AS/ECON 4080MW W2008 Assignment 2

due : Wed. March 12, before class

All 5 questions count equally.

The following information is to be used in all the questions.

Farm #1 is a dairy farm. It sells the milk it produces in a perfectly competitive market at a price of \$240 per truckload of milk that it produces. The cost to farm #1 of producing M truckloads of milk is

$$C^1(M) = M^2$$

(so that farm #1's profits are $240M - M^2$ if it produces M truckloads of milk).

Farm #2 is a wheat farm, which sells its wheat in a perfectly competitive market for \$360 a bushel. Farm 2's costs of producing W bushels of wheat are

$$C^2(W; M) = 2W^2 + 2WM$$

(so that farm #2's profits are $360W - 2W^2 - 2WM$). Farm #2's costs increase with farm #1's milk production, since more milk production requires more cows, and the cows tend to damage the wheat.

[The questions are on the next page.]

1. What are the efficient quantities of milk production and wheat production for the two farms?

2. If farm #1 chose its milk output M to maximize its own profit, and did not negotiate with farm #2, what quantity M would farm #1 choose, and what quantity W of wheat would farm #2 choose to to produce?

3. If farm #1 had to compensate farm #2 for any damage done by its cows, and if the two farms could not negotiate with each other, what quantity M would farm #1 choose, and what quantity W would farm #2 choose?

4. Suppose that farm #2 had to pay a tax of \$120 per truckload of milk to the government. This tax revenue does not go to the owners of farm #2, but to the general government revenue (and will not be spent on any government projects which give any benefit to farm #1 or farm #2).

But, unlike the situation in questions #2 or #3, the two farms are now capable of negotiating with each other. [Negotiation here does not alter the tax policy : farm #1 must still pay a tax of \$120 for every truckload of milk that it produces.]

What quantities M and W will they agree to produce, after negotiating with each other?

5. Rank the outcomes in questions 1 through 4, in order of their efficiency.