Econ 2010 Exam 2 Practice Problems

- 1. Consider a **utility-maximizing** individual who only derives happiness from purchasing jeans, beer, and going out to movies. He has already been purchasing some combination of these goods such that the jeans he just bought were \$50, the beer he just bought was \$2, and movie ticket he just bought was \$8. From each of these last purchases, his marginal utility from buying the jeans was 25 utils, from the beer was 1 util, and from going to see the movie was 4 utils. He now has only \$4 left. Will the consumer stop buying goods at this point (has he maximized his utility)? Why or why not? If not, what piece of information would you change so that he did maximize his utility?
- 2. Consider a college basketball player in his 3rd year of eligibility. He is good enough that he thinks if he leaves college now to play in the NBA, he can make \$1 million per year over the course of his career. He expects the length of his career will be identical to the average NBA player's career, which is 10 years (taking into account injuries, talent, etc.) He could also stay in school for one more year to graduate, and then play in the NBA. The tuition at his school is \$20,000 per year, but he is on a half-scholarship so he only is required to pay half of the tuition. By waiting the extra year to join the NBA, he will also make a slightly larger salary of \$1.1 million per year over the course of his career (the length of his career he does not expect to change).
 - a. For the first year only, what is the explicit cost for this basketball player to remain in school to graduate?
 - b. For the first year only, what is the implicit cost for this basketball player to remain in school to graduate?
 - c. Think through the logic of the player's decision to stay in school one more year or to enter the NBA right away. You can assume a 0% interest rate in all future years and calculate which alternative is better financially. Does this mean that the same decision is better *economically*? Make an argument for which decision you think would be better economically.
- 3. You own a company that makes plastic grocery store bags in a perfectly competitive market. The local government has decided to levy a lump-sum tax (a fixed cost) on all businesses in the city in order to raise money for the school system. You cannot avoid paying the tax without going out of business. Illustrate on a graph the effect of the tax in the short run.
- 4. The other firms in the plastic grocery store bag industry have decided to band together to reduce output so that they can charge a higher price. Somehow, they forgot to ask you to join! You're considering joining the cartel, but a valued manager says that you shouldn't. Why would the manager say this? Explain in words and draw a graph.

5. Due to the anti-trust laws in the US, you decide not to join the cartel. Word spread quickly, though, and the US government prosecuted the other plastic grocery bag firms and shut them all down. You're the only plastic grocery bag producer left in the industry! You know from earlier that the market demand curve and your marginal cost curve for plastic grocery bags is given by:

Р	Q	MC
(thousands)	(millions)	(thousands)
10	1	2
8	2	1
6	3	2
4	4	4
2	5	7
0	6	11

- a. What price would you charge and how many plastic grocery bags would you produce?
- b. How does this compare to how the cartel would have acted?
- c. Compare the *efficiency* of the outcome when you are a monopoly versus when you were a perfectly competitive firm. Which situation is more efficient from an economic perspective?
- 6. The following table gives the marginal utility of John's consumption of three goods: A, B, and C.

Units	MU of A	MU of B	MU of C
1	20	25	45
2	18	20	30
3	16	15	24
4	14	10	18
5	12	8	15
6	10	6	12

- a. Good A costs \$2 per unit, good B costs \$1, and good C costs \$3. How many units of each good should John buy with \$12 to maximize his utility?
- b. How will your answer to (a) change if the price of good B rises to \$2?
- c. How will your answer to (a) change if the price of C were \$0.50 (and the prices of goods A and B are the same as they are in (a))?
- 7. Early Classical economists found the following "diamond/water" paradox perplexing: "Why is water, which is so useful and necessary, so cheap, when diamonds, which are so

useless and unnecessary, so expensive?" Using the utility concept, explain why it is not really a paradox.

8. Suppose a large cheese pizza costs \$10 and a calzone costs \$5. You have \$40 to spend. The marginal utility (MU) that you derive from each is the following:

Units	MU of Pizza	MU of Calzone
1	60	30
2	40	28
3	30	24
4	20	20
5	10	10

- a. How many of each would you buy?
- b. Suppose the price of calzones rises to \$10. How many of each would you buy?
- c. Use this to show how the principle of rational choice leads to the law of demand.
- 9. Economan has been infected by the free enterprise bug. He sets up a firm on extraterrestrial affairs. The rent of the building is \$4,000, the cost of the two secretaries is \$40,000, and the cost of electricity and gas comes to \$5,000. There's a great demand for his information, and his total revenue amounts to \$100,000. By working in the firm, though, Economan forfeits the \$50,000 he could earn by working for the Friendly Space Agency and the \$4,000 he could have earned as interest had he saved his funds instead of putting them in his business.
 - a. What is his profit or loss by an accountant's definition?
 - b. What is his profit or loss by an economist's definition?
- 10. Explain how each of the following will affect the average fixed cost, average variable cost, average total cost, and marginal cost curves faced by a steel manufacturer:
 - a. New union agreement increases hourly pay
 - b. Local government imposes an annual lump-sum tax per plant
 - c. Federal government imposes a "stack tax" on emission of air pollutants by steel mills
 - d. New steel-making technology increases productivity of every worker
- 11. A firm has fixed costs of \$100 and variable costs of the following:

Output	1	2	3	4	5	6	7	8	9
VC	35	75	110	140	175	215	260	315	390

- a. Show AFC, ATC, AVC, and MC in a table
- b. Graph the AFC, ATC, AVC, and MC curves
- c. Explain the relationship between the MC curve and the ATC and AVC curves
- d. Suppose fixed cost drops to \$50. Which curves shifted? Why?
- 12. Give an example of the principal-agent problem, other than the one covered today in discussion. Give a brief explanation and identify which party is the principal and which is the agent.
- 13. The graph below contains a firm's cost curves. Label MC, AFC, AVC, and ATC (or AC). Also label the shut-down point and the break-even point.



- 14. Draw a long-run average total cost curve.
 - a. Why does it slope downward initially?
 - b. Why does it eventually slope upward?
 - c. How would your answers to (a) and (b) differ if you had to draw a short-run cost curve?

- d. How large is the fixed-cost component of the long-run cost curve?
- e. If there were constant returns to scale everywhere, what would the long-run cost curve look like?
- 15. Sea lions have been depleting the stock of steelhead trout. One idea to scare sea lions off the Washington state coast was to launch fake killer whales, predators of sea lions. The cost of making the first whale is \$16,000—\$5,000 for materials and \$11,000 for the mold. The mold can be reused to make additional whales, so additional whales would cost \$5,000 apiece.
 - a. Make a table showing the total cost and average total cost of producing 1 to 10 fake killer whales.
 - b. Does production of fake killer whales exhibit diseconomies of scale, economies of scale, or constant returns to scale?
 - c. What is the fixed cost of producing fake killer whales?
 - d. What is the variable cost of producing fake killer whales?
- 16. Draw a short-run marginal cost curve, short-run average cost curve, and long-run average total cost curve for an efficient firm producing where there are diseconomies of scale.
- 17. If a firm is experiencing learning by doing, what is likely true about the long-run average total cost curve? Explain your answer.
- 18. Draw marginal cost, marginal revenue, and average total cost curves for a typical perfectly competitive firm and indicate the profit-maximizing level of output and total profit for that firm. Is the firm in long-run equilibrium? Why or why not?
- 19. State what is *wrong* with each of the following graphs:



- 20. Draw marginal cost, marginal revenue, and average total cost curves for a typical perfectly competitive firm in long-run equilibrium and indicate the profit-maximizing level of output and total profit for that firm
- 21. Each of 10 firms in a given industry has the costs given in the left-hand table. The market demand schedule is given in the right-hand table.

F	irm	Market		
Quantity	Total Cost	Price	Quantity	
			Demanded	
0	12	2	110	
1	24	4	100	
2	27	6	90	
3	31	8	80	
4	39	10	70	
5	53	12	60	
6	73	14	50	
7	99	16	40	

- a. What is the market equilibrium price and the price each firm gets for its product?
- b. What is the equilibrium market quantity and the quantity each firm produces?
- c. What profit is each firm making?
- d. Below what price will firms begin to exit the market?
- 22. A Wall Street Journal headline states: "A Nation of Snackers Snubs Old Favorite: The Beloved Cookie." As U.S. consumers adopted more carbohydrate-conscious diets, the number of cookie boxes sold declined 5.4 percent that year, the third consecutive year of decline.
 - a. Assuming the cookie industry is perfectly competitive, demonstrate using market supply and demand curves the effect of this decline in demand on equilibrium price and quantity in the short run.
 - b. Assuming a cookie firm was in equilibrium before the change in demand, and that it is a constant-cost industry, demonstrate the effect of the decline on equilibrium price for an individual cookie firm in the short run.
 - c. How might your answer to (a) change if you are considering the long run?
- 23. Vocabulary is important in lots of subjects. It is in economics. So please define or demonstrate your familiarity with *six of the seven* terms below. If you answer all seven, your score will be the lowest of any of the six you selected.
 - a. provide an example of a *positive statement* and a *normative statement* (be sure to label each)
 - b. the elasticity of demand where, at that price-quantity combination, total revenue is maximized
 - c. the invisible hand

- d. economic concept of cost
- e. two prerequisites for a market economy
- f. cross-price elasticity of demand for substitute goods versus cross-elasticity of demand for complements.
- g. the distinction between an English auction versus a Dutch auction?

Price	Quantity Demanded	Quantity Supplied
(dollars)	(units)	(units)
10	5	25
8	10	20
6	15	15
2	20	10
0	25	0

24. a. Plot the supply and demand schedules of a market are given in the table below:

- a. Plot the supply and demand schedules of the table below as supply and demand curves.
- b. When the price is \$10.00, the consumer purchases 5 units during the relevant time period. If the price falls to \$8.00, 10 units are purchased. What is the elasticity of demand for this product in this price range? Show your work.
- 25. Assume you start a business with the person who sits on your right or left in Econ 201. The product you produce and sell has a demand that is relatively *inelastic*. Briefly explain to a person who has never taken an economics course what that means and what the economic implications of this are for your firm.
- 26. Studies show that students watch more television after peak exam periods are over and watch less television before peak exam periods, even though the television programs being shown are the same. What economic explanation is there for the change in viewing choices?
- 27. Two busy attorneys have a comparable income. One bills by the hour, while the other is salaried (i.e, receives a fixed annual income). Can you predict which attorney would shop around more for such an automobile? Explain your answer.
- 28. You have graduated from UVA and you now sell firewood in Michigan where your mother owns a sawmill. She lets you have all the wood scraps and trimmings from the sawmill "for free" which you sell, along with cut logs. Scraps and trimmings are pieces of wood that are a byproduct of the sawmill making boards and studs. How do your economic costs differ from your accounting costs?

- 29. State the law of diminishing marginal utility:
- 30. What are the necessary conditions for utility maximization?
- 31. Suppose I consume two goods: pumpkins and bags of candy corn. Pumpkins are \$10 each and candy corn is \$5 per bag. I have an income of \$35. If the marginal utility of my second pumpkin is 40 and the marginal utility of my second bag of candy corn is 20, am I maximizing my utility by buying 2 pumpkins and 2 bags of candy corn? Why or why not?
- 32. Suppose that consuming one more bag of candy corn gets me no more utility (a person can only handle so much candy corn). Am I utility maximizing by consuming 2 pumpkins and 3 bags of candy corn?
- 33. A tutor takes a week off of tutoring to visit her boyfriend in Alaska. The plane ticket costs \$700. In a week of tutoring, she usually makes \$100. What are the explicit, implicit, and economic costs of her trip?
- 34. Here is a diagram where demand, MC, and ATC all intersect at one point. Use the diagram to show the profit the *monopolist* shown in the graph below receives.



- 35. Why are cartels inherently unstable?
- 36. A firm has fixed costs of \$100 and the variable costs:

Quantity	FC	VC
0	100	0
1	100	35
2	100	75
3	100	110

4	100	140
5	100	175
6	100	215
7	100	260
8	100	315

- a. Is the firm in the short-run or long-run? How can you tell?
- b. Fill out the following cost schedule:

Quantity	FC	VC	TC	MC	AFC	AVC	MC
0	100	0					
1	100	35					
2	100	75					
3	100	110					
4	100	140					
5	100	175					
6	100	215					
7	100	260					
8	100	315					

37. Economies of scale occur when costs are ______ as quantity produced increases. On the graph below, economies of scale exist for quantities between ______ and ____.



- 38. State whether the following <u>could</u> describe marginal cost, average total cost, average variable cost, or average fixed cost. Some statements may describe more than one cost curve.
 - a. Costs continuously decline as output rises.
 - b. First decline as quantity increases, but then increases as quantity increases.

- c. Cuts the ATC and AVC curves at their minimum points
- 39. Suppose the bottled water industry is a perfectly competitive, and increasing-cost industry (i.e., cost of production increases as the number of firms increases in the market). Initially, the market is at its equilibrium. Each individual firm is producing its equilibrium level of output.
 - a. If the demand for bottled water decreases permanently, will there be more or less firms in the long run? Provide some intuition (in one or two sentences). You do not need to draw a graph for this part.
 - b. Use a market supply-demand graph AND an individual-firm graph to explain whether there will be an economic profit or loss for individual firms in the short run. In the graph for an individual firm, indicate what the economic profit / loss is.
 - c. Compared to the initial equilibrium price, will the new long run equilibrium price be higher or lower? Why? You do not need to draw a graph for this part.
- 40. There are only three things in life that John Doe likes: good A, good B, and good C. He has the following marginal utility schedules for the three goods. Good A sells for \$1 each, good B sells for \$0.10 each, and good C sells for \$0.50 each.

	\$1		\$0.10		\$0.50
Q	MU(A)	Q	MU(B)	Q	MU(C)
0		0		0	-
1	60	1	6	1	30
2	50	2	5	2	25
3	40	3	4	3	20
4	30	4	3	4	15
5	20	5	2	5	10
6	10	6	1	6	5
7	0	7	0	7	0

John's allowance is \$4.90 per week. According to economic theory, how will John spend his allowance (i.e., what quantity, if any, of A, B, and C will he purchase each week)?

- 41. A well-to-do attorney living in a major metropolitan area sets out to purchase either a new Acura, BMW, Lexus, or Audi and wants to shop rationally for the "best buy." There are at least a dozen dealerships for these cars in the area. How does the attorney decide when to stop visiting additional dealers? That is, when does a rational consumer quit searching for the "best buy"?
- 42. Find TC, AFC, AVC, ATC, and MC for the following table. Also, graph the TC, AFC, AVC, ATC, and MC on the graph below (with correct labels!).

Units	FC	VC	ТС	MC	AFC	AVC	ATC
0	50	0					
1	50	90					
2	50	120					
3	50	175					
4	50	250					
5	50	350					

- 43. In a perfectly competitive market, in which each firm earns zero economic profits, how many units (i.e., what quantity) will the firm in question 42 produce and what will be the per unit price?
- 44. You are a pumpkin farmer in Charlottesville and it's getting close to Halloween. There are many farms in and around Charlottesville, so consumers have many options in terms of where to go to pick pumpkins for Halloween.
 - a. Is this market likely to be perfectly competitive? Why or why not? Be sure to cite any requirements for perfect competition.
 - b. Draw two graphs:
 - On the left draw the market demand and supply for pumpkins in Charlottesville
 - On the right draw the demand for pumpkins from your own farm, along with the conventional MC, AVC, and ATC curves (assume you're in long-run equilibrium)
 - c. Unfortunately, an infestation of pumpkin-eating insects has emerged in Charlottesville. The insects eat $\frac{1}{3}$ of whatever you produce. Re-draw your two graphs from Question 2. Starting from the equilibrium, show (on the graphs) the effect of the infestation of pumpkin-eating insects. Additionally, what happens to equilibrium price, quantity, and your individual profits? Assume that you cannot grow any more pumpkins in time for Halloween. Be careful! Don't draw something on your graph that doesn't make sense. (Hint: Think about how the insects affect the cost of producing an additional pumpkin.)

Price: _____

Quantity: _____

Individual Profits:

d. What is likely to happen in the long-run if the infestation of pumpkin-eating insects becomes permanent?