Lösungen zur Klausur vom 05.06.14

Disclaimer: Schreibfehler sind nicht auszuschließen.

A1: A.

A2: D. $16!/(8!2^8) \approx \underline{\underline{2027}} \cdot 1000$.

A3: B. $7/\binom{14}{2} \approx \underline{\underline{0.077}}$.

A4: C. $1-(0.9{\cdot}0.8{\cdot}0.7{\cdot}0.6+0.1{\cdot}0.8{\cdot}0.7{\cdot}0.6+0.9{\cdot}0.2{\cdot}0.7{\cdot}0.6+0.9{\cdot}0.8{\cdot}0.3{\cdot}0.6+0.9{\cdot}0.8{\cdot}0.7{\cdot}0.4) = \underline{\underline{0.2572}}$.

A5: C.

A6: A.

A7: C. $0.45 \cdot 0.4 + 0.35 \cdot 0.3 + 0.2 \cdot 0.9 = \underline{\underline{0.465}}$.

A8: A. $0.45 \cdot 0.4/0.465 = \underline{\underline{0.387}}$

A9: B.

A10: C. $P(-1 \leq X - 1 \leq 1) = P(0 \leq X \leq 2) = \underline{\underline{0.7}}$.

A11: A. $E(X^2) = \sum_j a_j^2 p_j = \underline{\underline{6.5}}$.

A12: B. $P(X_1 = 1, X_2 = 1) = 0$.

A13: D. $P(D = 1) = P(D = 2) = P(D = 3) = 1/3$, $E(D) = \underline{\underline{2}}$.

A14: C.

A15: D. $(\frac{1}{4}x + \frac{1}{8}x^2)|_{1.5}^2 = \underline{\underline{0.34375}}$.

A16: B. $(\frac{1}{8}x^2 + \frac{1}{12}x^3)|_0^2 = \underline{\underline{1.1667}}$.

A17: A. $F(x) = \frac{1}{4}x + \frac{1}{8}x^2$ für $x \in [0, 2]$ $F(1.70) = 0.786 < 0.8 < 0.8272 = F(1.76)$.

A18: D. $4 \cdot 3 + 1 = \underline{\underline{13}}$.

A19: B. $2 \cdot (3 + 1^2) = \underline{\underline{8}}$.

A20: B. $X \sim B(10, 0.2)$, $P(X \leq 1) = \underline{\underline{0.3758}}$.

A21: D. $X \sim Exp(1/4)$, $P(X \geq 5) = \exp(-5/4) = \underline{\underline{0.2865}}$.

A22: B. $1 + 1.96 \cdot 2 = \underline{\underline{4.92}}$.

A23: A. $\Phi((\sqrt{3} - 1)/2) - \Phi((-\sqrt{3} - 1)/2) = \underline{\underline{0.559}}$.

A24: B.

A25: D. $\frac{1}{2} \cdot 1.5 = \underline{\underline{0.75}}$.

A26: A. $0.5 \cdot \int_0^2 \frac{1}{2} \cdot x^3 dx = \underline{\underline{1}}$.

A27: A. $E(Y) = \underline{\underline{1.25}}$.

A28: B. $E(Y|X=2) = \underline{\underline{1.375}}$.

A29: C. $E(X) = 2.2$, $E(X \cdot Y) = 2.9$, $Cov(X,Y) = 2.9 - 2.2 \cdot 1.25 = \underline{\underline{0.15}}$.

A30: D. $E(X_i) = 0.5$. $P(\bar{X}_n > 0.3) \to 1$.

A31: C. $Cov(U,X) = Cov(U, 2U - V) = 2Var(U) > 0$.

A32: C. $Cov(2U - V, U + V) = 2Cov(U,U) - Cov(V,V) + 0 - 0 = 2 \cdot 2 - 1 \cdot 3 = \underline{\underline{1}}$.

A33: D. $X \sim B(100, 0.8)$, $P(X \leq 85) \approx \Phi((85.5 - 80)/\sqrt{100 \cdot 0.8 \cdot 0.2}) \approx \underline{\underline{0.9162}}$.

A34: C.

A35: D. $V_n = S_n^2$, $plim(V_n) = Var(X_i) = \pi(1-\pi)$.

A36: A. $\mu = E(X) = \theta + 1.6$.

A37: C. $\bar{x} = 414$, $s^2 = \underline{\underline{222.48}} \cdot 10^3$.

A38: C. $441 + 2.7764 \cdot 471.68/\sqrt{5} = \underline{\underline{999.66}}$.

A39: B. $n = 35$, $2 \cdot 1.96 \cdot 20/\sqrt{35} = \underline{\underline{13.25}}$.

A40: C. $\hat{\pi} = 0.25$, $0.2731 - 0.2269 = 0.0462 = 2 \cdot 1.96 \cdot \sqrt{0.25 \cdot 0.75/n}, \implies n \approx \underline{\underline{1349.86}}$.

A41: D.

A42: B. $H_1 : \mu < 3.5 = \mu_0$, $\sqrt{n}(\bar{x} - \mu_0)/\sigma < -z_{1-\alpha}$ g.d.w. $\sum_i x_i < n(\mu_0 - z_{1-\alpha}\sigma/\sqrt{n}) = 10 \cdot (3.5 - 2.33 \cdot 0.15/\sqrt{10}) = \underline{\underline{33.89}}$.

A43: D. $t = \sqrt{20}(2.34 - 2)/1 \approx 1.52$, $1 - \Phi(t) \approx \underline{\underline{0.0643}}$.

A44: A.

A45: B.

A46: B. $\bar{X}_n \sim N(1, 1/16)$, $T = \sqrt{16}(\bar{X}_n - 0)/1 = 4\bar{X}_n \sim N(4,1)$.

A47: A. $\bar{x} = 86.1$, $s^2 = 216.544$, $t = \sqrt{10}(86.1 - 100)/\sqrt{216.544} \approx \underline{\underline{-2.987}}$

A48: B. $-t_{9,0.99} = \underline{\underline{-2.8214}}$.

A49: A.

A50: A.

A51: B.

A52: B. $t = (7.4 - 7.6)/\sqrt{1.3^2/119 + 0.79^2/47} = \underline{\underline{-1.128}}$.

A53: B.

A54: C. $\hat{\pi}_1 = 0.66$, $\hat{\pi}_2 = 0.56$, $t = (0.66 - 0.56)/\sqrt{0.66 \cdot 0.34/500 + 0.56 \cdot 0.44/500} = \underline{\underline{3.257}}$.

A55: D. 1.96.

A56: C. $s_{xy} = \frac{1}{49}(50 \cdot 19.07 - 50 \cdot 1.57 \cdot 10.96) = 1.901$, $\hat{\beta} = s_{xy}/s_x^2 = 1.901/0.269 = \underline{\underline{7.067}}$.

A57: A. $R^2 = 0.518$, $\hat{\sigma}^2 = 12.764$, $\hat{\sigma}^2_{\hat{\beta}} = 0.968$, $\hat{\sigma}_{\hat{\beta}} = \underline{\underline{0.984}}$.

A58: D. $\underline{\underline{6.71}}$

A59: C. $(-12.585 + 5)/1.713 = \underline{\underline{-4.428}}$.

A60: A. $\hat{\beta}_2$ ist signifikant und negativ. Für Typ B ($t_i = 2$) sind die y-Werte also im Mittel kleiner als für Typ A ($t_i = 1$).