a. i. 460   ii. 230+1=231   iii. 115+1=116

iv. A=150, B=50, C=120, D=140   A wins

v. 1st=4pts 2nd=3pts 3rd=2pts. 4th=1pts

A = $120\times1 + 50\times2 + 40\times3 + 90\times4 + 60\times4 + 100\times2 = 1140$ pts

B = $120\times2 + 50\times4 + 40\times2 + 90\times2 + 60\times1 + 100\times2 = 860$ pts

C = $120\times4 + 50\times3 + 40\times1 + 90\times3 + 60\times2 + 100\times1 = 1160$ pts

D = $120\times3 + 50\times1 + 40\times4 + 90\times1 + 60\times3 + 100\times4 = \underline{1240}$ pts

D wins

vi.

A–B:	B=120,	B=50,	A=40,	A=90,	A=60,	B=100,	190 vs. 270 = B	
A–C:	C=120,	C=50,	A=40,	A=90,	A=60,	A=100,	290 vs. 170 = A	
A–D:	D=120,	A=50,	D=40,	A=90,	A=60,	D=100,	200 vs. 260 = D	
B–C:	C=120,	B=50,	B=40,	C=90,	C=60,	B=100,	190 vs. 270 = C	
B–D:	D=120,	B=50,	D=40,	B=90,	D=60,	D=100,	140 vs. 320 = D	
C–D:	C=120,	C=50,	D=40,	C=90,	D=60,	D=100,	260 vs. 200 = C	

A = 1 pt.   B = 1 pt.   C = 2 pt.   D = 2 pt.   C & D both win in a tie

vii. A does not have a majority, B received the fewest votes, so eliminate
if B is eliminated C is 2nd on all his ballots recount as 1st

A = 150   B̶   C = 170   D = 140

Still no one has 231 votes. Next lowest is D, so eliminate.

40 votes for D go to A
100 votes for D go to B but he's out already, so A is next
140 for A

A = 290   B̶   C = 170   D̶   A wins

viii. There are 2 Condorcet candidates (vi) neither of which match
the plurality winner so that's a violation

no one had a majority, so no majority criterion violation
no monotonicity violation since we need to compare successive votes
w/same candidates
no IIA violation since no one dropped out of the race

16. i. 44   ii. 22+1=23   iii. 11+1=12

iv. A=18, B=11, C=9   D=6 ̶   <u>A wins</u>

v. A = 18×4 + 11×1 + 9×1 + 6×1 = 98
   B = 18×2 + 11×4 + 9×3 + 6×2 = (125)   <u>B wins</u>
   C = 18×1 + 11×3 + 9×4 + 6×3 = 105
   D = 18×3 + 11×2 + 9×2 + 6×4 = 118

vi.
   A-B: A=18   B=11   B=9   B=6   18 vs. 26   B
   A-C: A=18   C=11   C=9   C=6   18 vs 26   C
   A-D: A=18   D=11   D=9   D=6   18 vs. 26   D
   B-C: B=18   B=11   C=9   C=6   29 vs 15   B
   B-D: D=18   B=11   B=9   D=6   20 vs 24   D
   C-D: D=18   C=11   C=9   D=6   20 vs 24   D

   A=0, B=2, C=1, D=3   <u>D wins</u>

vii. A=18   B=11   C=9   ~~D=6~~ →C
      A=18   ~~B=11~~ →C   C=15
      A=18   C=26   <u>C wins</u>

viii. Condorcet candidate is D. all methods violate except Copeland's
   no majority, so this is okay in all cases.
   no monotonicity since no other set of ballots to compare w/
   no IIA since no one dropped out of race

2. if a voter supports an unpopular candidate who cannot win, a voter
   might choose to vote for their second place candidate instead of
   their true first choice in hopes of boosting that candidates' chances
   of winning over the less preferred third choice. In the US with
   2 strong parties, a third party candidate's voters are heavily pressured
   to vote for which of the two party candidates most closely matches their
   views.

3. Your answers will depend on what you want to achieve. I will give examples of good answers. There are no "correct" answers, only well-reasoned ones.

a. Use Borda Count, because it tends to reduce the likelihood of polarizing candidates winning and consensus candidates tend to win.

b. instant-run off voting because the plurality method alone reduces the party system to just 2 parties leaving a lot of people feeling unrepresented and change is difficult. Instant run-off gives third parties a chance, as well as independents, but if they don't achieve enough votes, can still be eliminated without the expense of a separate run-off vote. (Of course, more parties also means more elections could get thrown into the House which could be bad.)

c. Since one doesn't want home-coming queen to be polarizing, either Borda count or Copeland's method.

d. Borda count or instant run-off depending on how important the majority criterion is to you.

e. Copeland's method, since Borda Count is typically used here. If something is wrong with it, maybe this will give different results, but Borda count may be the best here since the irrelevance of independent alternatives criterion may matter a lot in this circumstance.