Problem set 1B

1) Consider the following extensive form game

```
1
 /   \\
2   2
(1,-1) (-1,1) (-1,1) (1,-1)
```

a) What is the strategy space for players 1 and 2?
b) Write the normal form of the game.
c) Can you arrive at a unique strategy profile with backwards induction? If so, what is it?
d) Using the normal form of the game, apply iterated dominance. Does the procedure find a unique strategy profile that “solves” the game? If so what is it?

Now considered the modified game:

```
1
 /   \\
2   2
(1,-1) (-1,1) (-1,1) (1,-1)
```

e) Write the normal form of the game.
f) Using the normal form of the game, apply iterated dominance. Does the procedure find a unique strategy profile that “solves” the game? If so what is it?

2) Harrington Chapter 3 question 9

3) Harrington Chapter 3 question 10

4) Harrington Chapter 3 question 11

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5) In Cournot duopoly, two producers of an identical product (call them firms A and B) simultaneously choose how much of that product to produce, say \( q_A \) and \( q_B \), between 0 and 10. For simplicity, assume that production cost is 5 per unit. The price \( p \) is \( 20 - q_A - q_B \). Payoffs are profit = (price – unitcost)*quantity, e.g., \((20 - q_A - q_B - 5)q_A\) for firm A.
   a. Write out the extensive form for this game. Assume that the only available \( q \)'s are 1, 3, 5, 7 and 9.
   b. Now write out the extensive form for the Stackelberg variant of this game, in which firm A chooses first, and firm B observes \( q_A \) before making its own choice.
   c. Write out the normal forms for both games.
   d. For the original simultaneous choice version of the game, can you identify one or more Nash equilibria? If so, what is it (are they)?

6) Harrington Chapter 4, question 8

7) Harrington Chapter 4, question 12