

Instructions: Use the Huntington-Hill method to apportion seats in problems #1 and #2. In the remaining problems, identify the paradox being illustrated and explain how you recognize it. Circle the relevant violations.

1. Total Seats Available: 210

State	Population	Standard Quota	LQ	UQ	$\sqrt{LQ \cdot UQ}$	Final Apportionment
Kanteria	88,129	54.46	54	55	54.4977	54
Humea	79,340	49.03	49	50	49.4974	49
Cartesia	89,920	55.57	55	56	55.4977	56
Socration	54,543	33.71	33	34	33.4962	34
Plateau	27,881	17.23	17	18	17.4928	17
Total	339,813					210

SD = 1618.16

2. Total Seats Available: 39

State	Population	Standard Quota	LQ	UQ	Final Apportionment
Charon	965	10.95	10	11	11
Nix	219	2.49	2	3	3
Hydra	519	5.89	5	6	6
Kerberos	828	9.40	9	10	9
Styx	906	10.28	10	11	10
Total	3437				39

SD = 88.128

	Population		Seats	
	1900	1901	1900	1901
Maine	694466	699114	3	4
Virginia	1854184	1873951	10	9

3.

$$\text{Maine} = \frac{699114 - 694466}{694466} = \frac{4648}{694466} = .0066929\dots$$

$$\text{Virginia} = \frac{1873951 - 1854184}{1854184} = \frac{19767}{1854184} = .01066\dots \text{ higher rate but lost a seat}$$

population paradox

	House of 299	House of 300
Alabama	7.646	7.671
Texas	9.640	9.672
Illinois	18.640	18.702

Alabama Paradox

4.

w/ 299 seats Alabama gets extra seat
but w/ 300 seats Illinois gets it instead

5.

State	Population	With 10 seats		With 11 seats	
		Fair share	Seats	Fair share	Seats
A	6	4.286	4	4.714	5
B	6	4.286	4	4.714	5
C	2	1.429	2	1.571	1

Alabama Paradox - more seats, but C loses a seat

6.

District	A	B	Total
Population	1045	8955	10,000

New States Paradox

District	A	B	C	Total
Population	1045	8955	525	10,525

7.

State	Population Time A	Standard Quota	Apportionment Time A	Population Time B	Standard Quota	Apportionment Time B
A	55	1.63	1	62	1.59	2
B	125	3.72	4	150	3.83	4
C	190	5.64	6	218	5.57	5
Total	370		11	430		11

$$A: \frac{62-55}{55} = \frac{7}{55} = .12727...$$

$$B: \frac{150-125}{125} = \frac{25}{125} = .2$$

$$C: \frac{218-190}{190} = \frac{28}{190} = .147368...$$

population paradox

grows at a rate higher than state A but loses a seat in reapportionment