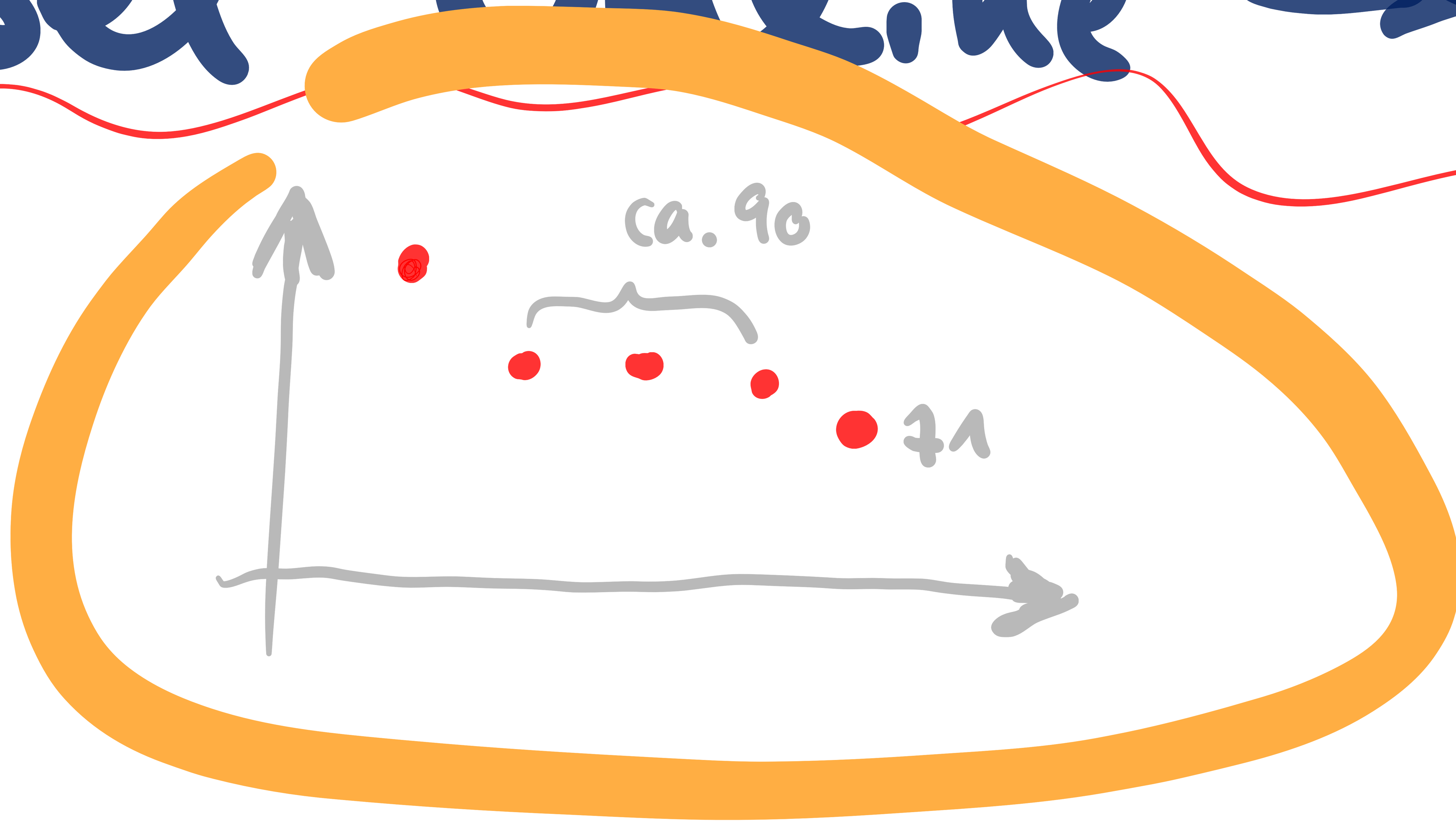
1. Corona ☹

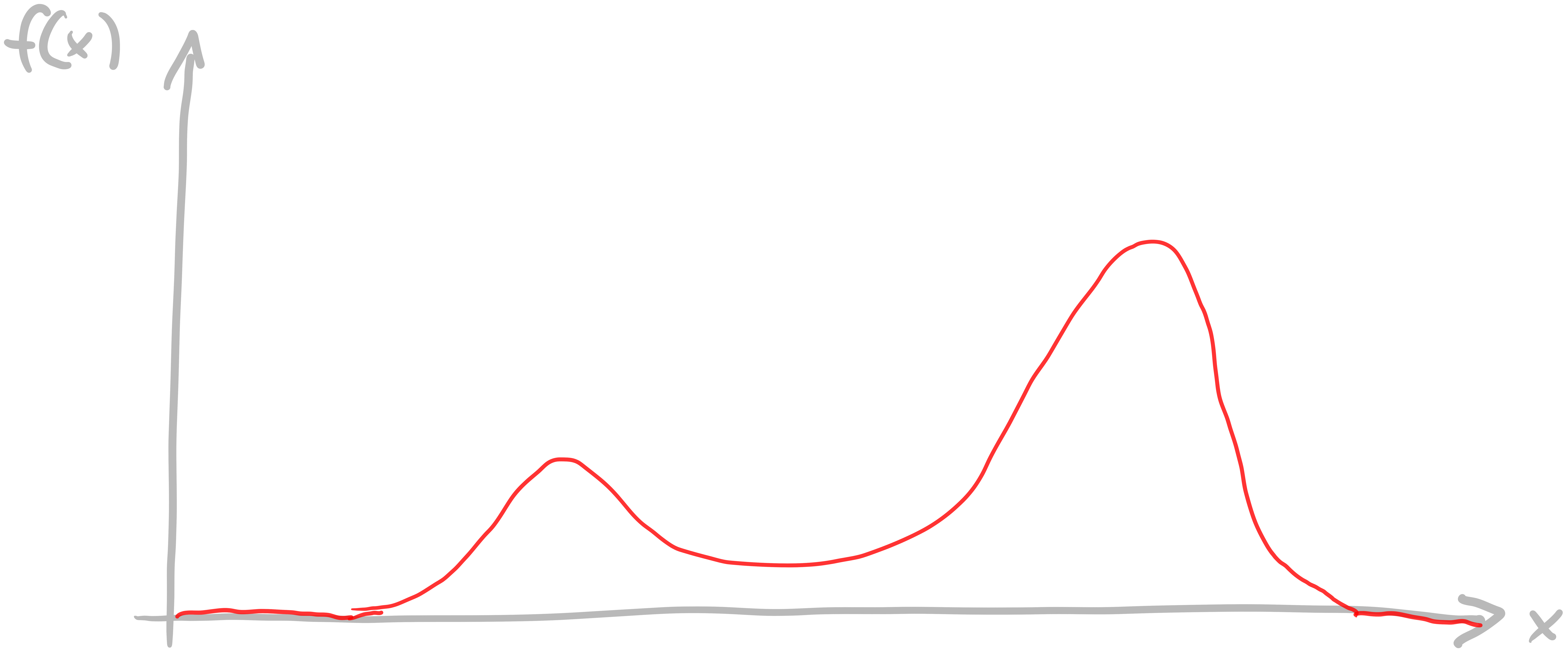
(und Bestehen (der SL))

2. Test 😳 (und Übungsbeteiligung)

3. Gruppenwechsel Online → X

4. ~~[illegible]~~-Bowl
Statistik ☺





Schätzen Sie für diese Verteilung ab:

- Erwartungswert
- 80 % - Quantil
- Varianz

Kovarianz und Unabhängigkeit:

- Zeige: wenn X, Y unabhängig, gilt $Cov(X,Y) = 0$.

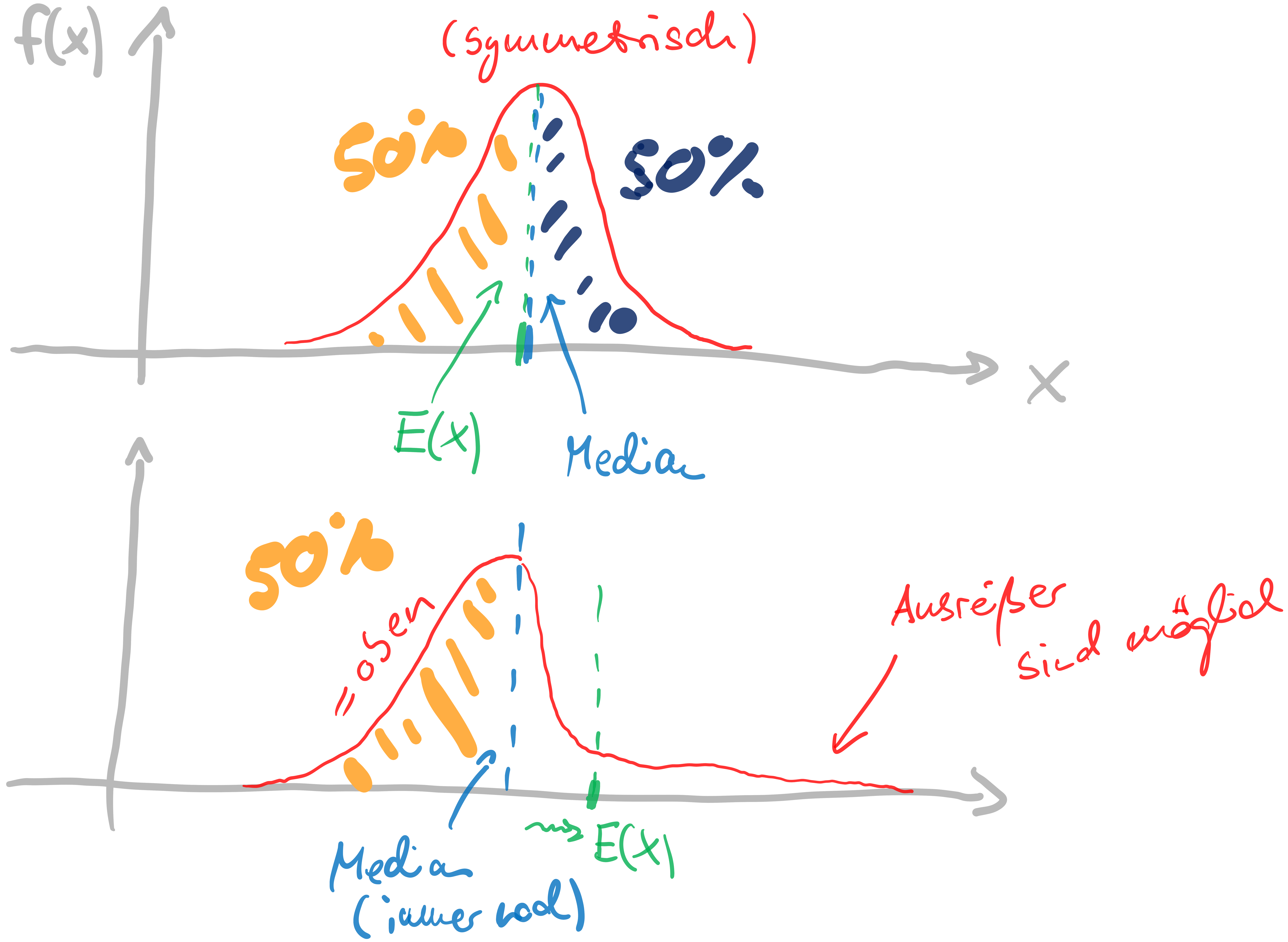
$$Cov(X,Y) = \sum_i \sum_j P(X = x_i, Y = y_j) \cdot (x_i - \mu_x) \cdot (y_j - \mu_y)$$

$= \ldots$

(wenn X, Y unabhängig)

$= 0$

Erwartungswert > 50%-Quantil?

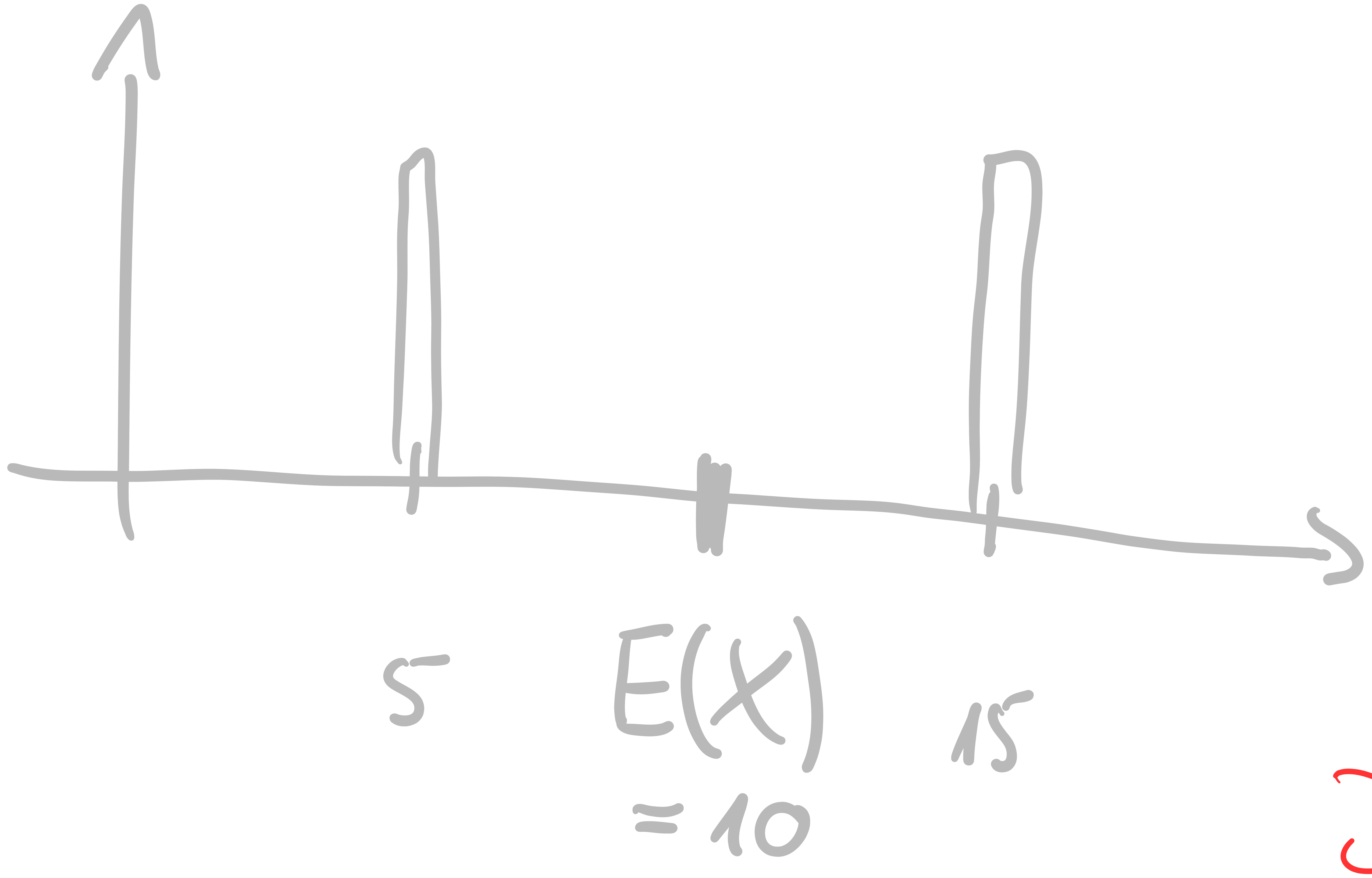


$$E(X) = \sum_{i=1}^{\infty} p_i \cdot x_i$$

Lebensdauer in Tagen

W'keit

Realisierung

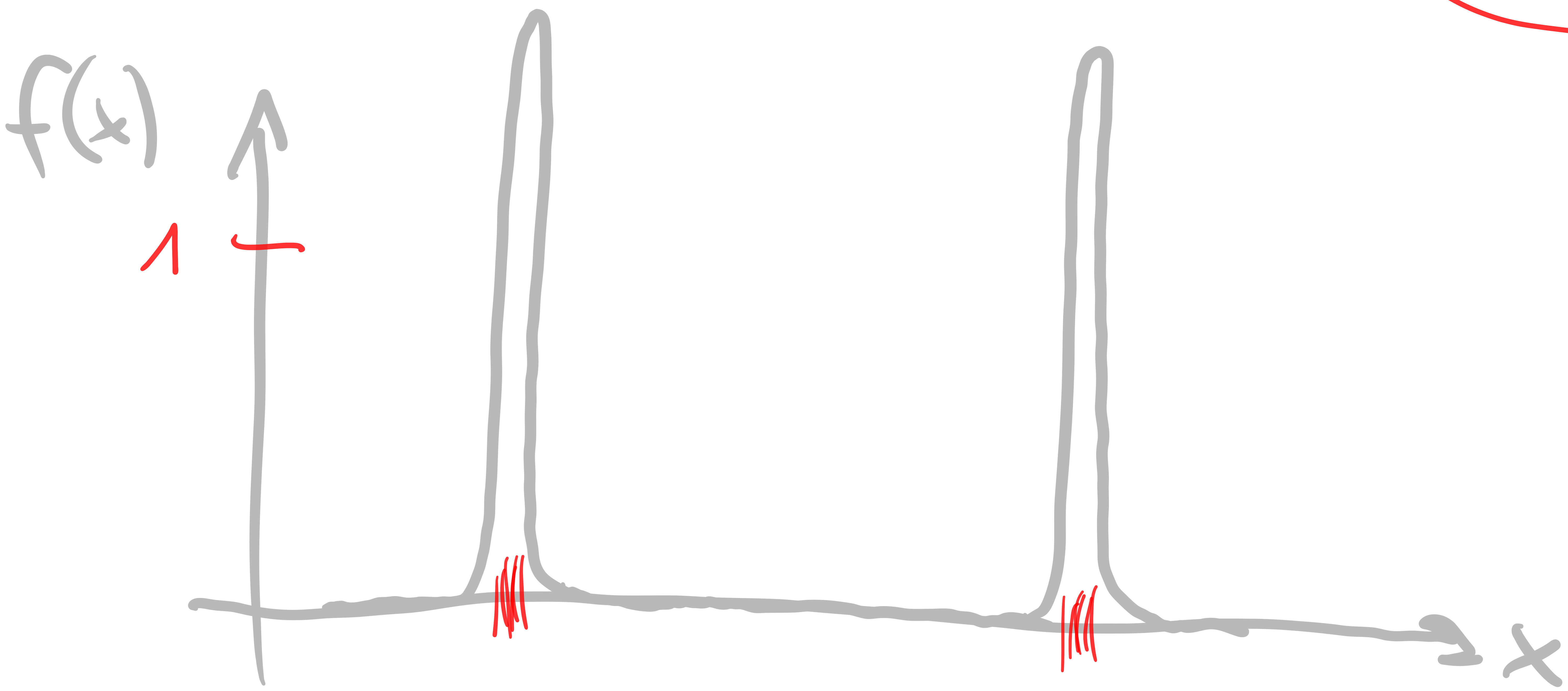


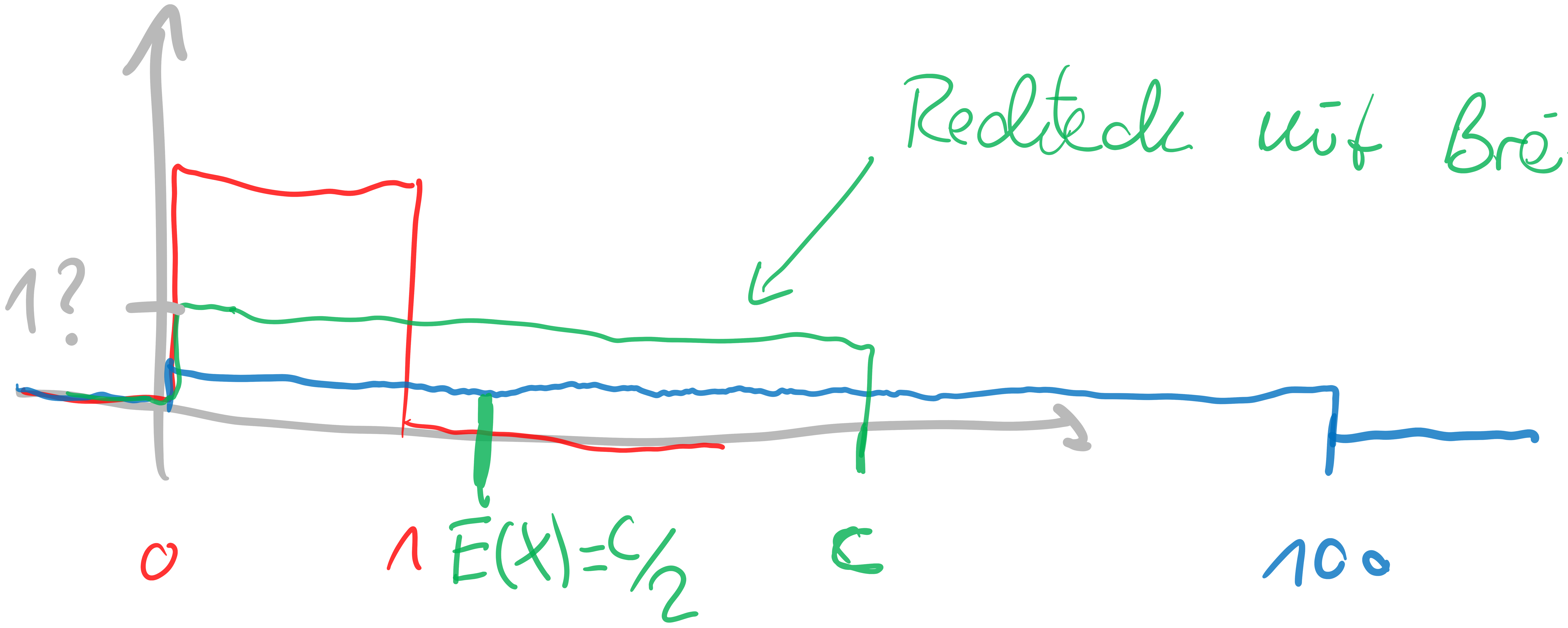
$x_1, x_2 = 5, 15$

$p_1, p_2 = 1/2, 1/2$

$Var(X) = 25$

Diskret, also keine Dichte





Rechteck mit Breite c und Höhe $1/c$

Bestimme c, so dass

$$Var(X) \overset{!}{=} 25 = \int_{-\infty}^{\infty} \underset{?}{f(x)} \cdot \Big(x - \underset{?}{\overbrace{E(X)}^{\mu}}\Big)^2 dx$$

$$= \int_0^c \frac{1}{c} \cdot \Big(x - \frac{c}{2}\Big)^2 dx$$

Analysis

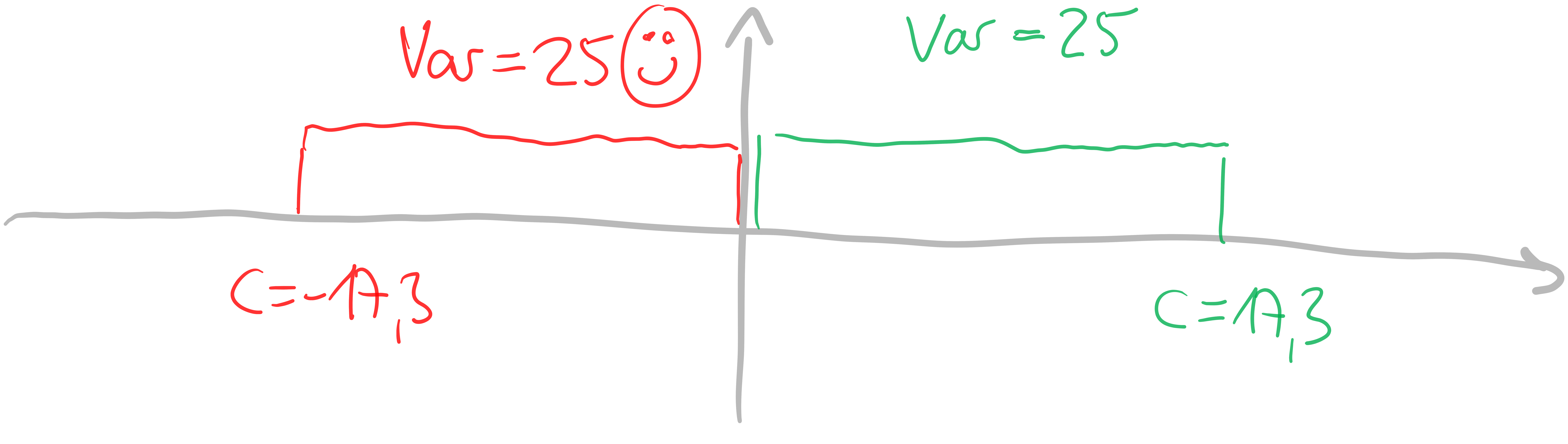
$$= \frac{1}{c} \cdot \int_0^c x^2 - \cancel{2} \cdot \frac{c}{\cancel{2}} \cdot x + \Big(\frac{c}{2}\Big)^2 dx$$

$$= \frac{1}{c} \cdot \left[\frac{1}{3}x^3 - \frac{1}{2} \cdot c \cdot x^2 + \left(\frac{c}{2}\right)^2 \cdot x \right]_0^c$$

$$= \frac{1}{c} \cdot \left[\left(\frac{1}{3}c^3 - \frac{1}{2}c^3 + \frac{1}{4}c^3 \right) - 0 \right]$$

$$25 = \frac{1}{\cancel{c}} \cdot 0{,}08333 \cdot c^{\cancel{3}\,2}$$

$$c = \pm \sqrt{25 / 0{,}0833} = \pm 17{,}32$$



Reali-sierungen $x_1, \ldots, x_n = 0, \quad 1$

W'keiten $p_1, \ldots, p_n = 1-p, \quad p$

$$E(X)$$

$$Var(X) = p^3 - \log(p) + p^2$$

$X = W_6 - W_4$ $\quad$ $X = |W_6 - W_4|$

$E(X) = E(W_6) - E(W_4)$

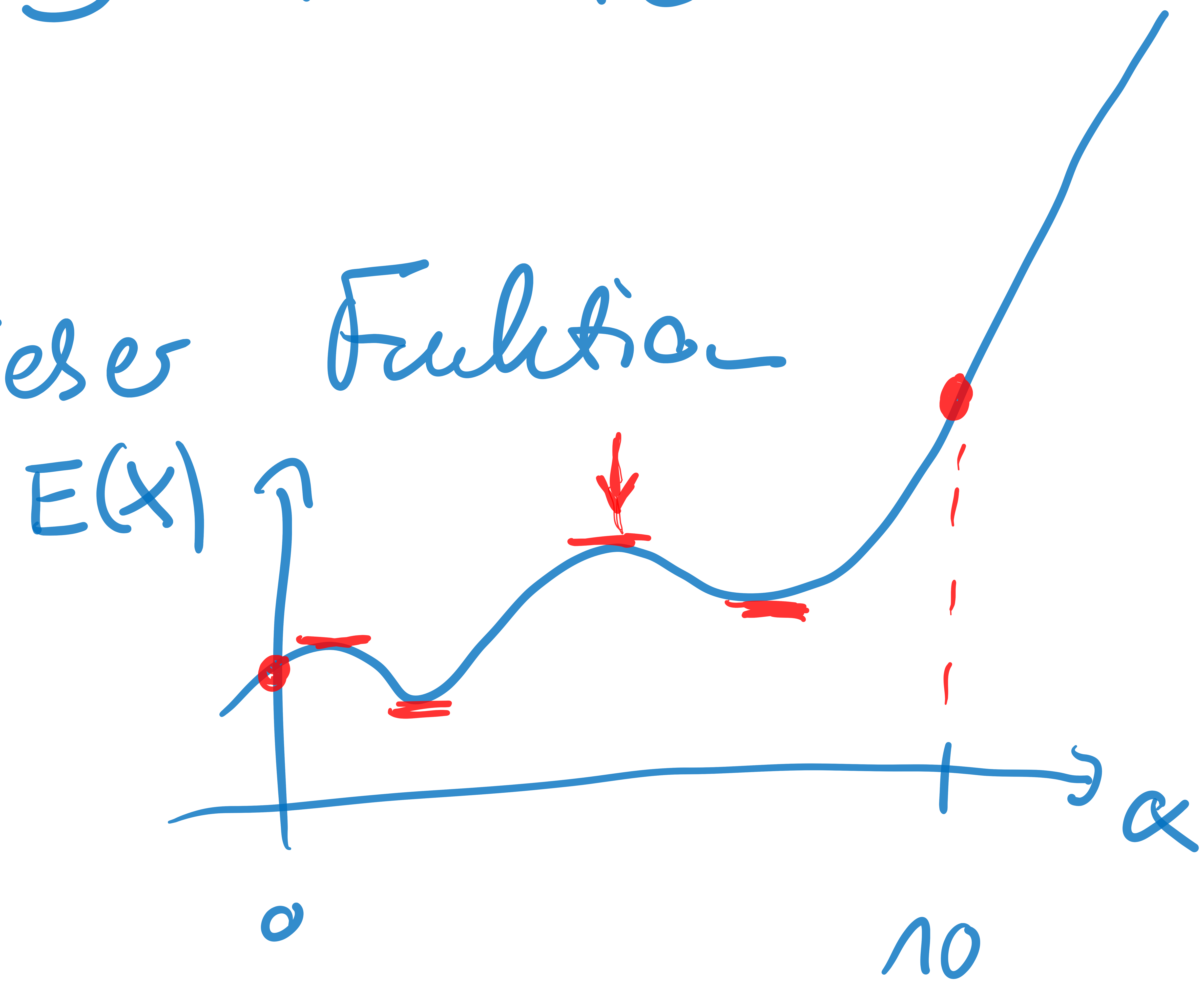
(Rechenregeln)

nicht mit Rechenregeln

$$E(x) = 3\alpha^2 - \log(\alpha)$$

$$= 3\alpha + 10$$

Maximum dieser Funktion



$$X = X_1 + \dots + X_{60}$$

-1 oder 1

$$E(X_i) = \sum_i p_i \cdot x_i \qquad x_1, x_2 = -1; 1$$

$$= 0{,}4 \cdot (-1) + 0{,}6 \cdot 1 \qquad p_1, p_2 = 0{,}4; 0{,}6$$

$$= 0{,}2$$

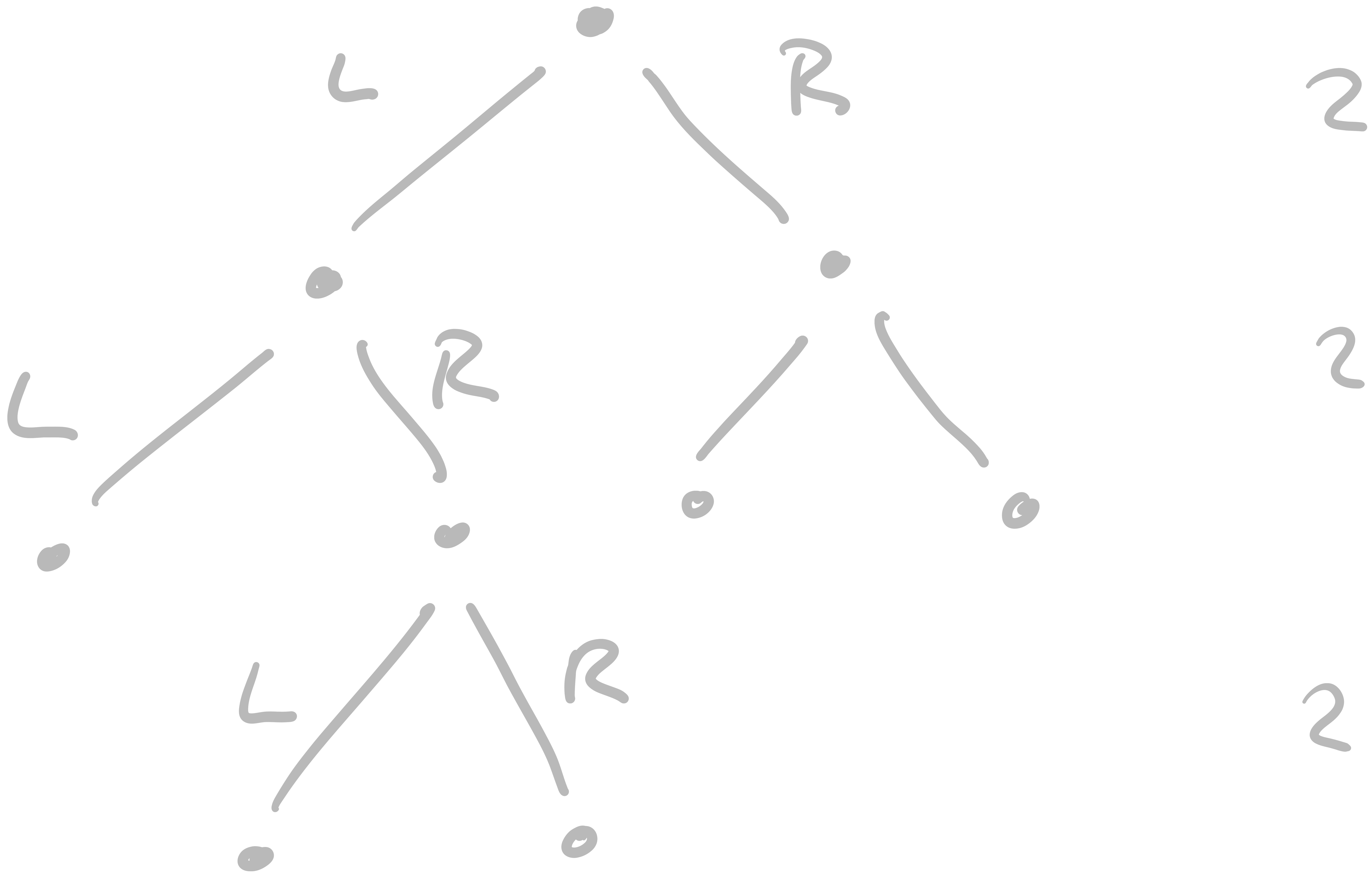
$$E(X) = E(X_1 + \dots + X_{60})$$

Rechenregel

$$= E(X_1) + E(X_2) + \ldots + E(X_{60})$$

$$= 0{,}2 + 0{,}2 + \ldots + 0{,}2$$

$$= 0{,}2 \cdot 60 = 12$$



2^{60} Möglichkeiten insgesamt