Second Quiz: Review
Managerial Economics: Eco 685
Quiz Date: Now Friday October 6

The quiz covers section III of short run costs, long run costs, and pricing. The pages in the notes are 34 to 64. Section VI of Cost Theory is an appendix for your reference and is not on the quiz. All questions come from the class notes. The chapters in the book are 6, 7, and 8. Additional study materials: homework 2 and this review sheet. Note: this review sheet covers only material since the last homework. Homework questions and review questions are equally likely to appear on the quiz. The following equations are provided.

Calculus

$$\frac{d\left(a+bQ^c\right)}{dQL} = bcL^{c-1}, \quad \frac{d \text{ objective}}{d \text{ decision}} \approx \frac{\Delta \text{ objective}}{\Delta \text{decision}} = 0 \text{ at the maximum}$$

Marginal Revenue and Marginal Cost, Break Even Point

$$MR = \frac{dTR}{dQ} \approx \frac{\Delta TR}{\Delta Q}, \quad MC = \frac{dTC}{dQ} \approx \frac{\Delta TC}{\Delta Q}, \quad \text{Break Even } Q = \frac{TFC}{P - AVC}$$

Conditions for Profit Maximization

$$MR = MC, \quad P = MC, \quad P = \frac{1}{\frac{1}{e_p}+1} MC,$$

Conditions for Long Run Competitive Equilibrium

$$P = LRAC = MC$$

Elasticity

$$e_p = \left(\frac{P}{Q}\right) \cdot \frac{dQ}{dP} \approx \frac{P}{Q} \cdot \frac{\Delta Q}{\Delta P} = \frac{\text{percent change in } Q}{\text{percent change in } P} = \frac{\frac{\Delta Q}{Q}}{\frac{\Delta P}{P}}$$

$$e_I = \frac{I}{Q}\frac{dQ}{dI} \approx \frac{I}{Q}\frac{\Delta Q}{\Delta I} = \frac{\text{percent change in } Q}{\text{percent change in } I} = \frac{\frac{\Delta Q}{Q}}{\frac{\Delta I}{I}}$$

Mark up

$$\text{Markup } = \frac{P - \text{cost}}{\text{cost}}, \quad \text{Optimal Mark up } = \frac{-1}{e_p + 1}$$

Costs

$$TC = TFC + TVC, \quad ATC = \frac{TC}{Q}, \quad AVC = \frac{TVC}{Q}, \quad AFC = \frac{TFC}{Q}$$

$$ATC = AVC + AFC, \quad LRAC = \frac{TC}{Q}, \quad \text{Ave Profit } = \frac{\pi}{Q} = P - ATC$$

Shorter Questions

Question 1

Suppose demand is inelastic. Give two reasons why increasing the price increases profits.

Question 2

Which of the following are true in the long run under perfect competition (true/false for each):

a. No firm earns positive accounting profits.

b. No firm earns more accounting profits than any other.

c. Marginal costs are greater than average costs.

d. All inputs are variable.

e. The manager has control over the price.

f. The price adjusts as firms enter and exit.

Question 3

Suppose in an imperfectly competitive industry, an individual firm finds that it's price elasticity is -2/3. Which of following are true? (true/false for each):

a. The optimal mark-up is 3 times marginal cost.

b. The firm should increase production.

c. The firm should decrease production.

d. Producing less will decrease costs.

e. Producing less will make demand more elastic.

f. The industry as a whole is more price elastic.

Question 4

Suppose CC's Cabs has a monopoly for cab rides in Miami. The demand for taxi service is:

$$Q = 250 - \frac{1}{2}P. \tag{1}$$

Total costs are:

$$TC = 50Q + \frac{1}{4}Q^2. \tag{2}$$

a. Calculate the quantity of cab rides which maximizes profits.

b. Calculate the price and price elasticity at the profit maximizing quantity.

c. Suppose Uber enters and the market becomes perfectly competitive. Calculate the quantity produced under perfect competition (Hint: use the demand function and $P = MC$).

d. Calculate the price and price elasticity under perfect competition.

e. Is the cab company's strategy under imperfect competition to restrict or increase production relative to perfect competition? Explain.

Question 5

Consider actual data on electric power plants:

	Single Unit Pulverized Coal	Double Unit Pulverized Coal	Dual Nuclear
Installation Cost ($M)	2,110	3,814	12,354
Fixed Operating Cost ($M)	25	41	208
Average Variable Costs ($M/mW)	4.47	4.47	2.14
Capacity (mW)	650	1,300	2,234

Table 1: Costs at alternative sized power plants. Dollar figures are in millions, capacity units are mega watts.

a. For each type of plant, calculate the cost plus price, assuming a 15% markup over average variable costs.

b. Assume the price elasticity is -6 and average variable costs are constant ($TC = TFC + AVC \cdot Q$). Calculate the optimal price for each type of plant.

c. Regulators often regulate the prices charged by utilities. Typically, the regulator uses cost plus pricing: the firm reports average variable costs and the regulator allows a fixed mark-up over average variable costs. Does the firm prefer the regulator use cost-plus pricing with a 15% markup or to be unregulated? Explain.

Question 6

April's Boutique sells fashion clothing in LA and San Francisco. The demand curves and total cost functions are:

$$Q_{LA} = 70 - 2P_{LA} \tag{3}$$

$$Q_{SF} = 50 - P_{SF} \tag{4}$$

$$TC = 100 + 6\left(Q_{LA} + Q_{SF}\right) \tag{5}$$

a. Suppose the company price discriminates between customers in each location. Calculate the optimal price and quantity in each market.

b. Calculate the price elasticity in each market. Which location has more price sensitive customers and how is that reflected in the price?

c. Give one possible reason why price discrimination might not work in this case.

d. Suppose now the company cannot price discriminate. Calculate the total quantity and price.

Question 7

Classify each of the following as either not price discrimination, or first, second, or third degree price discrimination. Explain your reasoning for each.

a. Verizon offers the following pricing plan: 2GB of data costs $30 per month, 5GB data costs $50 per month, and 10 GB data costs $80 per month.

b. A bar offers a discount on drinks during happy hour.

c. Pfizer and Merck offer free pharmaceuticals to individuals without health insurance whose income is below a certain level.

d. On Priceline.com, consumers state how much they are willing to pay, and Priceline decides whether or not to make the sale.

e. A salon charges more for women's hair cuts than for men's.

Question 8

a. Fill in the following table (use new minus old over new for the price elasticity):

Q	Price	Total Variable Cost	Total Fixed Costs	Marginal Revenue	Marginal Cost	Price Elasticity
2	18	10.5		NA	NA	NA
5	15	30				
6	14	38.5				
7	13	48	5			
8	12	58.5				
10	10	82.5				

Table 2: Cost/Revenue table.

b. Approximately how much should the firm produce and approximately what price should be charged?

Question 9

A hedge fund charges each investor a flat rate of $20,000 per year. Suppose hedge fund managers are paid $150,000 per year. The firm previously had 3 managers and 30 investors, but recently added another manager and now has 40 investors. Assume the hedge fund has no other variable costs.

a. What is the marginal cost of an investor?

b. Assuming the hedge fund is pricing optimally, what is the price elasticity?