1. Consider a town with three neighborhoods, Alpha, Beta, and Gamma. The neighborhoods have the following racial make-up:

<table>
<thead>
<tr>
<th></th>
<th>White</th>
<th>Minority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha</td>
<td>0</td>
<td>1000</td>
</tr>
<tr>
<td>Beta</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Gamma</td>
<td>1000</td>
<td>0</td>
</tr>
</tbody>
</table>

a. What is the minority percentage in the town?

b. What is the number of residents that would have to be “shifted” for each neighborhood to have the same racial composition?

c. Calculate dissimilarity index D. How does it relate to the answer to question b?

d. How does residential segregation relate to the “flight from blight” hypothesis of urban decentralization?
2. Suppose that we wish to locate a high-tech (corn) chip manufacturing plant along a high-way, between the corn field and the market 8 miles away. It takes 5 tons of corn to make 3 tons of chips. It costs $2 per ton-mile to ship the corn and $4 per ton-mile to ship the chips.

a. On the accompanying diagram, graph the relevant costs of collecting corn and shipping the chips.

b. According to the current parameters where would the efficient producer locate? Why?

c. If the cost of shipping the chips were to rise to $5 per ton-mile, would your answer to part b. change? Why or why not?

d. Given the structure of this problem would the producer EVER locate half way between the field and the market? Why?
3. Consider this diagram of a land rent function for the “Huron” metropolitan area.

![Diagram of land rent function]

a. How is this diagram used to determine how large the urban area will be?

a. Why is the rent function “downward sloping.”

c. Suppose that pollution increases in Huron, so that the town is more pleasant than it used to be. What will happen to the size of Huron, and why?

d. Although it is not mentioned explicitly in the problem, if pollution decreases, so that the town is more pleasant than it used to be, what will happen to the equilibrium wage level in the Huron urban area, and why?
4. In class, we looked at the “user cost” of housing, with the following equation:

\[ R = [(i + t)(1 - T) - g] V \]

where  
- \( R \) = rental income from asset
- \( i \) = real interest rate
- \( t \) = property tax rate
- \( T \) = income tax rate
- \( g \) = expected capital gain
- \( V \) = value of asset.

a. What is the meaning of “user cost.”

b. Why do expected capital gains reduce the user cost?

c. What does our income tax system do to the user cost?

d. In the late 1970s interest rates reached 12 to 14 percent and income tax rates reached 50% yet the demand for owner housing was very high. How is this explained with the user cost model?
5. We have discovered that consumers purchase both public and private goods.

   b. Very briefly, what is the difference between a public good and private good? (Hint: It is NOT that the government produces public goods and the private sector produces private goods.)

b. According to the “median voter” model, how do consumers determine how much of a public good will be provided in a municipality?

c. The Tiebout hypothesis describes how consumers will shop among competing municipalities for levels of public goods. Discuss the Tiebout hypothesis briefly, and indicate two problems with its underlying assumptions.

d. We talked about the library system in Warren during a current event presentation.” How does the Warren situation exemplify the Tiebout hypothesis?
6. Economists often look at crime as a “rational activity.”

a. If one is looking at burglary, enumerate briefly the costs and the returns to this activity.

b. According to this theory, why would fully employed individuals be less likely to engage in burglary activity than unemployed individuals?

c. Draw a burglary supply function. What is its shape and why? Label your axes (in the boxes) and your function carefully.

d. What happens to the burglary supply if the returns to robbery (a distinct activity) go up?
7. Using the Detroit database, Dr. Goodman ran a hedonic regression on rents and got the following result:

\[
\text{Rent} = 313 + 18 \times (\# \text{ of rooms}) - 2.8 \times (\text{Age of unit in years}) + 112 \times (\text{SUBURBS})
\]

Where SUBURBS = 1, if in Detroit, and 0 if not in Detroit.

a. What was the hedonic price of a room in a renter unit in the Detroit metropolitan area? How did you get this result?

b. What is the difference in rent between a 10 year old unit and a 30 year old unit? Why?

c. What is the price differential between Detroit and the suburbs. Why might we be finding this differential?

d. If we were to try to sell the unit on the market rather than rent it, how might we calculate the potential sales price of this rental unit?
8. A newspaper article in a large metropolitan area noted that the costs of crime in a given year were $900 million. This was made up of $100 million dollars for the police force and $800 million in stolen property.

a. Was the $900 million an accurate accounting of the economic costs of the crime? Why or why not?

b. A mayoral candidate ran on the basis of eliminating all crime in the city. Is this an economically efficient use of resources? Why or why not?

c. Is victim “pain and suffering” a valid economic cost of crime? How would you measure it?

d. If there is only a limited amount of money available for crime prevention, what is the economically efficient criterion for allocating it? Why?