Please write answers in **ink**. You may use a pencil to draw graphs.
100 points. Allocate your time efficiently.

**Part I: 35 points each.**

1. Use supply and demand diagrams, one for each part, to show the change in the equilibrium price and quantity of cheese when the following events occur. Explain your reasoning, briefly.

   a. The population grows.
   **Demand shifts right. Both price and quantity exchanged increase.**

   b. People's incomes fall and unemployment increases, in a recession.
   **Demand shifts left. Both price and quantity exchanged decrease.**

   c. The price of macaroni increases.
   **Demand shifts left because macaroni is a complement. Both price and quantity exchanged decrease.**

   d. The price of wine decreases.
   **Demand shifts right because wine is a complement. Both price and quantity exchanged increase.**

   e. A drought occurs in the dairy farming regions of Minnesota and Wisconsin.
   **Supply shifts left because dairy farmers find it more costly to continue to produce milk, the main ingredient to cheese. Price rises, but quantity of cheese exchanged decreases.**

   f. Information provided to consumers indicates that that the consumption of cheese increases the risk of heart disease.
   **Demand shifts left because consumers' tastes and preferences change in light of the new information. Both price and quantity exchanged decrease.**

   g. In order to eliminate a revenue shortfall, the government places an excise tax on cheese.
   **Supply shifts left because dairy farmers find it more costly to continue to produce milk, the main ingredient to cheese. Price rises, but quantity of cheese exchanged decreases.**

2. To earn extra money in the summer, you grow tomatoes and sell them at the farmers' market for 50 cents per pound. By adding compost to your garden, you can increase your yield as shown in the table below. If compost costs $1.00 per pound and your goal is to make as much money as possible, how many pounds of compost should you add?
Apply the cost-benefit principle. Continue to add compost as long as the marginal (additional) benefit exceeds the marginal (additional) cost.

Add either 3 or 4 pounds of compost. Net benefits are maximized at $61.00.

Part II: 10 points each.

3. For each long-distance call anywhere in the continental United States, a new phone service will charge users 30 cents per minute for the first 2 minutes and 2 cents per minute for additional minutes in each call. Tom’s current phone service charges 10 cents per minute for all calls, and his calls are never shorter than 7 minutes. If Tom’s dorm switches to the new phone service, what will happen to the average length of his calls?

For a seven-minute call the two phone systems charge exactly the same amount, 70 cents. But at that point under the new plan, the marginal cost is only 2 cents per minute, compared to 10 cents per minute under the current plan. And since the benefit of talking additional minutes is the same under the two plans, Tom will make longer calls under the new plan.

4. Nancy and Bill are auto mechanics. Nancy takes 4 hours to replace a clutch and 2 hours to replace a set of brakes. Bill takes 6 hours to replace a clutch and 2 hours to replace a set of brakes. State whether anyone has an absolute advantage at either task and, for each task, identify who has a comparative advantage.

Assume a 12 hour work day:

<table>
<thead>
<tr>
<th>Mechanic</th>
<th>Clutch</th>
<th>Brakes</th>
<th>Opp. Cost of Clutch</th>
<th>Opp. Cost of Brakes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nancy</td>
<td>3</td>
<td>6</td>
<td>2 brakes</td>
<td>½ clutch</td>
</tr>
<tr>
<td>Bill</td>
<td>2</td>
<td>6</td>
<td>3 brakes</td>
<td>½ clutch</td>
</tr>
</tbody>
</table>
In the time it takes Nancy to replace a set of brakes she can complete one-half of a clutch replacement. So her opportunity cost of replacing a set of brakes is one-half of a clutch replacement. In the time it takes Bill to replace a set of brakes, he can complete one-third of a clutch replacement. So his opportunity cost of replacing a set of brakes is one-third of a clutch replacement.

Because Bill’s opportunity cost of replacing a set of brakes is lower than Nancy’s, Bill has a comparative advantage in replacing brakes. That means that Nancy has a comparative advantage in replacing clutches. Nancy also has an absolute advantage over Bill in replacing clutches, since it takes her two hours less than it takes Bill to perform that job. Since each takes the same amount of time to replace a set of brakes, neither person has an absolute advantage in that task.

5. Use supply and demand analysis to explain why hotel room rental rates near your campus during parents’ weekend and graduation weekend might differ from the rates charged during the rest of the year. Compared with the rest of the year, there are more people who want to stay in hotel rooms near campus during parents’ weekend and graduation weekend. Thus the demand curve shifts to the right during these weekends. This implies a higher equilibrium price for hotel rooms (and, of course, a higher equilibrium quantity of rooms rented).