MATH 19-02: HW 7

TUFTS UNIVERSITY DEPARTMENT OF MATHEMATICS
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(1) (a) Suppose there are $m = 11$ seats on a governing council, and the districts in the town (districts B, P, and R) have populations $M_B = 54$, $M_P = 243$, and $M_R = 703$. Apportion the seats by Hamilton's method. (There's no constitutional requirement that everybody gets a seat on the council.)

(b) In the following election cycle, the populations have grown a bit to $M'_B = 56$, $M'_P = 255$, and $M'_R = 789$. Reapportion.

(c) What's the "paradox" here?

(2) (a) Next suppose there are $m = 10$ seats on the governing council, and the districts in the town (districts B, P, and R) have populations $M_B = 54$, $M_P = 243$, and $M_R = 703$. Apportion the seats by Hamilton's method.

(b) In the previous problem, you already worked out how this changes when the number of seats goes up to $m = 11$. What's the "paradox" here?

(3) (a) Back to the original scenario ($m = 11$, $M_B = 54$, $M_P = 243$, $M_R = 703$): suppose that a new neighborhood is annexed to the town, with population $M_J = 580$. Would it be fair to give this new district $m_j = 6$ seats, increasing the size of the council to $m = 17$?

(b) Reapportion with $m = 17$. What's the paradox here?