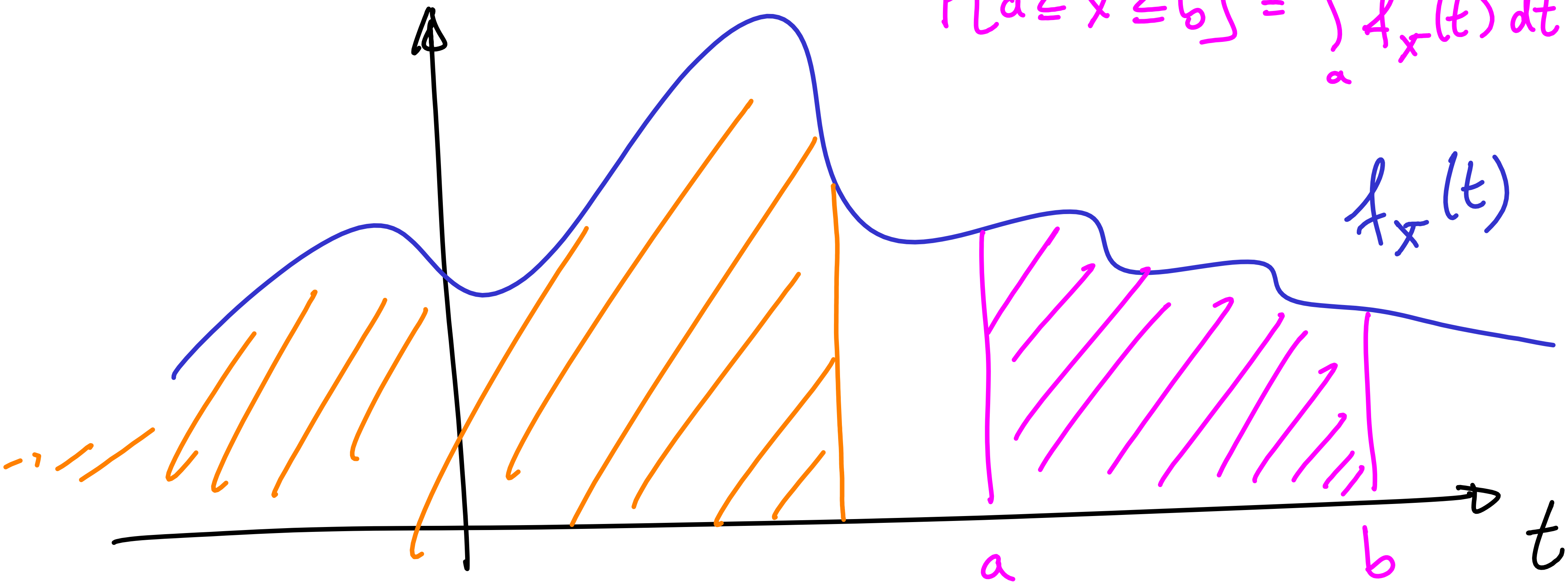
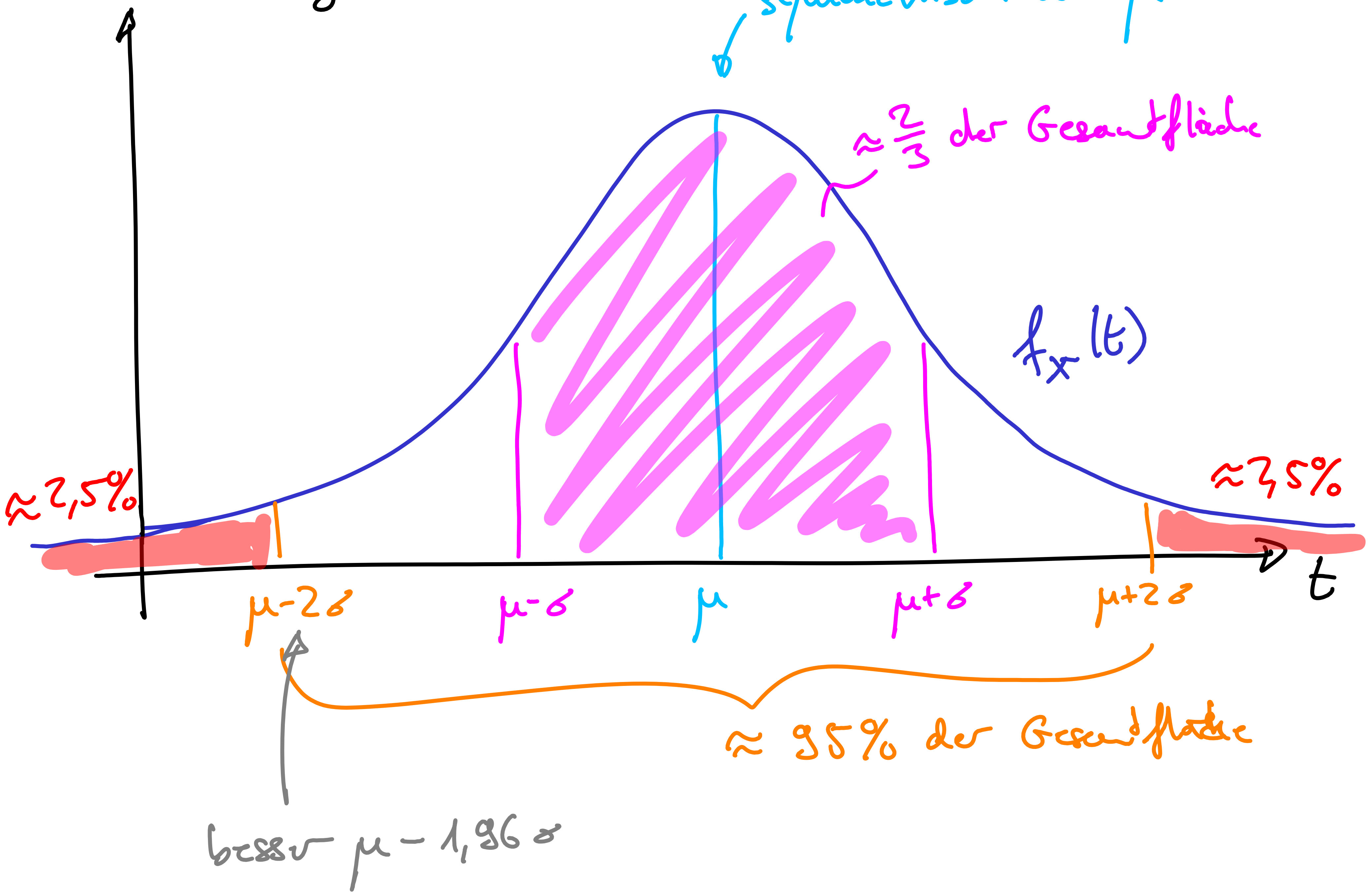
$$P[a \le X \le b] = \int_a^b f_X(t)\,dt$$



$$\left.\begin{aligned} F_X(\text{med}) &= \frac{1}{2} \\ F_X(\text{med}) &= \int_{-\infty}^{\text{med}} f_X(t)\,dt \overset{!}{=} \frac{1}{2} \end{aligned}\right\} \text{ definiert Median med}$$

Normalverteilung



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

Standardisiere: $Z := \frac{X-2}{\sqrt{5}} \sim N(0,1)$

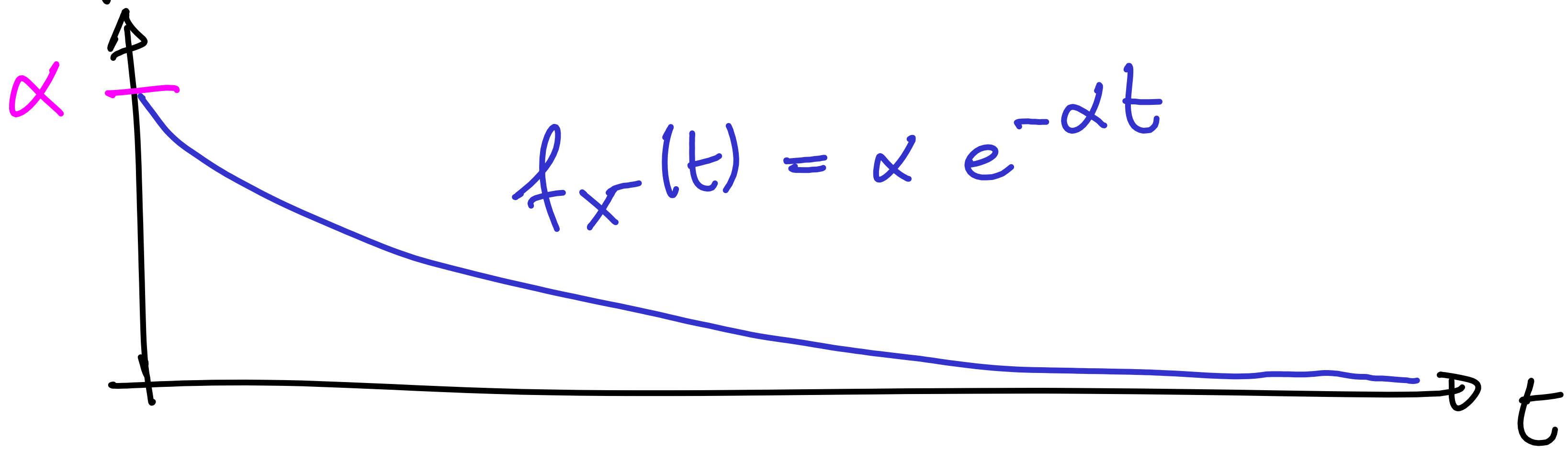
$$P[X \geq 7] = P[X - 2 \geq 5] = P\left[\frac{X-2}{\sqrt{5}} \geq \sqrt{5}\right]$$

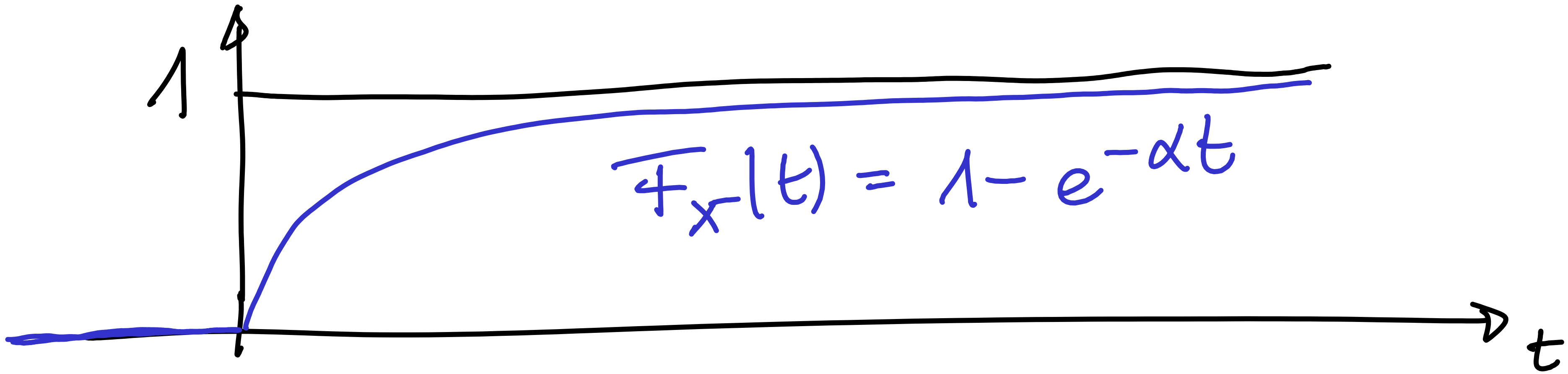
$$= P[Z \geq \sqrt{5}] = 1 - P[Z < \sqrt{5}]$$

$$= 1 - \Phi(\sqrt{5}) = 1 - \text{normcdf(sqrt(5))}$$

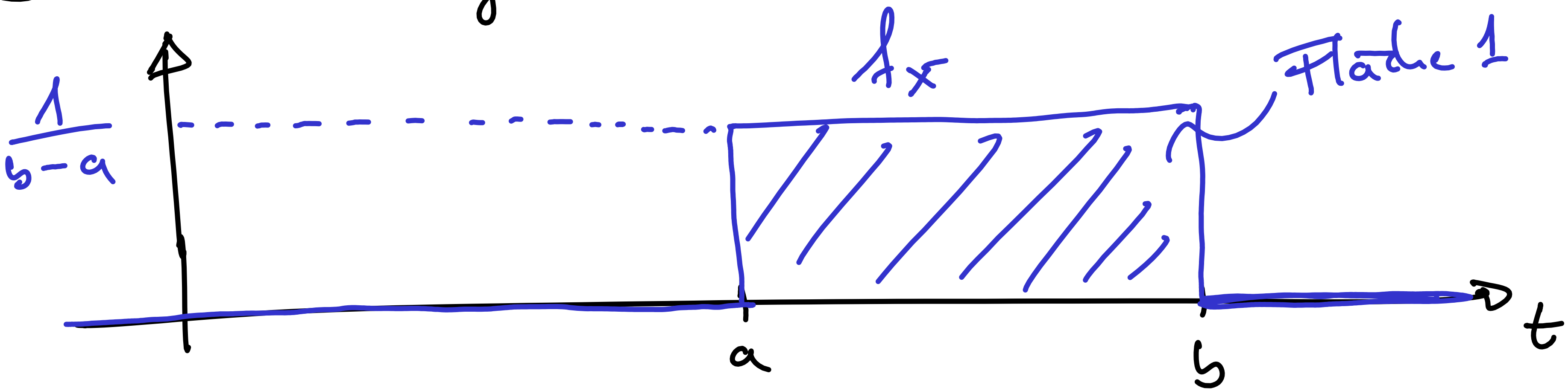
$$\approx 1{,}27\,\%$$

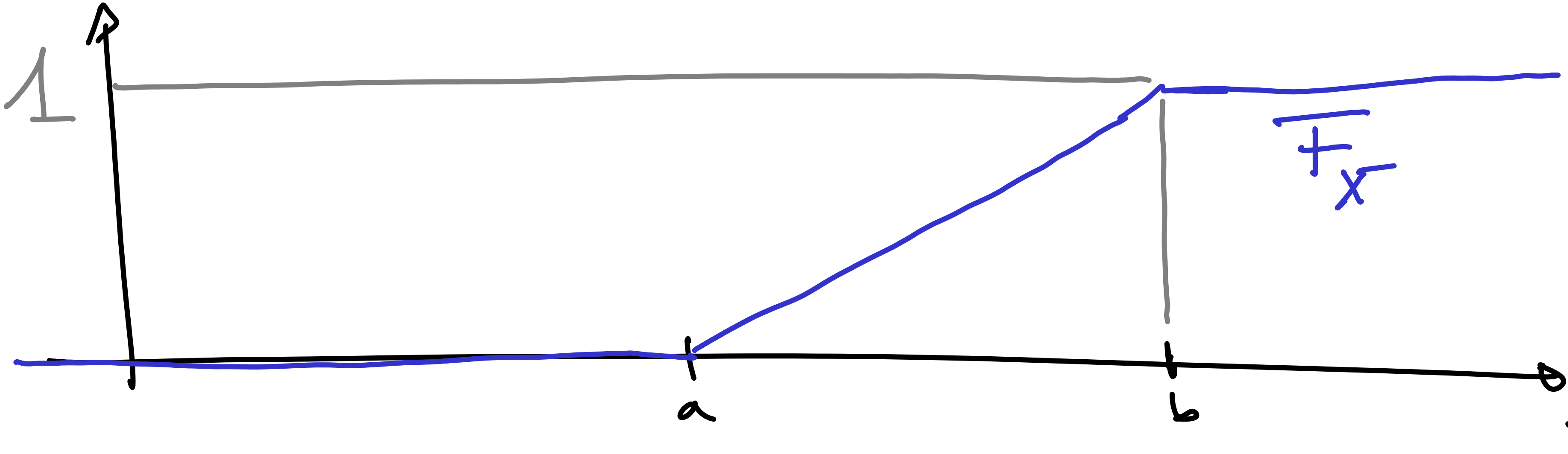
Exponentialverteilung

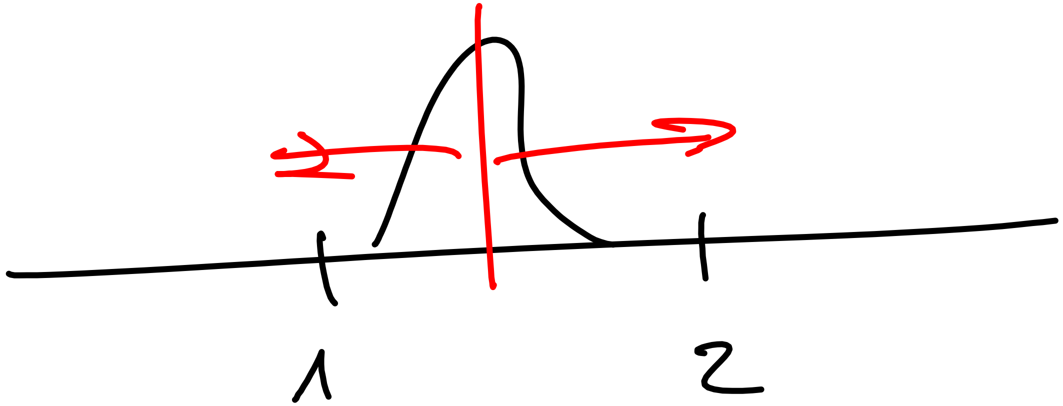




Gleichverteilung






1
2


ganze Zahlen

Bsp zum ZGS

z.B. $Bin(n,p) \approx N(np, np(1-p))$, $n \to \infty$

$X_1, X_2, \dots, X_n \sim Bin(1,p)$

immer

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

$E[Y] = np$, $Var(Y) = np(1-p)$

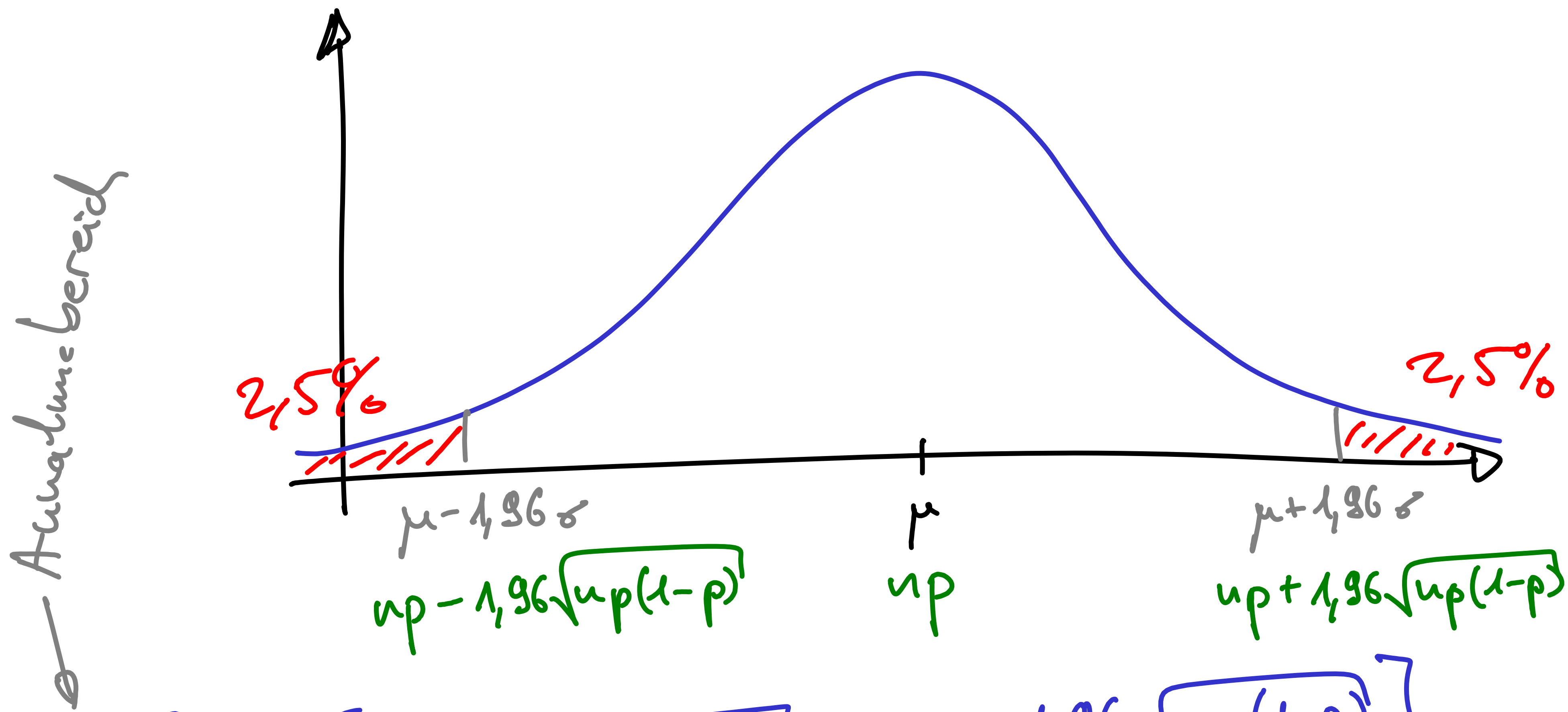
andererseits

für n groß, laut ZGS

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

Faustregel für Binomialtest

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



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

enthält ca. 95% der Werte, die X annehmen kann