Some Examples Using Hamilton's Method of Apportionment

Consider a (very) small nation consisting of four states with the following populations in 2010:

State	Population
A	13,000
B	15,000
C	4,000
D	6,000

1. (a) Use Hamilton's method to calculate the apportionment with a House size of 54.

State	Population	% of Total	Quota for 54 Seats	Floor of Quota	Largest Remainder	Apportionment
A	13,000	34.21%				
B	15,000	39.47%				
C	4,000	10.53%				
D	6,000	15.79%				
Total	38,000					

(b) Now use Hamilton's method with a House size of 55.

State	Population	% of Total	Quota for 55 Seats	Floor of Quota	Largest Remainder	Apportionment
A	13,000	34.21%				
B	15,000	39.47%				
C	4,000	10.53%				
D	6,000	15.79%				
Total	38,000					

(c) Compare your results.

2. (a) Use Hamilton's method to calculate the apportionment with a House size of 43.

State	Population	% of Total	Quota for 43 Seats	Floor of Quota	Largest Remainder	Apportionment
A	13,000	34.21%				
B	15,000	39.47%				
C	4,000	10.53%				
D	6,000	15.79%				
Total	38,000					

(b) Now suppose when the next census is completed in 2020 that the states have grown at the following rates:

A by 11%   B by 15%   C by 10%   D by 20%

Recalculate the apportionment using Hamilton's method

State	2020 Population	% of Total	Quota for 43 Seats	Floor of Quota	Largest Remainder	Apportionment
A						
B						
C						
D						
Total						

(c) Compare your results.

(d) If B had grown at 13%, how would the result change?

State	2020 Population	% of Total	Quota for 43 Seats	Floor of Quota	Largest Remainder	Apportionment
A						
B						
C						
D						
Total						

3. Consider once again the calculations from #1 for an apportionment for a House of size 54 for the 2010 census using Hamilton's method. Notice that each representative represents $\frac{38,000}{54} \approx 704$ citizens, on average.

Now suppose that state E is joining the nation with a population of 7,450. Based on the average representation, it seems that E should get 11 seats.

Calculate the apportionment using Hamilton's method with state E added and a House size of $54 + 11 = 65$ and compare to the results for a House size of 54 in #1.

State	Population	% of Total	Quota for 65 Seats	Floor of Quota	Largest Remainder	Apportionment
A	13,000					
B	15,000					
C	4,000					
D	6,000					
E	7,450					
Total	45,450					