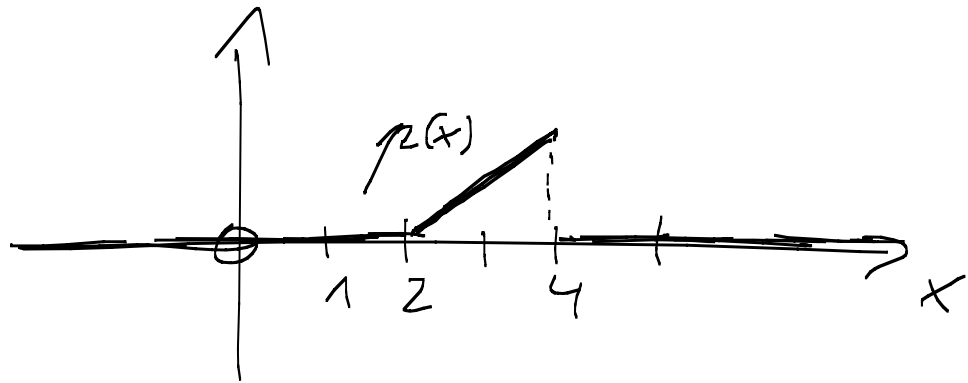


Praktikum 15

1)



$$1 = \int_2^4 c(x-2) dx = c \left[\frac{(x-2)^2}{2} \right]_2^4$$

$$= c \left(\frac{2^2}{2} - \frac{0^2}{2} \right) = 2c \Rightarrow c = \frac{1}{2}$$

$$\frac{1}{2} = \int_2^{\text{Median}} \frac{1}{2}(x-2) dx = \frac{1}{2} \left[\frac{(x-2)^2}{2} \right]_2^{\text{Median}}$$

$$= \frac{1}{2} \left(\frac{(\text{Median}-2)^2}{2} - \frac{0^2}{2} \right)$$

$$\Rightarrow (\text{Median}-2)^2 = 2$$

$$\Rightarrow \text{Median} = 2 + \sqrt{2}$$

$$\begin{aligned}
 2) \quad E[X] &= \int_2^4 x \frac{1}{2}(x-2) dx \\
 &= \frac{1}{2} \int_2^4 (x^2 - 2x) dx = \frac{1}{2} \left[\frac{x^3}{3} - x^2 \right]_2^4 \\
 &= \frac{1}{2} \left(\frac{64}{3} - 16 - \left(\frac{8}{3} - 4 \right) \right) \\
 &= \frac{32}{3} - 8 - \frac{4}{3} + 2 = \frac{28}{3} - 6 \\
 &= \frac{10}{3}
 \end{aligned}$$

$$\begin{aligned}
 3) \quad E[X^2] &= \int_2^4 x^2 \frac{1}{2}(x-2) dx \\
 &= \frac{1}{2} \int_2^4 (x^3 - 2x^2) dx \\
 &= \frac{1}{2} \left[\frac{x^4}{4} - \frac{2}{3}x^3 \right]_2^4 \\
 &= \frac{1}{2} \left(\frac{256}{4} - \frac{2}{3}64 - \left(\frac{16}{4} - \frac{2}{3}8 \right) \right) \\
 &= 32 - \frac{64}{3} - 2 + \frac{8}{3} = 30 - \frac{56}{3} \\
 &= \frac{34}{3}
 \end{aligned}$$

$$\Rightarrow \sigma^2 = \frac{34}{3} - \left(\frac{10}{3} \right)^2 = \frac{102 - 100}{9} = \frac{2}{9}$$

$$\Rightarrow \sigma = \sqrt{2}/3$$