

Econ 4621: Urban Economics (Hsu)
Spring 2008
Homework 1
(Due Tuesday, February 12)

1. Complete the density gradient assignment that is posted on the web and titled, "Minneapolis/St. Paul Density Gradient Problem."
2. Take the model setup of the firm location model (see notes posted on the course website) except for the following: firms now deliver goods to consumers (instead of consumers travel to the production site to consume). Suppose each point on the real line is a market in which firms engage in Bertrand competition of delivered price. Calculate the profit of a firm, and determine whether the equilibrium distance is socially optimal or not. If not, indicate the direction of the bias.
3. Suppose in the monocentric model of the city there are H individuals with a utility function $U(x,L)$ over material goods x and L . The transportation cost per mile is t for all individuals. If an individual lives a distance u from the central business district (CBD), the individual's net wage after transportation cost is $w-tu$. Let p be the price of x and let $R(u)$ be the rent on land that is u miles from the CBD. Let \bar{R} be the price of farm land. Let $L(u)$ be the equilibrium land demanded by individuals who live u miles from the CBD. The population density is $D(u)=1/L(u)$. Write down the equilibrium conditions.