

The total final is worth 30 points. Each question is worth 2 points, and each sub question is worth an equal share of the 2 points.

1) The own price demand elasticity was given in the lecture notes for some goods and services:

	Short Run	Long Run
Gasoline	-0.2	-0.5
HH Electricity	-0.1	-1.9
Air Travel	-0.1	-2.4
Intercity bus travel	-2.0	-2.2

- a. Write in the cell whether the own price demand elasticity for each item is: infinitely inelastic, unit inelastic, inelastic, perfectly inelastic, elastic, unit elastic, or infinitely elastic?

	Short Run	Long Run
Gasoline		
HH Electricity		
Air Travel		
Intercity bus travel		

- b. If I wanted to raise revenue by imposing a tax that raises the price of one of these by 10%, in the long run which good or service will have the largest % reduction in quantity demanded brought about by the imposition of the tax? Which one would have the smallest % reduction in quantity demanded?
- c. Compare the reported long run elasticities of gasoline and air travel. What about the characteristics of these two goods explains the difference you see in the degree of elasticity?

- 2) A food stamp policy is put in place in a state. For our representative consumer impacted by this policy, their initial income of Y is supplemented by a cash value of food stamps of \$100. The initial budget constraint is $y = p_f \cdot f + p_o \cdot o$, where f is food, o is all other goods, and the two prices are subscripted by their commodity.
- a. Draw the original budget line and the budget line after the food stamp policy is implemented.
- b. Reproduce your graph for (a), and then place on the graph indifference curves for a consumer who is made **equally well off** if we give the consumer \$100 in food stamps or \$100 in cash.

3) If $p_1 = 25$, $p_2=50$, and $Y=500$

a. Draw the budget constraint.

b. Show how you can derive the price consumption curve for a given consumer's preferences (drawn as you like so long as they obey the properties of indifference curves discussed in class) using the example of the budget line from (a) with $p_1 = 10$, a budget line if $p_1 = 25$ all else constant, and a budget line of $p_1 = 50$ all else constant.

c. Show how to derive the individual's demand curve from the graph in (b).

4) Market structure and externalities. The inverse demand curve is given as $p=116-4q$. The supply curve is $p=20+4q$.

a. What is the equilibrium price quantity pair if the market structure is perfectly competitive?

b. If there is a marginal externality generated by production of the good equal to $4 \cdot q$ ($MC^E=4 \cdot q$), what is the socially optimal price quantity pair?

c. If the market structure is a monopoly who takes no account of the cost of the externality, what is the equilibrium price quantity pair chosen by the monopolist?

5) Syracuse University is considering raising the price for a season's ticket for all men's basketball home games next year from \$420 to \$462. This year, at a price of \$420, they sold 30,000 season's tickets. The best available information suggests that the price elasticity of demand for season's tickets is -0.75 .

a. What is the predicted number of season's tickets sold next year if the price is raised?

b. Compare total revenue for the two prices. Which is higher?

c. How many season tickets will be sold next year if the elasticity is not -0.75 as assumed above, but is in fact -1.25 ?

6) Production function.

a) Draw the production function $Q=f(L, K)$ noting areas that are not feasible, not efficient and at the frontier of technological efficiency.

b) Show what technological progress looks like on a production function such as the one you drew for (a)

c) Draw an isoquant of the function $Q=f(L, K)$ noting areas that are not feasible, not efficient and at the frontier of technological efficiency.

7) The price of a loaf of bread has gone down in Central New York in 2011. Assume each explanation listed below is hypothesized to be the sole cause of this price increase. Which of the following explanations can you rule out, and which can you not rule out.

Explanation	Rule out	Not Rule Out (circle)
Incomes in Central New York have increased since last year.	Rule out	Not Rule Out
Consumer preferences have shifted from sandwiches made with slices of bread to ones made using wraps.	Rule out	Not Rule Out
The price of wheat has been gradually decreasing since the global peak in commodity prices reached in 2008 / 2009.	Rule out	Not Rule Out
New packaging regulations require use of higher cost biodegradable plastic wrappers for bread.	Rule out	Not Rule Out
A new labor agreement with the bakery workers' union has increased the wages of the workers in this sector.	Rule out	Not Rule Out
A new oven was developed that allows for significantly lower electricity use per loaf of bread baked and thus reduces production costs.	Rule out	Not Rule Out

8) The inverse demand curve is given as $p=80-2q$. The inverse supply curve is given as $p=5+q$.

a. What is the price-quantity equilibrium pair if the market is perfectly competitive?

b. What is the price-quantity equilibrium pair if the market is supplied by a monopolist?

c. Draw these two outcomes on a single graph.

d. Calculate the following areas:

	Consumer Surplus	Producer Surplus	Total Social Welfare
Perfect Competition			
Monopoly			

9) Cost.

a. Complete the following table.

Total Output	Fixed Cost	Total Cost	Variable Cost	Average Variable Cost	Average Fixed Cost	Average Cost	Marginal Cost
0	10		-----	-----	-----	-----	-----
1							15
2		39					
3						18	
4			62				
5		92					

b. Is this short run or long run cost information? Why?

c. If market price for the output produced is 18, what level of output is profit maximizing for a firm if the market structure is perfectly competitive?

10) Public goods. There are three people who live in a town. They each have a demand curve for the number of strings of lights to put on the Christmas tree in the town square (q is the # of strings of light here). Angelina's demand is $\$5.00 - \$0.10 \cdot q$. Eloise's demand is $\$3.20 - \$0.20 \cdot q$. Madeline's is $\$3.00 - \$0.10 \cdot q$.

- a. If the marginal cost of a string of lights is constant at $\$4.80$ per string of lights and no effort is made to avoid the free rider problem, what number of strings of lights will be provided and who will provide it?

- b. How much less is this than the socially optimal number of strings of lights if the cost is $\$4.80$ per string of lights?

11) The demand curve is given to you as $q=450-50*p$.

- a. Fill out the following table (use the relatively higher price / relatively lower quantity pair for the denominator in the elasticity calculation)

Price	Quantity	Elasticity
1		-----
2		
3		
4		
5		
6		

- b. Draw this demand curve with price on the y-axis and quantity on the x – axis. Identify the range over which this curve is elastic or inelastic.

12) Tax policy.

a. Illustrate on a supply and demand graph a specific tax of size τ placed on consumers.

b. Illustrate on a supply and demand graph a specific tax of size τ placed on producers.

c. Illustrate on a supply and demand graph the impact of an ad valorem tax rate of α placed on consumers.

13) Our project is trying to improve the income of livestock producers in northern Mali. The project we are proposing is to train producers in the production and use of animal feeds. Research has shown that a fattened animal sells for more than a non-fattened animal all else equal. However, it costs money to train people in the use of feeds, and it costs money to produce the feeds. We are considering implementing such a project. It is a three year project ($t=0$, $t=1$, and $t=2$). Benefits in $t=0$ are 0 million (m), in $t=1$ are 3m, and in $t=2$ are 4m. These benefits are the aggregate value added by fattening compared to not fattening. The costs of training people in the use of feeds in $t=0$ are 1m, in $t=1$ are 2m, and in $t=2$ are 1m. The costs of producing the feed in $t=0$ is 0m, in $t=1$ is 1m and in $t=2$ it is 1m.

- a) If the discount rate is 10%, should this project be implemented or not according to an evaluation of NPV?

- b) Would a higher discount rate make the project more or less attractive in NPV terms? Why?

- c) Would reducing the cost of training in $t=2$ from 1m to 0.5m change your answer to (a) if the discount rate is 10%?

14) There is one pasture two herders share in common. Milk produced on this pasture is determined by the combined herd of the two herders. Milk production is a function of total herd size is as follows:

# of animals	Liters of milk produced
0	0
1	10
2	19
3	27
4	34
5	40
6	45

For each livestock owner, the share of this total milk produced they receive is a function of your share of the total herd. The cash value of milk is \$1 per liter.

For each animal put on the pasture, it costs \$6 in private labor costs.

As before in class, then, payoffs are defined by the following equations.

$$\Pi_1 = \$1 * \left(\frac{h_1}{h_1 + h_2} \right) * f(h_1 + h_2) - \$6 * h_1, \quad \Pi_2 = \$1 * \left(\frac{h_2}{h_1 + h_2} \right) * f(h_1 + h_2) - \$6 * h_2$$

The profits for each herder are as written in each cell of the table below.

		Herder 1							
		0	1	2	3				
Herder 2	0	0	0	0	4	0	7	0	9
	1	4	0	3.5	3.5	3	6	2.5	2.5
	2	7	0	6	3	5	5	4	6
	3	9	0	7.5	2.5	6	4	4.5	4.5

a) What is the full set of best response strategies for each herder?

b) What is the Nash Equilibrium outcome of this game?

c) Propose one policy solution to Pareto improve on the Nash Equilibrium outcome, explaining what it means to Pareto improve in your answer.

15) Circle the correct answer.

Statement	The statement is (circle the correct answer)	
Income elasticity for a normal good is positive.	True	False
Consumer surplus is calculated as the area under the demand curve and above the price line.	True	False
In a perfectly competitive market the firm chooses q such that $AC(q)=AVC(q)$.	True	False
The slope of the budget line is defined by the negative ratio of the prices of the goods.	True	False
Cross price elasticity for substitutes is a positive number.	True	False
The bisection rule allows us to derive the marginal cost curve from a linear demand curve.	True	False
A monopsonist is the single buyer of a good for which there are many sellers.	True	False
A supply elasticity is the % change in price divided by the % change quantity supplied.	True	False

Work Page