The questions below draw from the material in the reading on Marginal Utility Theory and lecture on Thursday, Feb 13. Word-process or write out answers neatly on a separate page and proudly hand in at the beginning of your CL session. I encourage you to work on these problems in a small group, but the answers you hand in at CL must be your own.

1. Complete the following table, using \( P_X = $2 \) and \( P_Y = $3 \):

<table>
<thead>
<tr>
<th>Units</th>
<th>TU_X</th>
<th>MU_X</th>
<th>MU_X/PX</th>
<th>TU_Y</th>
<th>MU_Y</th>
<th>MU_Y/P_Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>10</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>1.67</td>
</tr>
<tr>
<td>2</td>
<td>17</td>
<td>7</td>
<td>3.5</td>
<td>9</td>
<td>4</td>
<td>1.33</td>
</tr>
<tr>
<td>3</td>
<td>20</td>
<td>3</td>
<td>1.5</td>
<td>12</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>22</td>
<td>2</td>
<td>1</td>
<td>14</td>
<td>2</td>
<td>0.67</td>
</tr>
<tr>
<td>5</td>
<td>23</td>
<td>1</td>
<td>0.5</td>
<td>15</td>
<td>1</td>
<td>0.33</td>
</tr>
</tbody>
</table>

a. Which good does this consumer purchase first? Why?
   **Buy X first, because X has higher MU per dollar.**

b. If the consumer has $17 income, how much of X and Y will the consumer purchase if all income is spent?
   **4X and 3Y for a total of $17 spent.**

c. Suppose the price of X rises from $2 to $4. Other things constant, how much of X and Y will be purchased?
   The \( MU_X/P_X \) column becomes 2.5, 1.75, 0.75, 0.5, 0.25. Now 2X and 3Y will be purchased. This case does not have equality of \( MU \) per dollar, so you must examine \( MU \) per dollar of each successive unit.

2a. State the equilibrium condition for a consumer in terms of utility theory.
   **The now familiar(!) equation showing \( MU/P \) equal across all goods.**

b. Explain the consumer equilibrium in words.
   **The MU of the last dollar spent is equal across all goods, meaning there is no good whose jollies per dollar is bigger than any other.**

3. Suppose that the MU of socks equals the MU of T-shirts. If the price of socks is less than the price of T-shirts, what will a rational consumer do?
   **\( MU/S \) is higher for socks, so the consumer will buy more socks.**
4. Suppose that the MU of the last ice cream is 200 utils and the price of ice cream is $2.00. If the price of a cookie is $1.50 and the consumer is in equilibrium, what is the MU of a cookie?

   **Set up equilibrium equation:**

   \[
   \frac{200}{2} = \frac{\text{MU}}{1.50}
   \]

   **Solve for MU:**

   \[
   \text{MU} = 150
   \]

5. Joe Cool wants to purchase either a Mazda Miata or a Porsche Boxster. Suppose that the Miata yields 100,000 jollies, while the Boxster yields 150,000. The price of the Miata is $25,000 while the Boxster is $30,000. Using utility theory, state an explanation for which car Joe will buy.

   MU/$ for the Miata is

   \[
   \frac{120,000}{30,000} = 4
   \]

   MU/$ for the Boxster is

   \[
   \frac{150,000}{40,000} = 3.75
   \]

   Miata yields more utility per dollar at the margin, so Joe will buy the Miata.

   **Car fact:** “Boxster” comes from a combination of “boxer” and “roadster.” A boxer engine is a “flat” engine with opposing pairs of cylinders in a horizontal plane that move in opposition to each other, mimicking the motion of boxers punching each other. A roadster is a two-seat car, often with a convertible top.

   If you want to know what “Miata” means, you have several choices:

   I suspect that it was computer-generated in the same way that Honda chose the name “Acura.”