1 Apportioning Candies

2 The House of Representatives

3 Hamilton’s Solution

4 Assignment
Example

I have a class of 10 students and I have 150 pieces of candy to hand out.
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- I will distribute the candies according to the number of correct answers they give on the next test, out of 12 questions.

The numbers of correct answers are 2, 4, 5, 6, 7, 8, 10, 10, 11, 12, for a total of 75 correct answers.

The ratio of 150:75 indicates that each correct answer is worth 2 candies.
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Apportioning Candies

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But, unfortunately, my dog ate 102 of the candies before I could hand them out, so now I have only 48 candies.
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Example

If we tried to give each student his exact number of candies, we would give the students

1.28, 2.56, 3.20, 3.84, 4.48, 5.12, 6.40, 6.40, 7.04, 7.68
candies, respectively.
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  1, 3, 3, 4, 4, 5, 6, 6, 7, 8

candies, which add up to only 47 candies.
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- Who gets the extra candy?
Apportioning Congressional Seats

- This is analogous to apportioning congressional seats to the states.
- There are 435 seats to be distributed among 50 states, according to their populations.
- How many seats should each state get?
Outline

1. Apportioning Candies
2. The House of Representatives
3. Hamilton’s Solution
4. Assignment
Alexander Hamilton proposed a solution in 1791, right after the first national census. His method, briefly, is:

- Calculate the *exact* number of seats that each state deserves.
- Separate each of those numbers into a whole number and the fractional part.
- Give each state its *whole number* of seats.
- Distribute the remaining seats to those states with the largest fractional parts.
Apply Hamilton’s Method

Example

Let’s apply Hamilton’s method to the 10 students and the 48 candies.

Give the students the whole numbers of candies 1, 2, 3, 3, 4, 5, 6, 6, 7, 7, for a total of 44 candies.

Which students should get the remaining 4 candies?
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Historical Note

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- Based on the 1790 census and a House of 120 members, several states would have received more than one representative for 30,000 people.
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Assignment

Chapter 4: Exercises 11, 12, 13, 14. Skip the terminology; apply Hamilton’s method.