1. (15) Answer the following questions:
   a. Government revenue as a percentage of total income has increased since 1950. Is this increase primarily attributable to changes in federal government revenue or in state and local government revenue?

   b. Looking at the combined revenue of the federal government and state and local governments, how has the composition of total revenue changed over time? Are personal income taxes more or less important?

   c. Looking at the combined expenditures of the federal government and state and local governments, how have the relative shares of transfer payments and purchases of goods and services changed over time?

2. (10) Briefly explain the difference between poverty and inequality. Has each of these been increasing or decreasing over the last 30-40 years?

   1. Poverty: Based on a fixed income level (adjusted for inflation and family size); absolute measure.
   Inequality: Based on relative income (or wealth); share of income.

   2. Poverty: No long-term trend, the up in recession.
   Inequality: Rising in last 30 years.
3. (15) Nimbus, Inc., makes brooms and then sells them door-to-door. Assume a worker cost $100 a day, and the firm has fixed costs of $200. Here is the relationship between the number of workers and Nimbus's output in a given day:

\[ \frac{\Delta TC}{\Delta Q} = 3 \]

<table>
<thead>
<tr>
<th>Workers</th>
<th>Output</th>
<th>Marginal Product</th>
<th>Total Cost</th>
<th>Average Total Cost</th>
<th>Marginal Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20</td>
<td>20</td>
<td>300</td>
<td>150</td>
<td>15 or 5</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
<td>30</td>
<td>400</td>
<td>200</td>
<td>3.33</td>
</tr>
<tr>
<td>3</td>
<td>90</td>
<td>40</td>
<td>500</td>
<td>167</td>
<td>2.50</td>
</tr>
<tr>
<td>4</td>
<td>120</td>
<td>30</td>
<td>600</td>
<td>150</td>
<td>3.33</td>
</tr>
<tr>
<td>5</td>
<td>140</td>
<td>20</td>
<td>700</td>
<td>140</td>
<td>5.00</td>
</tr>
<tr>
<td>6</td>
<td>150</td>
<td>10</td>
<td>800</td>
<td>5.33</td>
<td>10.00</td>
</tr>
<tr>
<td>7</td>
<td>155</td>
<td>5</td>
<td>900</td>
<td>5.81</td>
<td>20.00</td>
</tr>
</tbody>
</table>

a. Complete the table.

b. Given a competitive market price of $5.00, how many brooms will Nimbus produce?

\[ 140 \quad (c = P = MC) \]

4. (10) Wage rates paid to American workers have risen dramatically over the last 100 years.
   a) Carefully explain the (theoretical) income and substitution effects of higher wages on labor supply.
   
   Income Effect: Richer so work less (consume more leisure)

   Substitution Effect: Work more cut leisure is more expensive

   b) What has in fact happened to hours of work (for males, at least) over the last 100 years? What does this indicate about the relative strength of the income and substitution effects?

\[ \text{Income effect} > \text{Substitution effect} \]
5. (15) A competitive industry currently has 100 firms, each of which has fixed costs of $16 and variable cost as follows.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>VC</th>
<th>TC</th>
<th>MC</th>
<th>ATC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>17</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>20</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
<td>25</td>
<td>5</td>
<td>8.33</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
<td>32</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>25</td>
<td>41</td>
<td>9</td>
<td>8.20</td>
</tr>
<tr>
<td>6</td>
<td>36</td>
<td>52</td>
<td>11</td>
<td>8.67</td>
</tr>
</tbody>
</table>

a. The price is currently $10. What is the total quantity supplied in the market? (Answer in whole numbers.)

\[ Q = 5 \times 100 = 500 \]

b. As this market makes the transition to its long-run equilibrium, will the price rise or fall? Explain briefly.

At \( Q = 500 \), \( P = 10 \), \( P > ATC \) so profits.

are positive \( \Rightarrow \) firms will enter \( \Rightarrow \) supply increases \( \Rightarrow \) \( P \downarrow \)

c. Will the quantity demanded rise or fall? Explain briefly.

\( Q^D \uparrow \) cut \( P \downarrow \)

d. Will the quantity supplied by each firm rise or fall? Explain briefly.

\( Q \downarrow \) cut \( P \downarrow \)

e. Graph the long-run supply curve for this market.

\[ S_{LR} = \text{min } ATC = $8 \]
6. (10) What has happened over the last 30 years to the earnings of college educated workers relative to those with (only) a high school degree? Why?

Earnings of college educated rose relative to earnings of high school n.

Technology changes made college skills more valuable relative to h.s. skills

Trade?
Decline of unions?

7. (10) Choose one of the following two questions:
a) Explain the difference between “Rational” and “Taste” Discrimination. Which type of discrimination may be reduced by more information? Which may be reduced by competitive labor markets?

Or, b) Wheelan argues that small numbers may be an advantage in a democracy – the opposite of the Tyranny of the Majority. Explain his reasoning and give an example.

Rational (or Statistical): Based on available info, it is likely (probable) that there is a difference in productivity...

Taste: Prefer not to associate with some people

More info may reduce Rational discrimination

Small numbers may be able to extract large benefits per person, curt the cost to the rest of the population are small.

Example: Grain (sugar) farmers
8. (15) Based on market research, a film production company in Ectenia obtains the following information about the demand and production costs of its new DVD:

Demand: \( P = 1,000 - 10Q \)
Total Revenue: \( TR = 1,000Q - 10Q^2 \)
Marginal Revenue: \( MR = 1,000 - 20Q \)
Marginal Cost: \( MC = 100 + 10Q \)

where \( Q \) indicates the number of copies sold and \( P \) is the price in Ectenian dollars.

a. Draw a clearly labeled graph displaying the demand, marginal revenue, and marginal cost curves.
b. Find the price and quantity that maximize the company’s profit. (Your answer should be numerical.)

\[
\begin{align*}
\text{MR} &= MC \
\text{to max profit} \
1000 - 20Q &= 100 + 10Q \
900 &= 30Q \
\frac{Q}{30} &= 30 \
\sqrt{P} &= 1000 - 10Q = 1000 - 300 = 700
\end{align*}
\]

c. Find the price and quantity that would maximize social welfare. (Your answer should be numerical.)

\[
\begin{align*}
P &= MC \
to max welfare \\
1000 - 10Q &= 100 + 10Q \\
900 &= 20Q \
\frac{Q}{45} &= 45 \\
\sqrt{P} &= 1000 - 10Q = 1000 - 450 = 550
\end{align*}
\]

d. Calculate the deadweight loss from monopoly. (Your answer should be numerical.)

\[
\begin{align*}
\text{DWL} &= \begin{array}{c}
\end{array} \\
&= \frac{1}{2} (45 - 30) (700 - 400) \\
&= \frac{1}{2} (Q^* - Q^m) (P^m - MC^m) \\
&= \frac{1}{2} 15 \times 300 \\
&= 2,250
\end{align*}
\]