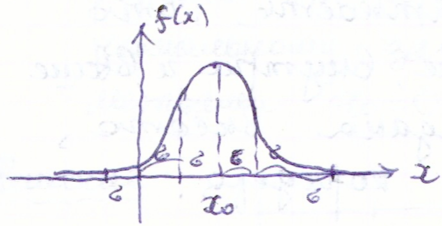
Нормальный закон распределения

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}}\, e^{-\frac{(x-x_0)^2}{2\sigma^2}};$$ — распр. $N(x_0, \sigma)$; $x_0 = M[X]$, $\sigma = \sigma[X]$

при $x_0 = 0$ и $\sigma = 1$ — осн. норм. з-н $N(0,1)$



$$P(|X-x_0|<\sigma) = 0{,}6826 \approx \frac{2}{3}$$

$$P(|X-x_0|<2\sigma) = 0{,}95$$

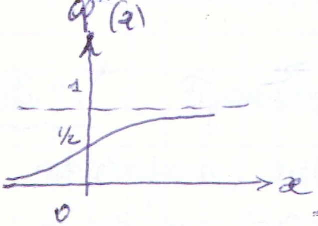
$$\boxed{P(|X-x_0|<3\sigma) = 0{,}9973}$$ — правило "трех сигм"

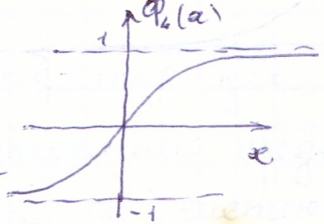
$$P(a<X<b) = \Phi^*\left(\frac{b-x_0}{\sigma}\right) - \Phi^*\left(\frac{a-x_0}{\sigma}\right) =$$
$$= \frac{1}{2}\left[\Phi_{Л}\left(\frac{b-x_0}{\sigma}\right) - \Phi_{Л}\left(\frac{a-x_0}{\sigma}\right)\right] =$$
$$= \Phi_0\left(\frac{b-x_0}{\sigma}\right) - \Phi_0\left(\frac{a-x_0}{\sigma}\right);$$

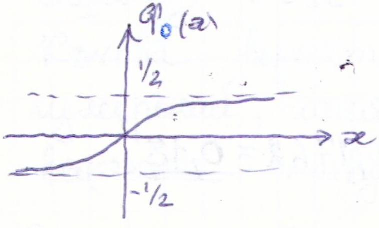
$$\Phi^*(x) = \frac{1}{\sqrt{2\pi}}\int_{-\infty}^{x} e^{-\frac{t^2}{2}}dt$$ — нормальная ф-ция распр.

$$\Phi_{Л}(x) = \frac{2}{\sqrt{2\pi}}\int_{0}^{x} e^{-\frac{t^2}{2}}dt$$ — ф-ция Лапласа

$$\Phi_0(x) = \frac{1}{2}\Phi_{Л}(x)$$







$$P(|X-x_0|<\delta) = \Phi_{Л}\left(\frac{\delta}{\sigma}\right) = 2\Phi^*\left(\frac{\delta}{\sigma}\right) - 1$$