1. Question 2 (DeGroot), page 281. Suppose that the distribution of the number of defects on any given bolt of cloth is a Poisson distribution with mean 5, and that the number of defects on each bolt is counted for a random sample of 125 bolts. Determine the probability that the average number of defects per bolt in the sample will be less than 5.5.

Recall that the variance of the Poisson distribution is the same as the expectation; in this case the common value is 5. Hence the distribution of interest has expectation 5 and standard deviation $\sqrt{5/125}$. The probability of fewer than 5.5 defects per bolt is $\Phi((5.5 - 5)/\sqrt{5/125}) = 0.9937$. The correction for continuity is $1/(2 \times 125)$, and is small enough to be ignored.