Economics 301  
Spring 2006  
Problem set #9: answers

Name: ____________________________________________

1. Demand curve is \( p = 100 - 2Q \), and short-run total cost function \( c(Q) = 640 + 20Q \). Thus, \( MC = 20 \), \( AC(Q) = \frac{640 + 20Q}{Q} = 640 + 20 \) and \( MR = 100 - 4Q \). The monopolist chooses \( Q \) such that \( MR = MC \), i.e., \( 100 - 4Q = 20 \), and thus the profit-maximizing level of output is \( Q^m = 20 \). The monopoly price is \( p^m = 60 \). The profit is

\[
\pi = p^m Q^m - c(Q^m)
\]

\[
\pi = 60 \times 20 - 640 - 20 \times 20
\]

\[
\pi = 160
\]

2. To get the profit maximizing output and price levels, set marginal cost equal to marginal revenue in each market and solve.

\[
MR_1 = 50 - 2Q_1 = MC = 10
\]

\[
Q_1^m = 20 \text{ and } p_1^m = 30
\]

\[
MR_2 = 60 - 1.33Q_2 = MC = 10
\]

\[
Q_2^m = \frac{75}{2} = 37.5 \text{ and } p_2^m = 35
\]

3. Perloff, third edition: question 1 page 309

See Figure 9.1. As demand becomes more elastic, the welfare effect of specific tax becomes larger because there is a larger change in the equilibrium quantity. In the graph, \( D0 \) is more elastic than \( D1 \) at point \( a \). When a specific tax shifts the supply curve upwards, the welfare loss with the more elastic demand curve is \( abc \). With \( D1 \), the welfare loss is only \( adf \).
4. Perloff, third edition: question 13 page 309
   See Figure 9.10. The government prefers the tariff. In either case, consumer surplus is reduced to area $A$. With the quota, the government collects no revenue. With the tariff, the government collects $B + C + D + E$ as revenue.

5. Perloff, third edition: question 14 page 309
   See Figure 9.11. The subsidy increases consumer welfare by $B + C$, but costs the government $B + C + D$. The net change in welfare is $-D$. 
6. Perloff, third edition: question 5 page 385

See Figure 11.2. The values of price and quantity depend on the demand curve drawn by the student. Profits are area $abcd$ and the deadweight loss is area $bef$.

7. Perloff, third edition: problem 18 page 386
Set $MC = MR$ and solve.

$$MR = 100 - 2Q$$

$$MC = 5$$

$$5 = 100 - 2Q$$

$$Q^* = 47.5$$

$$p^* = 52.5$$

$$\pi = 2493.75 - 247.50 = $2,246.25$$