

## Feedback — In-Video Quizzes Week 6

[Help Center](#)

You submitted this quiz on **Sat 23 Feb 2013 10:11 PM PST**. You got a score of **3.00** out of **3.00**.

### Question 1

6-2 Coalitional Game Theory: Definitions

Suppose  $N = 3$  and  $v(1) = v(2) = v(3) = 1$ . Which of the following payoff functions is superadditive?

Your Answer	Score	Explanation
<input type="radio"/> a) $v(1,2) = 3, v(1,3) = 4, v(2,3) = 5, v(1,2,3) = 5$ ;		
<input checked="" type="radio"/> b) $v(1,2) = 3, v(1,3) = 4, v(2,3) = 5, v(1,2,3) = 7$ ;	✓ 1.00	
<input type="radio"/> c) $v(1,2) = 0, v(1,3) = 4, v(2,3) = 5, v(1,2,3) = 7$ ;		
<input type="radio"/> d) None of the above.		
Total	1.00 / 1.00	

#### Question Explanation

(b) is true.

- Use the definition of superadditivity to check that (b) is the answer.
- (a) is not superadditive because  $5 = v(2,3 \cup 1) < v(2,3) + v(1) = 5 + 1$ .
- (c) is not superadditive because  $0 = v(1 \cup 2) < v(1) + v(2) = 1 + 1$ .

## Question 2

### 6-3 The Shapley Value

Suppose  $N = 2$  and  $v(1) = 0$ ,  $v(2) = 2$ ,  $v(1, 2) = 2$ . What is the Shapley Value of both players?

Your Answer	Score	Explanation
<input type="radio"/> a) $\phi_1(N, v) = 1$ , $\phi_2(N, v) = 0$		
<input type="radio"/> b) $\phi_1(N, v) = 1/2$ , $\phi_2(N, v) = 1/2$		
<input type="radio"/> c) $\phi_1(N, v) = 1/3$ , $\phi_2(N, v) = 2/3$		
<input checked="" type="radio"/> d) $\phi_1(N, v) = 0$ , $\phi_2(N, v) = 2$	✓ 1.00	
Total	1.00 / 1.00	

### Question Explanation

(d) is true.

- Use the definition of the Shapley Value to compute its value for each player.
- Another way to find the Shapley Value is to notice that player 1 is a dummy player:
  - when added to the unique coalition  $1, 2$ , player 1's contribution is 0.
  - By the theorem presented in the lecture, the Shapley Value satisfies the Dummy player axiom. Then,  $\phi_1(N, v)$  must be 0.

## Question 3

### 6-4 The Core

- Suppose  $N = 3$  and  $v(1) = v(2) = v(3) = 0$ ,  $v(1, 2) = v(2, 3) = v(3, 1) = 2/3$ ,  $v(1, 2, 3) = 1$ .

Which allocation is in the core of this coalitional game?

Your Answer	Score	Explanation
<input type="radio"/> a) (0,0,0);		
<input type="radio"/> b) (1/3, 1/3, 0);		
<input checked="" type="radio"/> c) (1/3, 1/3, 1/3);	✓ 1.00	
<input type="radio"/> d) None of the above.		
Total	1.00 / 1.00	

#### Question Explanation

(c) is true.

- By definition, the core of this game is formed by a triplet  $(x_1, x_2, x_3) \in R_+^3$  that satisfies:
  - $x_i + x_j \geq 2/3$  for  $i \neq j$
  - $x_1 + x_2 + x_3 \geq 1$
  - Then, the core is a singleton with  $(x_1, x_2, x_3) = (1/3, 1/3, 1/3)$ .