

1. Define a statistical survey and explain briefly its purpose.
2. What is simple random sampling?
3. What is a clinical study? What is a blind clinical study?
4. What is a double-blind study? Briefly state a possible advantage of a double-blind study over a blind study.
5. Define the median. Define the first quartile.
6. State Arrow's impossibility theorem.
7. What is the Condorcet criterion? Explain briefly a method that satisfies it.
8. Identify the three parts of a weighted voting system.
9. What does it mean for a player in a weighted voting system to have veto power?
10. The Banzhaf power index for each player is the ratio of the number of times the player is critical to the total number of times *any* player is critical. What does it mean for a player to be critical?
11. How many coalitions does a weighted voting system with n players have? Write down all coalitions if there are three players, named P_1 , P_2 , and P_3 .
12. Briefly explain the difference between the Shapley-Shubik power index and the Banzhaf power index.
13. In a fair division problem with N players, what does "fair share" mean?
14. Which methods did we learn to solve a *discrete* fair division problem?
15. Which methods did we learn to solve a *continuous* fair division problem?
16. Of the methods you named in #14 and #15, which are *guaranteed* to produce a fair division?
17. What is an apportionment problem?
18. Briefly describe Hamilton's method.
19. State Balinski and Young's impossibility theorem.
20. What is an Euler circuit? Identify a situation where you would want to have or use an Euler circuit.
21. How can you tell that a graph contains an Euler circuit without actually trying to find one?
22. What is a Hamilton circuit? Identify a situation where you would want to have or use a Hamilton circuit.
23. When are you guaranteed that a graph will have a Hamilton circuit?
24. Discuss, briefly, the pros and cons of the brute force and nearest-neighbor algorithms.
25. Define linear growth.
26. Define exponential growth.
27. Define annual yield.
28. Give the formula for the amount of money in a savings account at the end of N years if the annual interest rate is i and there are k compounding periods per year. What do the other variables in the equation stand for?