Tank Estimators

How can a random sample of integers between 1 and N (with N unknown to the researcher) be used to estimate N?

1. The pennies in the bowl are numbered from 1 to N. Working with your group, randomly select seven pennies, without replacement, from the bowl. The pennies are numbered:

2. Think about how you would use your data to estimate N. (Come up with at least 2 estimators.) Come to a consensus within the group as to how this should be done.

   Our estimates of N are:

   Our rules or formulas for the estimators of N based on a sample of n (in your case 7) integers are:
Tank Estimators – Write-up

Based on the estimators we came up with as a class and the sampling distributions I simulated, answer the following questions.

1. Why is the \( \frac{(n+1)}{n} \cdot \max \) an intuitive estimator? (\( n \) is the sample size, here it was 7.)

2. What should happen to the sampling distributions of each of the estimators if the sample size increases (i.e., you were allowed to sample more tanks.)

3. How did I create the sampling distributions?


5. What is the difference between the bias we see here and the bias we got in the random rectangle experiment?

Note: Your responses don’t need to be written as a paper, but they should be typed, re-read, and edited. (Also, please double space your paper so that it is easier to read and comment.)