

test 3 – answer key

Instructions:

1. Answer all of the following questions on the answer sheets provided. You can write on this list of questions, but credit will be awarded only for answers written on answer sheets.
2. Do not access any book, notebook, newspaper, calculator, computer, cell phone, or other possible source of inappropriate aid during the test, do not leave the room before you are finished taking the test, and be sure to finish the test within this 50-minute testing period. No credit will be given for any work done after you access any possible source of inappropriate aid, after you leave the room for any reason, or after the end of the testing period.
3. When you are finished, be sure your name is written on each of your answer sheets, and turn them in. Also, turn in this list of questions. If you write your name on it, it will be returned with your graded answer sheets.

Special instruction:

The following two profiles and corresponding social preference orderings are referred to in some of the questions given below. Assume that the social preference orderings were generated by some social welfare function called ‘F’.

<u>Profile 1:</u>				<u>Profile 2:</u>			
<u>A</u>	<u>B</u>	<u>C</u>	<u>s.p.o.</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>s.p.o.</u>
<i>b</i>	<i>a, b</i>	<i>d</i>	<i>a</i>	<i>a</i>	<i>b</i>	<i>b, c</i>	<i>a</i>
<i>a</i>	<i>c</i>	<i>b</i>	<i>b</i>	<i>b</i>	<i>a</i>	<i>a, d</i>	<i>c</i>
<i>d</i>	<i>d</i>	<i>c</i>	<i>c</i>	<i>c</i>	<i>c, d</i>		<i>b</i>
<i>c</i>		<i>a</i>	<i>d</i>	<i>d</i>			<i>d</i>

Questions:

1. Write a 2×2 matrix that is an example of a coordination game. Circle the equilibrium outcome(s).

answer: the following, or many other possibilities:

	C_1	C_2
R_1	3, 2	1, 1
R_2	0, 0	2, 3

2. Write a 2×2 matrix that is an example of a prisoner’s dilemma. Circle the equilibrium outcome(s).

answer: the following, or many other possibilities:

	C_1	C_2
R_1	3, 3	1, 4
R_2	4, 1	2, 2

3. *Borda count:*

- 3a. What is the social preference ordering that the Borda count would generate for profile 1?
Next to each alternative in the ordering you write, write the score that the Borda count would give for it.

answer:

b (10.5)

a (7.5)

d (7)

c (5)

- 3b. Does the Borda count satisfy the independence of irrelevant alternatives condition?
(You can just write ‘Yes.’ or ‘No.’ You do not need to explain your answer.)

answer:

No.

4. *Pairwise majority rule:*

- 4a. What are the social preferences that pairwise majority rule would generate for profile 1?
(You do not have to compile the social preferences into a social preference ordering.)

answer:

b P a

a P c

a P d

b P c

b P d

d P c

- 4b. Does pairwise majority rule satisfy the Pareto condition?
(You can just write ‘Yes.’ or ‘No.’ You do not need to explain your answer.)

answer:

Yes.

5. *Pairwise majority rule, continued:*

- What is an example of a profile that shows that pairwise majority rule violates condition U?
(Profiles 1 and 2 might be useless for this question; your best bet is probably to just write another profile.)

answer: the following, or many other possibilities:

A B C

a *c* *b*

b *a* *c*

c *b* *a*

6. *Plurality voting:*

What is the social preference ordering that plurality voting would generate for profile 1?

answer:

b
d
a
c

7. *Instant runoff voting:*

Apply instant runoff voting to profile 1. Show your work as well as the resulting social preference ordering.

answer:

tally of first-place votes:

<u>alternative</u>	<u>number of first-place votes</u>	<u>eliminate:</u>
<i>a</i>	0.5	
<i>b</i>	1.5	
<i>c</i>	0	✓
<i>d</i>	1	

revised profile, with *c* eliminated:

<u>A</u>	<u>B</u>	<u>C</u>
<i>b</i>	<i>a, b</i>	<i>d</i>
<i>a</i>	<i>d</i>	<i>b</i>
<i>d</i>		<i>a</i>

tally of first-place votes:

<u>alternative</u>	<u>number of first-place votes</u>	<u>eliminate:</u>
<i>a</i>	0.5	✓
<i>b</i>	1.5	
<i>d</i>	1	

revised profile, with *a* eliminated:

<u>A</u>	<u>B</u>	<u>C</u>
<i>b</i>	<i>b</i>	<i>d</i>
<i>d</i>	<i>d</i>	<i>b</i>

tally of first-place votes:

<u>alternative</u>	<u>number of first-place votes</u>	<u>eliminate:</u>
<i>b</i>	2	
<i>d</i>	1	✓

social preference ordering:

b
d
a
c

8. Which one of the following statements is true? If your answer is that statement a is true or that statement b is true, indicate a pair of alternatives that would be mentioned in an explanation of why it is true. (You do not have to provide the explanation.)
- Profiles 1 and 2 and their corresponding F-determined social preference orderings entail that F satisfies condition I.
 - Profiles 1 and 2 and their corresponding F-determined social preference orderings entail that F violates condition I.
 - Profiles 1 and 2 and their corresponding F-determined social preference orderings do not entail either that F satisfies condition I or that F violates condition I.

answer:

c

9. Which one of the following statements is true?
- Profile 1 and its corresponding F-determined social preference ordering entails that F satisfies condition NI.
 - Profile 1 and its corresponding F-determined social preference ordering entails that F violates condition NI.
 - Profile 1 and its corresponding F-determined social preference ordering does not entail either that F satisfies condition NI that F violates condition NI.

answer:

c

10. If a social welfare function violates condition ND, does it necessarily satisfy condition P? Why or why not?

answer:

Yes, it does. If a social welfare function violates condition ND, then it treats some person (say, D) as a dictator. That means that whenever D prefers any alternative to another one, that preference is reflected in the social preference ordering. Now, condition P pertains to cases in which the people are unanimous in preferring one alternative to another one. If the people are unanimous in preferring one alternative to another one, then D prefers that first alternative to the second. But as just stated, that preference will necessarily be reflected in the social preference ordering. So, any unanimous preference will be reflected in the social preference ordering. That means condition P is satisfied.

Instructions, revisited:

As stated in item 3 of the instructions, turn in this list of questions along with your answer sheets.