Final Name: _____
PPA 723, Spring 2008

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) Types of Goods.
a) What type of good goes in which blank?

	Rival	Non Rival
Exclusion		
Non Exclusion		

b) Illustrate how deriving the demand curve for a public good differs from deriving the demand curve for a private good, and **explain how this difference relates to your answers to (a).**

2) Market structure and externalities. The inverse demand curve is given as p=116-4q. The supply curve is p=20+8q.

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*q (MC^E=4*q), what is the socially optimal price quantity pair ?

c. If the market structure is a monopoly, what is the equilibrium price quantity pair chosen by the monopolist?

3) The own price demand elasticity for public administration programs is -1.8.

a. Is the own price demand elasticity for public administration programs infinitely inelastic, inelastic, perfectly inelastic, elastic, unit elastic, or infinitely elastic?

b. Currently we have 100 students in the program. If we raise tuition for next year (the price) by 10%, what number of students should we expect next year?

c. If the price is 20,000 before we raised it by 10%, would such a raise increase, decease, or leave unchanged our total revenue? Why?

4) 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	12		-------	------	-----	------	---------
1			15				
2						20	
3		55					
4							17
5		92					

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

c. If market price for the output produced is 15, what level of output is profit maximizing for a firm if the market structure is perfectly competitive?

5) Deriving demand.

a) Derive a price consumption curve.

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

6) The demand curve is given to you as q=200-20*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.

7) The price of milk in this area has gone up over the past year. 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)
Consumers' income in this area has gone up significantly since last year.	Rule out Not Rule Out
Feed grains for livestock that produce the milk have increased in price dramatically.	Rule out Not Rule Out
The introduction over the past year of a new breed of cattle that is a much more productive milk producer than the old breed.	Rule out Not Rule Out
A health scare where unsafe milk was consumed in Ohio has made people more nervous about drinking milk.	Rule out Not Rule Out
Innovations in the soy milk production process have dramatically lowered the price of soy milk.	Rule out Not Rule Out
A specific tax on producers has been introduced for milk in the past year.	Rule out Not Rule Out

8) Circle the correct answer.

Statement	**The statement is (circle the correct answer)**
The expansion path traces out all points that are economically efficient.	True False
Consumer surplus is calculated as the area above the supply curve and below the price line.	True False
The slope of an indifference curve is called the marginal rate of substitution.	True False
The income elasticity of demand for an inferior good is a negative number.	True False
If there is an externality generated by producing a good, the price of that good in a perfectly competitive market will be lower than socially optimal.	True False
Decreasing the discount rate increases future costs in present value terms.	True False
A monopsonist is the single buyer of a good.	True False
The free rider problem leads to underprovision of a public good.	True False

9) Public goods.

a. There are three people (Bounce, Snowdrop, and Dragonfly) who live in a town. We are considering the demand for the number of butterfly houses to put in the city parks. Here q is the number of butterfly houses put in the park that is accessible to all three people. Bounce's demand is defined by 10-q. Snowdrops' is defined by 40-4*q. Dragonfly's is defined by 70-5*q. What is total marginal willingness to pay on the societal demand curve for the provision of the 5^{th} butterfly house?

b. If the marginal cost of butterfly house provision is constant at 60 per hectare and no effort is made to avoid the free rider problem, what number of butterfly houses will be provided and who will provide it?

10) Tax policy.

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

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

c. Explain the concept of consumer incidence based on your graph in part (b). Note in your answer what economic concepts determine the size of consumer incidence.

11) Syracuse is considering opening a sewage treatment plant that will release treated water into Onondaga Lake. The Onondaga Yacht club members sail yachts in this lake. The Yacht club is trying to decide on the membership fee they should charge this year. The Onondaga Yacht club can charge nothing, have no members and make no profit, set a fee of $100 per person and have the profits listed in the table, or a $200 per person fee and have the profit listed in the table. The payoffs to Syracuse are cost reductions from the current level for sewage treatment. Syracuse can choose no plant, a small plant, or a large plant.

Onondaga Yacht Club							
		No fee		$100 fee		$200 fee	
Syracuse sewage treatment	No plant	0	0	0	14,000	0	15,000
	Small plant	10,000	0	10,000	10,000	10,000	5,000
	Large plant	15,000	0	15,000	2,000	15,000	-3,000

a) Describe the full set of best response strategies and the Nash Equilibrium outcome of this game.

A court has passed a judgment that Onondaga Yacht club must be compensated by Syracuse by $7,000 if the small plant is built and $14,000 if the large plant is built. The following payoffs result.

Onondaga Yacht Club							
		No fee		$100 fee		$200 fee	
Syracuse sewage treatment	No plant	0	0	0	14,000	0	15,000
	Small plant	3,000	7,000	3,000	17,000	3,000	12,000
	Large plant	1,000	14,000	1,000	16,000	1,000	11,000

b) Describe the full set of best response strategies and the Nash Equilibrium outcome of this game.

c) Contrast these outcomes in terms of the sum of the payoffs to the two players and the concept of Pareto improvement.

12) The demand curve is defined by the relationship p=20-q. Marginal cost is defined by the curve MC=10.

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

b. What is the price quantity equilibrium if the market structure is monopolistic?

c. Identify the magnitude of consumer surplus, producer surplus and total social welfare for cases (a) and (b).

	Consumer Surplus	Producer Surplus	Total Social Welfare
Perfect Competition			
Monopoly			

13) Benefit cost.
We are worried that climate change will negatively impact yields of rice in the Gambia. Over the next three years (t=0,t=1,t=2), we could invest in research that is aimed at developing new varieties that will be as productive as current varieties after climate change leads to a 2.5 Celsius increase in mean temperature in the Gambia starting in t=3. Without the development of new varieties, this predicted increase in temperature will lead to a reduction in the rice sector's contribution to GNP. The present value net benefits of the "with investment to develop new varieties to maintain current yield levels" over the "without investment to develop new varieties so we have declining yields" has been estimated to be 124 million current USD.

a) Draw the net benefit stream over time with time on the x-axis and net benefits on the y-axis for the "with" and "without" scenarios, being sure to contrast "with" and "without" with "before" and "after".

b) If it will cost us 100 million this year (t=0), 15 million next year (t=1), and 10 million the year after that (t=2) for the research in the "with" scenario and the discount rate is 10%, does a benefit cost test tell us we should or should not invest in the research to develop new varieties?

c. It turns out after we have implemented the project that the estimated present value benefits we used in answering (b) overestimated by 10% (so benefits turn out to be 90% of what you used above). Would have made the same decision as in (b) if we had used the correct benefit estimate?

14) A food stamp policy is put in place in a state. For our representative consumer impacted by this policy, their initial income of $1000 is supplemented by food stamps worth $100 of food. The price of food is $20 per unit, the price of the composite other good which cannot be purchased using food stamps is $10 per unit.

a. Draw the original budget line and the budget line after the food stamp policy is implemented.

b. Reproduce the graph you drew for (a) below. Illustrate on this graph a consumer who has preferences such that they will consume a bundle that has more than $100 worth of food both before and after they are given the food stamps.

15) Syracuse University has to decide whether to build an elevated gondola that will transport students through the air from the Dome box office to Armory Square. They are also wondering whether to build an underground subway link connecting Sims hall with the Ice Pavilion on South Campus. Two remarkable facts will aid your analysis. One, recruiting has gone horribly, so we only have 5 students attending SU who get to vote on these two proposals. Two, both projects are expected to cost the remarkably low and identical figure of $10,000. The five students have the following willingness to pay for each project, and if a project passes each will each pay an equal share of $10,000 cost ($2,000 each) of any project that receives a majority yes vote.

WTP per student per project	Student 1	Student 2	Student 3	Student 4	Student 5
Gondola	200	800	1000	5000	6000
Subway	250	2750	2250	2500	1750

a.If the students vote on these two proposals, will they select neither, one, or both? Explain your answer.

Vote	Student 1	Student 2	Student 3	Student 4	Student 5
Gondola	Y N	Y N	Y N	Y N	Y N
Subway	Y N	Y N	Y N	Y N	Y N

b) Compare the two projects if the sum of willingness to pay is the measure of benefits and the costs and benefits can be interpreted as present value figures. Is one project better than the other in NPV terms?