ECON3510 Tutorial 8 Answers - See Claudio's Answer Guide for Text/Missing Sections

2019

Exercise 1

1.1 Question 1

$$Q = S[\frac{1}{n} - (P - AP)]$$
$$\frac{Q}{S} = \frac{1}{n} - P + AP$$
$$P = \frac{1}{n} + AP - \frac{Q}{S}$$
$$PQ = \frac{Q}{n} + AP \cdot Q + \frac{Q^2}{S}$$
$$\therefore MR = \frac{\partial}{\partial Q} = \frac{1}{n} + AP - \frac{2Q}{S}$$
$$AP = \frac{Q}{S} - \frac{1}{n} + P$$
$$MR = \frac{1}{n} + \frac{Q}{S} - \frac{1}{n} + P - \frac{2Q}{S}$$
$$MR = P - \frac{Q}{S}$$

Equal market share implies $Q = \frac{S}{n}$ and so:

$$\therefore MR = P - \frac{1}{n}$$
$$MC = \frac{\partial}{\partial Q} = 1$$

So to solve for PP we have:

$$MR = MC$$
$$P - \frac{1}{n} = 1$$
$$P = 1 + \frac{1}{n} \quad (PP)$$
$$AC = \frac{10}{Q} + 1$$

1.2 Question 2

Equal market share implies $Q = \frac{S}{n}$ and so:

$$\therefore AC = \frac{10n}{s} + 1$$
$$P = \frac{10n}{s} + 1$$

For home:

$$P = \frac{10n}{90} + 1 = \frac{n}{9} + 1 \quad (CChome)$$

For foreign:

$$P = \frac{10n}{160} + 1 = \frac{n}{16} + 1 \quad (CCforeign)$$

1.3 Question 3

Home:

$$PP = CC$$
$$1 + \frac{1}{n} = \frac{n}{9} + 1$$
$$\frac{1}{n} = \frac{n}{9}$$
$$9 = n^2$$
$$n = 3$$
$$P = \frac{3}{9} + 1 = 1.333$$

Foreign:

$$PP = CC$$
$$1 + \frac{1}{n} = \frac{n}{16} + 1$$
$$18 = n^2$$
$$n = 4$$
$$P = \frac{4}{16} + 1 = 1.25$$

1.4 Question 4

$$s = 90 + 160 = 250$$
$$CC = \frac{n}{25} + 1$$
$$PP = CC$$
$$1 + \frac{1}{n} = \frac{n}{25} + 1$$
$$n^2 = 25$$
$$n = 5$$

Exercise 2

2.1 Question 1

As before we have that for both home and foreign

$$MR = P - \frac{1}{n}$$

MC in home is $\frac{\partial}{\partial Q} = 2$ so PP is:

$$MR = MC$$
$$P - \frac{1}{n} = 2$$
$$\therefore P = 2 + \frac{1}{n} \quad (PP)$$

AC in home is:

$$AC = \frac{10}{Q} + 2$$
$$AC = \frac{10n}{s} + 2$$

Therefore CC in home is:

$$CC = \frac{10n}{s} + 2$$
$$CC = \frac{10n}{90} + 2$$
$$CC = \frac{n}{9} + 2 \quad (CC)$$

So we have:

$$CC = PP$$
$$\frac{n}{9} + 2 = 2 + \frac{1}{n}$$
$$n^2 = 9$$
$$n = 3$$
$$P = 2.333$$

As before we have that for both home and foreign: $MR = P - \frac{1}{n}$. MC in foreign is

$$\frac{\partial}{\partial Q} = 3$$
$$P = 3 + \frac{1}{n}$$

AC for foreign is

$$AC = \frac{10}{Q} + 3$$
$$AC = \frac{10n}{s} + 3$$

Therefore CC in foreign is:

$$CC = \frac{10n}{s} + 3$$
$$CC = \frac{10n}{160} + 3$$
$$CC = \frac{n}{16} + 3$$

So we have:

$$CC = PP$$
$$\frac{n}{16} + 3 = 3 + \frac{1}{n}$$
$$n^2 = 16$$
$$n = 4$$
$$p = 3.25$$

2.2 Question 2

$$s = 90 + 160 = 250$$

If home takes over production then CC is:

$$CC = \frac{n}{25} + 2$$
$$PP = CC$$
$$2 + \frac{1}{n} = \frac{n}{25} + 2$$
$$n^2 = 25$$
$$n = 5$$
$$P = 2.2$$

If foreign takes over production then CC is:

$$CC = \frac{n}{25} + 3$$

$$PP = CC$$

$$\frac{1}{n} + 3 = \frac{n}{25} + 3$$

$$n = 5$$

$$P = 3.2$$

Since $P^* > P$ we would expect that all production will be located in home - reflecting its lower marginal cost