PRACTICE EXAM

APEconLabs

AP® Microeconomics

Free-Response Questions

Practice Set 2

Developed by APEconLabs

Original practice material modeled on the format of the AP Microeconomics exam. Section II — 3 free-response questions — suggested time 1 hour. A complete answer key and scoring guidelines are included at the end of this document.

MICROECONOMICS
SECTION II

TOTAL TIME — 1 HOUR · 3 QUESTIONS

Directions

Section II has 3 questions and lasts 1 hour. You may use the available paper for scratch work and planning, but you must write your answers in the free-response booklet. Label parts (e.g., A, B, C) and sub-parts (e.g., i, ii, iii) as needed. Use a pencil or a pen with black or dark blue ink to write your responses.

Include correctly labeled graphs, if useful or required, in explaining your answers. A correctly labeled graph must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

A calculator is allowed in this section.

You may pace yourself as you answer the questions in this section, or you may use these optional timing recommendations: spend the first 10 minutes reading all of the questions and planning your answers. Then spend about 25 minutes on Question 1 and about 12 minutes each on Questions 2 and 3.

You can go back and forth between questions in this section until time expires.

Note: This is original practice material developed by APEconLabs. It mirrors the structure and concept coverage of the AP Microeconomics free-response section and is intended for teacher and student use in the classroom.

1. Hollowbrook Farm is a typical profit-maximizing firm that produces and sells oats in a constant-cost, perfectly competitive market that is in long-run equilibrium. The market equilibrium price of oats is $9 per bushel.

A. Draw correctly labeled side-by-side graphs for the oat market and for Hollowbrook Farm, and show each of the following.

i. The market equilibrium price and quantity, labeled $9 and Q_M, respectively

ii. Hollowbrook Farm's profit-maximizing price and quantity, labeled P_F and Q_F, respectively

iii. Hollowbrook Farm's average total cost curve consistent with a long-run equilibrium, labeled ATC

B. If Hollowbrook Farm is the only firm in the market that chooses to increase its price of oats to $10 per bushel, will Hollowbrook Farm's total revenue increase, remain the same, or decrease to $0? Explain.

C. Oats are used as an input in the production of granola. Granola now becomes a more popular food option among consumers. On your graphs in part A, show the short-run effect of the increased popularity of granola on each of the following.

i. The new market equilibrium price and quantity of oats, labeled P_2 and Q_2, respectively

ii. Hollowbrook Farm's new profit-maximizing quantity, labeled Q*

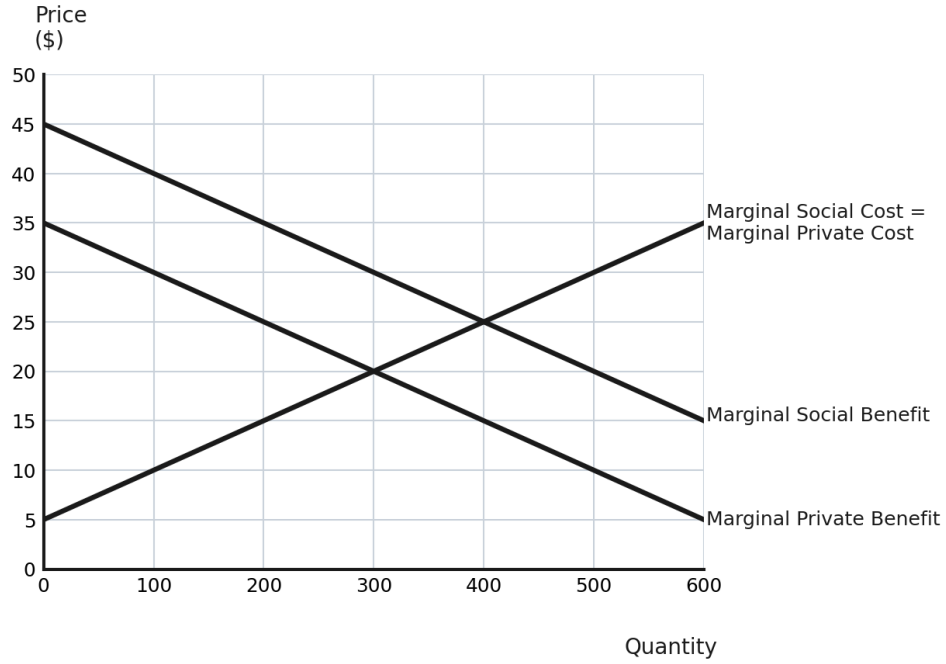
D. Given the increase in popularity of granola in part C, what will happen to the number of firms in the oat market in the long run? Explain.

E. Suppose a 20% increase in the market price of muesli causes a 4% decrease in the quantity demanded of muesli and an 8% increase in the quantity demanded of granola.

i. Is the demand for muesli elastic, inelastic, or unit elastic? Explain using numbers.

ii. Calculate the cross-price elasticity of demand between muesli and granola. Show your work.

2. Flu vaccinations are produced and sold in a perfectly competitive market. The provided graph shows the market for flu vaccinations in the country of Larkhaven.



A. Identify the market equilibrium price and quantity.

B. Calculate the deadweight loss at the market equilibrium. Show your work.

C. Suppose the government wants to eliminate the deadweight loss in the market for flu vaccinations.

i. Which of the following will achieve the government's objective: a per-unit tax on consumers or a per-unit subsidy to consumers? Explain.

ii. What is the dollar value of the per-unit tax or per-unit subsidy identified in part C(i)?

D. Suppose instead the government imposes a price ceiling of $15. Will the price ceiling achieve the socially optimal quantity of flu vaccinations? Explain.

3. Skyline Airlines and Horizon Air are the only two airlines serving a region. Skyline Airlines is deciding whether to expand Routes or Lounges. Horizon Air is deciding whether to expand its Fleet or its Service. The payoff matrix shows the payoffs for each combination of strategies. The first entry in each cell shows Skyline Airlines' profit, and the second entry shows Horizon Air's profit. Each firm independently and simultaneously chooses its strategy. Assume the two firms know all the information in the matrix and do not cooperate.

		Horizon Air	
		Fleet	**Service**
Skyline Airlines	**Routes**	\$14 million, \$30 million	\$36 million, \$38 million
	Lounges	\$34 million, \$44 million	\$28 million, \$22 million

A. What is Horizon Air's most profitable strategy if Skyline Airlines chooses to expand Routes?

B. Does Skyline Airlines have a dominant strategy? Explain using numbers from the payoff matrix.

C. Is Skyline Airlines choosing to expand Routes and Horizon Air choosing to expand Service a Nash equilibrium? Explain using numbers from the payoff matrix.

D. Suppose Skyline Airlines and Horizon Air decide to merge to maximize combined profits and choose to keep operating both airlines. Assuming the values in the payoff matrix do not change, what would be the new firm's total profit?

E. Suppose instead that a rise in jet-fuel costs reduces the profitability of expanding Service by \$12 million for Horizon Air. Identify each firm's profit at the Nash equilibrium.

STOP · END OF SECTION II

Answer Key
& Scoring Guidelines

Practice Set 2

Model responses below indicate the economic reasoning and key terms expected for full credit. On the exam, correctly labeled graphs are required where a question asks students to "draw" or "show"; graph requirements are described in words here.

Question 1

A. Side-by-side graphs. The market graph shows downward-sloping demand and upward-sloping supply intersecting at price $9 and quantity Q_M. The firm graph shows a horizontal demand = marginal revenue line at P_F = $9, an upward-sloping MC, and a U-shaped ATC. Q_F is where MC = MR. In long-run equilibrium the price line is tangent to the minimum of ATC, so P_F = minimum ATC and economic profit is zero.

B. Decrease to $0. In a perfectly competitive market each firm is a price taker facing perfectly elastic demand. If Hollowbrook Farm alone raises its price to $10, buyers simply purchase from other firms still selling at $9, so Hollowbrook Farm sells nothing and its total revenue falls to $0.

C. The increased popularity of granola raises the demand for oats, an input.

i. Market demand for oats shifts right, raising the market equilibrium price and quantity to P_2 and Q_2.

ii. The firm's demand = MR line shifts up to the new higher price, so the firm's new profit-maximizing quantity Q* (where MC = new MR) is larger.

D. The number of firms will increase. The higher price lets firms earn short-run positive economic profit, which attracts new firms to enter the market in the long run. In a constant-cost industry, entry continues until price returns to minimum ATC and economic profit is again zero.

E. i. Inelastic. The price elasticity of demand for muesli = %Δ quantity demanded ÷ %Δ price = 4% ÷ 20% = 0.2. Because 0.2 is less than 1, demand for muesli is inelastic.

ii. Cross-price elasticity = %Δ quantity demanded of granola ÷ %Δ price of muesli = +8% ÷ +20% = +0.4. The positive sign indicates that muesli and granola are substitutes.

Question 2

A. The market equilibrium is where marginal private cost equals marginal private benefit (MPC = MPB): quantity = 300 and price = $20.

B. Flu vaccinations have a positive externality, so the market under-produces. Deadweight loss is the triangle between the market quantity (300) and the socially optimal quantity (400). Its maximum height is the gap between MSB and MSC at quantity 300, which is $30 - $20 = $10. DWL = ½ × (400 - 300) × $10 = $500.

C. i. A per-unit subsidy to consumers. Flu vaccinations create a positive externality and the market under-produces, so consumption must be increased to reach the socially optimal quantity. A subsidy to consumers increases consumption; a tax would decrease it.

ii. The per-unit subsidy equals the marginal external benefit — the vertical distance between MSB and MPB — which is $10 per unit.

D. No. The socially optimal quantity (400) is greater than the market quantity (300). A price ceiling of $15 is below the equilibrium price of $20, so it is binding and reduces quantity supplied to 200. It pushes quantity even further below the socially optimal 400, so it does not achieve the socially optimal quantity.

Question 3

A. Service. If Skyline Airlines expands Routes, Horizon Air earns $30 million from Fleet and $38 million from Service. Because $38 million > $30 million, Horizon Air's most profitable strategy is Service.

B. No, Skyline Airlines does not have a dominant strategy. If Horizon Air expands Fleet, Skyline earns $14 million from Routes versus $34 million from Lounges, so it prefers Lounges. If Horizon Air expands Service, Skyline earns $36 million from Routes versus $28 million from Lounges, so it prefers Routes. Because its best choice depends on Horizon Air's choice, Skyline has no dominant strategy.

C. Yes. Consider (Routes, Service). Given Horizon Air expands Service, Skyline earns $36 million from Routes versus $28 million from Lounges, so Routes is its best response. Given Skyline expands Routes, Horizon Air earns $30 million from Fleet versus $38 million from Service, so Service is its best response. Because both firms are playing best responses, (Routes, Service) is a Nash equilibrium.

D. Combined profit per cell: Routes/Fleet = $14M + $30M = $44M; Routes/Service = $36M + $38M = $74M; Lounges/Fleet = $34M + $44M = $78M; Lounges/Service = $28M + $22M = $50M. The merged firm maximizes combined profit by choosing Lounges/Fleet, for a total profit of $78 million.

E. The $12 million reduction lowers Horizon Air's Service payoffs to $26 million (with Routes) and $10 million (with Lounges). Now Horizon Air earns more from Fleet than from Service no matter what Skyline does ($30M > $26M and $44M > $10M), so Fleet becomes Horizon Air's dominant strategy. Given Horizon Air expands Fleet, Skyline earns $14M from Routes versus $34M from Lounges, so it chooses Lounges. The Nash equilibrium is (Lounges, Fleet): Skyline Airlines earns $34 million and Horizon Air earns $44 million.