1. Which of the following types of remarks corresponds to nonconvex indifference curves:
   A: “I would rather spend all my time in the country (küt) or all my time in the town (şehir) rather than divide myself between the two”
   B: “I prefer a mixture of town and country life being restricted to one or the other”

2. Derive the demand curves for $X$ and $Y$ assuming $U = X^\alpha Y^\beta$. Are $X$ and $Y$ substitute or complement?

3. In 1998, American smoked 470 billion cigarettes or 23.5 billion packs of cigarettes. The average retail price is $2 per pack. Statistical studies have shown that the price elasticity of demand is -0.4 and the price elasticity of supply is 0.5. Using this information, derive linear demand and supply curves for cigarette market.

4. Suppose $p = 200$ and $MC = 150$. The firm’s demand curve is linear and the estimated elasticity at $p = 200$ is $\epsilon_p = -3$. In which direction should the firm change its price to maximize its profit? What will be the effect on $\epsilon_p$ of such a change? How will the firm know when to stop?

5. Cornell Pharmaceutical Inc., and Penn Medical Ltd. supply generic drugs to treat a wide variety of illnesses. A major product for each company is a generic equivalent of an antibiotic used to treat postoperative infections. Proprietary cost and output information for each company reveal the following relations between price and output:
   \[ P_c = 10 + 0.004Q_c. \] (Cornell)
   \[ P_P = 8 + 0.008Q_P. \] (Penn)

Assume these two firms make up the entire industry, determine the industry supply curve. (Hint: It must be kinked)

6. Ironside Industries, Inc. is a leading manufacturer of tufted carpeting under the Ironside brand. Demand for Ironside’s products is closely tied to the overall pace of building and remodeling activity and, therefore, is highly sensitive to changes in national income. The carpet manufacturing industry is highly competitive so Ironside’s demand is also very price-sensitive. During the past year, Ironside sold 15 million square yards (units) of carpeting at an average wholesale price of $7.75 per unit. This year, income per capita is expected to surge from $17250 to $18750 as the nation recovers from a steep recession. Without any price change, Ironside’s marketing director expects current-year sales to rise to 25 million units.
   a. Calculate the implied income arc elasticity of demand.
b. Given the projected rise in income, the marketing director believes that the current volume of 15 million units could be maintained despite an increase in price of $0.5 per unit. On this basis, calculate the implied arc price elasticity of demand.

7. The demand for personal computers can be characterized by the following point elasticities: price elasticity=-5, cross-price elasticity with software=-4, and income elasticity=2.5. Indicate whether each of the following statements is true or false and explain your answer.
a. A price reduction for personal computers will increase both the number of units demanded and the total revenue of sellers.
b. The cross-price elasticity indicates that a 5 percent reduction in the price of personal computers will cause a 20 percent increase in software demand.
c. Falling software prices will increase revenues received by sellers of both computers and software.
d. A 2% price reduction would be necessary to overcome the effects of a 1% decline in income.

8. For the following revenue and cost relations:

\[
TR = \$5100Q - 0.25Q^2.
\]
\[
TC = \$7200000 + 600Q + 0.2Q^2.
\]

Find the output levels which a) maximize total revenue, b) minimize total cost and c) maximize profit.

9. Joy Land Toy, a toy manufacturer, is experiencing quality problems on its assembly line. The marketing division estimates that each defective toy that leaves the plant costs the firm $10, on average, for replacement or repair. The engineering department recommends hiring quality inspectors to sample for defective toys. In this way many quality problems can be caught and prevented before shipping. After visiting other companies, a management team derives the following schedule showing the approximate number of defective toys that would be produced for several levels of inspection:

<table>
<thead>
<tr>
<th>Number of Inspectors</th>
<th>Average Number of Defective Toys (per day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>92</td>
</tr>
<tr>
<td>1</td>
<td>62</td>
</tr>
<tr>
<td>2</td>
<td>42</td>
</tr>
<tr>
<td>3</td>
<td>27</td>
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<td>4</td>
<td>17</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

The daily wage of inspectors is $70.
a. How many inspectors should the firm hire?
b. What if the average cost of defective toy is $5, how your answer will change in part a?