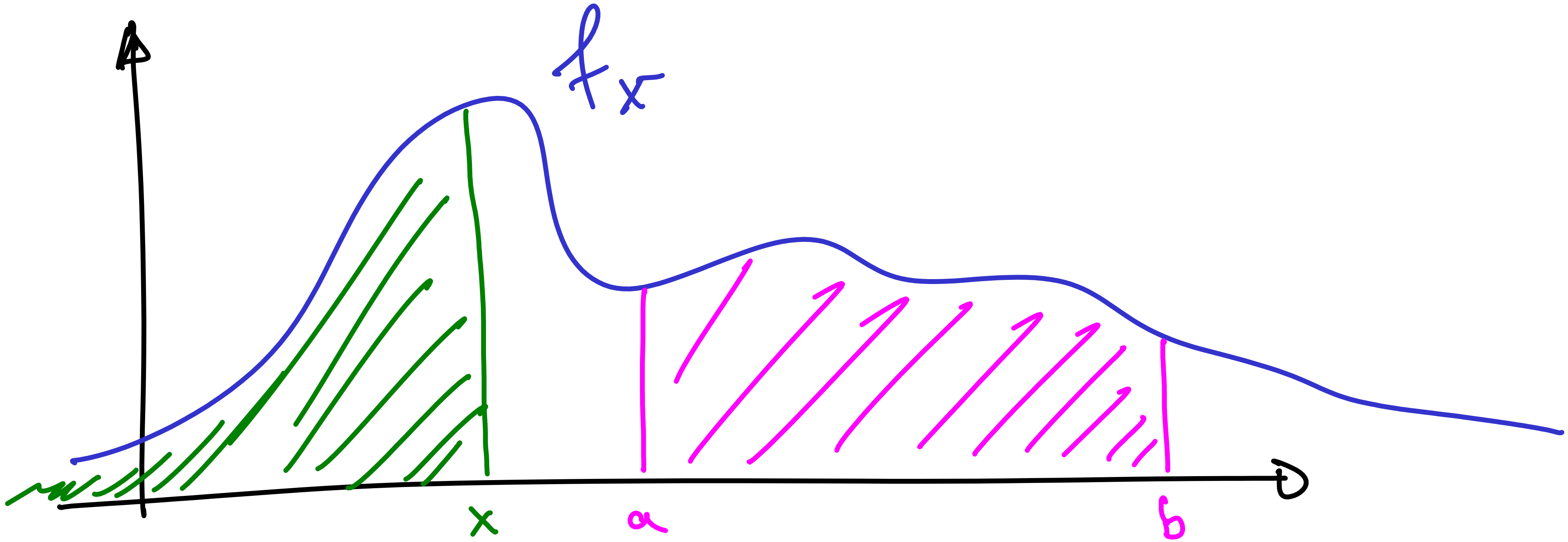
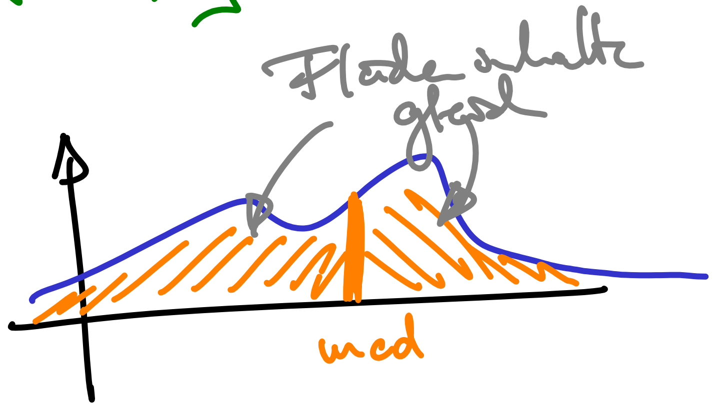


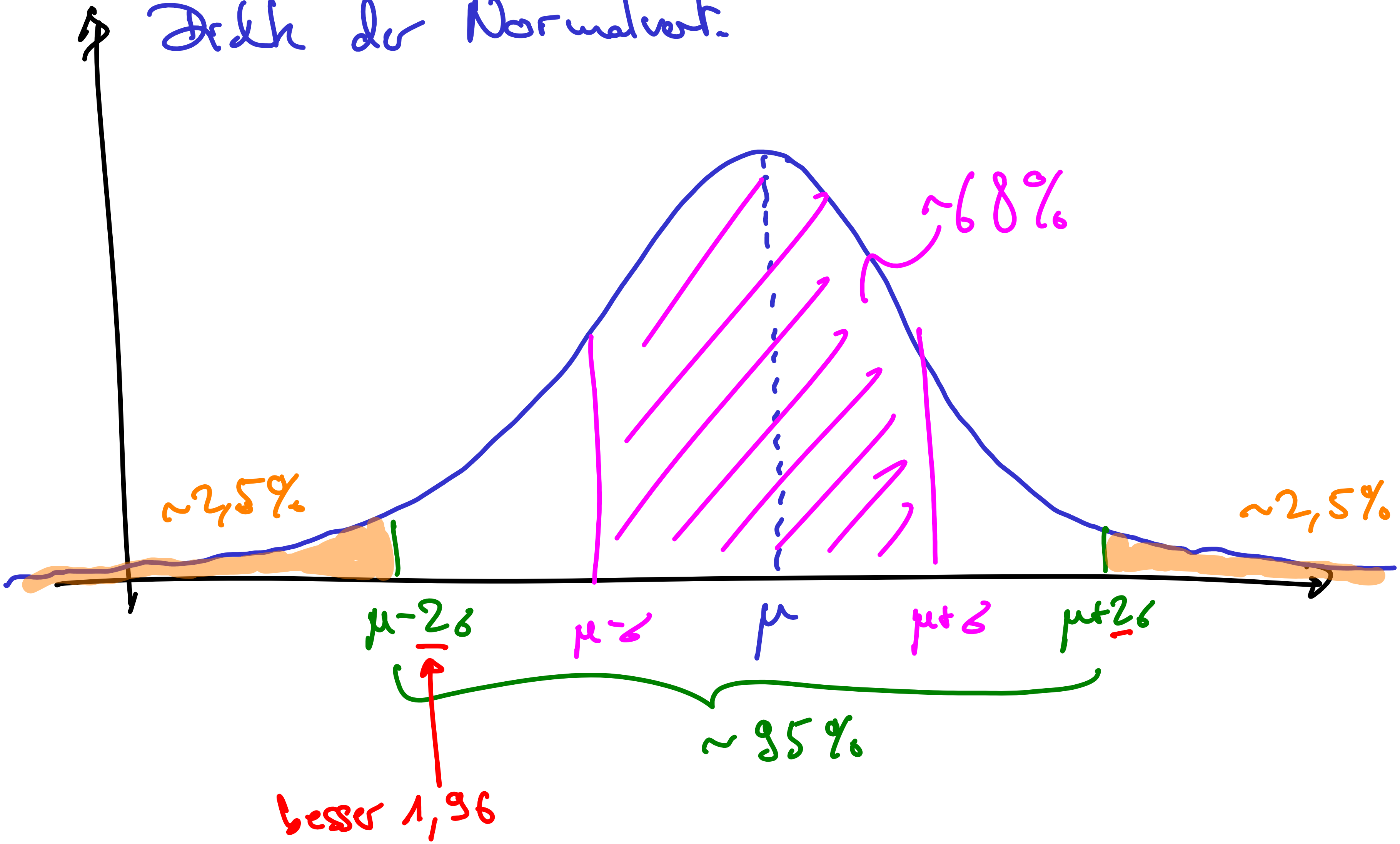
$$\mathbb{P}[a \le X \le b] = \int_a^b f_X(t)\,dt = F_X(b) - F_X(a)$$

$$F_X(x) = \int_{-\infty}^{x} f_X(t)\,dt = \mathbb{P}[X \le x]$$

$$F_X(med) = \int_{-\infty}^{med} f_X(t)\,dt = \frac{1}{2}$$



Dichte der Normalvert.



$$X \sim N(\underbrace{2}_{\mu}, \underbrace{5}_{\sigma^2})$$

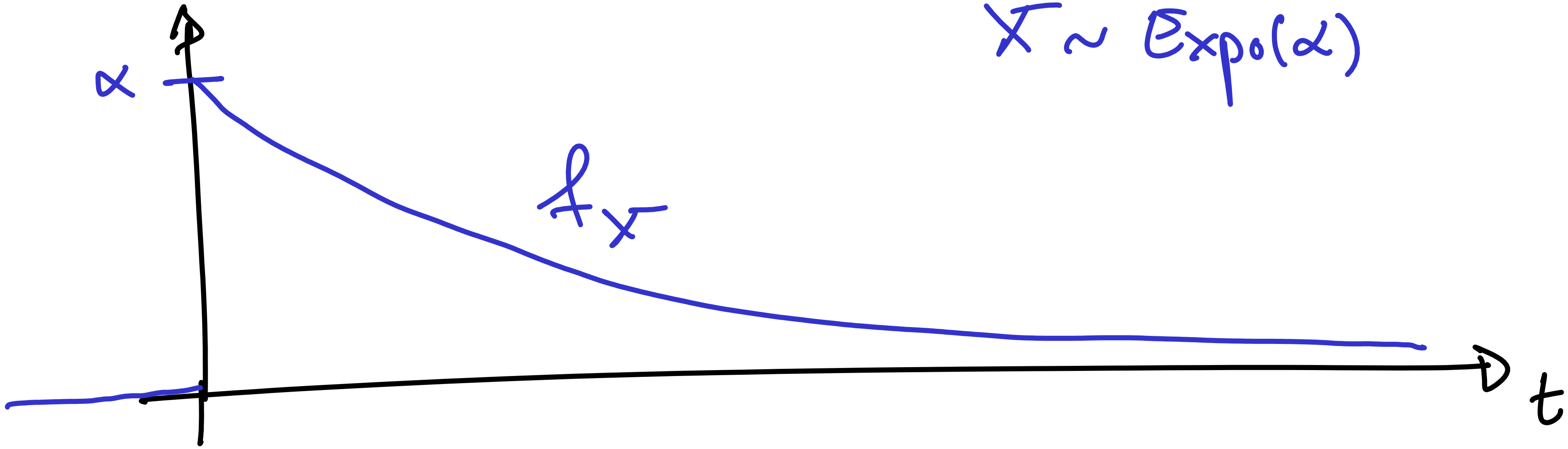
Standardisieren: $Z = \dfrac{X-\mu}{\sigma} = \dfrac{X-2}{\sqrt{5}}$

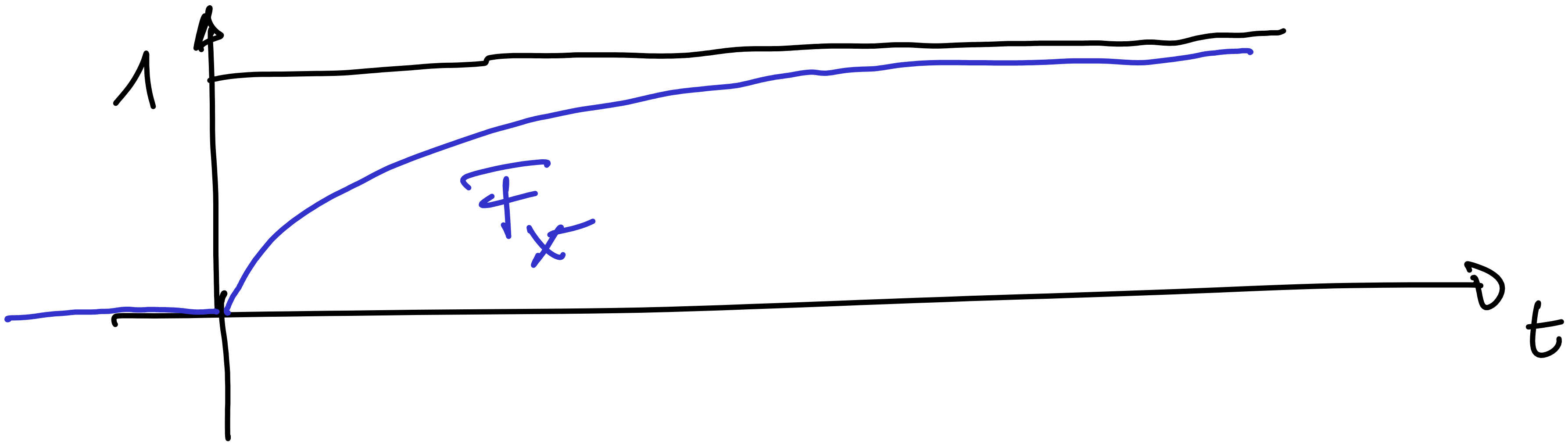
dann gilt $Z \sim N(0,1)$

$$\begin{aligned}
P[X \geq 7] &= P[2+\sqrt{5}\,Z \geq 7] \\
&= P[\sqrt{5}\,Z \geq 5] \\
&= P[Z \geq \sqrt{5}] \\
&= 1 - P[Z \leq \sqrt{5}] \\
&= 1 - \text{normcdf}(\text{sqrt}(5)) \\
&\approx 1{,}27\,\%
\end{aligned}$$

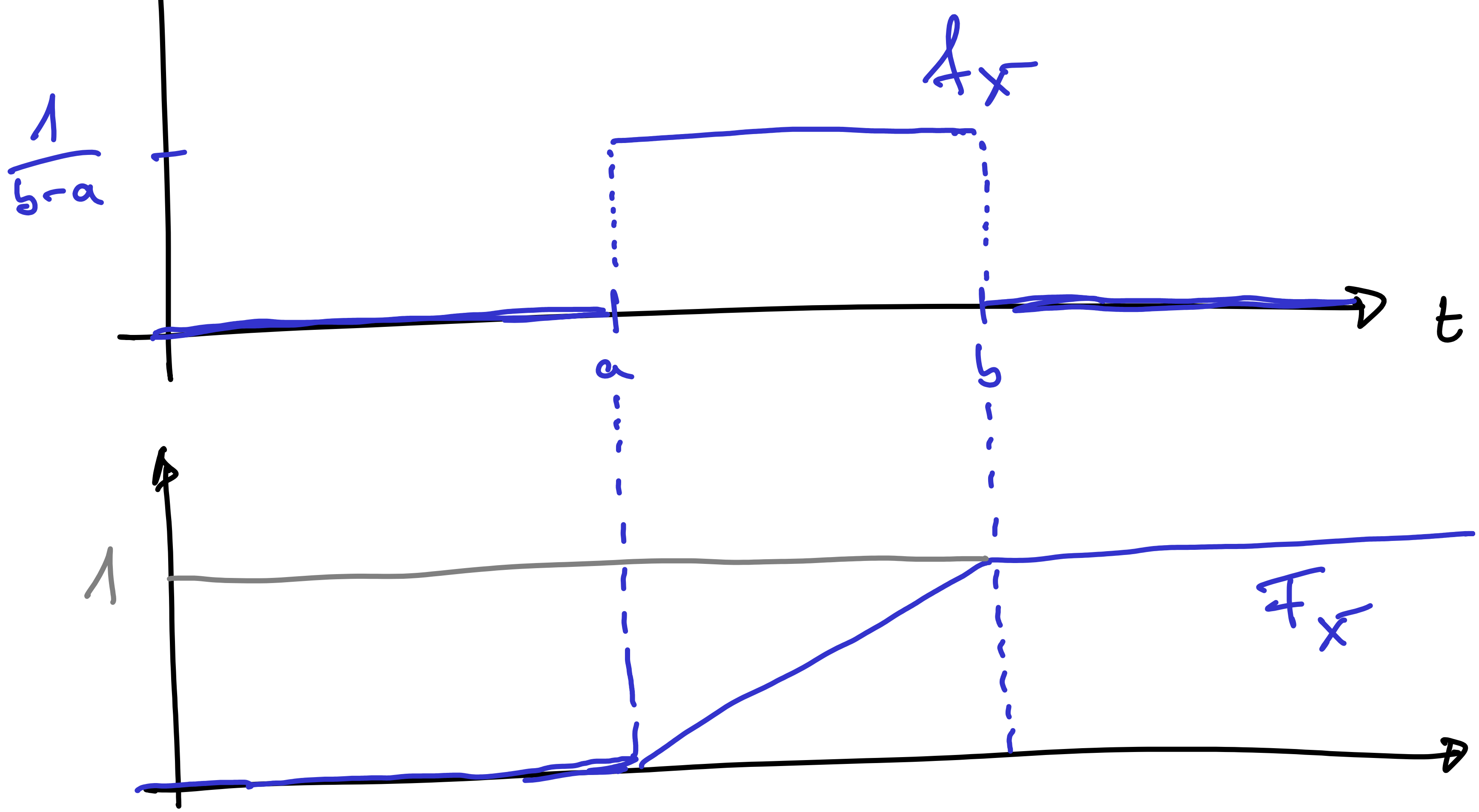
hier "<" oder "≤" egal da stetige Vert.

$X \sim Expo(\alpha)$





Gleichverteilung



zum ZGS, Bsp. Binomialvert.

z.z. $\quad Bin(n,p) \underset{n\to\infty}{\approx} N(np,\, np(1-p))$

$X_1, \dots, X_n \sim Bin(1,p)$

Eigenschaft d. Binomialvert.

$Y = X_1 + X_2 + \dots + X_n \sim Bin(n,p)$

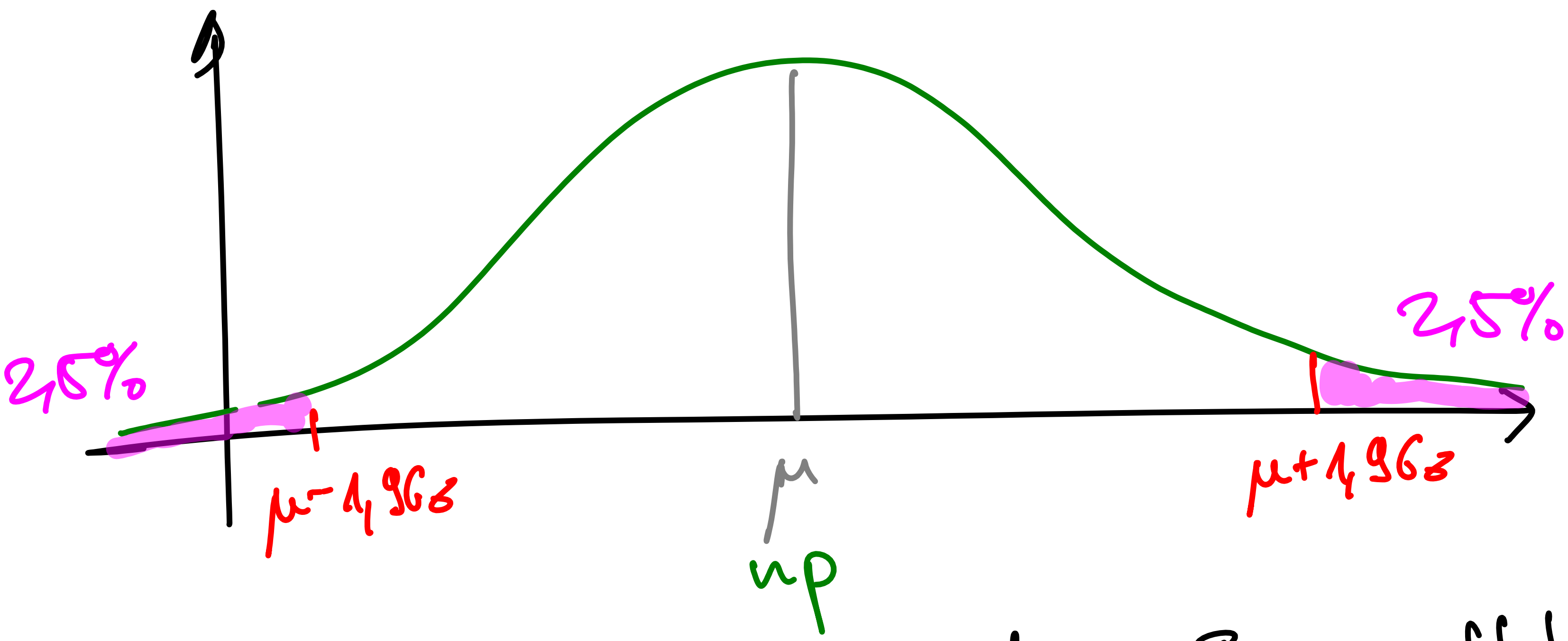
wir wissen $\quad E[Y] = np \quad , \quad Var(Y) = np(1-p)$

$Y = X_1 + X_2 + \dots + X_n \sim N(np,\, np(1-p))$

für große n wg. ZGS

Faustregel Binomialtest

Teststatistik $X \sim Bin(n,p) \approx N(np, np(1-p))$



Annahmebereich bei zweiseitigem Binomialtest, $\alpha = 5\%$

$$K^c = \left[np - 1{,}96 \underbrace{\sqrt{np(1-p)}}_{\sigma},\ np + 1{,}96\sqrt{np(1-p)} \right]$$