Math 17: Quiz 4 Solutions Name:

For full credit you must show your work. Partial credit may be given for incorrect solutions if sufficient work is shown.

Mom has 50 identical pieces of candy which she is planning to divide among her five children (Alan, Betty, Connie, Doug, and Ellie). She decides to divide the candy in proportion to the amount of time spent helping her with chores last week. The table below shows the number of minutes each child spent helping with the chores last week.

Child	Alan	Betty	Connie	Doug	Ellie	Total
Minutes worked	150	78	173	204	295	900
SQ	8.33	4.33	9.61	11.33	16.39	50
L	8	4	9	11	16	48
Residue	0.33	0.33	0.61	0.33	0.39	2
Ranking of residue			1st		2nd	
Apportionment	8	4	10	11	17	50

1. Calculate the standard divisor. (1pt)

   Note: here the "states"are the five children, the "seats"are the pieces of candy, and the "populations"are the minutes worked. The standard divisor (SD) is the total population divided by the number of seats.

   $$\text{SD} = \frac{900 \text{ minutes}}{50 \text{ candy}} = 18 \text{ (minutes/candy)}$$

2. Describe what the standard divisor means in the context of this problem. (2pt)

   18 minutes of work are required per 1 piece of candy. Note: a common mistake is to interpret this as 18 pieces of candy per child, but this is clearly incorrect as there are 5 children and only 50 pieces of candy. To avoid this mistake, remember how you calculated the SD (minutes/candy NOT candy/children).

3. Write the definition of standard quota. (1pt)

   In general, the standard quota (SQ) is the number of seats a state would get if fractional seats were allowed. In this context, the SQ is the number of pieces of candy a child would get if fractional candy were allowed. It is computed as

   $$\text{SQ} = \frac{\text{state population}}{\text{SD}}.$$

4. Find the apportionment of candy using Hamilton's Method. (6pt)
   Show your work for this problem by adding to the table above.

   Alan gets 8 pieces of candy, Betty gets 4, Connie gets 10, Doug gets 11, and Ellie gets 17.