Final Name: _____
PAI 723, Spring 2015

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: perfectly elastic, unit elastic, perfectly inelastic, inelastic, or 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) Voting on the funding for the Syracuse City School District. Syracuse faces a substantial decline in state funds due to the economic crisis. It is voting on how many teachers to cut. It can issue bonds to earn some money to fill the funding gap. We are voting on the budget and bond strategy. Our options are:

Low Budget, No bonds – low cost budget, 700 teacher jobs lost
Medium Budget, Low Bonds – medium cost budget, 250 jobs lost
High Budget, High Bonds– highest budget, no teacher jobs lost

Four groups in society:
Moderates, who prefer Medium, to High, to Low (30%)
Fiscal Conservatives, who prefer Low, then Medium, then High (35%)
People with kids enrolled in the city schools, who prefer High, to Low, to Medium (30%)
Teachers, who prefer High, to Medium, to Low (5%)

| Preferences over Budget Levels | | | | |
|---|---|---|---|---|
| | First Choice | Second Choice | Third Choice | Percent of the vote |
| Moderates | Medium | High | Low | 30% |
| Fiscal Conservatives | Low | Medium | High | 35% |
| Effective Schoolers | High | Low | Medium | 30% |
| Teachers | High | Medium | Low | 5% |

For each agenda, describe the voting in each round and the final outcome.

a. **Agenda A: Compare High to Low, then winner takes on Medium**

b. **Agenda B: Compare Medium versus Low, winner takes on High**

c. **Agenda C: Compare High versus Medium, winner takes on Low**

3) If $p_1 = 20$, $p_2=10$, and $Y=400$

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 $p_1 = 20$ all else constant, and a budget line of $p_1 = 25$ 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=116-2q. The supply curve is p=20+2q.

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. What size specific Pigovian tax $\tau$ could be placed on producers to arrive at the socially optimal outcome?

5) Syracuse University is considering raising the price for a season's ticket for all men's basketball home games next year from $455 to $475. This year, at a price of $455, they sold 25,000 season's tickets. The best available information suggests that the price elasticity of demand for season's tickets is -0.9.

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 -0.9 as assumed above, but is in fact -1.1?

6) Production function.

a) Draw the production function Q=f($L, \bar{K}$) 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 ham sandwich has increased by an average of $0.40 over the past year 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 ham sandwiches to turkey sandwiches. | Rule out Not Rule Out |
| The price of bread has come down due to a better harvest last year in North America. | Rule out Not Rule Out |
| New packaging regulations require use of higher cost biodegradable plastic wrappers for sandwiches sold in CNY. | Rule out Not Rule Out |
| A new labor agreement with the food service workers' union has increased the wages of the workers in this sector. | Rule out Not Rule Out |
| A disease has swept through the pig population in North America, significantly reducing the supply of pigs to ham producers. | Rule out Not Rule Out |

8) The inverse demand curve is given as p=40-2*q. The inverse supply curve is given as p=10+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 | 8 | | ------- | ------ | ----- | ------ | --------- |
| 1 | | | | | | | 13 |
| 2 | | 36 | | | | | |
| 3 | | | | | | 17 | |
| 4 | | | 60 | | | | |
| 5 | | 88 | | | | | |

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

c. If market price for the output produced is 17, 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 10m by 10m tulip beds to be planted along the roadside (q is the # of tulip beds here). Angelina's demand is $50.00-$1.00*q. Eloise's demand is $32.00-$2.00*q. Madeline's is $30.00-$1.00*q.

a. If the marginal cost of a 10m by 10m tulip bed is constant at $48.00 per bed and no effort is made to avoid the free rider problem, what number of beds will be provided and who will provide it?

b. How much less is this than the socially optimal number of tulip bulbs if the cost is $48.00 per bed?

11) The demand curve is given to you as q=400-40*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 $\tau$ placed on consumers.

b. Illustrate on a supply and demand graph a specific tax of size $\tau$ placed on producers.

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

13) Heifer Project is distributing milking goats to women in Senegal. The cost to the project to buy the goats to distribute is $200,000 in t=0. Women will be trained in zero grazing and stable building for these goats. Training will take place in t=0 and t=1 and costs Heifer Project $100,000 in each year. The women will bear a cost of $100,000 in t=0 to build the stables and $50,000 in t=1, t=2, and t=3 to feed the goats. The added value of the milk that will be produced by these goats compared to without them is $250,000 in years t=1, t=2, and t=3.

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

b) If we use a lower discount rate will this make the project more or less attractive in NPV terms? Why?

c) If the cost of the goats turns out to be $250,000 instead of $200,000 in year zero do you still have the same answer as you found for part (a)?

14) 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).

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)=MC(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 revenue 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 natural monopoly is where marginal cost is less than average cost over the whole feasible range of demand. | True False |

Work Page