

Final
 PPA 723, Fall 2003
 Professor John McPeak
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Name: _____

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

- 1) The demand curve is given to you as $Q=100-50*p$.
 - a. Fill out the following table (use the relatively higher price / relatively lower quantity pair in the elasticity calculation).

Price	Quantity	Elasticity
\$0.50		-----
\$0.75		
\$1.00		
\$1.25		
\$1.50		
\$1.75		

- b. Draw this demand curve with price on the y-axis and quantity on the x-axis. Identify the range over which the demand curve is inelastic, and over which it is elastic. Note the unit elastic point.

- c. Derive the inverse demand curve from this demand curve.

- d. Interpret the demand curve – what does a demand curve tell you?

- 2) So far this winter, the price of natural gas has increased over last year's price by 12%.
- a. If the market for natural gas is perfectly competitive, is the quantity demanded of natural gas this year higher or lower than last year's quantity demanded? Why?

 - b. Two theories are advanced to explain the price increase. One, consumers are relying less on natural gas and more on electricity, as electricity generation has become cheaper given relaxed regulation in coal burning electricity generation plants. Two, recent events in Iraq have disrupted the supply of natural gas to international markets. Which can you dismiss as inconsistent with the evidence you have and why?

 - c. You run a program that supports low income families with their natural gas heating bills. Should you anticipate that the need for assistance will be greater in the short run or the long run if the price increase is permanent? Why?

- 3) Race to the bottom. Maryland and Virginia are considering reducing welfare benefits. Currently, Maryland is spending 10 million per year on welfare programs, and Virginia is spending 20 million per year. Given their close proximity and high population density in the DC area, there is likely to be migration from one state to another if one state cuts its benefits and the other does not. In fact, research has indicated that the following pattern is going to hold. NOTE THESE ARE COSTS, NOT PAYOFFS, SO HIGH IS “BAD”, LOW IS “GOOD”

		Virginia	
		Reduce benefits	Maintain Current Benefits
Maryland	Reduce benefits	7 16	6 23
	Maintain Current Benefits	12 15	10 20

- a. Define the full set of best response strategies for each state.

- b. What is the outcome (the Nash Equilibrium) of this game.

- c. What is the nature of the externality in this game?

- d. Does the outcome of this game resolve whether society is made better off by reducing or maintaining current benefits? Why or why not?

- 4) The demand curve for processed pork (back to the pork!) is defined by $Q=286-20*p$ and the supply curve is defined by $Q=88+40*p$
- What is the equilibrium price quantity pair?
 - If the government steps in and sets a price floor at \$4.00, what will be the quantity supplied and the quantity demanded? Is this a shortage or a surplus?
 - If the government steps in and sets a price ceiling at \$2.00, what will be the quantity supplied and what will be the quantity demanded? Is this a shortage or a surplus?
 - Provide for me an explanation for why a government would choose to step in and set a price floor knowing that there will be the impact described in (b).

- 5) Studies have shown that increased women's education leads to lower population growth rates. Studies also show that improved access to family planning programs leads to lower population growth rates. Your country is experiencing social and economic problems that you attribute to rapid population growth rates, and you are hoping to implement policies to reduce this rate. Two proposals are on your desk, each designed to reduce population growth rate in your country by 1% per year. You only have enough operating funds to do one, and you can't combine them – it is pick one or the other.

GIRL'S EDUCATION: This is a three year program (start up is year zero, year one is a training year, year two is a training year, then the project phase ends) to improve facilities for girls to go to school and fund their attendance for two years. It will cost 2.3 million in the current start up year to build the facilities and start up the program, and will cost 1 million per year for each of two years of program implementation for funding the girls to be at school.

FAMILY PLANNING: This is also a three year program (start up is year zero, year one is a training year, year two is a training year, then the project phase ends) to build a set of family planning centers and fund for two operational years the staffing and operating costs. The start up year costs 1.5 million, while the operating costs per year are 1.4 million.

a. Which program achieves the targeted reduction of population growth rate at the lowest present value cost if the discount rate is 10%?

b. Which program achieves the targeted reduction of population growth rate at the lowest present value cost if the discount rate is 6%?

c. Explain the difference between your answer to (a) and (b) by describing how future expenses are impacted by a relatively lower discount rate, and the pattern of cost flows for the two policies.

6) Complete the following table.

a) Quantity of Output	Fixed Cost	Total Cost	Average Cost	Marginal Cost	Variable Cost	Average Variable Cost
0		15	-----	-----	-----	-----
1		35				
2		54				
3		72				
4		89				
5		107				
6		126				
7		146				
8		168				

b. If the market price for the output produced is 19 and the market structure is competitive, what level of output is the profit maximizing level of output, and why?

c. Is this a short run or a long run cost table? Why?

7) Deriving demand.

a. Derive a price consumption curve from the underlying budget constraint and consumer preferences.

b. Derive an individual's demand curve from the graph you drew in (a).

c. Describe how using the information contained in the individual's demand curve to arrive at the market demand curve differs whether we are analyzing a public good or a private good, and explain the reason for this difference.

8) Societal welfare.

a. Illustrate how a monopoly market structure lowers overall societal welfare compared to a perfectly competitive market structure noting graphically the area of dead weight loss.

b. Illustrate how the presence of an externality generated by production of the good in question makes the optimal price quantity pair from society's perspective differ from the price quantity pair arrived at in the perfectly competitive market.

c. Is the Coase Theorem concerned with improving societal welfare in the Pareto sense? Why or why not.

9) Fill in the following table. What is the technical term associated with the slope of the following curves?

Curve	Technical name of the slope
Utility	
Indifference Curve	
Total Cost	
Production function	
Budget constraint	
Isoquant	
Revenue curve	

10) The price of food is \$10 per unit, the price of all other goods is \$20 per unit, and the consumer's income is \$1000.

d. Draw the consumer's budget constraint.

e. If the consumer's income changes to \$2000, draw the new budget constraint.

f. If the consumer from the original problem (with an income of \$1000) is instead given \$1,000 in food stamps in addition to her original \$1,000 income, draw the new budget constraint.

13) Public Goods. Two people live next door to each other on a bay, and are the only residents on the bay. During storms, high waves cause property damage on each person's property. By building a breakwater near the mouth of the bay, they can avoid this damage to their shoreline. The only place that it is feasible to build this breakwater will provide this protection to both properties. Dorothy owns one of the houses, and spends \$13,000 repairing her property from the storm damage. Henry owns the other house, and spends \$3,000 repairing his property. Building the breakwater costs \$10,000. If they both agree to build it, they share the cost of building equally (\$5,000 each).

- a. Is the total benefit (as reflected in the benefit of not having to pay to repair storm damage) greater than the cost? You can assume both the damage repair costs and the building cost are in present value terms.

- b. Explain how the Nash Equilibrium outcome of this game illustrates the free rider problem in the provision of public goods.

		Dorothy			
		Build		Don't Build	
Henry	Build	-\$5,000	-\$5,000	-\$10,000	\$0
	Don't Build	\$0	-\$10,000	-\$3,000	-\$13,000

- c. Does the free rider problem in this example lead to an inefficient outcome?

