

Lösungen zur Klausur

Disclaimer: Schreibfehler sind nicht auszuschließen.

F1: C. $p_2 = 1/\binom{15}{2} = 1/105 \approx \underline{0.00952}$.

F2: A. $A \cap B = \emptyset$.

F3: D. 1 Richtiger: $p_1 = 2 \cdot 13/105 \approx 0.2476$. $E(X) = 120 \cdot p_2 + 1.20 \cdot p_1 = \underline{1.44}$.

F4: C. $t = \sqrt{30} \cdot (195.3 - 200)/10.3 \approx \underline{-2.499}$.

F5: A. $t < -t_{29,0.95} = -1.6991$, also H_0 ablehnen.

F6: A. 6 günstige, 20 mögliche Kugeln.

F7: C. $P(T_* < t) = F_{T_*}(t) = F_{20}(1.78)$, vgl. $p = \Phi(t)$.

F8: C. Richtig für $P(A) = 0$, falsch für $P(A) > 0$.

F9: A. $s_{X,Y} = 0.5 \cdot 3 \cdot 10 = 15$, $\beta_1 = 15/9 \approx \underline{1.667}$.

F10: A. $RSS = (1 - 0.5^2) \cdot (30 - 1) \cdot 10^2 = \underline{2175}$.

F11: C. Gütefunktion ≤ 0.1 unter H_0 .

F12: B. $1 - g(3) \approx 1 - 0.55 = \underline{0.45}$.

F13: B.

F14: C. $\binom{6+10-1}{10} 0.5^6 0.5^{10} \approx \underline{0.0458}$

F15: D. Skizze.

F16: D. $1^3/3 + (7/4)(1.5 - 1) - (3/8)(1.5^2 - 1) \approx \underline{0.7396}$.

F17: C. $1^4/4 + (7/8)((7/3)^2 - 1^2) - (1/4)((7/3)^3 - 1^3) \approx \underline{1.213}$

F18: C. $x^3/3 = 0.2$, $x = \sqrt[3]{0.6} \approx \underline{0.843}$

F19: A. $t = \sqrt{20}(6.73 - 5)/3 \approx \underline{2.579}$.

F20: C. $p = 1 - \Phi(2.58) \approx 1 - 0.9951 = \underline{0.0049}$.

F21: A. $0.4 + 0.3 = \underline{0.7}$

F22: B. Skizze.

F23: D. $E(X) = 2$, $E(X^2) = 5$, $Var(X) = \underline{1}$.

F24: A. $0.4/1^2 + 0.3/2^2 + 0.2/3^2 + 0.1/4^2 \approx \underline{0.5034}$.

F25: D. $T_n \rightarrow 1/\mu = \lambda$, $S_n \rightarrow 1/\mu = \lambda$.

F26: B. $P(X < \log(1)) = \Phi((0 - 1)/\sqrt{2}) \approx 1 - \Phi(0.71) \approx \underline{0.2389}$.

F27: A. $E((1 + \sqrt{2}Z)^3) = 1^3 + 3 \cdot 1 \cdot 2E(Z^2) = \underline{7}$.

F28: B.

F29: A. $(-1.0204 - (-0.5))/0.5397 \approx \underline{-0.9642}$.

F30: B. $4.3131 + 2.9768 \cdot 13.1447 \approx \underline{43.44}$

F31: C. $218913/292326 \approx \underline{0.749}$.

F32: C.

F33: C. $\sqrt{6} \cdot 30 \approx \underline{73.48}$.

F34: B. $X_i \sim N(190, 30^2)$, $Y_j \sim N(150, 25^2)$, $\sum_{i=1}^6 X_i > \sum_{j=1}^7 Y_j > 0$ g.d.w. $Z = \sum_{j=1}^7 Y_j - \sum_{i=1}^6 X_i < 0$, $Z \sim N(-90, 9775)$, $P(Z < 0) = \Phi(90/\sqrt{9775}) \approx \Phi(0.91) \approx \underline{0.8186}$.

F35: D. $0.05 \cdot 0.98 + 0.95 \cdot 0.01 = \underline{0.0585}$.

F36: D. $0.05 \cdot 0.98/0.0585 \approx \underline{0.837}$.

F37: C. $0.4 + 0.7 - 0.9 = \underline{0.2}$.

F38: D. $0.2/0.7 \approx \underline{0.286}$.

F39: A.

F40: B. $\hat{s}_X^2 = 9.5^2 \cdot 44/45 \approx 88.,2444$, $\hat{s}_Y^2 = 8.9^2 \cdot 49/50 \approx 77.6258$,
 $t = (23.6 - 20.1)/\sqrt{88.2444/45 + 77.6258/50} \approx \underline{1.867}$.

F41: D. $4^2 \cdot (4/12) + 3^2 \cdot 2 \cdot 0.5 \cdot 0.5 \approx \underline{9.833}$.

F42: D. $195.3 + 2.0484 \cdot 9.3/\sqrt{30} \approx \underline{198.78}$.

F43: A. $29 \cdot 9.3^2/45.722 \approx \underline{54.86}$.

F44: A.

F45: A. $Cov(\bar{X}_n, X_i) = \dots = \sigma^2/n$. $Cov(\bar{X}_n + X_1, \bar{X}_n - X_2) = Var(\bar{X}_n) - Cov(X_n, X_2) + Cov(X_1, \bar{X}_n) - Cov(X_1, X_2) = \sigma^2/n > 0$.

F46: B. $\bar{Y}_n \rightarrow E(X_i I_{(-\infty, 3]}(X_i)) = \int_0^3 x(1/4)dx = (1/2)x^2|_0^3 \cdot (1/4) = 9/8 = \underline{1.125}$.

F47: B. $0.05 + 0.10 + 0.15 + 0.20 = \underline{0.50}$.

F48: B. $E(X) = 0.5$, $E(Y) = 2.1$, $E(X \cdot Y) = 1.2$, $Cov(X, Y) = \underline{0.15}$

F49: D. $E(Y|X = 1) = 2.4$, $E(Y^2|X = 1) = 7.8$, $Var(Y|X = 1) = \underline{2.04}$.

F50: C. $(84226 - 30 \cdot 53.33 \cdot 51.7)/(29 \cdot 10.32 \cdot 9.1) \approx \underline{0.555}$.

F51: A. $0.5\sqrt{27}(\ln(1.555/0.445) - \ln(1.3/0.7)) \approx \underline{1.64}$.

F52: C. $P(25 \leq S_{60} \leq 30) \approx \Phi((30 - 30)/\sqrt{15}) - \Phi((25 - 30)/\sqrt{15}) \approx \underline{0.4015}$.

F53: B. $\hat{\pi} = 0.0075$, $0.0075 + 1.96 \cdot \sqrt{0.0075 \cdot 0.9925/800} \approx \underline{0.0135}$.

F54: B. $0.0075 \cdot 0.9925(1.96/0.0025)^2 \approx \underline{4575.3}$.

F55: B. $\Phi((2-1)/\sqrt{5}) - \Phi((1-1)/\sqrt{5}) \approx \underline{\underline{0.1772}}$.

F56: D. $5 + 1^1 = \underline{\underline{6}}$

F57: B.

F58: C.

F59: B. $|25/100 - 30/90|/\sqrt{(1/4)(3/4)/100 + (1/3)(2/3)/90} \approx 0.0833/0.0659 \approx \underline{\underline{1.264}}$.

F60: A. $\Phi(-1.27) \approx \underline{\underline{0.102}}$