

MATH 103 {Test #1} Keys

- #1. b There are total 10 pairwise comparisons and E must win 4 times, more than anyone else.
- #2. c
- #3. b
- #4. e
- #5. d Because in Round 1, A=21, B=0, C=13, D=9. So B is removed first, then D will be removed next.
- #6. c
- #7. 4
- #8. d Because A=4, B=2, C=6, D=7
- #9. 33 pts Because A=4+12+7+6+4=33
- #10. d Because B=8+9+14+12+1=44, C=2+6+21+24+3=56, D=6+3+28+18+2=57
- #11. c Because in Round 1, B is removed; in Round 2, A=4, C=6, D=9, so A is removed; in Round 3, C=10, D=9
- #12. c Because A:B=4:15 (B gets 1 pt), A:C=6:13 (C gets 1 pt), A:D=4:15 (D gets 1 pt), B:C=5:14 (C gets 1 pt), B:D=5:14 (D gets 1 pt), C:D=10:9 (C gets 1 pt). So C wins.
- #13. 76
- #14. P_1 and P_2
- #15. 15 Because $2^4 - 1 = 15$
- #16. anarchy
- #17. $\langle 1, \underline{2}, 3 \rangle, \langle 1, \underline{3}, 2 \rangle, \langle 2, \underline{1}, 3 \rangle, \langle 2, 3, \underline{1} \rangle, \langle 3, \underline{1}, 2 \rangle, \langle 3, 2, \underline{1} \rangle$
- #18. b Because $\langle 1, \underline{2}, 3 \rangle, \langle 1, \underline{3}, 2 \rangle, \langle 2, \underline{1}, 3 \rangle, \langle 2, 3, \underline{1} \rangle, \langle 3, \underline{1}, 2 \rangle, \langle 3, 2, \underline{1} \rangle$ (pivotal players=underlined), so Shapely-Shubik index of $P_1 = 4/6 = 2/3$
- #19. $\{\underline{1}, \underline{2}\}, \{\underline{1}, \underline{3}\}, \{\underline{1}, 2, 3\}$
- #20. a Because $\{\underline{1}, \underline{2}\}, \{\underline{1}, \underline{3}\}, \{\underline{1}, 2, 3\}$ (critical players=underlined), so Banzhaf index of $P_3 = 1/5$
- #21. 45 Because $(10 \times 9)/2 = 45$
- #22. (a) 6
(b) 70
(c) 18
- #23. (a) 9
(b) 16
- #24. (a) 11
(b) 9
(c) 9
- #25. $\langle 1, \underline{2}, 3 \rangle, \langle 1, 3, \underline{2} \rangle, \langle 2, \underline{1}, 3 \rangle, \langle 2, 3, \underline{1} \rangle, \langle 3, 1, \underline{2} \rangle, \langle 3, 2, \underline{1} \rangle$