Economics 335  
Midterm 2 (15 points)

NAME: ____________________________________

1. (1 point) Consider the following variation of the turkey price game that was discussed in class: The players are Fairway and HyVee. Each must simultaneous announce a low or a high price for turkeys one week prior to Thanksgiving. The payoffs are given as follows.

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>HyVee</td>
<td>3,3</td>
<td>2,0</td>
</tr>
<tr>
<td>Fairway</td>
<td>0,2</td>
<td>10,10</td>
</tr>
</tbody>
</table>

Circle the Nash equilibrium (or equilibria) of this game.

2. (2 points) The Department of Justice often uses the Herfindahl-Hirschman Index (HHI) to determine whether it is likely that a merger will significantly lessen competition. The index is given as  \[ HHI = \sum_{i=1}^{N} S_i^2, \] where \( S_i \) is the percent market share of firm \( i \) and \( N \) is the number of firms in the market. Values in excess of 1800 indicate a concentrated market. In your own words, explain why high values of the HHI might indicate industry concentration and market power.

3. (1 point) Why do firms collude, and why are collusive agreements unstable?
4. **Cournot Duopoly Model:** Consider a market with two firms and no further threat of entry. Firms simultaneously and non-cooperatively choose output. The market (inverse) demand curve is given by $P(Q) = 100 - Q$, where $Q$ is the market quantity. Each firm has a cost function $C(q_i) = 10q_i + 0.5q_i^2$, for $i = 1,2$.

4.a (2 points) Identify the four elements of this game.

4.b (2 points) Calculate the best response function for each player 2. Explain your calculations.

5. (1 point) Why would a player never select a dominated strategy?
6. Suppose that the demand by student for a 4-year college education in Iowa is given by 
\[ P^T(Q) = 20 - \frac{1}{2}Q \], where \( Q \) denotes the number of graduating seniors (measured in thousands of students) and \( P^T \) is the annual tuition. The marginal cost per of education a student is roughly \$10 (measured in thousands of dollars).

6a. (1 point) It is often argued that taxes and subsidies cause distortions and dead weight loss in markets. Why then do the citizens of Iowa generally support school subsidization?

6.b (2 points) Suppose that due to budget shortfalls, State legislators decide to end school subsidization. Based on your answer to 5.a, draw a diagram to show the dead weight loss that would occur without education subsidies (HINT: This is difficult. If you have trouble with the diagram just describe your ideas in words).
7. (3 points) Suppose that your company has developed a new genetically modified seed that produces significantly higher yields than other seeds on the market. One drawback is that the seed does not do as well in fields with poor drainage. A marketing agency has divided the population of Iowa farmers into those with wet fields and those with dry fields, and has provided the following seed demand estimates:

\[ Q_D = 8 - \frac{1}{2} p \]
\[ Q_W = 6 - \frac{1}{2} p, \]

where \( Q_D \) is quantity demanded by farmers with dry fields and \( Q_W \) is quantity demanded by farmers with wet fields. The cost of producing the seed is \( C(Q) = 4Q \). You plan to sell the seed in small and large bags. You must decide how much seed to put in each bag and how much to charge for each bag. One problem you face is that it is impossible to know whether a particular farmer has a dry or a wet field. Determine how much seed to put in small and large bags, and what price to charge. (Assume there are an equal number of farmers with dry and wet fields and that farmers cannot trade seed among themselves.)