Econ 100M: Intermediate Microeconomics  
Problem Set 4  
Due in class Thursday March 8

1. NS 11.2, 12.1  
2. The demand curve for ski lessons is given by 

\[ D(P_D) = 100 - 2P_D. \]

The industry supply curve is given by 

\[ S(P_S) = 3P_S. \]

a. Find the equilibrium price and quantity for ski lessons. What is the consumer and producer surplus?  
b. The government decides that not enough ski lessons are being offered, and offers a subsidy for ski lessons. Suppose a subsidy of $10 is given to firms for each ski lesson they provide. What is the price consumers pay per unit and what price do producers receive? What is the quantity of ski lessons in equilibrium? What is the consumer and producer surplus? What is the deadweight loss associated with the subsidy?  
c. Next, ignore the subsidy. Suppose a price ceiling of \( p = \$15 \) is imposed by the government. How many ski lessons will be sold with the price ceiling? What is consumer and producer surplus, and what is the deadweight loss? Who is better off?

3. A good is produced by a constant-cost industry. Market demand for the good is 

\[ Q_D(P) = 85 - 3P. \]

The long run total costs for each firm in the industry are given by:

<table>
<thead>
<tr>
<th>Output</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>3</td>
<td>48</td>
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<tr>
<td>4</td>
<td>60</td>
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<tr>
<td>5</td>
<td>80</td>
</tr>
<tr>
<td>6</td>
<td>108</td>
</tr>
<tr>
<td>7</td>
<td>140</td>
</tr>
<tr>
<td>8</td>
<td>176</td>
</tr>
</tbody>
</table>

a. What is the long-run equilibrium price?  
b. What is the quantity produced by each firm?  
c. What is the long-run industry level of production?  
d. What is the number of firms in the long-run?

The government decides that only firms currently in the industry should be allowed to compete in the industry. These firms receive licenses to produce the good. No other firms may enter. Notice that by itself, the licensing does not change the long-run
equilibrium in the industry under the current demand and supply. Suppose however that
demand shifts out to $Q_d(P) = 144 - 3P$.

e. How high would price have to be to get each firm to produce 5 units? To produce 6
   units? To produce 7 units?
f. Denote the three prices calculated in part (e) as $p_5$, $p_6$, and $p_7$. One of these is the new
   market clearing price. Which one? Why?
g. What is average total cost in this equilibrium? What would it be if free entry were
   allowed?
h. How much profit, if any, does each firm earn?