Midterm Exam 1

The total time for the exam is 60 minutes, although you are given 70 minutes to complete it. Points are allocated proportionally to the time allocations.

1. [20 minutes total] Hecksher-Ohlin.

   a. (10 minutes) Draw the "Johnson Diagram", where aircraft production is labor intensive and food is land intensive, and Home is land abundant, assuming that both countries are initially non-specialized. Analyze the effect of an increase in the amount of labor in Foreign. Be sure to specify how “big” the increase in Foreign labor is.

   b. (10 minutes) Using whichever diagram(s) is(are) most appropriate, assess which groups benefit in each country from the change indicated in part(a).

2. [25 minutes total] Suppose the laptop computer industry operates in the home country, such that each firm's sales of laptop computers is given by:

   \[ X = S \left[ \frac{1}{n} - b(P - \bar{P}) \right] \]  

   where \( X \) is firm sales, \( S \) is total sales, \( n \) is the number of firms. \( P \) is the price charged by the firm and \( \bar{P} \) is the average industry price. Note that if all firms charge the same price, then \( X = S/n \).

   a. (5 minutes) Suppose the pricing rule is:

   \[ P = c + \frac{X}{Sb} \]  

   and the average cost is given by:

   \[ AC = n \times \left( \frac{F}{S} \right) + c \]

   where \( c \) is marginal cost. Solve for the equilibrium number of firms (call it \( n_0 \)), if \( S_0 \) is the level of industry sales.

   b. (5 minutes) Show the equilibrium, in a graph with \( P \), AC on the vertical axis and \( n \) on the horizontal axis.
c. (5 minutes) Show what happens, graphically, if the consumers suddenly consider all brands of laptop computers to be more substitutable with each other.

d. (5 minutes) Ignore your answer to part c. Show what happens, algebraically, to the number of firms if trade restrictions are eliminated between two countries so that total industry sales rise to 3 times that of the original amount.

e. (5 minutes) Ignore your answer to part c. Show what happens, algebraically, to the industry price if trade restrictions are eliminated between two countries so that total industry sales rise to 3 times that of the original amount.

3. [15 minutes total] The following shows the labor time necessary to produce one unit of the good in a Ricardian model of trade:

<table>
<thead>
<tr>
<th></th>
<th>Computer</th>
<th>Automobile</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>280 worker-days</td>
<td></td>
</tr>
<tr>
<td>Japan</td>
<td>140 worker-days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 worker-days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>160 worker-days</td>
<td></td>
</tr>
</tbody>
</table>

a. (8 minutes) Which country has a comparative advantage in what good? If the US has 28,000 workers, draw and label the country's PPF. Show graphically the production and consumption point for the US under autarky (assume that you know the preferences of the country).

b. (7 minutes) Suppose that trade opens up. Show graphically the US production and consumption points under trade (assume that you know the world prices of the goods). Can the consumption of Computers be smaller with trade? Can the consumption of Automobiles be smaller with trade? In what sense is the country better off?