Appalachian State University
Economics 3550 – Public Economics
October 2016
Midterm Test

Instructions: Attempt ALL questions.  All questions are of equal value.

1.  A government program to reduce air pollution by requiring reformulated gasoline will raise the price of gasoline in North Carolina by $0.20 per gallon.  The average person buys 1000 gallons per year before but with the price increase is predicted to reduce consumption to 920 gallons.  What is the cost of the program to the average driver?  If the average individual benefit (due to improved air quality) is valued at $400, will the average net benefit be positive or negative?  Would this project be justified?  Does it matter whether the people who benefit are not the same people who purchase the average quantity of gasoline?  Explain.

2.  As you may have read (or know from personal experience), hog farms tend to be a source of unpleasant odors (and water contamination when the ponds are breached).  The amount of odor increases as the number of hogs being raised increases.  Suppose that a hog farm (HF) locates near a tourist resort (TR).  The table shows the marginal (net) benefit to HF and the marginal damage to TR for various levels of hog production.

| Hog Production (in 100s) | Marginal Benefit to HF | Marginal Damage to TR |
| --- | --- | --- |
| 1 | 15 | 3 |
| 2 | 12 | 6 |
| 3 | 9 | 9 |
| 4 | 6 | 12 |
| 5 | 3 | 15 |
| 6 | 0 | 18 |

a)  How many hogs would HF produce if it considered only its own profits?
b)  What is the socially efficient level of hog production?  Why?
c)  Suppose a tax were imposed on hog operations to obtain the socially efficient level of hog production at HF.  What is the level of the tax that would be needed?
d)  Is it socially optimal to ban hog production in this case?  Explain.
e)  Could the TR and HF reach an efficient solution if either were assigned the property rights to the air quality in the area?  Explain the outcome of the bargain.

3.  Three members of a club (Arthur, Betty, and Charles) are being asked to vote whether or not the club should buy a pool table or a ping pong table.  The net benefits each would enjoy are provided in the table below.  The club requires that the members vote on purchases and that a simple majority is required to approve the purchase.

| Member | Ping Pong Table | Pool Table |
| --- | --- | --- |
| Arthur | 10 | -11 |
| Betty | -5 | 6 |
| Charles | -3 | 4 |

a) Which purchase or purchases would be approved under majority rule voting?  Are these socially beneficial (improve total net benefits)?

b) If the members agreed to trade votes which purchase or purchases would be approved?

c) Which purchase or purchases would make the club better off (maximize the total net benefits to all members)?

d) Suppose Arthur's net benefit from the pool table changed from -11 to -9.  Would your answer to parts a) and b) change?  How?

4. The owners of three restaurants, Arthur, Betty, and Charles, are each lobbying the Boone Town Council to grant an exclusive permit (only one will be awarded) to sell liquor by the glass in his or her restaurant.  The estimated profits to having such a permit are $500,000 over the next 20 years.  How much will the three spend individually on lobbying?  What is the total amount spent on lobbying?  Suppose the town was going to award 2 licenses and the profits would be split but because of agglomeration economies the total profit is $700,000.  Now how much will the three spend individually on lobbying?  What is the term used to describe this type of activity?  Does it affect the final outcome – which gets the license or licenses?  Explain.

5. Identify whether the following goods are non-rival, non-excludable, or both.  In each case, provide a brief explanation for your classification.
    a) attending an ASU football game
    b) viewing the Blue Ridge Mountains
    c) space in the overhead bins on airplanes
    d) fire protection from the Boone Fire Department

6. Thelma and Louise are neighbors.  During the winter, it is impossible for a snowplow to clear the street in front of Thelma's house without also clearing the snow in front of Louise's.  Thelma's marginal benefit from snowplowing services is $12 - Z$ where $Z$ is the number of times the street is plowed.  Louise's marginal benefit is $8 - 2Z$.  The marginal cost for having the street plowed is $16.  Draw the two marginal benefit schedules and the aggregate (total) marginal benefit schedule.  Draw the marginal cost schedule and find the efficient level of provision of snowplowing services.  If Thelma and Louise agree to pay their valuation for snowplowing how much does each pay?

7. Everyone hates finding a table in the cafeteria where the previous user left a mess of dirty dishes.  After cleaning up someone's mess (all the other tables are in use), it is tempting to leave yours for the next person too.  We'd all be better off, and do no more work, if everyone bused their own tables, yet this rarely happens.  Explain this phenomenon using a game theory model (prisoner's dilemma).