Answer on Question #85576 – Math – Statistics and Probability

Question

From the list of 500 names and addresses, 100 names are selected without replacement and 25 wrong addresses were found. Identify the population and estimate the total no. of addresses needing correction in the list. Also estimate the standard error of the estimate.

Solution

Assume a Poisson distribution

$$P(X = x) = \frac{\lambda^x e^{-\lambda}}{x!} \; , x = 0, 1, 2, \ldots$$

Let X denote the number of wrong addresses in 500 names. Then, since 100 names are selected without replacement and 25 wrong addresses were found, we have

$$\lambda = 25 \cdot \frac{500}{100} = 125$$

We have Poisson distribution

$$P(X = k) = \frac{\lambda^k e^{-\lambda}}{k!} \; , k = 0, 1, 2, \ldots, \lambda = 125, n = 500$$

The standard error of the estimate
$$SE = \sqrt{\lambda/n} = \sqrt{125/500} = \frac{1}{2} = 0.5.$$