

ECO 260
Homework 5 Solution

1. (a) Nash Equilibrium in Bertrand is $P = MC$. So,

$$P^B = 5.$$

(b) $5 = 30 - 5Q$
 $Q^B = 5$

$$q_1^B = q_2^B = \frac{Q^B}{2} = 2.5$$

2. (a) Firm 2:

$$MR_2 = 30 - 5q_1 - 10q_2$$

$$30 - 5q_1 - 10q_2 = 5$$

Solve for q_2 :

$$q_2 = \frac{25 - q_1}{10} - \frac{q_1}{2}$$

Firm 1:

$$TR_1 = pq_1 = \frac{35}{2}q_1 - \frac{5q_1^2}{2}$$

$$MR_1 = \frac{dTR_1}{dq_1} = \frac{35}{2} - 5q_1$$

$$MR_1 = MC$$

$$5 = \frac{35}{2} - 5q_1$$

$$q_1^S = 2.5$$

$$q_2^S = 1.25$$

(b) $Q^S = q_1^S + q_2^S = 3.75$

(c) $P^S = 30 - 5(3.75) = 11.25$

3. Cournot

Best Response Functions

$$q_1 = \frac{25}{10} - \frac{q_2}{2}$$

$$q_2 = \frac{25}{10} - \frac{q_1}{2}$$

$$q_1 = \frac{25}{10} - \left(\frac{\frac{25}{10} - q_1}{2} \right)$$

$$\frac{3}{4}q_1 = \frac{25}{20}$$

$$q_1^C = q_2^C = \frac{5}{3}$$

$$Q^C = 10/3 = 3.33$$

$$P^C = 30 - 5(3.33) = 13.35$$