**Name:** _____

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# AP Microeconomics — Practice Exam

**Instructions:** Section I style multiple choice (20 questions, five answer choices each, 1 point each) followed by one free-response question (10 points), 35 minutes in total. A four-function calculator is allowed, as on the real exam, but none is needed. Wrong multiple-choice answers are not penalized. On the free-response question, show your work for every calculation and draw graphs large, labeling all axes, curves, prices and quantities.

**Time Limit:** 35 minutes

**Multiple Choice** (20 questions)

**[1 point]** 1. Hobmoor Bakery is the only bakery in a small village. The table shows the daily demand for its sourdough loaves. If the bakery cuts its price from 6 dollars to 5 dollars, the marginal revenue per additional loaf, and the price elasticity of demand over this price range, are:

| Price (dollars) | Loaves demanded per day |
|---|---|
| 9 | 10 |
| 8 | 20 |
| 7 | 30 |
| 6 | 40 |
| 5 | 50 |
| 4 | 60 |
| 3 | 70 |

A. 5 dollars per loaf, and demand is elastic

B. 1 dollar per loaf, and demand is inelastic

C. 1 dollar per loaf, and demand is elastic

D. 10 dollars per loaf, and demand is unit elastic

E. Minus 1 dollar per loaf, and demand is inelastic

**[1 point]** 2. Which of the following can allow a firm to keep earning a positive economic profit in the long run? I. A government license that only one firm in the region is allowed to hold. II. Economies of scale so large that the firm's long-run average total cost is still falling at the quantity the whole market demands. III. Buyers regard the firm's product as identical to those of many rival sellers and can compare all their prices at no cost.

A. I only

B. III only

C. I and III only

D. I, II and III

E. I and II only

**[1 point]** 3. In Industry X, four firms provide nearly all of a country's mobile phone service; when one cuts its prices the others usually respond within days, and a new entrant would need a national network and spectrum licenses. In Industry Y, a city has about 200 independent coffee shops, each with its own menu, decor and location, and opening a new shop needs only a lease and an espresso machine. Which of the following correctly describes the two industries?

A. X is an oligopoly and Y is monopolistic competition, and firms in both industries face downward-sloping demand curves with marginal revenue below price

B. X is an oligopoly and Y is monopolistic competition, but firms in Y face horizontal demand curves because there are so many sellers

C. X is an oligopoly and Y is monopolistic competition, and firms in Y can earn positive economic profit in the long run because their products are differentiated

D. X is monopolistic competition and Y is an oligopoly

E. X is a monopoly, because an entrant would need a national network and licenses, and Y is perfect competition

**[1 point]** 4. Ostwick Ice Rink is the only ice rink in its region. Weekly demand for skating sessions is $Q = 120 - 4P$, where $Q$ is hundreds of sessions and $P$ is the price in dollars. The rink's marginal cost is a constant 6 dollars per session. Its profit-maximizing output and price are:

A. 9,600 sessions a week at 6 dollars

B. 6,000 sessions a week at 15 dollars

C. 4,800 sessions a week at 6 dollars

D. 4,800 sessions a week at 18 dollars

E. 7,200 sessions a week at 12 dollars

**[1 point]** 5. Tamsin's Tidal Kayaks is the only company running guided kayak trips on Lake Orra. The table shows the price it can charge for each number of trips a day and its total cost. To maximize profit, the firm should run how many trips, at what price, and earn what daily profit?

| Trips per day | Price (dollars) | Total cost (dollars) |
|---|---|---|
| 0 | 56 | 40 |
| 1 | 52 | 58 |
| 2 | 48 | 70 |
| 3 | 44 | 80 |
| 4 | 40 | 94 |
| 5 | 36 | 116 |
| 6 | 32 | 148 |
| 7 | 28 | 192 |

A. 5 trips at 36 dollars, for a profit of 64 dollars

B. 4 trips at 40 dollars, for a profit of 66 dollars

C. 6 trips at 32 dollars, for a profit of 44 dollars

D. 4 trips at 28 dollars, for a profit of 18 dollars

E. 4 trips at 40 dollars, for a profit of 106 dollars

**[1 point]** 6. Pell Harbor Ferry, an unregulated monopoly, learns that at its current fare the price elasticity of demand for crossings is 0.6 in absolute value. Its marginal cost per passenger is positive. To increase its profit, the ferry should:

A. raise the fare: a 10 percent rise cuts crossings by about 6 percent, so total revenue rises, and carrying fewer passengers lowers total cost

B. lower the fare, because a lower fare will attract enough extra passengers to raise total revenue

C. keep the fare unchanged, because with inelastic demand passengers do not respond to fare changes

D. lower the fare, because a monopolist maximizes profit where demand is inelastic

E. raise the fare and keep carrying the same number of passengers, since demand is inelastic

**[1 point]** 7. Halden Bio holds the patent on a drought-resistant wheat seed. Its marginal cost and average total cost are both a constant 12 dollars a bag. It sells 300,000 bags a month at 36 dollars a bag. Demand is a straight line, and if the seed were sold at a price equal to marginal cost, 600,000 bags a month would be sold. Compared with that competitive outcome, the monopoly's deadweight loss and the amount of consumer surplus that becomes the firm's profit are, respectively:

A. 7.2 million dollars and 3.6 million dollars a month

B. 10.8 million dollars and 7.2 million dollars a month

C. 7.2 million dollars and 7.2 million dollars a month

D. 3.6 million dollars and 10.8 million dollars a month

E. 3.6 million dollars and 7.2 million dollars a month

**[1 point]** 8. At its profit-maximizing output of 500 units, an unregulated monopolist charges a price of 40 dollars. At that output its marginal cost is 22 dollars and its average total cost is 30 dollars; its average total cost would reach its minimum, 27 dollars, at 800 units. Which of the following is correct?

A. It earns an economic profit of 5,000 dollars and is allocatively efficient, because it produces where marginal revenue equals marginal cost

B. It earns an economic profit of 9,000 dollars and is productively efficient but not allocatively efficient

C. It earns an economic profit of 5,000 dollars and is neither allocatively nor productively efficient

D. It earns an economic profit of 6,500 dollars and is productively efficient, because it earns a positive profit

E. It earns an economic profit of 5,000 dollars and is allocatively efficient, because price exceeds average total cost, but not productively efficient

**[1 point]** 9. Aldmoor Cable Car, an unregulated monopoly, earns an economic profit of 90,000 dollars a year. The town considers two policies: an annual license fee of 50,000 dollars, or a tax of 2 dollars on every ride. Which of the following correctly compares their short-run effects on the cable car?

A. Both policies raise the fare and reduce the number of rides, because a monopolist passes any tax on to its riders

B. The license fee leaves the fare and the number of rides unchanged and cuts profit to 40,000 dollars; the per-ride tax raises the fare and reduces the number of rides

C. The license fee raises the fare because it raises average total cost; the per-ride tax leaves the fare unchanged because the monopolist already charges the most riders will pay

D. The license fee reduces the number of rides because it raises average total cost; the per-ride tax raises the fare by exactly 2 dollars and leaves the number of rides unchanged

E. Neither policy changes the fare or the number of rides; both only reduce the cable car's profit

**[1 point]** 10. Brackwater Quarry is the only supplier of building stone to an isolated region. Demand is $P = 72 - 0.25Q$, where $Q$ is tons per day and $P$ is dollars per ton, and the quarry's marginal cost and average total cost are both a constant 12 dollars a ton. The regional government imposes a maximum price of 27 dollars a ton. Compared with the unregulated monopoly, the price ceiling causes the quarry's output and the deadweight loss to change as follows:

A. Output falls below 120 tons a day and a shortage develops, as with any price ceiling

B. Output stays at 120 tons a day and only the price falls, so the deadweight loss stays at 1,800 dollars a day

C. Output rises to 240 tons a day, the allocatively efficient output, and the deadweight loss disappears

D. Output rises from 120 to 180 tons a day, and the deadweight loss falls from 1,800 to 450 dollars a day

E. Output rises from 120 to 180 tons a day, and the deadweight loss falls from 3,600 to 900 dollars a day

**[1 point]** 11. Hartsea Golf Club owns the only golf course on an island. Daily demand for rounds is $P = 40 - 0.5Q$, its marginal cost is a constant 8 dollars a round, and it has no fixed costs. If the club could charge every golfer exactly his or her maximum willingness to pay (perfect price discrimination), its daily output and profit would be:

A. 32 rounds and 512 dollars

B. 64 rounds and 2,048 dollars

C. 32 rounds and 768 dollars

D. 64 rounds and 1,024 dollars

E. 80 rounds and 1,600 dollars

**[1 point]** 12. Skarn Ridge is the only ski area in its valley. It sells identical day passes to tourists and to local residents, who must show a resident card; every pass carries the buyer's photo, so passes cannot be resold. Daily demand is $P = 90 - 0.5Q$ for tourists and $P = 50 - 0.5Q$ for residents, and the marginal cost of a pass is a constant 10 dollars. To maximize profit, Skarn Ridge should charge:

A. 50 dollars to tourists and 30 dollars to residents
B. 40 dollars to both groups
C. 30 dollars to tourists and 50 dollars to residents
D. 45 dollars to tourists and 25 dollars to residents
E. 80 dollars to tourists and 40 dollars to residents

**[1 point]** 13. Which of the following is an example of price discrimination?

A. A courier charges 40 dollars more to deliver a parcel to a remote island than to a nearby town, because the island delivery costs it 40 dollars more
B. A patent holder charges every customer the same price, which is well above its marginal cost
C. A publisher sells the same chemistry textbook for 160 dollars in Country X and 40 dollars in Country Y, where incomes are lower, and copies sold in Y may not legally be imported into X
D. A gas station raises its price for every customer after the wholesale price of gasoline rises
E. A furniture maker charges 200 dollars more for an oak table than for a pine table of the same design, because the oak costs it 200 dollars more

**[1 point]** 14. Pinecrest Ramen is one of many differentiated noodle restaurants in a city that new restaurants can enter easily. It maximizes profit by selling 1,200 bowls a week, where marginal revenue and marginal cost both equal 6 dollars. Its price is 14 dollars a bowl and its average total cost at that output is 11 dollars. Pinecrest's weekly economic profit, and what happens to it in the long run, are:

A. 9,600 dollars; entry shifts Pinecrest's demand curve left until it is tangent to the average total cost curve
B. 3,600 dollars; the profit lasts in the long run because Pinecrest's ramen is differentiated
C. 3,600 dollars; entry pushes Pinecrest's price down until it equals minimum average total cost, as in perfect competition
D. 3,600 dollars; entry makes Pinecrest's demand curve horizontal at the new market price
E. 3,600 dollars; entry shifts Pinecrest's demand curve left until it is tangent to the average total cost curve

**[1 point]** 15. Tillbrook Bakery is a monopolistically competitive firm in long-run equilibrium. It sells 400 cakes a week at 18 dollars each, and its marginal cost at that output is 11 dollars. Its average total cost would reach its minimum, 15 dollars, at 600 cakes a week. Which of the following is correct?

A. Its economic profit is 2,800 dollars a week, and it has excess capacity of 200 cakes
B. Its economic profit is zero, its price is 7 dollars above marginal cost, and it has excess capacity of 200 cakes
C. Its economic profit is zero and it has no excess capacity, because in the long run it produces at minimum average total cost
D. Its economic profit is 1,200 dollars a week, and it has excess capacity of 200 cakes
E. Its economic profit is zero, and it is allocatively efficient because price equals average total cost

**[1 point]** 16. Kestwood Gym, a monopolistically competitive firm, runs an expensive advertising campaign that convinces many customers its classes are unlike those of any rival gym. The cost of the campaign does not depend on how many classes the gym sells. If the campaign succeeds, its most likely effects on Kestwood's demand curve and cost curves are:

A. demand shifts right and becomes more elastic, and the average total cost curve does not move

B. demand shifts left because customers expect the gym to pass the cost on, and the average total cost curve shifts up

C. demand shifts right and becomes less elastic, and the average total cost curve shifts down because more members share the fixed costs

D. demand shifts right and becomes less elastic, and neither the average total cost curve nor the marginal cost curve moves

E. demand shifts right and becomes less elastic, and the average total cost curve shifts up while the marginal cost curve does not move

**[1 point]** 17. Voltaro and Pellwick are the only two makers of electric scooters in a country. Each must decide, at the same time and without consulting the other, whether to build Plug X or Plug Y into its scooters. The payoff matrix shows annual profits in millions of dollars; in each cell Voltaro's profit is listed first. Which of the following is correct?

| | Pellwick: Plug X | Pellwick: Plug Y |
|---|---|---|
| Voltaro: Plug X | $(30, 25)$ | $(10, 8)$ |
| Voltaro: Plug Y | $(6, 12)$ | $(22, 32)$ |

A. Plug X is a dominant strategy for Voltaro, so the only Nash equilibrium is both firms choosing Plug X

B. Neither firm has a dominant strategy, and there are two Nash equilibria: both choose Plug X, or both choose Plug Y

C. Neither firm has a dominant strategy, so the game has no Nash equilibrium

D. Plug Y is a dominant strategy for Pellwick, so the only Nash equilibrium is both firms choosing Plug Y

E. The only Nash equilibrium is both firms choosing Plug X, because that cell has the largest combined profit

**[1 point]** 18. Brenna Quarry and Corrie Quarry are the only two quarries near the town of Ashfell. Each week, at the same time, each decides whether to run a night shift or work days only. The payoff matrix shows weekly profits in thousands of dollars; in each cell Brenna's profit is listed first. To stop night-time blasting, the town council plans a weekly fee on any quarry that runs a night shift. The smallest fee that would make "Day only" a dominant strategy for both quarries is any fee greater than:

| | Corrie: Night shift | Corrie: Day only |
|---|---|---|
| Brenna: Night shift | $(14, 9)$ | $(31, 12)$ |
| Brenna: Day only | $(18, 10)$ | $(27, 16)$ |

A. zero: "Day only" is already a dominant strategy for both quarries

B. 3 thousand dollars

C. 13 thousand dollars

D. 4 thousand dollars

E. 17 thousand dollars

**[1 point]** 19. Stavros Cement and Ulvik Cement, the only two cement makers in a region, have secretly agreed that each will limit its output to a quota. Each decides, at the same time, whether to keep or exceed its quota. The payoff matrix shows annual profits in millions of dollars; in each cell Stavros's profit is listed first. Which of the following is correct?

| | Ulvik: Keep quota | Ulvik: Exceed quota |
|---|---|---|
| Stavros: Keep quota | (40, 36) | (22, 44) |
| Stavros: Exceed quota | (48, 20) | (30, 26) |

A. Exceeding the quota is a dominant strategy for both firms, so they earn 30 and 26 million dollars, each 10 million less than if both kept their quotas

B. Keeping the quota is a dominant strategy for both firms, so the agreement is stable

C. Exceeding the quota is a dominant strategy only for Stavros, so the Nash equilibrium is Stavros exceeding and Ulvik keeping its quota

D. The game has no Nash equilibrium, because both firms would be better off if both kept their quotas

E. The Nash equilibrium is both firms keeping their quotas, because that cell has the largest combined profit, 76 million dollars

**[1 point]** 20. Which of the following makes it most likely that firms in an oligopoly can keep charging the high price they have agreed on, instead of cheating on the agreement?

A. The firms expect to compete with each other only once, in a single season

B. The number of firms in the industry grows

C. Each firm sees its rivals' prices immediately, and the firms expect to compete with each other for many years

D. Secret discounts to large customers are hard for rivals to detect

E. New firms can enter the industry easily and cheaply

**Short Answer** (1 question)

**[10 points]** 21. Natural monopoly and regulation. Tollmere Fiber owns the only broadband network on the island of Tollmere. The monthly demand for connections is $P = 90 - Q$, where $P$ is the monthly price in dollars and $Q$ is thousands of connections. The network has a fixed cost of 1,200 thousand dollars a month and a constant marginal cost of 10 dollars per connection, so its average total cost is $ATC = 10 + \frac{1{,}200}{Q}$ dollars. All totals (revenue, cost, profit and surplus) are in thousands of dollars a month.

$$P = 90 - Q, \qquad MC = 10, \qquad ATC = 10 + \frac{1{,}200}{Q}$$

**[2 points]** (a) Assume Tollmere Fiber is an unregulated, single-price monopolist. Calculate its profit-maximizing quantity and price. Show your work.

**[2 points]** (b) (i) Calculate Tollmere Fiber's monthly economic profit at the output you found in part (a). Show your work. (ii) Using the average total cost formula, explain why one network can serve the island's customers at a lower average cost than two networks could. Include a numerical example.

**[2 points]** (c) Draw a correctly labeled graph for Tollmere Fiber showing its demand, marginal revenue, marginal cost and average total cost curves. Label the unregulated profit-maximizing quantity $Q_M$ and price $P_M$, and shade the area of deadweight loss.

**[2 points]** (d) (i) Calculate the deadweight loss of the unregulated monopoly. (ii) A regulator now requires Tollmere Fiber to charge a price equal to its marginal cost. Calculate the number of connections it would sell and its economic profit or loss, and explain why the firm would not keep operating at this price in the long run without help from the government. Show your work.

**[2 points]** (e) Instead of marginal-cost pricing, the regulator sets a fair-return price ceiling of 30 dollars a month. (i) Calculate the number of connections Tollmere Fiber sells, and show that it earns zero economic profit. (ii) Calculate the deadweight loss that remains. Show your work.



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