

## Ch. 1 The Mathematics of Voting

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

For an election with four candidates (A, B, C, and D) we have the following preference schedule:

Number of Voters	6	3	5	8
1st choice	D	D	A	C
2nd choice	B	A	C	A
3rd choice	A	B	B	D
4th choice	C	C	D	B

1) Using the plurality method, which candidate wins the election?

- A) A                                      B) B                                      C) C                                      D) D

2) Using the Borda count method, which candidate wins the election?

- A) A                                      B) B                                      C) C                                      D) D

3) Using the plurality-with-elimination method, which candidate wins the election?

- A) A  
B) B  
C) C  
D) D  
E) None of the above

4) Using the method of pairwise comparisons, which candidate wins the election?

- A) A  
B) B  
C) C  
D) D  
E) None of the above

5) In this election,

- A) B is a Condorcet candidate.  
B) A is a Condorcet candidate.  
C) every candidate is a Condorcet candidate.  
D) there is no Condorcet candidate.  
E) None of the above

- 6) The ranking of the candidates using the extended plurality method is
- A) first: D; second: C; third: A; fourth: B.
  - B) first: D; second: A; third: C; fourth: B.
  - C) first: D; second: A; third: B; fourth: C.
  - D) first: C; second: D; third: A; fourth: B.
  - E) None of the above
- 7) The ranking of the candidates using the extended plurality –with–elimination method is
- A) first: C; second: A; third: D; fourth: B.
  - B) first: C; second: D; third: A; fourth: B.
  - C) first: C; second: A; third: B; fourth: D.
  - D) first: D; second: C; third: A; fourth: B.
  - E) None of the above
- 8) The ranking of the candidates using the extended Borda count method is
- A) first: A; second: C; third: D; fourth: B.
  - B) first: D; second: A; third: C; fourth: B.
  - C) first: A; second: D; third: C; fourth: B.
  - D) first: D; second: C; third: A; fourth: B.
  - E) None of the above
- 9) The ranking of the candidates using the extended pairwise comparisons method is
- A) first: A; second: D; third: C; fourth: B.
  - B) first: A; second: C; third: D; fourth: B.
  - C) first: D; second: A; third: C; fourth: B.
  - D) first: D; second: C; third: A; fourth: B.
  - E) None of the above
- 10) Using the recursive plurality ranking method, which candidate comes in last?
- A) A
  - B) B
  - C) C
  - D) D
  - E) None of the above

- 11 ) Using the recursive Borda count method, which candidate comes in second?
- A) B
  - B) C
  - C) D
  - D) There is a tie for second place between C and D.
  - E) None of the above
- 12 ) Using the recursive plurality-with-elimination ranking method, which candidate comes in second?
- A) A
  - B) B
  - C) C
  - D) D
  - E) None of the above
- 13 ) Using the recursive pairwise comparisons ranking method, which candidate comes in second?
- A) A
  - B) B
  - C) C
  - D) D
  - E) None of the above

**For an election with four candidates (A, B, C, and D) we have the following preference schedule:**

<b>Number of voters</b>	<b>15</b>	<b>11</b>	<b>9</b>	<b>6</b>	<b>2</b>
<b>1st choice</b>	A	C	D	B	C
<b>2nd choice</b>	B	B	C	D	D
<b>3rd choice</b>	C	D	B	C	B
<b>4th choice</b>	D	A	A	A	A

- 14 ) How many first-place votes are needed for a majority in this election?
- A) 15
  - B) 20
  - C) 22
  - D) 43
  - E) None of the above

- 15 ) Using the plurality method, which candidate wins the election?
- A) A
  - B) B
  - C) C
  - D) D
  - E) None of the above
- 16 ) How many Borda points does candidate D earn in this election?
- A) 88
  - B) 97
  - C) 121
  - D) 124
  - E) None of the above
- 17 ) Using the Borda count method, which candidate wins the election?
- A) A
  - B) B
  - C) C
  - D) D
  - E) None of the above
- 18 ) Using the plurality-with-elimination method, which candidate is eliminated second?
- A) A
  - B) B
  - C) C
  - D) D
  - E) None of the above
- 19 ) Using the plurality-with-elimination method, which candidate wins the election?
- A) A
  - B) B
  - C) C
  - D) D
  - E) None of the above

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### Answer Key

- 1) D
- 2) A
- 3) C
- 4) A
- 5) B
- 6) A
- 7) B
- 8) C
- 9) B
- 10) B
- 11) D
- 12) A
- 13) C
- 14) C
- 15) A
- 16) B
- 17) B
- 18) C
- 19) D
- 20) C
- 21) C
- 22) C
- 23) A
- 24) A
- 25) D
- 26) C
- 27) B
- 28) D
- 29) C
- 30) C
- 31) B
- 32) B
- 33) D
- 34) C
- 35) A
- 36) A
- 37) D
- 38) B
- 39) B
- 40) C
- 41) A
- 42) A
- 43) D
- 44) D
- 45) C
- 46) A
- 47) B
- 48) C
- 49) A
- 50) D
- 51) B