Section 1.4
Applications of Functions to Economics

1. A company that makes Adirondack chairs has fixed costs of $5000 and variable costs of $30 per chair. The company sells the chairs for $50 each.
   a. Find the formulas for the cost and revenue functions.
   b. Find the marginal cost and marginal revenue.
   c. Graph the cost and revenue functions on the same axes.
   d. Find the break-even point.

2. Let \( D(p) = 100 - 2p \) be the demand curve and \( S(p) = 3p - 50 \) be the supply curve. We can calculate that the equilibrium price is $30 and the equilibrium quantity is 40 units. Suppose that a sales tax of 5% is imposed on the consumer, so that the consumer pays \( p + 0.05p \), while the supplier’s price is \( p \).
   a. Find the new equilibrium price and quantity.
   b. How much is paid in taxes on each unit? How much of this is paid by the consumer and how much by the producer?
3. One table below represents a supply curve; the other represents a demand curve.

\[
\begin{array}{|c|c|c|c|c|c|c|c|}
\hline
p \ ($/\text{unit}) & 182 & 167 & 153 & 143 & 133 & 125 & 118 \\
q \ (\text{quantity}) & 5 & 10 & 15 & 20 & 25 & 30 & 35 \\
\hline
p \ ($/\text{unit}) & 6 & 35 & 66 & 110 & 166 & 235 & 316 \\
q \ (\text{quantity}) & 5 & 10 & 15 & 20 & 25 & 30 & 35 \\
\hline
\end{array}
\]

a. Which table represents which curve? Why?

b. At a price of $155, approximately how many items would consumers purchase?

c. At a price of $155, approximately how many items would manufacturers supply?

d. Will the market push prices higher or lower than $155?

e. What would the price have to be if you wanted consumers to buy at least 20 items?

f. What would the price have to be if you wanted manufacturers to supply at least 20 items?