You must answer all of the following questions. Each question is worth the same amount. You have the class period to complete the exam.

Answer each question clearly and concisely. You must show your work to receive credit.

This exam is given under the rules of the Montana State University. By printing your name above you acknowledge the University’s Honor Code and agree to comply with the provisions of the Honor Code. You may not use notes or receive any assistance. There is to be no talking during the exam. You may use a calculator, but are never allowed to use device allowing you to take photographs or transmit over a network. **No notes, no assistance, no talking, no cell phones, but you can use a calculator.**

Clearly print your name above, in the space provided on the next page and in your blue book(s). You must turn in your blue book(s).
1. There is one buyer and many sellers (a monopsony). The sellers will only sell one unit if their marginal cost is below the equilibrium price. The distribution of the buyer’s willingness to pay and the sellers’ marginal cost is as follows.

<table>
<thead>
<tr>
<th>Monopsonist’s Willingness to Pay</th>
<th>10</th>
<th>10</th>
<th>9</th>
<th>9</th>
<th>8</th>
<th>7</th>
<th>7</th>
<th>5</th>
<th>5</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sellers’ Marginal Cost</td>
<td>8</td>
<td>7</td>
<td>7</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>2</td>
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</tbody>
</table>

(a) Graph the demand curve.

(b) For each quantity on the demand curve, find the price the monopsonist would buy at and the consumer surplus.

(c) What is the equilibrium price and quantity?

(d) What is the equilibrium dead weight loss?

2. There are three firms, A, B, and C each with a constant marginal cost of 15. All firms compete in quantities and the market demand is \( P = 135 - 5Q \).

(a) What is the best response of each firm with simultaneous competition?

(b) What are the firm quantities, profits, and equilibrium price with simultaneous competition?

(c) What is the best response of each firm with sequential competition where Firm A choose their quantity first, and then Firms B and C make a simultaneous quantity choice second?

(d) What are the firm quantities, profits and equilibrium price with the sequential competition described above?

(e) Compare the sequential equilibrium to the simultaneous equilibrium.

3. There are two types of representative consumers, 1 and 2, with the following inverse demand curves.

\[ P_1 = 126 - Q_1 \]
\[ P_2 = 186 - 2Q_2 \]

Both markets are served by a monopolist who has a constant marginal cost of $6.

(a) If the monopolist can discriminate between the groups with a single price per group, find the equilibrium prices, quantities, and profits.

(b) Now suppose that the monopolist can perfectly price discriminate. How do the equilibrium prices, quantities and profits change?

(c) What type of price discrimination is part a and what type of price discrimination is in part b? (I’m looking for the degree and a description.)

(d) Are consumers better off or worse off with perfect price discrimination and why?
4. Consider a Hotelling duopoly model with Firm A located to the far left of the product space at \( x = 0 \) and Firm B located to the far right at \( x = 20 \). Consumers have a baseline valuation of $50 and travel costs are $1 per distance traveled. Both firms have a constant marginal cost, but they differ. The marginal cost of Firm A is $2, and the marginal cost of Firm B is $8. Answer the following questions for a competitive equilibrium if it exists.

(a) What are the equilibrium prices and quantities?
(b) Find the profits for each firm, and the consumer surplus.
(c) Firm A considers lobbying for a policy that would double their marginal cost and Firm B’s marginal cost. What would be the new equilibrium prices and quantities with the policy?
(d) How would firm profits and the consumer surplus change with the policy?