5.1)

a) $F =$ "Festplatte fällt aus"
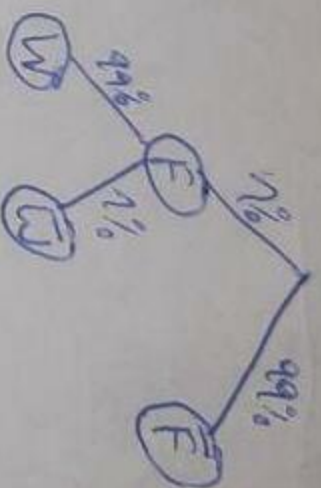
$W =$ "Festplatte läuft normal weiter"

$P(F) = 0.01$

$P(W | F) = 0.99$

$P(X > 4) = 1 - P(X < 5)$

$P(X > 4) = 1 - P(X < 5)$

$= 0.99^4 \cdot 0.01 = 0.00961 = 0.96\%$

b) $F(x) = P(X \leq x) = 1 - P(X > x) = 0.99^x \cdot 0.01$

$= 1 - P(X > x) = 0.99^x \cdot 0.01$

5.2) a)

$f(x) = 4 - (x-1)^2 \quad [-1; 3]$

$G(x) = 4x - \dfrac{(x-1)^3}{3}$

$\displaystyle\int_{-1}^{3} f(x)\, dx = [G(x)]_{-1}^{3} = G(3) - G(-1) = \dfrac{32}{3} \Rightarrow \alpha = \dfrac{1}{(32/3)}$

$f(x) = \begin{cases} \frac{1}{32/3} \cdot (4-(x-1)^2) & \text{falls } x \in [-1; 3] \\ 0 & \text{sonst} \end{cases}$

$F(x) = \begin{cases} \frac{3x}{8} - \dfrac{(x-1)^3}{32} & \text{falls } x \in [-1; 3] \\ 0 & \text{sonst} \end{cases}$

b) $P(0 < X \le 3) = \displaystyle\int_{0}^{3} f(x)\, dx = [F(x)]_{0}^{3} = F(3) - F(0) = \dfrac{7}{8} - \dfrac{1}{32} = \dfrac{27}{32}$

$= 0.844 = 84.4\%$

$P(-1 \le X \le 0) = 1 - P(0 < X \le 3) = 15.6\%$