

# SAMPLE SOLUTIONS

2. Construct an example of an election that has **100 voters** and four candidates:

Cyberman (C), Dalek (D), the Sontaran (S), and Weeping Angel (W).

a. The Cyberman is a majority candidate, and the Weeping Angel wins using Borda count. (Show how many Borda points both of these have.)

|    |    |
|----|----|
| 51 | 49 |
| C  | W  |
| W  | D  |
| D  | S  |
| S  | C  |

← Cyberman has 51 1<sup>st</sup> place votes, more than half.

Borda points: C  $51(4) + 49(1) = 253$

winner → **W**  $51(3) + 49(4) = 349$

D  $51(2) + 49(3) = 249$

S  $51(1) + 49(2) = 149$

b. The Dalek wins using the plurality method, but is not a majority candidate.

|    |    |    |
|----|----|----|
| 40 | 30 | 30 |
| D  | C  | S  |
| C  | W  | D  |
| S  | D  | W  |
| W  | S  | C  |

1<sup>st</sup> place votes:

**D 40** C 30 S 30 W 0

D wins using plurality, but does not have 51 or more 1<sup>st</sup> place votes.

↗ you will need at least  
↘ three columns

c. The Dalek wins using plurality, but the Sontaran wins using plurality with elimination.

|          |          |          |
|----------|----------|----------|
| 40       | 35       | 25       |
| <b>D</b> | <b>S</b> | W        |
| W        | W        | <b>S</b> |
| C        | C        | C        |
| S        | D        | D        |

plurality: D 40 S 35 W 25 C 0  
D wins.

plur w/elim: No majority candidate.

Elim C:

|    |    |    |
|----|----|----|
| 40 | 35 | 25 |
| D  | S  | W  |
| W  | W  | S  |
| S  | D  | D  |

still no majority,

Elim W:

|    |    |    |
|----|----|----|
| 40 | 35 | 25 |
| D  | S  | S  |
| S  | D  | D  |

D 40, S 60  
S wins.