Section 6.3 (cont.)

3) The demand for marble fountains can be modeled by \( D(p) = -45p + 900 \) fountains when the market price is \( p \) hundred dollars per fountain.

a) According to the model, at what price will consumers no longer purchase fountains? Is this price guaranteed to be the highest price any consumer will pay for a marble fountain? Explain.
b) Find the quantity of fountains that consumers will purchase if the market price is $1150.
c) Determine the amount consumers are willing and able to spend to purchase 500 fountains.
d) Find the consumers’ surplus when consumers purchase 500 fountains.
e) The willingness of marble fountain producers to supply fountains can be modeled by the following function:

\[
S(p) = \begin{cases} 
0 \text{ fountains} & \text{if } p < 2 \\
0.3p^2 + 8.1p + 300 \text{ fountains} & \text{if } p \geq 2 
\end{cases}
\]

when the market price is \( p \) hundred dollars per fountain. How many fountains will producers supply if the market price is $175? $400?
f) At what price will producers supply 365 fountains?
g) Find the producers’ revenue if the market price is $450.
h) Find the producers’ surplus if the market price is $450.
i) Find the price fountains will be sold for at the equilibrium point.
j) Find the total social gain from the sale of fountains at market equilibrium.