SPEA V401 – Financial and Cost-Benefit Analysis

Assignment #4

**Show all of your work, including both math and graphs. You should respond to these questions on separate paper from the questions, and keep your work and answers well organized. Upload scanned or photographed images of your work. *If you photograph them, make sure to check that they are legible and the files are well organized, preferably one single file.***

1. Two suppliers have been contracted by a government agency to provide a total of 100 hours of training services to help agency employees learn how to use a new computer system. The marginal cost curve of firm 1 is MC1=100+.2Q1, while the marginal cost curve for Firm 2 is MC2=90+.4Q2. Suppose each firm provides 50 hours of training services each week.
   1. What is the marginal cost of training for firm 1 at 50 hours of training?
   2. What is the marginal cost of training for firm 2 at 50 hours of training?
   3. What is the total cost to firm 1 of providing 50 hours of training?
   4. What is the total cost to firm 2 of providing 50 hours of training?
   5. Is this the least costly division of training services between the two firms if the total should be 100 hours of training services? If not, which firm should produce more, and which should produce less?
2. The market marginal benefit curve for water (measured in thousands of gallons) is MB=300-Q, where Q is thousands of gallons of water. The marginal cost of providing the water (including treatment, pumping, and other costs) is MC=.5Q. Suppose that the government utility regulator has required that the price of water be set at $50 per thousand gallons and that the quantity supplied must be 250 thousand gallons.
   1. What is the total benefit of that amount of water to consumers?
   2. What is the total cost of providing that amount of water to producers?
   3. What is the consumer surplus of that amount of water at that price?
   4. What is the net benefit to society (total benefits minus total costs) of that amount of water?
   5. Are net benefits maximized at 250 thousand gallons? If not, how many gallons should be supplied to maximize net benefits?
3. The market marginal benefit for milk (in gallons) is given by MB = 12.5-.0115Q. There are two firms in the market that produce milk. The first firm’s marginal cost curve is given by MC1 = .05Q, while the second firm’s marginal cost curve is MC2=.0125Q.
   1. What is the equation for firm 1’s supply curve (quantity supplied as a function of price)?
   2. What is the equation for firm 2’s supply curve?
   3. What is the equation for the market supply curve?
   4. What is the equilibrium price and quantity of milk?
   5. What are the total benefits to consumers from the equilibrium quantity of milk?
4. The demand curve for two liter bottles of soda is given by QD=2000-1000P, and the supply curve is given by QS=1000P. In an effort to reduce soda consumption, the government has placed a tax of $0.50 per two liter bottle that is added to the consumer’s bill at the checkout. Based on this supply and demand curve, it turns out that the consumers end up paying $0.25 more per two liter bottle than before the tax, and the producers collect $0.25 less per two liter bottle than before the tax.

* 1. Before the tax was imposed, what was the equilibrium quantity?
  2. After the tax is imposed, what is the equilibrium quantity?
  3. How much revenue will the government collect from this tax?
  4. What is the reduction in total benefits due to this tax (i.e. total benefit before the tax minus total benefit remaining after tax is implemented)?
  5. What is the reduction in total costs due to the tax?
  6. What is the deadweight loss of this tax?