Apportionment Study Guide

A small country consists of four states. The population of State A is 44,800, the population of State B is 52,200, the population of State C is 49,200, and the population of State D is 53,800. The total number of seats in the legislature is 100.

1) The standard quota for State C is
   A) 24.6
   B) 26.9
   C) 25.7
   D) 26.1
   E) none of these
   49,200 \div 200 = 24.6

2) The standard quota for State B is
   A) 26.9
   B) 26.1
   C) 25.7
   D) 24.6
   E) none of these
   52,200 \div 200 = 26.1

3) Under Hamilton's method, the apportionments to each state are
   A - 22
   B - 26
   C - 25
   D - 27

4) Under Jefferson's method, the apportionments to each state are
   A - 22
   B - 26
   C - 25
   D - 27

5) Under the Huntington-Hill method, the apportionments to each state are
   A - 22
   B - 26
   C - 25
   D - 27

\[ \sqrt{24.23} = 25.4944 \quad \sqrt{26.47} = 26.495 \quad \sqrt{26.27} = 26.495 \quad \sqrt{24.25} = 24.495 \]
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The following question refers to a country with five states. There are 240 seats in the legislature, and the populations of the states are given in the table below.

<table>
<thead>
<tr>
<th>State</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (in thousands)</td>
<td>427</td>
<td>754</td>
<td>4389</td>
<td>3873</td>
<td>157</td>
</tr>
</tbody>
</table>

6) The standard divisor is
   a) 40
   b) 4000
   c) 9600
   d) 20,000
   
   \[
   SD = \frac{9600}{240} = 40
   \]

7) The standard quota for State A is
   A) 0.148
   B) 427
   C) 11
   D) 10.675
   E) none of these
   \[
   \frac{427}{40} = 10.675
   \]

8) The standard quota for State D is
   A) 97.725
   B) 96
   C) 97.825
   D) 96.825
   E) none of these
   \[
   \frac{3873}{40} = 96.825
   \]

9) Under Adams’ method, the apportionments to each state are
   \[
   \begin{array}{cccccc}
   A & B & C & D & E & \text{Total} \\
   427 & 754 & 4389 & 3873 & 157 & 9000 \\
   \end{array}
   \]
   \[
   \begin{array}{cccccc}
   \text{SQ:} & 40 & 10.68 & 18.85 & 10.73 & 96.825 & 2.93 \\
   \text{UQ:} & 11 & 19 & 10 & 97 & 4 & 241 \text{ many} \\
   \text{UO:} & 11 & 19 & 10 & 97 & 4 & 240 \checkmark \\
   \end{array}
   \]
   \[
   \begin{array}{cccccc}
   \text{MO:} & 10.30 & 15.71 & 96.00 & 37.90 \\
   \text{UO:} & 11 & 19 & 10 & 97 & 4 & 240 \checkmark \\
   \end{array}
   \]
   A-11 B-19 C-109 D-97 E-4

10) Under Webster’s method, the apportionments to each state are
   \[
   \begin{array}{cccccc}
   A & B & C & D & E & \text{Total} \\
   427 & 754 & 4389 & 3873 & 157 & 9000 \\
   \end{array}
   \]
   \[
   \begin{array}{cccccc}
   \text{SQ:} & 40 & 16.06 & 18.85 & 109.73 & 96.825 & 3.93 \\
   \text{Int:} & 11 & 19 & 110 & 97 & 4 & 241 \text{ too many} \\
   \text{MO:} & 10.65 & 18.80 & 109.45 & 96.58 & 3.92 \\
   \end{array}
   \]
   \[
   \begin{array}{cccccc}
   \text{UO:} & 11 & 19 & 10 & 97 & 4 & 240 \checkmark \\
   \end{array}
   \]
   A-11 B-19 C-109 D-97 E-4
Apportionment Study Guide

A bus company operates four bus routes (A, B, C, and D) and 100 buses. The buses are apportioned among the routes on the basis of average number of daily passengers per route which is given in the following table.

<table>
<thead>
<tr>
<th>Route</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily average number of passengers</td>
<td>12,444</td>
<td>36,503</td>
<td>19,581</td>
<td>31,472</td>
</tr>
</tbody>
</table>

14) The standard divisor is
   A) 100.
   B) 10,000.
   C) 100,000.
   D) 1000.
   E) none of these

\[ SD = \frac{100,000 \text{ Pop}}{100 \text{ seats}} = 1000 \]

15) The standard divisor represents
   A) the number of passengers that one bus is able to transport per day.
   B) the number of buses required for 100,000 passengers.
   C) the daily average number of passengers per bus
   D) the daily average number of passengers per 100 buses.
   E) none of these

20) Which of the following apportionment methods can produce the Population paradox?
   A) Jefferson's method
   B) Webster's method
   C) Hamilton's method
   D) Adams's method
   E) none of these

21) Which of the following apportionment methods does not violate the quota rule?
   A) Hamilton's method
   B) Jefferson's method
   C) Adams's method
   D) Webster's method
   E) none of these

22) Which apportionment method does not violate the quota rule and does not suffer from any of the paradoxes?
   A) Adams's method
   B) Webster's method
   C) Jefferson's method
   D) Hamilton's method
   E) There is no such method.

23) In a certain apportionment problem, State X has a standard quota of 48.9. The final apportionment to State X is 50 seats. This is called
   A) an upper-quota violation.
   B) a lower-quota violation
   C) the population paradox.
   D) the Alabama paradox.
   E) none of these

24) In a certain apportionment problem, State X has a standard quota of 48.9. The final apportionment to State X is 47 seats. This is called
   A) an upper-quota violation.
   B) a lower-quota violation.
   C) the population paradox.
   D) the Alabama paradox.
   E) none of these
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29) In a certain apportionment problem, State X has a standard quota of 73.9. The final apportionment to State X is 72 seats. Which of the following apportionment methods could have produced this result?  
A) Hamilton's method  
B) Adams's method  
C) Jefferson's method  
D) all of these  
E) none of these

30) In a certain apportionment problem, State X has a standard quota of 73.9. The final apportionment to State X is 75 seats. Which of the following apportionment methods could have produced this result?  
A) Adams's method  
B) Jefferson's method  
C) Hamilton's method  
D) all of these  
E) none of these

34) Under a certain apportionment method State X receives 51 seats and State Y receives 19 seats. Ten years later, the population of State X has increased by 3%, while the population of State Y remains unchanged. Under the same apportionment method, State X now receives 50 seats and State Y receives 20 seats. This is called  
A) a violation of the quota rule.  
B) the new states paradox.  
C) the Alabama paradox  
D) the population paradox.  
E) none of these

36) A father wishes to distribute 16 pieces of candy among his 3 children (Abe, Betty, and Cindy) based on the number of hours each child spends doing chores around the house. Using a certain apportionment method, he has determined that Abe is to get 9 pieces of candy, Betty is to get 4 pieces, and Cindy is to get 3 pieces. However, just before he hands out the candy, he discovers that he has 17 pieces (not 16) of candy. When he apportions the 17 pieces of candy using the same apportionment method, Abe ends up with 10 pieces, Betty with 5 pieces, and Cindy with 2 pieces. This is an example of  
A) the population paradox.  
B) the Alabama paradox  
C) the new states paradox.  
D) a violation of the quota rule.  
E) none of these

39) A mother wishes to distribute 16 pieces of candy among her three children (Abe, Betty, and Cindy) based on the number of hours each child spends doing chores around the house. Using a certain apportionment method, she has determined that Abe is to get 9 pieces of candy, Betty is to get 4 pieces, and Cindy is to get 3 pieces. However, just before she hands out the candy, she discovers that a neighbor (Dave) has been helping her children with the household chores. Since Dave has worked the same number of hours as Cindy, the mother decides to add 3 more pieces of candy and distribute 19 pieces. When she apportions the 19 pieces using the same apportionment method, Abe ends up with 10 pieces, Betty with 5 pieces, Cindy with 3 pieces, and Dave with 3 pieces. This is an example of  
A) the population paradox.  
B) the new states paradox.  
C) a violation of the quota rule.  
D) the Alabama paradox.  
E) none of these