**Problem Set 7**

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I worked on this PS with JungWoo Hong

# Question 0:

**0A:** Yes, I followed the honor code on this problem set.

**0B:** 6hrs

# Question 1:

**Question 1A:** B >= A >= D >= C

**Question 1B:** c >= a >= d >= b

**Question 1C:** This is prisoner's dilemma.

# Question 2:

**Question 2A:**

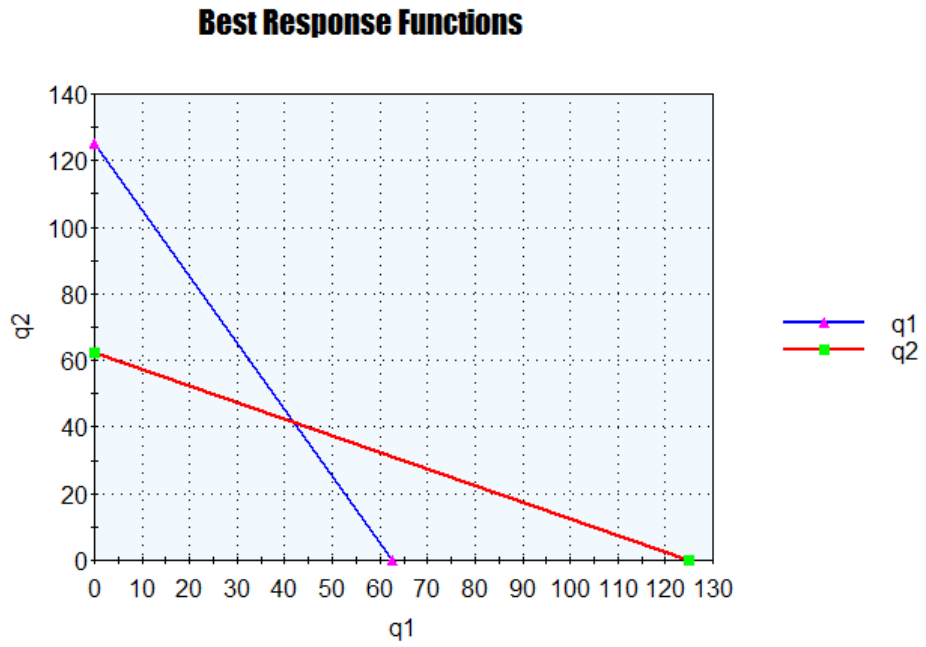
$MR_1 = 300q_1 - 4q_1 - 2q_2$

$MR_1 = MC_1$

$300q_1 - 4q_1 - 2q_2 = 50$

**$BR_1 = q_1 = 62.5 - (½)q_2$**

**$BR_2 = q_2 = 62.5 - (½)q_1$**




(I worked on this graph with Asli Mumtaz and Jungwoo Hong)

**Question 2B:**

$q_1=62.5 - (½)q_2$

$q_1=62.5 - (½)[62.5 - (½)q_1]$

**$q_1 = 41.67$**

**$q_2 = 41.67$**

**Question 2C:**

$P = 300 - 2(Q)$

$P = 300 - 2(2*41.67)$

$P = 133.32$

$Profit_1 = q_1(P-MC_1)$

$Profit_1* = 41.67(133.32-50)$

**$Profit_1^* = 3471.9444$**

**$Profit_2^* = 3471.9444$**

**Question 2D:**

$MC_1 = 40$, $MC_2 = 50$

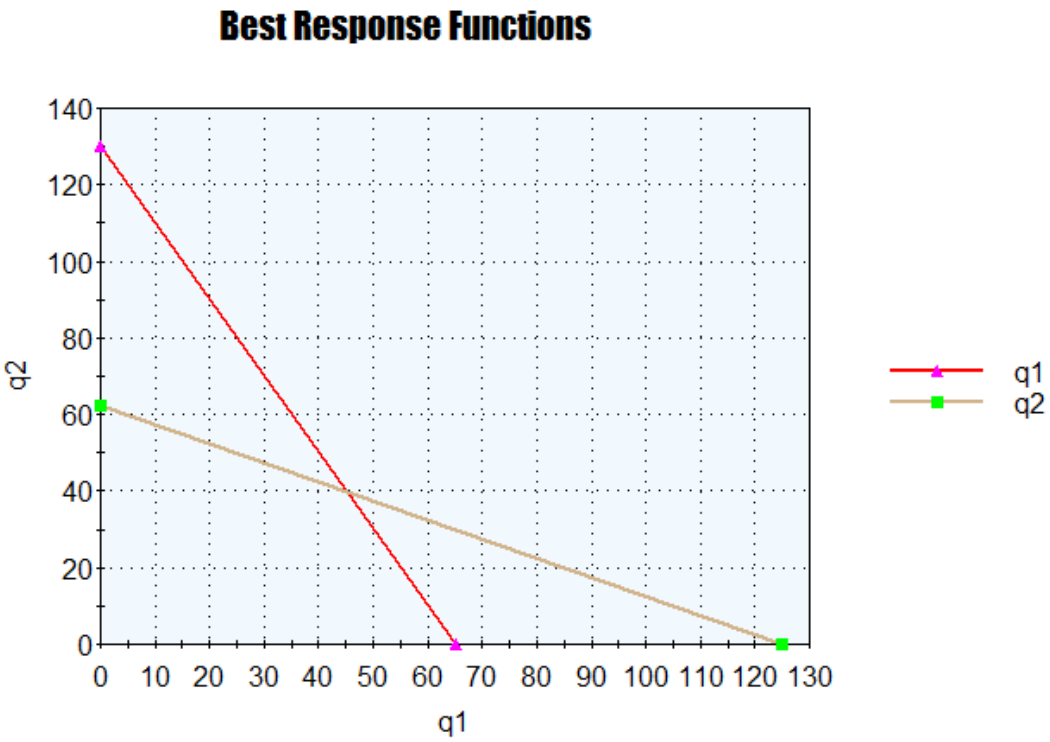
$MR_1 = MC_1$

$300 - 4q_1 - 2q_2 = 40$

**$BR_1 = q_1 = 65 - (1/2)q_2$**

$MR_2 = MC_2$

**$BR_2 = q_2 = 62.5 - (1/2)q_1$**




(I worked on this graph with Asli Mumtaz and Jungwoo Hong)

**Question 2E:**

$q_1=65 - (½)q_2$

$q_1=65 - (½)[62.5 - (½)q_1]$

**$q_1 = 45$**

**$q_2 = 40$**

**Question 2F:**

$P = 300 - 2(45 + 40)$

$P = 130$

$Profit_1 = q_1(P-MC_1)$

$Profit_1 = 45(130-40)$

**$Profit_1 = 4050$**

$Profit_2 = q_2(P-MC_2)$

$Profit_2 = 40(130-50)$

**$Profit_2 = 3200$**

**Question 2G:**

Firm1 makes profit of $3471.94 at MC=50 and makes profit of $4050 at MC = 40. Therefore, it would be willing to pay ($4050 - $3471.94) $578 to upgrade its factory.