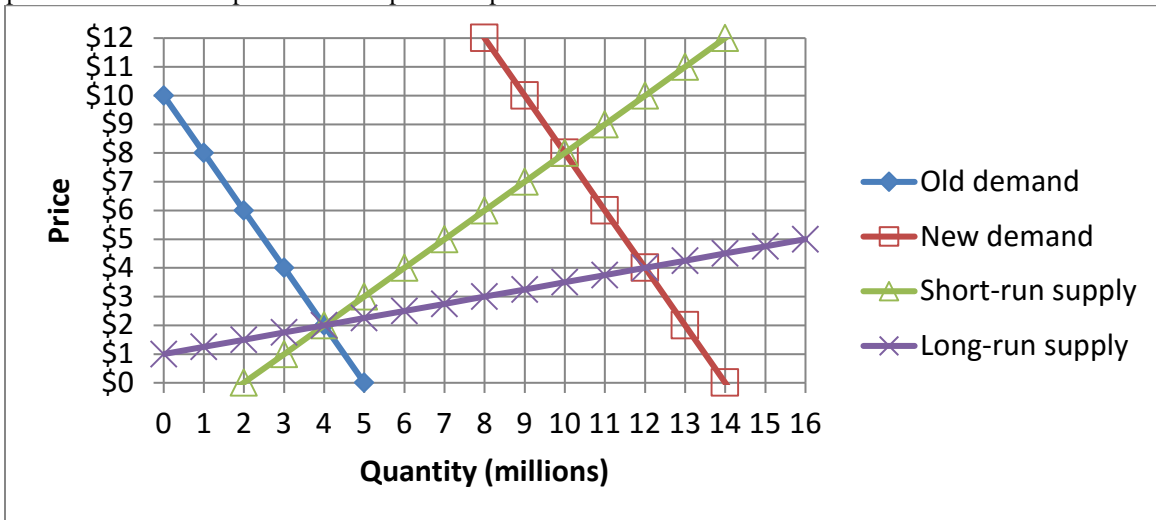
Initially the market is in long-run equilibrium, with the demand curve given by "old demand" and the short-run supply curve given by "short-run supply" as shown in the graph.

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 cupcakes suddenly become popular, 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 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 $1000 for an average-size house. You know that you can get all the business you can handle if you just put up a few signs. You review your costs last year in order to decide what to do this year. You discover that last year, your average cost per house was about $800, and your marginal cost per house was about $1200. 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) Suppose last month you paid $500 for a non-refundable airline ticket for your vacation trip next month. Your remaining costs for hotels, meals, and so forth will be $300. However, you now feel that the benefit to you from this vacation will be only about $400. Should you take this vacation trip or cancel it? Justify your answer, identifying any sunk cost(s).

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]