

Lösungen zur Klausur vom 30. August 2014

Disclaimer: Schreibfehler sind nicht auszuschließen.

A1: C. $4 \cdot \binom{12}{3} \cdot 3 \cdot \binom{9}{3} \cdot 2 \cdot \binom{6}{3} \cdot 1 \cdot 1 \approx \underline{\underline{8.87 \cdot 10^6}}.$

A2: C. $[(\binom{10}{4} + \binom{10}{3}\binom{10}{1})]/\binom{20}{4} \approx \underline{\underline{0.291}}.$

A3: A. $0.7 - 0.4 = \underline{\underline{0.3}}.$

A4: C. $P(A \cap B) = 0.2, P(A|B) = 0.2/0.4 = \underline{\underline{0.5}}.$

A5: B. $1/6 + 1/2 - (1/6)(1/2) \approx \underline{\underline{0.583}}.$

A6: B. Aussage richtig, wenn $P(A \cap B) = 0$. Die Aussage ist falsch, wenn $P(A \cap B) \neq 0$ und $P(A) \neq P(B)$.

A7: D. $0.02 \cdot 0.6 + 0.035 \cdot 0.4 = \underline{\underline{0.026}}.$

A8: B. $0.02 + 0.026 - 0.02 \cdot 0.026 = \underline{\underline{0.04548}}.$

A9: C. $\underline{\underline{0.6}}.$

A10: C. $E(X) = 1, E(X^2) = 4, Var(X) = \underline{\underline{3}}.$

A11: D. $\underline{\underline{1}}$

A12: D. $\underline{\underline{0.5}}.$

A13: C. $\underline{\underline{1.583}}.$

A14: C. $F(x) = \int_0^x f(t)dt = (1/3) + (x-1)/3. F(x) = 0.8 \implies x = \underline{\underline{2.4}}.$

A15: D.

A16: A.

A17: A.

A18: D. $P(X = 1) = e^{-1.5} \cdot 1.5 \approx \underline{\underline{0.3347}}.$

A19: A. $P(X > 2) = 1 - e^{-1.5} \cdot (1 + 1.5 + 1.5^2/2!) \approx \underline{\underline{0.191}}.$

A20: D. $Y \sim B(3, \pi)$ mit $\pi = P(X \geq 1) \approx 0.7769$.
 $P(Y \geq 2) = P(Y = 2) + P(Y = 3) = 3\pi^2(1 - \pi) + \pi^3 \approx \underline{\underline{0.8729}}.$

A21: B. $X \sim N(2500, 15^2), P(2490 < X < 2520) \approx \underline{\underline{0.6568}}.$

A22: B. $P((X - 32) \cdot 5/9 \leq 1380) = P(X \leq 2516) \approx \underline{\underline{0.8577}}.$

A23: D. $\underline{\underline{0.3}}.$

A24: B. $\underline{\underline{0.5}}.$

A25: A. $1 \cdot 0.1/0.4 + 2 \cdot 0.3/0.4 = \underline{\underline{1.75}}.$

- A26:** C. $X \sim B(5, 0.5)$, $P(X = 2, Y = 3) = P(X = 2) = \underline{\underline{0.3125}}$.
- A27:** A. $X + Y = 5$, also $Var(X + Y) = \underline{\underline{0}}$.
- A28:** A. $0.4 \cdot 0.5 + 0.6 \cdot 1 = \underline{\underline{0.8}}$.
- A29:** D. $Var(U) = 0.25$, $Cov(X, U) = 0.4 \cdot Var(U) = 0.1$,
 $Var(X) = 0.4^2 \cdot 0.5^2 + 0.6^2 \cdot 1 = 0.4$, $\rho(X, Y) \approx \underline{\underline{0.3162}}$.
- A30:** C. $X \sim U(-2, 3)$, $E(X) = 0.5$, $(E(X))^2 = \underline{\underline{0.25}}$.
- A31:** C. $Var(X) \approx 2.083$, $E(X^2) \approx \underline{\underline{2.333}}$.
- A32:** A.
- A33:** D.
- A34:** C. $\mu = E(X) = \theta/4 - 1/4 \implies \theta = 4\mu + 1$.
- A35:** A. $(1/12)(156.436 - 13 \cdot 3.448^2) \approx \underline{\underline{0.1569}}$.
- A36:** B. $3.448 + 2.681 \cdot \sqrt{0.1569/13} \approx \underline{\underline{3.743}}$.
- A37:** A. $0.042 + 1.96 \cdot \sqrt{0.042 \cdot 0.958/1000} \approx \underline{\underline{0.0544}}$.
- A38:** C. $0.042 \cdot 0.958 \cdot (1.96/0.005)^2 \approx \underline{\underline{6183}}$.
- A39:** C. $\pi_0 = 0.03$, $t = (42 - 1000 \cdot 0.03)/\sqrt{1000 \cdot 0.03 \cdot 0.97} \approx \underline{\underline{2.225}}$.
- A40:** B.
- A41:** D. $t = \sqrt{17}(15.42 - 15.5)/0.16 \approx \underline{\underline{-2.062}}$.
- A42:** B. $\Phi(-2.06) \approx \underline{\underline{0.0197}}$.
- A43:** B.
- A44:** D. $t = \sqrt{20}(1403.74 - 1400)/\sqrt{129.69} \approx \underline{\underline{1.469}}$.
- A45:** D. $t_{19, 0.975} \approx \underline{\underline{2.093}}$.
- A46:** B.
- A47:** B. $(9 \cdot 25 + 7 \cdot 9)/16 = \underline{\underline{18}}$.
- A48:** B. $t = (204 - 200)/\sqrt{((1/10) + (1/8))18} \approx \underline{\underline{1.988}}$.
- A49:** B. $t_{16, 0.975} = \underline{\underline{2.1199}}$.
- A50:** B.
- A51:** D. $t = (200/200) \cdot \sqrt{100} = \underline{\underline{10}}$.
- A52:** D. $s_{xy} = \dots = (s_x^2 + s_y^2 - s_z^2)/2 = 285000 \rightsquigarrow r_{xy} = \underline{\underline{0.95}}$.
- A53:** B. $\chi^2 = \sum_{ij} (n_{ij} - e_{ij})^2 / e_{ij} = \dots \approx \underline{\underline{39.22}}$.
- A54:** A.

A55: D. $\varrho = 1/\sqrt{1 \cdot 9} \approx \underline{\underline{0.333}}$.

A56: B. $Z = X - Y \sim N(-3, 8) \rightsquigarrow P(Z > 0) \approx \underline{\underline{0.1446}}$.

A57: A. $152.8 + (-10.5) \cdot 1 = \underline{\underline{142.6}}$.

A58: A. $t = -10.5/1.39 \approx \underline{\underline{-7.554}}$.

A59: B.

A60: A.