

Quiz 2–Advanced Probability

Name:

ID:

Score:

1 (33 points) For any sequence $\{X_n\}$, the convergence of S_n/n to 0 in probability would lead to that of X_n/n to 0 in probability as well.

2 (33 points) Let $\{X_n, n \geq 1\}$ be a sequence of r.v.'s. Suppose $S_n = X_1 + \cdots + X_n$ and for any t , define $N(t)$ such that $S_{N(t)} \leq t < S_{N(t)+1}$. Show that

$$\mathbb{E}[N(t)] = \sum_{n=1}^{+\infty} \mathbb{P}[S_n \leq t].$$

3 (34 points) Find the n th iterated convolution of an exponential distribution.