$$\lim_{n\to\infty} M_{W_n}(t) = e^{t^2/2} = M_Z(t)$$

От свойство $\Rightarrow W_n \xrightarrow[n\to\infty]{d} Z$

$$W_n = \frac{S_n - n\mu}{\sigma\sqrt{n}} \xrightarrow[n\to\infty]{d} Z$$

$$Z_n = \frac{S_n - n\mu}{\sigma\sqrt{n}} \xrightarrow[n\to\infty]{d} Z$$

$$\mathbb{P}(Z_n \in (a,b)) \xrightarrow[n\to\infty]{} \frac{1}{\sqrt{2\pi}}\int_a^b e^{-y^2/2}\,dy = \phi(b) - \phi(a)$$

⊕ $X_i = \begin{cases} 1 & p \\ 0 & 1-p=q \end{cases}$ $\quad X_i \sim Be(p)$

$$\frac{S_n}{n} \xrightarrow[n\to\infty]{n.c} p \qquad \varepsilon_n = \left|\frac{S_n}{n} - p\right|$$

$$\mathbb{P}(|\varepsilon_n| > \varepsilon) = \mathbb{P}\left(\left|\frac{S_n - np}{\sqrt{n}\sqrt{pq}}\right| > \frac{\sqrt{n}\,\varepsilon}{\sqrt{pq}}\right) =$$

$$= \mathbb{P}\left(|Z| > \frac{\sqrt{n}\,\varepsilon}{\sqrt{pq}}\right) = 2\bar{\phi}\left(\frac{\sqrt{n}\,\varepsilon}{\sqrt{pq}}\right) \le 2\bar{\phi}\left(2\frac{\sqrt{n}\,\varepsilon}{1}\right) = \qquad \sqrt{pq} \le \frac{1}{2}$$

$$= 2\frac{1}{\sqrt{2\pi}}\int_{2\sqrt{n}\,\varepsilon}^{\infty} e^{-y^2/2}\,dy$$

Теорема (Бери - Есеен):

Нека $(X_i)_{i=1}^{\infty}$ са н.е.р сл.вел с $EX_1 = \mu$, $DX_1 = \sigma^2$, $E|X_1 - EX_1|^3 = \rho_3$

$$\sup_{x\in\mathbb{R}} \left| \mathbb{P}\left(\frac{S_n - n\mu}{\sigma\sqrt{n}} \le x\right) - \underset{\mathbb{P}(t<x)}{\underset{\parallel}{\phi(x)}} \right| \le 0,4748 \frac{\rho_3}{\sigma^{3/2}\sqrt{n}}$$

$X_1 \sim Be(p)$, то $\mu = p$ $\quad \sigma^2 = \underset{p(1-p)}{\underset{\parallel}{pq}}$ $\quad \rho_3 = p(1-p)(p^2 + (1-p)^2)$