ECON3510 Tutorial 7 Answers

2019

Exercise 1

1.1 Question 1

$$AC_{CH}(Q) = D_{CH}(Q)$$
$$\frac{36}{Q+10} = 10 - Q$$
$$36 = (10 - Q)(Q + 10)$$
$$36 = 10Q + 100 - Q^2 - 10Q$$
$$Q^2 = 64$$
$$Q_{CH} = 8$$
$$P = 10 - 8 = 2$$

1.2 Question 2

$$AC_{US}(Q) = D_{US}(Q)$$
$$\frac{51}{Q+10} = 10 - Q$$
$$Q^2 = 49$$
$$Q_{US} = 7$$
$$P = 10 - 7 = 3$$

1.3   Question 3

World Demand is:

$$Q = (10 - P) + (10 - P)$$

$$Q = 20 - 2P$$

$$P = 10 - Q/2$$

$$D^w(Q) = 10 - Q/2$$

Set AC equal to inverse of world demand:

$$AC_{CH}(Q) = D^W(Q)$$

$$\frac{36}{Q + 10} = 10 - Q/2$$

$$36 = (10 - 0.5Q)(Q + 10)$$

$$-64 = 5Q - 0.5Q^2$$

$$\therefore 0 = -Q^2 + 10Q + 128$$

Using quadratic formula we have:

$$x = \frac{-b +/- \sqrt{b^2 - 4ac}}{2a}$$

$$Q = \frac{-10 +/- \sqrt{10^2 - 4 \cdot -1 \cdot 128}}{2 \cdot -1}$$

$$\therefore Q = 17.369$$

$$\therefore P = 10 - 17.369/2 = 1.32$$

1.4 Question 4

$$AC_{US} = D^W(Q)$$

$$\frac{51}{Q + 10} = 10 - Q/2$$

$$51 = (10 - 0.5Q)(Q + 10)$$

$$\therefore 0 = -Q^2 + 10Q + 98$$

Using wolfram alpha:

$$Q = 16.09$$

$$P = 10 - 16.09/2 = 1.95$$

Exercise 2

2.1 Question 1

$$Q = (5 - P/2) + (5 - P/2)$$

$$Q = 10 - P$$

$$\therefore D^W(Q) = 10 - Q$$

$$AC_{US} = D^W(Q)$$

$$\frac{51}{Q + 10} = 10 - Q$$

$$\therefore Q = 7$$

$$\therefore P = 3$$

$$Q_{CH} = Q_{US} = 5 - 3/2 = 3.5$$

2.2 Question 2

$$AC_{US} = \frac{51 - 2Q_1}{Q + 10} = \frac{51 - 14}{Q + 10} = \frac{37}{Q + 10} > AC_{CH} = \frac{36}{Q + 10}$$

$$AC_{CH} = D^W(Q)$$

$$\frac{36}{Q + 10} = 10 - Q$$

$$\therefore Q = 8$$

$$\therefore P = 2$$

$$Q_{CH} = Q_{US} = 5 - 2/2 = 1$$

2.3 Question 3

$$AC_{US} = \frac{51 - 3Q_1}{Q + 10} = \frac{51 - 21}{Q + 10} = \frac{30}{Q + 10} < AC_{CH} = \frac{36}{Q + 10}$$

Therefore the US becomes the world producer:

$$AC_{US} = D^W(Q)$$

$$\frac{30}{Q + 10} = 10 - Q$$

$$30 = (10 - Q)(10 + Q)$$

$$\therefore Q = 8.37$$

$$\therefore P = 1.63$$

$$\therefore Q_{CH} = Q_{US} = 55 - 1.63/2 = 4.185$$