

STA2001 Tutorial 13

1. 5.7-13. Let X_1, X_2, \dots, X_{36} be a random sample of size 36 from the geometric distribution with pmf $f(x) = (1/4)^{x-1}(3/4)$, $x = 1, 2, 3, \dots$. Approximate
 - (a) $P(46 \leq \sum_{i=1}^{36} X_i \leq 49)$.
 - (b) $P(1.25 \leq \bar{X} \leq 1.50)$.

Hint: Observe that the distribution of the sum is of the discrete type.

2. 5.9-3. Let S^2 be the sample variance of a random sample of size n from $N(\mu, \sigma^2)$. Show that the limit, as $n \rightarrow \infty$, of the mgf of S^2 is $e^{\sigma^2 t}$.

3. Let $X_n \xrightarrow{d} X$ where $X \equiv x$ is a constant random variable. Prove that $X_n \xrightarrow{p} X$.

Note that \xrightarrow{d} is the convergence in distribution and \xrightarrow{p} is the convergence in probability.