2) Weak Law of Large Numbers

Let $X_1, X_2, \cdots, X_n$ be a random sample from $f(x)$ with μ and $\sigma^2 < \infty$

Then $\bar{X} \xrightarrow{P} \mu$ (conv. in probability)

(ie. $\lim_{n\to\infty} P\left[|\bar{X}-\mu| > \varepsilon\right] \leq \lim_{n\to\infty} \frac{\sigma^2}{n\varepsilon^2} = 0$)

3) Strong Law of Large Numbers

If μ exists,

$$P\left[\omega \mid \lim_{n\to\infty} \bar{X}(\omega) = \mu\right] = 1$$

ie. $\bar{X} \to \mu$ almost surely

We will prove the weak LLN, but the strong LLN cannot be proven in this course (it's very difficult)