

MAS Ü8

5.) P...Normalverteilung mit $\mu=4$ $\sigma^2=25$

ges: $P([-\infty, 7])$ $P([3, \infty])$ $P(\{x: |x| > 6\})$

$$P([-\infty, 7]) = \Phi_{4,5}(7) = \Phi_{0,1}\left(\frac{7-4}{5}\right) = \Phi_{0,1}(0,6) = 0,72575$$

$$\begin{aligned} P([3, \infty]) &= 1 - P([-\infty, 3]) = 1 - \Phi_{4,5}(3) = 1 - \Phi_{0,1}\left(\frac{3-4}{5}\right) = 1 - \Phi_{0,1}(-0,2) \\ &= 1 - (1 - \Phi_{0,1}(0,2)) = \Phi_{0,1}(0,2) = 0,57926 \end{aligned}$$

$$\begin{aligned} P(\{x: |x| > 6\}) &= 1 - P([-6, 6]) = 1 - (\Phi_{4,5}(6) - \Phi_{4,5}(-6)) = 1 - (\Phi_{0,1}\left(\frac{6-4}{5}\right) - \Phi_{0,1}\left(\frac{-6-4}{5}\right)) \\ &= 1 - (\Phi_{0,1}(0,4) - \Phi_{0,1}(-2)) = 1 - (\Phi_{0,1}(0,4) - (1 - \Phi_{0,1}(2))) = 1 - (\Phi_{0,1}(0,4) - 1 + \Phi_{0,1}(2)) \\ &= 1 - \Phi_{0,1}(0,4) + 1 - \Phi_{0,1}(2) = 2 - 0,65542 - 0,97725 = 0,36733 \end{aligned}$$

ges: $c \in \mathbb{R}$ mit $P([-\infty, c]) = 0,9$

$$0,9 = P([-\infty, c]) = \Phi_{4,5}(c) = \Phi_{0,1}\left(\frac{c-4}{5}\right)$$

$$\Phi_{0,1}(1,29) = 0,90147 \quad \Rightarrow \quad \frac{c-4}{5} = 1,29 \Leftrightarrow c-4 = 6,45 \Leftrightarrow c = 10,45$$