ECON 120 - Regulation & Antitrust Policy
Drake University, Spring 2018
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Signature: _____

Printed name: _____

FINAL EXAMINATION
May 15, 2018

INSTRUCTIONS: This exam is closed-book, closed-notes. Simple calculators are permitted, but graphing calculators or calculators with alphabetical keyboards are NOT permitted. Mobile phones or other wireless devices are NOT permitted. Fractional answers are acceptable. Decimal answers, if rounded, must be correct to at least three significant digits. Points will be subtracted for illegible writing or incorrect rounding. Point values for each question are noted in brackets. Maximum total points are 200.

I. Multiple choice: Please circle the one best answer to each question. [2 pts each, 64 pts total]

(1) Which of the following does *not* enforce antitrust policy in the United States?
a. Department of Justice.
b. Federal Trade Commission.
c. Department of Commerce.
d. All of the above enforce antitrust policy.
e. None of the above enforce antitrust policy.

(2) "Economies of scale" mean that the firm's average cost curve
a. is horizontal.
b. is vertical.
c. slopes up.
d. slopes down.

(3) Suppose there is a change in government policy affecting the automobile industry. Which of the following outcomes would pass the compensation test of Kaldor and Hicks?
a. Automobile companies gain $50 billion while consumers lose $100 billion.
b. Automobile companies gain $50 billion while consumers are not affected.
c. Automobile companies gain $100 billion while consumers lose $50 billion.
d. Both (b) and (c).
e. All of the above.

(4) Monopoly causes economic inefficiency because
a. monopolists enjoy profits, called monopoly rents, even in the long run.
b. monopolists are usually wealthier than their customers.
c. some consumers, willing to pay the marginal cost of the product, are not served.
d. monopoly prices are unfair.
e. it is unfair for one firm to control the market.

(5) An action by firms that is *per se* illegal
a. may be illegal if it decreases other firms' profits.
b. may be illegal if it appears to lessen competition.
c. may be illegal if it increases the firm's profit.
d. is always illegal regardless of circumstances.

(6) The Cournot model of oligopoly assumes that each firm maximizes its profit while taking its rivals'
a. costs as given.
b. prices as given.
c. output quantities as given.
d. all of the above.

(7) Suppose a certain industry is served by a symmetric Cournot oligopoly of 5 firms. If the elasticity of market demand is -2, the Lerner index (or "price-cost margin") in equilibrium equals
a. 0.1 .
b. 0.2 .
c. 0.3 .
d. 0.5 .

(8) A cartel member's "trigger strategy" discourages other cartel members from cheating by threatening to
a. admit new members to the cartel.
b. raise members' costs.
c. raise the market price.
d. lower the market price to the competitive level for a long time.

(9) Under the Department of Justice's corporate leniency program, amnesty can be given to
a. any cartel participants that agree to leave the cartel.
b. any cartel participants that cooperate with the government investigation.
c. the first cartel member that cooperates with the government investigation.
d. the last cartel member that cooperates with the government investigation.

(10) Although profits are greater in more highly concentrated industries, social welfare may also be greater in such industries, according to the
a. differential efficiency hypothesis.
b. Bertrand model of price competition.
c. permanent income hypothesis.
d. collusion hypothesis.

(11) Which statute required prior notification of mergers to the Federal Trade Commission and the Antitrust Division of the Department of Justice?
a. Federal Trade Commission Act.
b. Celler-Kefauver Act.
c. Sherman Act Section 2.
d. Hart-Scott-Rodino Act.
e. Clayton Act.

(12) Typically, if the definition of the market is broadened to include more products believed to be close substitutes, then the Hirschman-Herfindahl index (HHI) will
a. increase.
b. decrease.
c. become negative.
d. The HHI is not usually affected by market definition.

(13) Why might a manufacturer of a product require retailers to maintain a *minimum* retail price?
a. To encourage retailers to provide marketing services like showrooms and personalized sales.
b. To encourage discount retailers like Walmart to sell the product.
c. To increase the quantity demanded by consumers.
d. To prevent "double marginalization."

(14) To be convicted of violating the Sherman Act Section 2, firms must possess monopoly power and
a. have higher cost than any potential rival.
b. enjoy above-normal profit.
c. have lower cost than any potential rival.
d. show intent to monopolize a market.

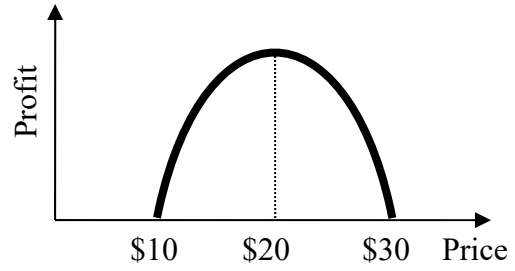
(15) Predatory pricing can be profitable only if predation is followed by a period of
a. accommodation.
b. losses.
c. competition.
d. recoupment.
e. price discrimination.

(16) Compared to single-price monopoly, market-segmenting price discrimination
a. results in no change in social welfare.
b. always increases social welfare.
c. always decreases social welfare.
d. may increase or decrease social welfare.

(17) The Supreme Court often makes the mistake of "protecting competitors instead of protecting competition," according to Justice Potter Stewart's dissenting view in the case of
a. Standard Oil v. U.S (1911).
b. U.S. v. U.S. Steel (1920).
c. U.S. v. Alcoa (1945).
d. U.S. v. United Shoe Machinery (1953).
e. Utah Pie v. Continental Baking (1967).
f. Berkey Photo v. Kodak (1979).

(18) The principle that a regulated firm "is entitled to ask for a fair return" on investment was established by the Supreme Court in the case of
a. Nebbia v. New York.
b. Smyth v. Ames.
c. Standard Oil v. United States.
d. United States v. United Shoe.

The next three questions refer to the following graph, which relates the economic profit of a regulated firm to the price of its output. Assume that MC=AC=$10 for this firm.

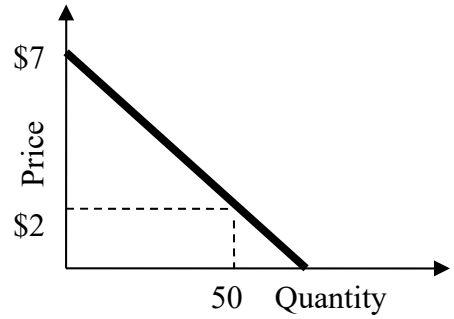


(19) For the graph above, the "capture theory" of regulation predicts that regulators will set price
a. between zero and $10.
b. at $10 exactly.
c. between $10 and $20.
d. at $20 exactly.
e. between $20 and $30.
f. at $30 exactly.
g. above $30.

(20) For the graph above, the Stigler-Peltzman theory of regulation predicts that regulators will set price
a. between zero and $10.
b. at $10 exactly.
c. between $10 and $20.
d. at $20 exactly.
e. between $20 and $30.
f. at $30 exactly.
g. above $30.

(21) For the graph above, the "public interest theory" (also called the "normative analysis as positive theory") of regulation predicts that regulators will set price
a. between zero and $10.
b. at $10 exactly.
c. between $10 and $20.
d. at $20 exactly.
e. between $20 and $30.
f. at $30 exactly.
g. above $30.

The next question refers to the following graph of a demand curve for a typical public-utility customer.



(22) In the graph above, if the per-unit price is set at $2, then the maximum entry fee this customer will pay is
a. $2.
b. $7.
c. $50.
d. $100.
e. $125.
f. $225.

(23) The *rate base* for a regulated public utility is
a. the number of customers it serves.
b. the monthly service fee for its lowest-price customers.
c. the minimum usage price it may charge.
d. the value of its plant and equipment.

(24) According to Kahn's definition, the cost of an input that can be used to produce both of two outputs, where the amount needed of the input depends on the maximum of the two outputs, is called
a. an average cost.
b. a fixed cost.
c. a common cost.
d. a joint cost.
e. a fully-distributed cost.

(25) If a utility switches from uniform pricing to peak-load pricing, it will require
a. more capacity.
b. the same capacity.
c. less capacity.
d. Cannot be determined from information given.

(26) Assume that in some wholesale electricity market, all producers are paid the same equilibrium price, and that no firm has the ability to manipulate the final price. Then each firm's optimal bid is
a. equal to its true marginal cost.
b. greater than its true marginal cost.
c. less than its true marginal cost.
d. zero.

(27) One lesson from the California electricity crisis of 2000-2001 is that if retail electricity prices are fixed but wholesale prices fluctuate,
a. generators may malfunction, causing a blackout.
b. transmission lines may develop excess capacity.
c. utilities are forced to bear too much price risk.
d. retail customers are forced to bear too much price risk.

(28) Why was trucking regulated?
a. Shippers lobbied heavily for regulation of trucking.
b. Trucking is a natural monopoly.
c. Railroads were losing money.
d. Informal cartels had been keeping rates above competitive levels.
e. All of the above.

(29) Deregulation of railroads caused
a. an increase in railroad profits.
b. a shift in traffic from bulk commodities to manufactures.
c. a decrease in spending on track, structures and rolling stock.
d. an increase in the number of communities served.
e. All of the above.

(30) One group that was harmed by deregulation of trucking was
a. consumers.
b. unionized truck drivers.
c. shippers.
d. all of the above.

(31) From 1938 when the Civil Aeronautics Board was created to 1978 when the Airline Deregulation Act was passed, the CAB received 79 applications for new trunk airlines. How many applications were approved?
a. 0.
b. 5.
c. 12.
d. 39.
e. 79.

(32) Airlines' shift from a point-to-point route system to a hub-and-spoke system tended to reduce
a. the frequency of departures.
b. airlines' unit (per-passenger) costs.
c. total travel time from origin to destination.
d. the number of times passengers had to change planes.
e. load factors.

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) [Antitrust statutes: 4 pts] Insert one of the following statutes in each box. You may insert the same statute into more than one box.

Sherman Act Section 1 *Sherman Act Section 2*
Clayton Act Section 7 *Federal Trade Commission Act*

a. "No corporation engaged in commerce shall acquire, directly or indirectly, the whole or any part of the stock … of another corporation engaged also in commerce, where ... the effect of such acquisition may be substantially to lessen competition, or to tend to create a monopoly."	
b. "Every person who shall monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to monopolize any part of the trade or commerce … shall be deemed guilty of a felony…"	
c. "Unfair methods of competition in or affecting commerce, and unfair or deceptive acts or practices in or affecting commerce, are declared unlawful."	
d. "Every contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce … is declared to be illegal."	

(2) [Cournot duopoly: 14 pts] Suppose a market is served by only two firms: Acme Products Company and Best Products Company. Suppose the two firms form a *symmetric Cournot duopoly*, each firm setting its own quantity while taking the other firm's quantity as given. Let q_A = Acme's quantity and q_B = Best's quantity, so that total market quantity $Q = q_A + q_B$. The market demand curve is $P = 15 - (Q/10)$. Each firm has constant marginal and average cost equal to \$3. Circle your final answers. Use the space at the bottom of the next page for scratch work.

a. Find an expression for Acme's revenue, as a function of its own quantity and the quantity produced by the other firm: $TR_A(q_A,q_B)$. [Hint: By definition, $TR_A = P\ q_A$. Here, replace P by the equation for the demand curve, and then replace Q by $(q_A + q_B)$.]

b. Find an expression for Acme's marginal revenue, as a function of its own quantity and the quantity produced by the other firm: $MR_A(q_A,q_B)$. [Hint: $MR_A = dTR_A / dq_A$.]

c. Find an expression for Acme's reaction function (or best reply function), showing how much Acme will produce for any given level of quantity set by the other firm: $q_A^* = f(q_B)$. [Hint: Set $MR_A = MC$ and solve for q_A as a function of q_B .]

d. Assume the equilibrium is symmetric (that is, assume $q_A^* = q_B^*$) and compute Ames's equilibrium quantity q_A^*.

Question continues on next page.

e. Compute total market quantity Q* and the equilibrium price P*.

f. Compute the Lerner index of market power [(P-MC)/P].

g. Compute the social deadweight loss from Cournot duopoly.

(3) [Joint profit maximization: 10 pts] Suppose the two firms in the previous problem form a cartel to maximize the sum of their profits. Show your work and circle your final answers.

a. Find the cartel's marginal revenue function.

b. Compute the cartel's profit-maximizing level of output Q*.

c. Compute the cartel's profit-maximizing price P*.

d. Compute the cartel's Lerner index of market power [(P-MC)/P].

e. Compute the social deadweight loss from the cartel.

(4) [HHI and merger guidelines: 12 pts] The following are recent estimates of market shares of U.S. cell phone companies.[1]

Firm	AT&T	Verizon	T-Mobile	Sprint	US Cellular
Market share	36%	31%	18%	14%	1%

a. Compute the current value of the Hirschman-Herfindahl index.

b. Under the 2010 DOJ-FTC *Horizontal Merger Guidelines*, would this industry be classified as "unconcentrated," "moderately concentrated," or "highly concentrated"?

Now suppose T-Mobile were to merge with Spring.

c. Compute the postmerger value of the Hirschman-Herfindahl index.

d. Under the 2010 *Guidelines*, would this industry now be classified as "unconcentrated," "moderately concentrated," or "highly concentrated"?

e. On the basis of these calculations alone, under the 2010 *Guidelines*, would this merger be deemed "**unlikely to have adverse competitive effects**," or would it "**raise significant competitive concerns**," or would it be "**presumed to be likely to enhance market power**"? Why?

(5) [Successive monopolies with fixed proportions: 18 pts] Suppose an upstream monopoly firm produces a component that is used by a downstream firm to make a particular appliance. The upstream firm has constant marginal cost (equal to average cost) of MC_C= \$2. Each appliance requires exactly one component and \$3 of other inputs in fixed proportion. Therefore the downstream firm has constant marginal cost (equal to average cost) of \$3 plus the price of the component, P_C, which is set by the upstream firm. The key assumptions are

Marginal and average cost of component:	$MC_C = AC_C = \$2.$
Marginal and average cost of appliance:	$MC_A = AC_A = \$3 + P_C$
Demand for appliance:	$P_A = 15 – (Q/100).$

a. [2 pts] Find the equation for the marginal revenue curve for the appliance. [Hint: If demand is linear, marginal revenue has the same vertical intercept, but twice the slope, as the demand curve.]

$MR_A =$

[Question continues on next page.]

[1] Elizabeth Winkler, Will T-Mobile Keep Disrupting After the Deal? *Wall Street Journal*, April 30, 2018, https://www.wsj.com/articles/will-t-mobile-keep-disrupting-after-the-deal-1525121067 .

Now compare market outcomes under two scenarios: (i) upstream and downstream markets are both monopolized, and (ii) upstream and downstream are served by a vertically-integrated monopoly.

(i) First suppose both upstream and downstream markets are both monopolized. This is the scenario of "successive monopolies" or "double marginalization."

b. [2 pts] Find the equation for the derived demand curve for component. [Hint: Set the marginal cost of the appliances equal to MR_A and solve for P_C.]

$P_C =$

c. [2 pts] Find the equation for the marginal revenue curve for component. [Hint: For linear demand curves, marginal revenue has the same vertical intercept, but twice the slope, as the demand curve.]

$MR_C =$

Now compute the quantity of component (and thus appliances) sold Q, the price of component P_C, the upstream component monopolist's profit, the price of appliances P_A, and the downstream appliance monopoly's profit. Insert your answers in column (i) in the **Table of Results** below.

(ii) Second, assume the upstream and downstream industries are served by a vertically-integrated monopoly. The marginal cost of appliances for the vertically-integrated monopoly is therefore $MC_A = \$2 + \$3$.

Now compute the quantity of appliances, the price of appliances P_A, and the integrated monopolist's profit. Insert your answers in column (ii) of the Table of Results below.

Table of Results [9 pts]	**(i) Successive monopolies**	**(ii) Vertically integrated monopoly**
Q = quantity of components (and appliances)		
P_C = price of component	$	
Profit of upstream firm	$	
P_A = price of appliances	$	$
Profit of downstream firm	$	
Total upstream + downstream profits	$	$

d. [3 pts] Suppose this industry were initially organized as successive monopolies. Then suppose the upstream firm proposed to merge with the downstream firm. Should the government try to block the merger? Why or why not?

(6) [Tying: 14 pts] Suppose a monopoly software company believes that the representative customers below are willing to pay the following amounts for three programs.

	Word processor	Spreadsheet	Presentation
Attorney	$350	$200	$50
Accountant	$150	$300	$20
Sales representative	$50	$100	$250

Suppose each program were priced separately, and suppose the software company wishes to maximize revenue.

a. What price should the company set for the word-processing program? $

b. What price should the company set for the spreadsheet program? $

c. What price should the company set for the presentation program? $

d. How much revenue would the company receive in total for all three programs and all three customers? $

Suppose all three programs were bundled and priced as a single "office" package. Again assume the software company wishes to maximize revenue.

e. What price should the company set for the package of three programs? $

f. How much revenue would the company receive in total for all three customers? $

g. Should the company sell the programs *separately* or as a *package*? (Assume the marginal cost of all programs is zero.)

(7) [Ramsey pricing: 4 pts] Suppose a regulated monopoly produces three products with the following price elasticities of demand.

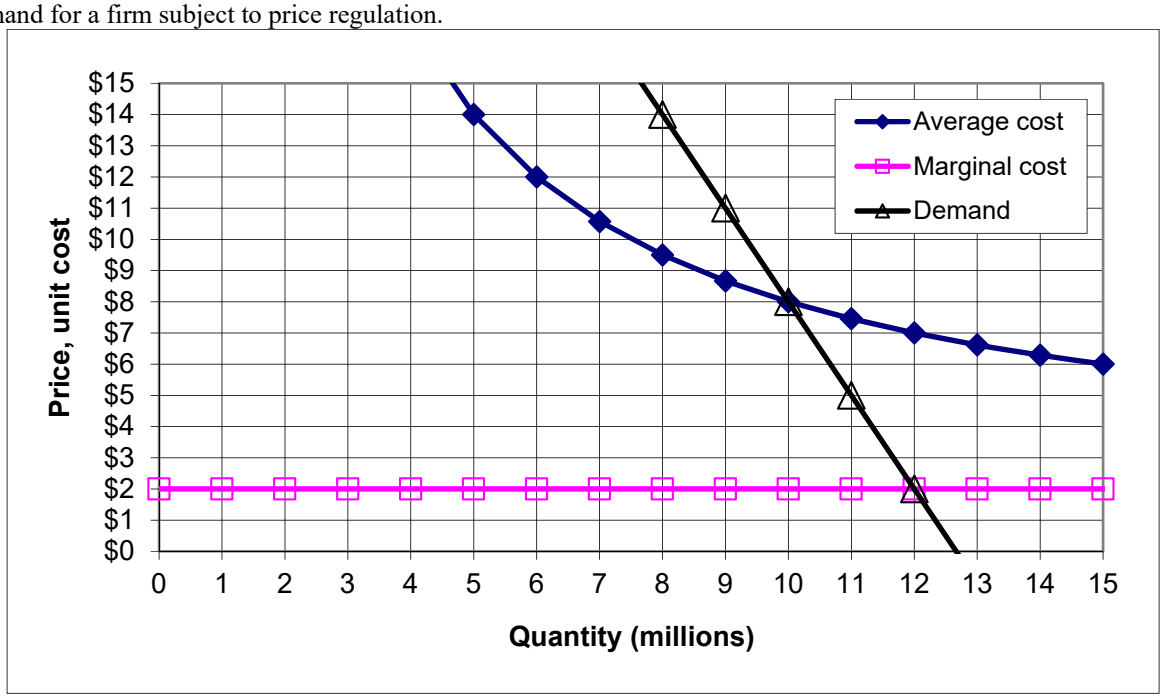
	Price elasticity
Product (i)	-3.0
Product (ii)	-4.5
Product (iii)	-1.5

Unfortunately, due to economies of scale, marginal cost pricing will not completely cover the monopoly's costs. Suppose Ramsey pricing is used to recover the extra costs. (Assume that cross-price elasticities of demand for these products are zero.)

a. Which product should have the highest markup $\left(\frac{P-MC}{P}\right)$?

b. If the Ramsey markup for product (i) is 15%, what should be the markup for product (ii)?. %

(8) [Pricing with economies of scale: 20 pts] The following graph shows average cost, marginal cost, and market demand for a firm subject to price regulation.



First, suppose the regulator uses marginal-cost pricing.

a. What price would be set? $

b. Does the firm experience economic profit, loss, or neither?

c. How much? $ million

d. Compute the social deadweight loss from this policy. $ million

Second, suppose the regulator uses average-cost pricing.

e. What price would be set? $

f. Does the firm experience economic profit, loss, or neither?

g. How much? $ million

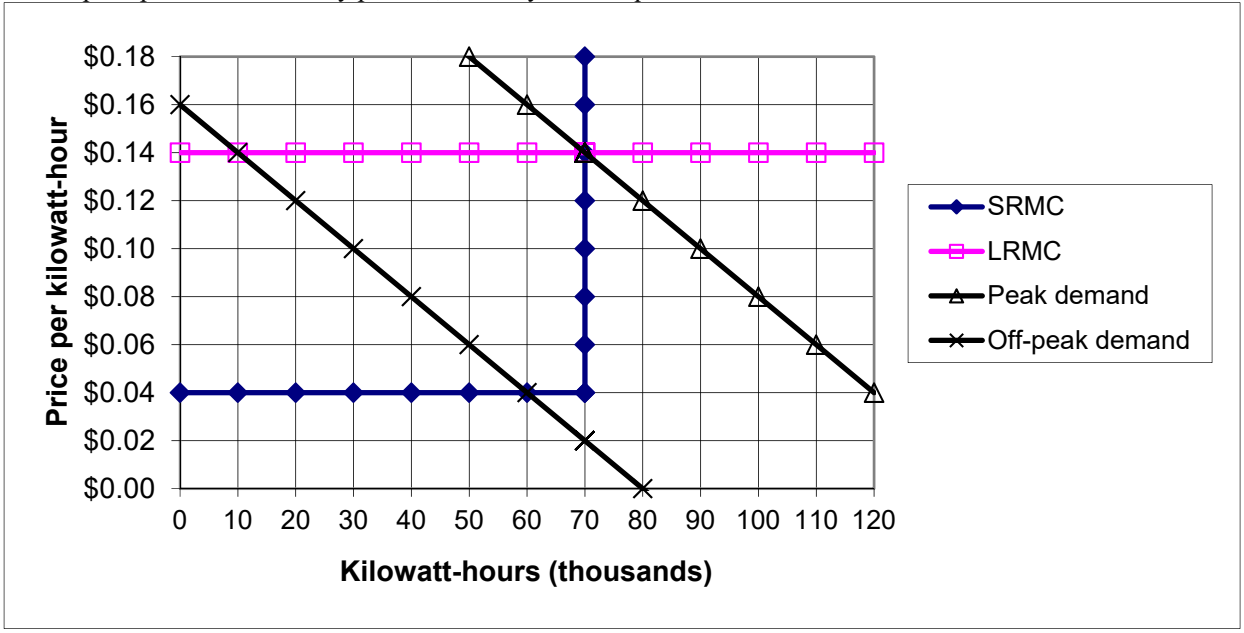
h. Compute the social deadweight loss from this policy. $ million

Third, suppose the regulator uses a two-part tariff to maximize social welfare (efficiency) while permitting the firm to break even.

i. What per-unit price would be set? $

j. What per-customer fixed charge (or "entry fee") would be set? Assume the firm has **2** million customers with identical individual demands. $

(9) [Peak-load pricing: 22 pts] Suppose cost and demand for electricity are given by the following graph. Costs are shown as short-run marginal cost (SRMC) and long-run marginal cost (LRMC) curves. LRMC includes the cost of building new capacity. Demands are shown as peak demand and off-peak demand. Assume for simplicity that peak and off-peak periods are the only periods, and they are of equal duration.



a. Explain in words why SRMC bends up vertically at 70 thousand kilowatt hours.

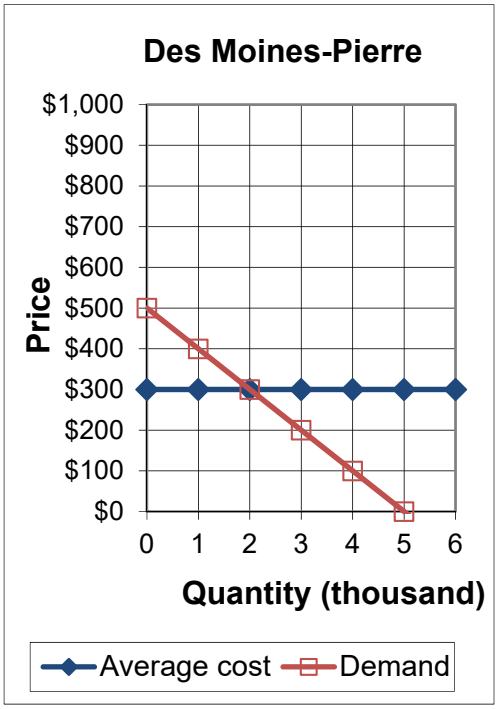
First, suppose efficient peak-load pricing is used.

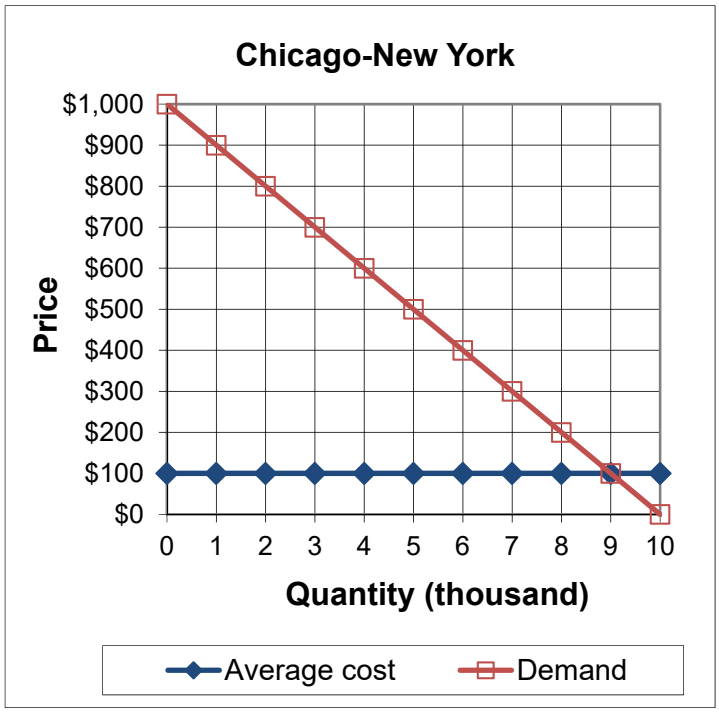
b. Find the price of electricity during the peak period.	$ per kWh
c. Find the quantity of electricity demanded during the peak period.	thousand kWh
d. Find the price of electricity during the off-peak period	$ per kWh
e. Find the quantity of electricity demanded during the off-peak period.	thousand kWh

Now suppose instead a uniform price of **$ 0.12** per kilowatt-hour is used in both peak and off-peak periods.

f. Find the quantity of electricity demanded during the peak period.	thousand kWh
g. Find the quantity of electricity demanded during the off-peak period.	thousand kWh
h. Would generation capacity have to *increase*, *decrease*, or *stay the same* to accommodate uniform pricing?	
i. By how much?	thousand kWh
j. In the graph above, shade the areas representing social deadweight loss from uniform pricing.	
k. Compute the social deadweight loss from uniform pricing.	$ thousand

(10) [Cross-subsidization: 12 pts] The following graphs show the demands and average costs for air travel between Des Moines and Pierre, and between Chicago and New York. Assume that average cost equals marginal cost. Average cost is lower in the Chicago-New York market because larger planes can be used.





Suppose a regulated airline is required to set the airfare between Des Moines and Pierre at **$100**.

a. Compute the social deadweight loss in the Des Moines-Pierre market from this pricing policy. $ _____ thousand

b. Compute the loss that the firm will experience in the Des Moines-Pierre market from this pricing policy. $ _____ thousand

Suppose the regulated firm is permitted to recover its loss in the Des Moines-Pierre market by raising price above average cost in the Chicago-New York market.

c. What is the lowest price in the Chicago-New York market that would allow the firm to recover its loss in the Des Moines-Pierre market? $ _____

d. Compute the social deadweight loss in the Chicago-New York market from this pricing policy. $ _____ thousand

e. Shade both areas of deadweight loss in the graphs above.

f. Compute the social loss from regulation with cross-subsidization—that is, the social deadweight loss in the Des Moines-Pierre market plus the social deadweight loss in the Chicago-New York market. $ _____ thousand

III. Critical thinking: Write a one-paragraph essay answering *just one* question below (your choice). Full credit requires correct economic reasoning, legible writing, good grammar including complete sentences, and accurate spelling. [6 pts]

(1) Martin O'Malley was briefly a candidate for president in 2016. He promised to "restore America's competition and antitrust laws," according to his website. "Our nation's antitrust laws were built to protect fair and competitive markets where small businesses, small farmers, and innovation could thrive. But [previous administrations] reinterpreted those laws to protect 'efficiency' instead, allowing bigger and bigger corporations to shut out competition in many once-vibrant areas of our economy." Would economists agree with Mr. O'Malley on the purpose of antitrust laws? Why or why not?

(2) Many city governments build parking garages (sometimes called "parking ramps") in downtown commercial districts. Garages are expensive to construct, so often the money to pay for their construction is recovered through parking fees. Garages are intensively used on weekdays (Monday-Friday) but only lightly used on weekends (Saturday-Sunday).
   a. Is garage construction a *joint cost* or a *common cost*[i] for weekday parking and weekend parking? Why?
   b. Assume that the city government wants to set parking fees so that price equals marginal cost. How should parking fees be set? Why? Illustrate your answer with a carefully-drawn and labeled diagram of parking demand and marginal cost.

[end of exam]

[i] Use Kahn's definitions of *common cost* and *joint costs*. Alfred E. Kahn, *The Economics of Regulation: Principles and Institutions*, Volume 1, New York: Wiley, 1970, pp.78-79.