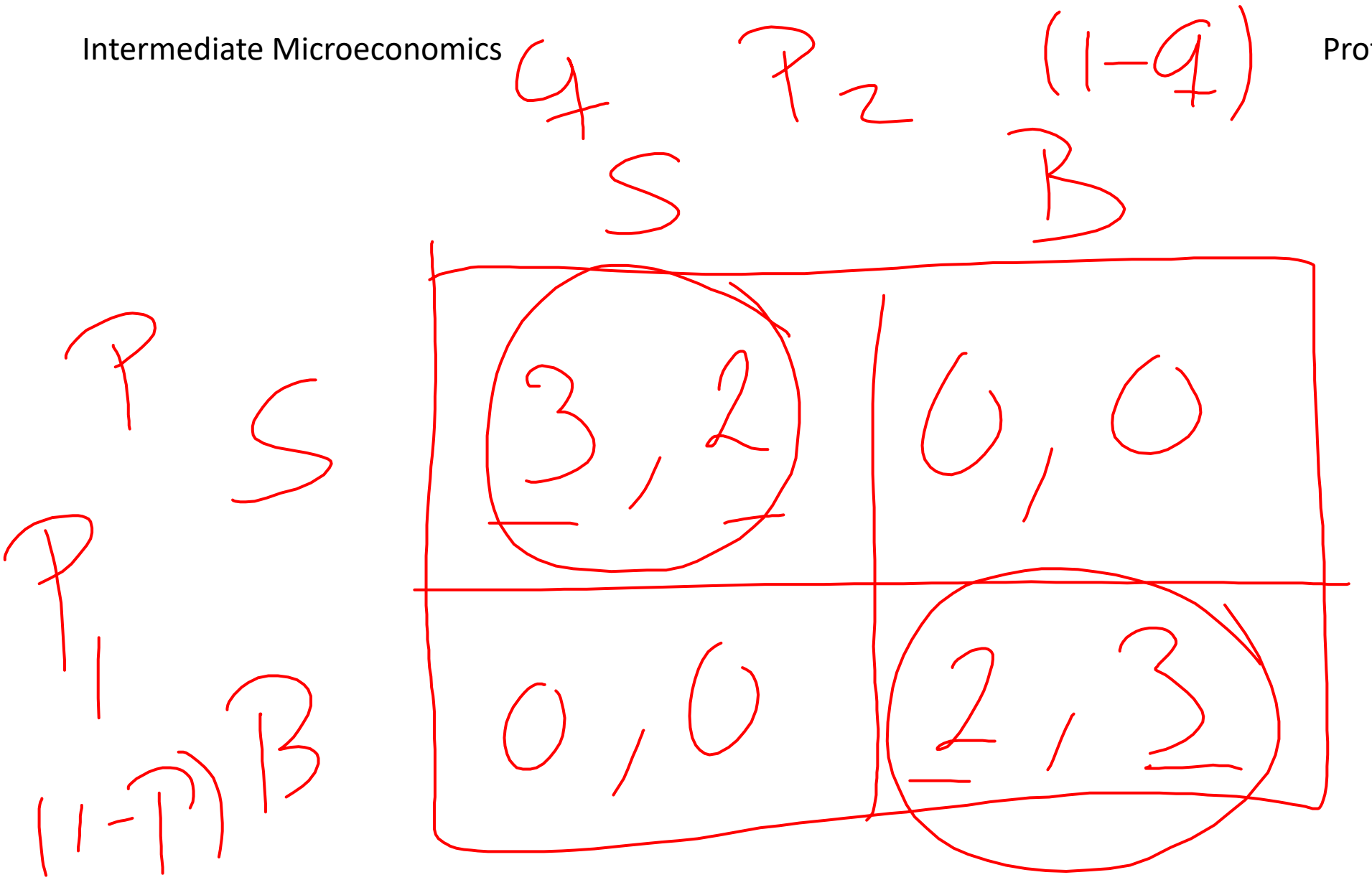
NASH EQUILB

P_1 \ P_2	C	DC
C	-6, -6	0, -10
DC	-10, 0	-1, -1


q
P2
(1-q)
S
B
P
S
3, 2
0, 0
P1
0, 0
2, 3
(1-P)
B

$P(Q) = a - bQ$

$Q = q_1 + q_2$

Follower (Firm 2)

$$\max_{q_2} \pi_2 = P(Q)q_2 - cq_2 = (P(Q) - c)q_2$$

$$\max_{q_2} (a - bQ - c)q_2$$

$$\max_{q_2} (a - bq_1 - bq_2 - c)q_2$$

$$\max_{q_2} aq_2 - bq_1q_2 - bq_2^2 - cq_2$$

FOC

$$\frac{\partial \pi(q_1, q_2)}{\partial q_2} : a - bq_1 - 2bq_2 - c = 0$$

$$2bq_2 = a - bq_1 - c$$

$$q_2^* = \frac{a - c - bq_1}{2b}$$

$$\max_{q_1} P(Q)q_1 - cq_1$$

$$s.t \quad q_2 = \frac{a-c-bq_1}{2b}$$

$$\max_{q_1} (a - bq_1 - bq_2 - c)q_1$$

$$s.t \quad q_2 = \frac{a-c-bq_1}{2b}$$

$$\max_{q_1} aq_1 - bq_1^2 - b\left(\frac{a-c-bq_1}{2b}\right)q_1 - q_1$$

$$\max_{q_1} \; aq_1 - bq_1^2 - \frac{1}{2}(aq_1 - cq_1 - bq_1^2) - cq_1$$

FOC

$$a - 2bq_1 - c \qquad -\frac{1}{2}(a - c - 2bq_1) = 0$$

$$\frac{1}{2}(a - 2bq_1 - c) = 0$$

$$2bq_1 = a - c \Rightarrow \boxed{q_1^* = \frac{a-c}{2b}}$$