Name__________________________________________

Economics 5800
Urban Economics
Mid-Term 1 – Winter 2001

Instructions

This examination has five questions and you are to do all five in a bluebook that you provide. Please number your answers clearly. Each question will be worth 20 points, and each part of each question will be worth 5 points, so allocate your time accordingly. The exam is “closed book – closed notes.” You may use a calculator, although you shouldn’t need one.

You will have until 12:30 to complete the exam. Latecomers will not be given extra time to finish the exam.

The proctor will not answer questions. If you are unsure of a question, indicate what assumptions you are making and go forward.

The proctor will be asked to note any perceived cases of unusual behavior among those taking the exam. I will address such cases if they are reported, but I truly hope that there are none.

1. Consider a flexible carrot farmer. Complete the following table, assuming that: (1) the farmer produces 10 tons of carrots; (2) the price of carrots is $40 per ton; and (3) transport cost per ton per mile is $5.

<table>
<thead>
<tr>
<th>Distance to Market (miles)</th>
<th>Farm size (acres)</th>
<th>Total Revenue</th>
<th>Non-land Costs</th>
<th>Transport Costs</th>
<th>Pre-rent Profit per acre</th>
<th>Rent per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.70</td>
<td></td>
<td>$66</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0.80</td>
<td></td>
<td>$52</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.90</td>
<td></td>
<td>$40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1.00</td>
<td></td>
<td>$30</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Fill in columns (c) and (e). Explain your reasoning briefly.
b. Fill in column (f). Explain your reasoning briefly.
c. Fill in column (g). Explain your reasoning briefly.
d. If marginal transport costs rise to $10 per ton per mile, what will happen to your answer to part (c)? Why?
2. In a class presentation, we learned:

The [Detroit] suburbs’ class A vacancy rate fell to 8.12% in third quarter 2000 from midyear's 10.22%, explains Matthew Fenster, CCIM, MCRS and Paragon CRS executive director. “A few large tenants leased space in Bloomfield Hills that had stood vacant since year-end 1999,” says Fenster. “That helped Birmingham/Bloomfield Hills/Bingham Farms' class A vacancy rate drop to 12.7% from 21.6% at midyear.”

The I-275 corridor also continued the gradual tightening over the past 12 months, Fenster says. The I-275 corridor's class A vacancy rate fell to 10.6% from 14.4% at midyear and 27% a year ago. Suburban office rents remain stagnant but still relatively firm. The average quoted rent for class A office space inched up to $24.72 per SF in third quarter, up from $24.51 a year ago. The average asking class B rent is $20.88 per SF, essentially unchanged from midyear 2000 but up $1.23 per SF from third quarter 1999.

a. Sketch out supply and demand of office space on the accompanying diagram, drawing supply, demand, and the market price equilibrium. Label all curves and axes.

b. If demand increases, what is likely to happen to equilibrium price? Why?

c. What role do vacancies have in this market process?

d. Why is short run market supply of office space very price inelastic?

3. There are several assumptions regarding the economic determinants of cities (or more generally groupings of activities). Please discuss each of them and their importance. Give as much detail as you need to provide a complete answer.

a. Increasing returns to scale.

b. Transportation costs to central transportation depots.

c. Shopping externalities.

d. Localization economies.
4. Consider a town with three neighborhoods, A, B, and C. The neighborhoods have the following racial make-up:

<table>
<thead>
<tr>
<th></th>
<th>White</th>
<th>Minority</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>200</td>
<td>800</td>
</tr>
<tr>
<td>B</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>C</td>
<td>800</td>
<td>200</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?

5. Suppose that we wish to locate a high-tech (potato) chip manufacturing plant along a highway, between the potato patch and the market 10 miles away. It takes 7 tons of potatoes to make 3 tons of chips. It costs $2 per ton-mile to ship the potatoes and $4 per ton-mile to ship the chips.

a. On the accompanying diagram, graph the relevant costs of collecting potatoes 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 is it likely that the producer would ever locate half-way between the potato patch and the market? Why or why not?