1. Suppose California, Washington, British Columbia, and Oregon have formed their own union called Pacifica. Pacifica's legislature is apportioning 198 seats in the House of Representatives. The apportionment will be based upon each state/province's population: California 39.56 million, Washington 7.536 million, British Columbia 4.992 million, and Oregon 4.191 million.



Apportion these 198 seats using Jefferson's Method.

- A. CA: 143 seats, WA: 24 seats, BC: 15 seats, OR: 16 seats.
- B. CA: 141 seats, WA: 26 seats, BC: 17 seats, OR: 14 seats.
- C. CA: 141 seats, WA: 26 seats, BC: 18 seats, OR: 13 seats.
- D. CA: 143 seats, WA: 24 seats, BC: 17 seats, OR: 14 seats.
- E. CA: 142 seats, WA: 25 seats, BC: 18 seats, OR: 13 seats.
- F. CA: 142 seats, WA: 25 seats, BC: 19 seats, OR: 12 seats.
- G. CA: 143 seats, WA: 24 seats, BC: 19 seats, OR: 12 seats.
- H. CA: 141 seats, WA: 26 seats, BC: 15 seats, OR: 16 seats.

- 2. True or False: Jefferson's Method is immune to paradoxes.
- A. True
- B. False

3. Suppose a small country has three states with the following populations:

State	Adams	Lincoln	Madison
Population	250	1140	6320

The legislature is apportioning seats to each of the three states. First, use Hamilton's Method to apportion 100 seats to each of these three states according to their respective populations. Suppose that a new state "Washington" enters the union with a population of 500. The legislature has decided to add 5 new seats to the House of Representatives. Now apportion these 105 seats to each state again using Hamilton's method.

Did the New-States Paradox occur?

A. No.

B. Yes.

- 4. Which of the following apportionment methods is immune to violating the the Quota Rule?
- A. The Huntington-Hill Method
- B. None of the above and/or below methods
- C. Jefferson's, Webster's, and The Huntington-Hill Method
- D. Webster's Method
- E. Jefferson's Method
- F. Hamilton's Method

5. Suppose California, Washington, British Columbia, and Oregon have formed their own union called Pacifica. Pacifica's legislature is apportioning 143 seats in the House of Representatives. The apportionment will be based upon each state/province's population: California 39.56 million, Washington 7.536 million, British Columbia 4.992 million, and Oregon 4.191 million.



Apportion these 143 seats using Hamilton's Method.

- A. CA: 98 seats, WA: 21 seats, BC: 11 seats, OR: 13 seats.
- B. CA: 98 seats, WA: 18 seats, BC: 14 seats, OR: 13 seats.
- C. CA: 101 seats, WA: 19 seats, BC: 13 seats, OR: 10 seats.
- D. CA: 100 seats, WA: 17 seats, BC: 15 seats, OR: 11 seats.
- E. CA: 100 seats, WA: 21 seats, BC: 11 seats, OR: 11 seats.
- F. CA: 100 seats, WA: 19 seats, BC: 13 seats, OR: 11 seats.
- G. CA: 101 seats, WA: 17 seats, BC: 15 seats, OR: 10 seats.
- H. CA: 101 seats, WA: 18 seats, BC: 14 seats, OR: 10 seats.

6. Consider the following weighted voting system [6:2,3,4,1].

True or False: There is a player with veto power.

A. True

B. False

7. In the U.S., the Electoral College is used in presidential elections. Each state is awarded a number of electors equal to the number of representatives (based on population) and senators (2 per state) they have in congress. Since most states award the winner of the popular vote in their state all their states electoral votes, the Electoral College acts as a weighted voting system. To explore how the Electoral College works, we'll look at a fictional country with 4 states.

Suppose Delaware, Hawaii, South Dakota, and Nebraska have formed their own union called the "The Disparate States of America," or the DSA. The DSA has retained the same electoral college system for electing their president and thus, has retained the same number of electoral votes as before: Delaware 3, Hawaii 3, South Dakota 3, and Nebraska 5. To win the presidency, a candidate must receive at least 8 electoral votes.

Find the Shapley-Shubik Power Index of each state in the DSA. (Use reduced fractions to express each state's power.)

A. $DE = \frac{3}{16}, HI = \frac{3}{16}, SD = \frac{7}{48}, NE = \frac{23}{48}$ B. $DE = \frac{1}{6}, HI = \frac{1}{6}, SD = \frac{1}{6}, NE = \frac{1}{2}$ C. $DE = \frac{1}{8}, HI = \frac{1}{6}, SD = \frac{5}{24}, NE = \frac{1}{2}$ D. $DE = \frac{1}{4}, HI = \frac{1}{4}, SD = \frac{1}{12}, NE = \frac{5}{12}$ E. $DE = \frac{3}{16}, HI = \frac{1}{4}, SD = \frac{7}{48}, NE = \frac{5}{12}$ F. $DE = \frac{1}{6}, HI = \frac{3}{16}, SD = \frac{1}{6}, NE = \frac{23}{48}$ 8. In the U.S., the Electoral College is used in presidential elections. Each state is awarded a number of electors equal to the number of representatives (based on population) and senators (2 per state) they have in congress. Since most states award the winner of the popular vote in their state all their states electoral votes, the Electoral College acts as a weighted voting system. To explore how the Electoral College works, we'll look at a fictional country with 3 states.

Suppose South Carolina, Missouri, and New York have formed their own union called the "The Disparate States of America," or the DSA. The DSA has retained the same electoral college system for electing their president and thus, has retained the same number of electoral votes as before: South Carolina 9, Missouri 10, and New York 29. To win the presidency, a candidate must receive at least 25 electoral votes.

Find the Banzhaf Power Index of each state in the DSA. (Use reduced fractions to express each state's power.)

- A. $SC = \frac{2}{3}, MO = \frac{2}{3}, NY = \frac{1}{3},$
- B. $SC = \frac{2}{3}, MO = \frac{2}{3}, NY = \frac{5}{3},$
- C. $SC = \frac{2}{3}, MO = \frac{2}{3}, NY = \frac{5}{3},$
- D. SC = 0, MO = 0, NY = 1,
- E. $SC = 0, MO = \frac{2}{3}, NY = 1,$
- F. $SC = \frac{1}{6}, MO = 0, NY = \frac{7}{6},$

9. In the U.S., the Electoral College is used in presidential elections. Each state is awarded a number of electors equal to the number of representatives (based on population) and senators (2 per state) they have in congress. Since most states award the winner of the popular vote in their state all their states electoral votes, the Electoral College acts as a weighted voting system. To explore how the Electoral College works, we'll look at a fictional country with 4 states.

Suppose Mississippi, Virginia, New Jersey, and Oklahoma have formed their own union called the "The Disparate States of America," or the DSA. The DSA has retained the same electoral college system for electing their president and thus, has retained the same number of electoral votes as before: Mississippi 6, Virginia 13, New Jersey 14, and Oklahoma 7. To win the presidency, a candidate must receive at least 21 electoral votes.

Find the Shapley-Shubik Power Index of each state in the DSA. (Use reduced fractions to express each state's power.)

A. $MS = 0, VA = \frac{1}{6}, NJ = \frac{1}{2}, OK = \frac{1}{3}$ B. $MS = 0, VA = \frac{1}{4}, NJ = \frac{1}{2}, OK = \frac{1}{4}$ C. $MS = \frac{1}{8}, VA = \frac{1}{6}, NJ = \frac{3}{8}, OK = \frac{1}{3}$ D. $MS = \frac{1}{12}, VA = \frac{5}{24}, NJ = \frac{5}{12}, OK = \frac{7}{24}$ E. $MS = \frac{1}{12}, VA = \frac{1}{4}, NJ = \frac{5}{12}, OK = \frac{1}{4}$ F. $MS = \frac{1}{8}, VA = \frac{7}{24}, NJ = \frac{3}{8}, OK = \frac{5}{24}$ 10. Consider the following weighted voting system [14: 14, 5, 4, 1]. Which of the following is true about Player 1?

- A. Player 1 is a dummy.
- B. Player 1 is a dictator.
- C. Player 1 has veto power.

Answers

- 1. B.
- 2. A.
- 3. B.
- 4. F.
- 5. F.
- 6. B.
- 7. B.
- 8. D.
- 9. E.
- 10. B.