FIRST TEST. ECON 237, SPRING 2016. NAME: _____

Fill in the blanks, and answer in the spaces provided. Show your work.

1. A public good (12 pts). The Town of Donksburg contains five people, named Person 1, Person 2, etc. They are deciding how many miles of road to build. Some residents of Donksburg drive more than others, so they have different marginal benefit functions for roads – these are:

$$MB_1 = \frac{50}{y} \qquad MB_2 = \frac{100}{y} \qquad MB_3 = \frac{150}{y} \qquad MB_4 = \frac{200}{y} \qquad MB_5 = \frac{500}{y}$$

where y is the mileage of roads built. The marginal cost (i.e. the price) of building a mile of road is $MC = 50$.

a) If the people are purely selfish and must contribute to the road fund in an uncoordinated way, the Nash equilibrium road mileage is _____.

b) The Pareto optimal road mileage is _____.

c) Suppose that it is agreed that each citizen will pay 1/5 of the cost of the roads, and the road mileage will be determined by majority rule. Given this agreement, person 1's first choice of road mileage is y_1^* =_____. Person 2's first choice is y_2^* =_____. Similarly, we have y_3^* =_____, y_4^* =_____, and y_5^* =_____. The unique equilibrium in majority voting is y_{mv}^* =_____.

d) If you know the marginal benefit functions of all individuals, you could assign the Lindahl shares s_1 =_____, s_2 =_____, s_3 =_____, s_4 =_____, and s_5 =_____. With the cost shares assigned in this way, the society would vote unanimously for _____ miles of roads to be built.

2. A negative externality (16 pts). The market for oobleck is perfectly competitive, and is defined by the marginal benefit (inverse demand), marginal cost (inverse supply), and marginal external cost functions:

$$MB = 100 - \frac{4}{10}q \qquad MC = 20 + \frac{1}{10}q \qquad MEC = 20$$

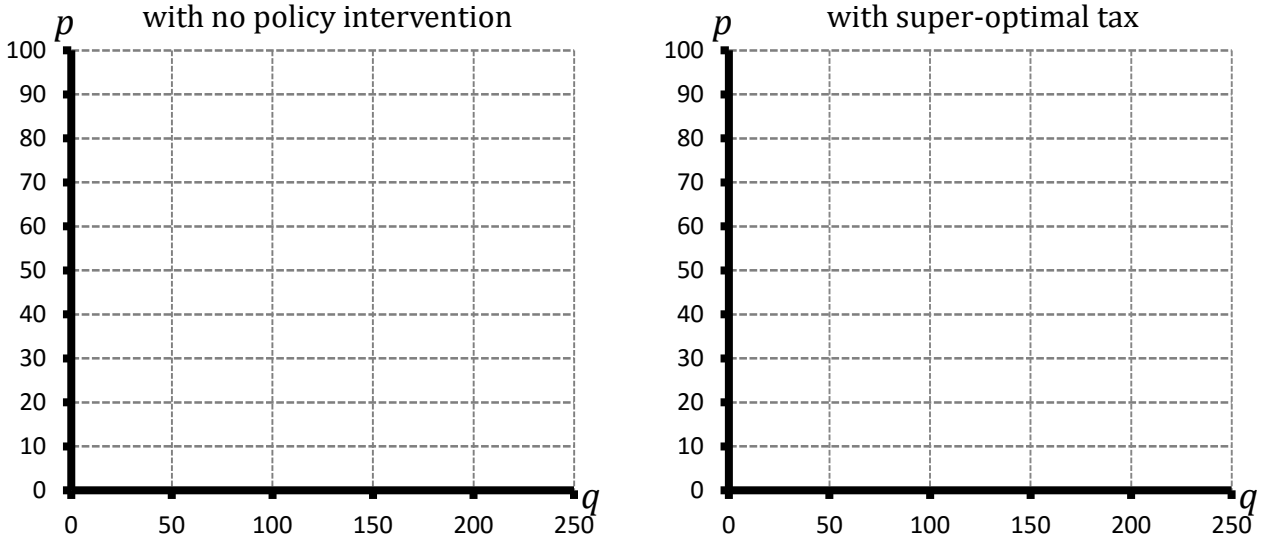
a) Equilibrium without intervention or coordination. If the negative externality goes completely un-internalized, find the equilibrium q, p (price), TES (total economic surplus), and DWL (deadweight loss).

b) Efficient resolution. Without yet being specific about how efficiency is achieved, characterize the Pareto efficient state of this market in terms of q and TES.

c) Optimal government policy. What tax on oobleck would lead to efficiency? What cap in a cap-and-trade program would lead to efficiency?

d) Super-optimal tax. Find q, p, TES, and DWL if the government over-estimates the marginal external cost, and imposes an oobleck tax of $\tau = 50$. Relative to (a), has the government done more good or harm, in terms of efficiency?

e) Graphing. On the left, graph the market in part (a), labeling consumer surplus (CS), producer surplus (PS), total external cost (TEC), and deadweight loss (DWL). On the right, graph the market in part (d), with the super-optimal tax, labeling CS, PS, TEC, DWL, and government revenue (GR).



3. Tragedy of the commons (5 pts). Suppose that there is a pasture somewhere that can be used for bison grazing. In the nearby village, any amount of bison can be purchased, for \$100 each. If the number of bison that people buy and keep in the pasture is x, the revenue that can be derived from the bison living in the pasture (e.g. from their milk, or whatever) is $R(x) = 700x - x^2$. (This function is concave and eventually decreasing in x due to the fact that the bison will be less healthy if they have less grass to eat.)

a) If the pasture is a non-excludable common resource, and the world is teeming with entrepreneurs seeking to profit from the bison business, how many bison will be on the pasture in equilibrium, and how much profit will be gained from the pasture? (Assume that each bison on the pasture yields the same revenue.)

b) Suppose that the pasture is still open to all, but the government is able to charge a per-bison tax, τ. What is the most efficient tax, how much revenue does the government get in the equilibrium, and how much profit do the bison owners get?

4. Coase theoem (7 pts). Suppose that some guy wants to build a factory on the River Road in Red Hook, NY. The factory will be ugly, and mess up the view along the road, to the detriment of area residents. Let the $G be the profit gained by the factory if it is built, and $L be the loss that the community experiences from the disturbance of their nice country views. Assume that property rights are clear, and perfect bargaining is costless. In this environment, explain what the Coase theorem predicts in the following four cases: (1) G>L and the guy has the right to build, (2) G<L and the guy has the right to build, (3) G>L and the guy needs the community's permission to build, (4) G<L and the guy needs the community's permission to build.

5. Public goods (7 pts). Define precisely what economists mean by a 'public good'. Explain why decentralized markets for public goods are generally not efficient, and why government may be able to improve efficiency. Explain all of this in a very clear way, as though you were explaining to a roommate without a background in economics. That is, define all special terms (jargon) you use, and construct a clear logical progression from beginning to end.

6. Black's majority voting equilibrium (3 pts). In 1(c), we construct a simple majority voting equilibrium that is an application of Black's (1948) theorem. Briefly, explain how this equilibrium is defined, and why the outcome you find is uniquely stable.