Practice for Chapter 2 - Solution

\[ Q_d = 300 - 15p + 4 - 4 \times 3.5 + 12 \]
(1) \[ = 300 - 15p + 4 - 14 + 12 \]
\[ = 302 - 15p \]

\[ Q_s^{w} = Q_s^{d} + Q_s^{f} \]
(2) \[ = 6p - 20 - 7w + 4p - 40 \]
\[ = 10p - 60 - 7 \times 4 \]
\[ = 10p - 88 \]

(3) when \( p_b = 6 \), \[ Q_d = 300 - 15p + 6 - 4 \times 7 + 12 \]
\[ = 302 - 15p \]
\[ \frac{dQ_d}{dp_b} = +1 > 0 \]

By LAW OF DEMAND, when price of bus goes up, the quantity demanded for bus ticket will decrease, but we see that quantity demanded for car goes up. So quantity demanded for bus ticket and car change in opposite direction, which implies that these two goods are substitutes.

when \( p_t = 5 \), \[ Q_d = 300 - 15p + 6 - 4 \times 5 + 12 \]
\[ = 298 - 15p \]
\[ \frac{dQ_d}{dp_t} = -4 < 0 \]

By similar reasoning, tire and car are complements.

(4) Has been answered in question (2)

(5) when wage increases to 7.
\[ Q_s^{w} = Q_s^{d} + Q_s^{f} \]
\[ = 6p - 20 - 7w + 4p - 40 \]
\[ = 10p - 60 - 7 \times 7 \]
\[ = 10p - 109 \]

Market supply curve shifts to left because the cost of producing a car has been increased.
\[ Q_s^M = Q_d \Rightarrow 10p - 88 = 302 - 15p \]
\[ \Rightarrow 25p = 390 \]

(6) Before all the shocks:
\[ p^* = \frac{390}{25} = 15.6, \]
\[ Q^* = Q_s^M = 10 \times 15.6 - 88 = 68 \]

\[ Q_s^M = Q_d \Rightarrow 10p - 109 = 298 - 15p \]
\[ \Rightarrow 25p = 407 \]
After all the shocks:
\[ p^* = \frac{407}{25} = 16.28, \]
\[ Q^* = Q_s^M = 10 \times 16.28 - 88 = 74.8 \]

(7) When there is a ban policy
\[ Q_s^f = 0 \]
\[ Q_s^M = Q_s^d + Q_s^f \]
\[ = 6p - 69 + 0 \]
\[ = 6p - 69 \]
\[ Q_s^M = Q_d \Rightarrow 6p - 69 = 298 - 15p \]
\[ \Rightarrow 21p = 367 \]
\[ \Rightarrow p^* = \frac{367}{21} = 17.5, \]
\[ Q^* = Q_s^M = 6 \times 17.5 - 69 = 35.9 \]

(8) When there is a quota policy,
1st step: Under what condition that the imports from Japan \( Q_s^f > 40? \)
\[ Q_s^f > 40 \Rightarrow 4p - 40 > 40 \]
\[ \Rightarrow 4p > 80 \]
\[ \Rightarrow p > 20 \]
If the price is greater than 20, the quantity import will be more than 40. However, due to
the import quota, the quantity import cannot exceed 40. Hence, if the price is higher than
20, the total supply equals the domestic supply plus 40, i.e. \( Q_s^{in} = Q_s^d + 40 \) (part C)

2nd step: To see foreign supply curve at different prices
\[ Q_s^f = 0 \quad \text{when } p \leq 10 \]
\[ = 4p - 40 \quad \text{when } 10 < p \leq 20 \]
\[ = 40 \quad \text{when } p > 20 \]

3rd step: To see foreign supply curve at different prices
\[ Q_s^d = 6p - 69 = 0 \quad \text{when } p \leq 11.5 \]
\[ = 6p - 69 \quad \text{when } p > 11.5 \]
Last step: \( Q^M = Q^d + Q^f = 0 \) when \( p \leq 10 \)

\[ = 4p - 40 \] when \( 10 < p \leq 11.5 \) (Part A)

\[ = 10p - 109 \] when \( 11.5 < p \leq 20 \) (Part B)

\[ = 6p - 29 \] when \( p > 20 \) (Part C)

Note: if you are using different \( W \), you will have the intercept on the \( P \) axis = 8 but the analysis will be similar.

(9) Before the shocks, equilibrium price \( p^* = 15.6 \) and \( Q^* = 68 \).

When price ceiling sets price at 10, the actual price in the market is 10 and the actual amount of cars sold in the market \( Q^M = 10 \times p - 88 = 100 - 88 = 12 \) and there is shortage.

(10) When price floor sets the minimum price at 20, the actual price in the market is 20 and the actual amount of cars sold in the market \( Q^d = 302 - 15p = 302 - 300 = 2 \) and there is excess supply.