Feedback — Final Exam (One timed attempt only! You only have 4 hours once you open the exam.)

Help Center

You submitted this exam on **Fri 8 Mar 2013 12:13 PM PST**. You got a score of **10.00** out of **10.00**.

Question 1

1\ 2	x	y	z
a	2,5	2,1	0,1
b	3,2	4,4	1,1
c	1,0	1,1	1,2

Find the strictly dominant strategies (there may be zero, one or more):

Your Answer		Score	Explanation
☐ 1) a;	✔	0.17	
☐ 2) b;	✔	0.17	
☐ 3) c;	✔	0.17	
☐ 4) x;	✔	0.17	
☐ 5) y;	✔	0.17	
☐ 6) z;	✔	0.17	
Total		1.00 / 1.00	

Question Explanation

No strategy is a dominant strategy.

- a is strictly dominated by b and so is not dominant;
- if 2 plays z then 1 is indifferent between c and b, while if 2 plays y then b is strictly better than c, and so neither is strictly dominant.
- Similarly, when 1 plays a, x is the unique best response for 2; when 1 plays b, y is the unique best response for 2; when 1 plays c, z is the unique best response for 2, and so none of them is dominant.

Question 2

1\ 2	x	y	z
a	2,5	2,1	0,1
b	3,2	4,4	1,1
c	1,0	1,1	1,2

Find the weakly dominated strategies (there may be zero, one or more):

Your Answer		Score	Explanation
☐ 1) a;	✔	0.17	
☐ 2) b;	✔	0.17	
☑ 3) c;	✔	0.17	
☐ 4) x;	✔	0.17	
☐ 5) y;	✔	0.17	
☐ 6) z;	✔	0.17	

Total		1.00 / 1.00	

Question Explanation

(3) is correct.

- For 1, c is weakly dominated by b. When 2 plays x or y, b is strictly better than c; when 2 plays z, 1 is indifferent between b and c.
- From the previous answer, player 2 has no weakly dominated strategies.

Question 3

1\ 2	x	y	z
a	2,5	2,1	0,1
b	3,2	4,4	1,1
c	1,0	1,1	1,2

Which strategies survive the process of iterative removal of strictly dominated strategies (there may be zero, one or more)?

Your Answer		Score	Explanation
☐ 1) a;	✔	0.17	
☑ 2) b;	✔	0.17	
☑ 3) c;	✔	0.17	
☐ 4) x;	✔	0.17	
☑ 5) y;	✔	0.17	
☑ 6) z;	✔	0.17	
Total		1.00 / 1.00	

Question Explanation

(2), (3), (5) and (6) are the survivors.

- a is dominated by b.
- x is dominated by y, once a is removed.
- No further removals can be made.

Question 4

1\ 2	x	y	z
a	2,5	2,1	0,1
b	3,2	4,4	1,1
c	1,0	1,1	1,2

Find all strategy profiles that form pure strategy Nash equilibria (there may be zero, one or more):

Your Answer		Score	Explanation
☐ 1) (a, x);	✔	0.11	
☐ 2) (a, y);	✔	0.11	
☐ 3) (a, z);	✔	0.11	
☐ 4) (b, x);	✔	0.11	
☑ 5) (b, y);	✔	0.11	
☐ 6) (b, z);	✔	0.11	
☐ 7) (c, x);	✔	0.11	

☐ 8) (c, y);	✔	0.11
☑ 9) (c, z).	✔	0.11
Total		1.00 / 1.00

Question Explanation

(5) (b, y) and (9) (c, z) are pure-strategy Nash equilibria.

- It is easy to check the pure-strategy Nash equilibrium: no one wants to deviate from (5) and (9).
- In any of the other combinations at least one player has an incentive to deviate. Thus, they are not equilibria.

Question 5

1\ 2	y	z
b	4,4	1,1
c	1,1	2,2

Which of the following strategies form a mixed strategy Nash equilibrium? (p corresponds to the probability of 1 playing b and $1-p$ to the probability of playing c; q corresponds to the probability of 2 playing y and $1-q$ to the probability of playing z).

Your Answer		Score	Explanation
○ 1) $p=1/3$, $q=1/3$;			
○ 2) $p=1/3$, $q=1/4$;			
○ 3) $p=2/3$, $q=1/4$;			
◉ 4) $p=1/4$, $q=1/4$;	✔	1.00	

Total 1.00 / 1.00

Question Explanation

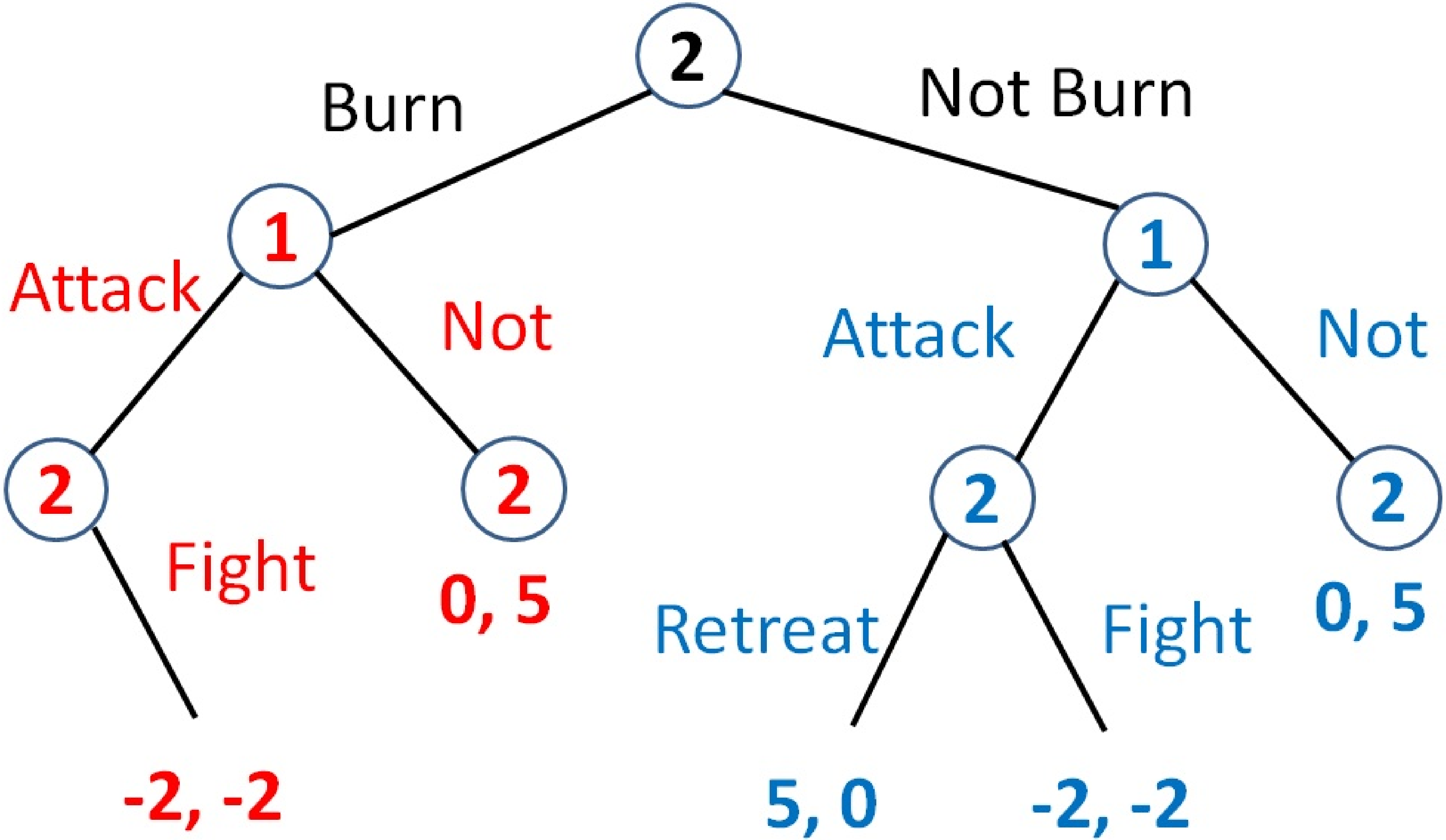
(4) is true.

- In a mixed strategy equilibrium in this game both players must mix and so 1 must be indifferent between b and c, and 2 between y and z.
- b gives 1 an expected payoff: $4q + (1 - q)$
- c gives 1 an expected payoff: $1q + 2(1 - q)$
- Setting these two payoffs to be equal leads to $q = 1/4$.
- By symmetry we have $p = 1/4$.

Question 6

Burning the Bridge

- One island is occupied by Army 2, and there is a bridge connecting the island to the mainland through which Army 2 could retreat.
- Stage 1: Army 2 could choose to burn the bridge or not in the very beginning.
- Stage 2: Army 1 then could choose to attack the island or not.
- Stage 3: Army 2 could then choose to fight or retreat if the bridge was not burned, and has to fight if the bridge was burned.



First, consider the blue subgame. What is a subgame perfect equilibrium of the blue subgame?

Your Answer		Score	Explanation
a) (Attack, Fight).			
b) (Attack, Retreat).	✔	1.00	

c) (Not, Fight).

d) (Not, Retreat).

Total	1.00 / 1.00

Question Explanation

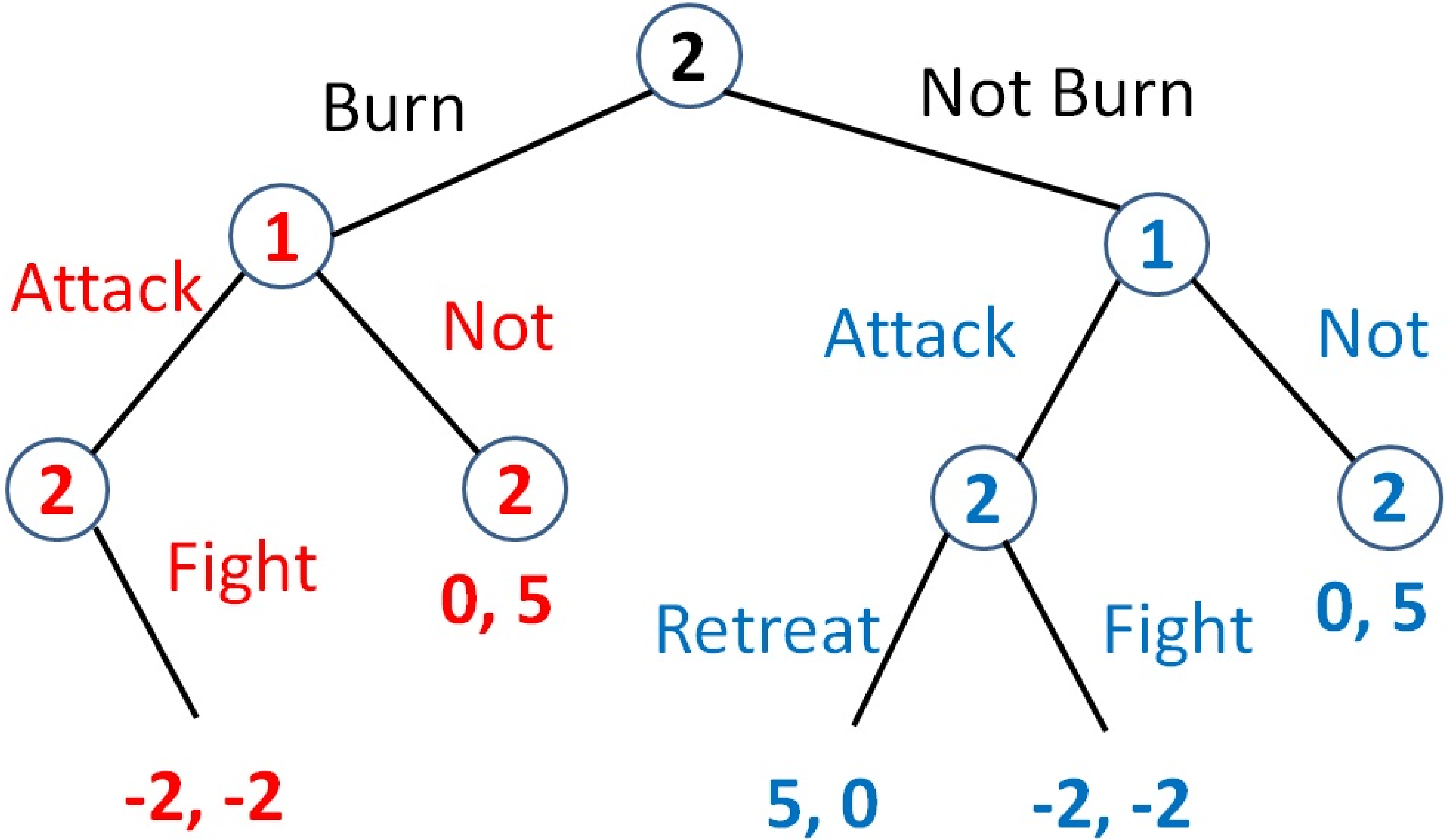
(b) is true.

- At the subgame when 1 attacks, it is better for 2 to retreat with a payoff (5, 0).
- If 1 doesn't attack, the payoff is (0, 5).
- It is thus optimal for 1 to attack, and so (Attack, Retreat) is the unique subgame prefect equilibrium in this subgame.

Question 7

Burning the Bridge

- One island is occupied by Army 2, and there is a bridge connecting the island to the mainland through which Army 2 could retreat.
- Stage 1: Army 2 could choose to burn the bridge or not in the very beginning.
- Stage 2: Army 1 then could choose to attack the island or not.
- Stage 3: Army 2 could then choose to fight or retreat if the bridge was not burned, and has to fight if the bridge was burned.



What is the outcome of a subgame perfect equilibrium of the whole game?

Your Answer		Score	Explanation
a) Bridge is burned, 1 attacks and 2 fights.			
b) Bridge is burned, 1 does not attack.	✔	1.00	

c) Bridge is not burned, 1 attacks and 2 retreats.

d) Bridge is not burned, 1 does not attack.

Total	1.00 / 1.00

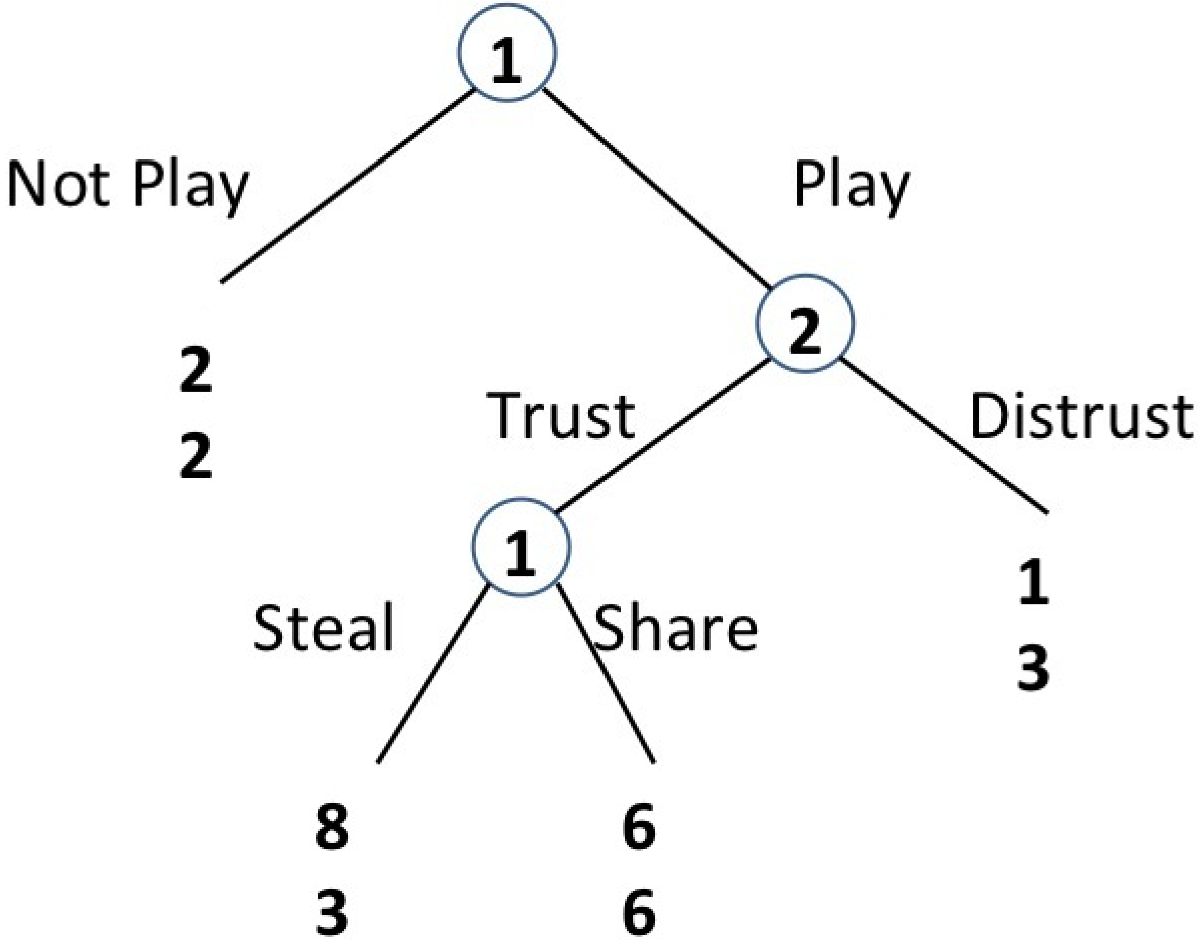
Question Explanation

(b) is true.

- At the subgame when the bridge is not burned, the equilibrium outcome is (5, 0) from the previous question.
- If the bridge is burned:
  - If 1 attacks, 2 has to fight and gets (-2, -2);
  - If 1 doesn't attack, the payoff is (0, 5).
  - 1 is better off not attacking, with a payoff (0, 5).
- Thus, it is better for 2 to burn the bridge, which leads to (0, 5) instead of (5, 0).

Question 8

Repeated Trust Game



There is a probability p that the game continues next period and a probability $(1-p)$ that it ends. What is the threshold p^* such that when $p \geq p^*$ ((Play,Share), (Trust)) is sustainable as a subgame perfect equilibrium by a grim trigger strategy, but when $p < p^*$ ((Play,Share), (Trust)) can't be sustained as a subgame perfect equilibrium? [Here a trigger strategy is: player 1 playing Not play and player 2 playing Distrust forever after a deviation from ((Play,Share), (Trust)).]

Your Answer		Score	Explanation
a) 1/2;			
b) 1/3;	✔	1.00	

c) 2/3;

d) 1/4.

Total 1.00 / 1.00

Question Explanation

(b) is true.

- In the infinitely repeated game supporting ((Play,Share), (Trust)):
  - Suppose player 2 uses the grim trigger strategy: start playing Trust and play Distrust forever after a deviation from ((Play,Share), (Trust)).
  - If player 1 deviates and plays (Play, Steal), player 1 earns $8-6=2$ more in the current period, but loses 4 from all following periods, which is $4p/(1-p)$ in total.
  - Thus in order to support ((Play,Share), (Trust)), the threshold is $2=4p/(1-p)$, which is $p=1/3$.
  - Note that given player 1's strategy, player 2 has no incentive to deviate for any value of p.

Question 9

Friend or Foe

- There are two players.
- The payoffs to player 2 depend on whether 2 is a friendly player (with probability p) or a foe (with probability $1-p$).
- Player 2 knows if he/she is a friend or a foe, but player 1 doesn't know.

See the following payoff matrices for details.

Friend	Left	Right
Left	3,1	0,0
Right	2,1	1,0

with probability p

Foe	Left	Right
Left	3,0	0,1
Right	2,0	1,1

with probability $1-p$

When $p = 1/4$, which is a pure strategy Bayesian equilibrium: (1's strategy; 2's type - 2's strategy)

Your Answer		Score	Explanation
a) (Left ; Friend - Left, Foe - Right);			
b) (Right ; Friend - Left, Foe - Right);	✔	1.00	
c) (Left ; Friend - Left, Foe - Left);			
d) (Right ; Friend - Right, Foe - Right);			
Total		1.00 / 1.00	

Question Explanation

(b) is true.

- For player 2, Left is strictly dominant when a friend and Right when a foe. Thus, that must be 2's strategy in any equilibrium.
- Conditional on 2's strategy, 1 gets an expected payoff of $3p = 3/4$ when choosing Left and $2p + (1-p) = 5/4$ when choosing Right. Thus, 1's best response is to play Right.
- It is easy to check that in any of the remaining options, at least one player has an incentive to deviate.

Question 10

Entry Game

Player 1 is a company choosing whether to enter a market or stay out;

- If 1 stays out, the payoff to both players is (0, 3).

Player 2 is already in the market and chooses (simultaneously) whether to fight player 1 if there is entry

- The payoffs to player 2 depend on whether 2 is a normal player (with prob $1-p$) or an aggressive player (with prob p).

See the following payoff matrices for details.

Aggressive	Fight	Not
Enter	-1,2	1,-2
Out	0,3	0,3

with probability p

Normal	Fight	Not
Enter	-1,0	1,2
Out	0,3	0,3

with probability $1-p$

Player 2 knows if he/she is normal or aggressive, and player 1 doesn't know. Which is true (there may be zero, one or more):

Your Answer		Score	Explanation
☑ a) When $p > 1/2$, it is a Bayesian equilibrium for 1 to stay out, 2 to fight when aggressive and not when normal;	✔	0.25	
☑ b) When $p = 1/2$, it is a Bayesian equilibrium for 1 to stay out, 2 to fight when aggressive and not when normal;	✔	0.25	
☑ c) When $p = 1/2$, it is a Bayesian equilibrium for 1 to enter, 2 to fight when aggressive and not when normal;	✔	0.25	
☑ d) When $p < 1/2$, it is a Bayesian equilibrium for 1 to enter, 2 to fight when aggressive and not when normal.	✔	0.25	

Total	1.00 / 1.00

Question Explanation

All are true.

- When 1 enters, it is optimal for the aggressive type to fight and for the normal type not to fight; and those actions don't matter when 1 stays out.
- Conditional on 2's strategy, it is optimal for 1 to enter when $p < 1/2$, it is optimal for 1 to stay out when $p > 1/2$ and it is indifferent for 1 to enter or to stay out when $p = 1/2$.