

Section 1.2 review

1. Problem 1.2
2. In Section 1.2.3, Agresti makes reference to a Poisson random variable with a mean of 100. Graph the probability mass function of a Poisson random variable with mean 100 using the package of your choice. Overlay a normal curve with mean 100 and standard deviation 10.
3. In Section 1.2.2, the book states that the covariance of two multinomial counts n_j and n_k is $-n\pi_j\pi_k$. Justify the steps in the following proof:

$$\begin{aligned} \text{Cov}(n_j, n_k) &= \text{Cov}\left(\sum_i Y_{ij}, \sum_i Y_{ik}\right) \\ &= \sum_i \sum_{i'} \text{Cov}(Y_{ij}, Y_{i'k}) \\ &= \sum_i \text{Cov}(Y_{ij}, Y_{ik}) \\ &= \sum_i (E(Y_{ij}Y_{ik}) - E(Y_{ij})E(Y_{ik})) = -n\pi_j\pi_k \end{aligned}$$