Lösungen zur Klausur vom 07.06.13

Disclaimer: Schreibfehler sind nicht auszuschließen.

A1: A.

A2: D. $\binom{30}{6} + \binom{6}{1}\binom{30}{5} \approx \underline{\underline{1.449 \cdot 10^6}}$.

A3: C. $\binom{7}{4}\binom{5}{3} \cdot 4 \cdot 6!/(12!/5!) = \underline{\underline{0.2525}}$.

A4: C.

A5: D. $P(A \cap B) = 0.2$, $P(A \setminus B) = 0.9 - 0.3 - 0.2 = \underline{\underline{0.4}}$.

A6: C. $P(A) = 1/2$, $P(B) = 1/6$, $P(A \cap B) = 1/12$.

A7: C. $1/2 + 1/6 - 1/12 \approx \underline{\underline{0.5833}}$.

A8: D. Formel totale Wkt: $0.93 \cdot 0.03 + 0.03 \cdot 0.97 = \underline{\underline{0.057}}$.

A9: A. Formel von Bayes: $0.02 \cdot 0.93/0.057 \approx \underline{\underline{0.4895}}$.

A10: C.

A11: C.

A12: D. $P(X = 3) = \underline{\underline{1/4}}$.

A13: C. $E(X) = \underline{\underline{2.2}}$.

A14: C. $2(0.2/1 + 0.5/2 + 0.2/3 + 0.1/4) = \underline{\underline{1.0833}}$.

A15: B. p=Preis, G=Gewinn. G=p-2, wenn beide Produkte einwandfrei, sonst -2.
$0.48 = E(G) = p \cdot 0.9^2 - 2 \implies p \approx \underline{\underline{3.0617}}$.

A16: B.

A17: A.

A18: A. $E(X) \approx 1.1111$, $E(X + 2) = E(X) + 2 \approx \underline{\underline{3.1111}}$.

A19: C. $E(X^2) \approx 1.5556$, $Var(X) \approx 0.3210$, $4 \cdot Var(X) = 4 \cdot 0.3210 = \underline{\underline{1.284}}$.

A20: B. $0.3 = P(2 - X \leq q) = 1 - F_X(2 - q)$, also $F_X(2 - q) = 0.7$.
Damit ist $2 - q = q_{0.7} = 1$, d.h. $q = \underline{\underline{1}}$.

A21: C. $E(X) = \mu = 1.5$. Ausmultiplizieren liefert ... $Var(Y) + 4 \cdot \mu^2 = \underline{\underline{11}}$.

A22: D. Wahrscheinlichkeit, beim zweimaligen Würfeln mindestens eine ‚6' zu werfen: 11/36.
$Y \sim B(10, 11/36)$, $P(Y \geq 2) = 1 - P(Y = 0) - P(Y = 1) \approx \underline{\underline{0.8592}}$.

A23: B. $X \sim B(10, 1/6)$, $Var(X) = 10 \cdot (1/6) \cdot (5/6) \approx \underline{\underline{1.3889}}$.

A24: D. $P(X \geq 2) = 1 - P(X = 0) - P(X = 1) \approx \underline{\underline{0.8001}}$.

A25: A.

A26: D. $Var(X) + Var(Y) = (2+1)^2/12 + 1/1.1^2 \approx \underline{\underline{1.576}}$.

A27: A. $F_Y(1.5) - F_Y(-0.1) = (1 - e^{-1.1 \cdot 1.5}) - 0 \approx \underline{\underline{0.8079}}$.

A28: A. $G \sim N(10 \cdot 52, 10 \cdot 5^2)$, $P(G > 530) \approx 0.2643$.

A29: D. $\bar{G}_n \sim N(\mu, 2^2/n)$, also $P(|\bar{G}_n - \mu| \leq 0.5) = 2\Phi(\sqrt{n} \cdot 0.25) - 1 = 0.9876$ nach n umstellen. Daraus folgt $n \approx \underline{\underline{100}}$.

A30: B. 0.25.

A31: C. $0.15 + 0.2 + 0.25 = \underline{\underline{0.6}}$.

A32: B. $E(Y|X=2) = \underline{\underline{2.0909}}$

A33: D. $E(X_i Y_i) = E(X_i)E(Y_i) = (1/2) \cdot (1/2) = \underline{\underline{0.25}}$.

A34: D. $S = \sum_{i=1}^{n} X_i$ Tagesfördermenge, $E(X_i) = 3$, $Var(X_i) = 1$, $\mu = E(S) = 100 \cdot 3$, $\sigma^2 = Var(S) = 100 \cdot 1^2$, $P(S \leq 295) \approx \Phi((295 - \mu)/\sigma) \approx \underline{\underline{0.3085}}$.

A35: D. $\hat{\pi} = 434/760 \approx \underline{\underline{0.5711}}$.

A36: A. $g_u \approx 0.5711 - 1.64\sqrt{0.5711 \cdot 0.4289/760} \approx \underline{\underline{0.5417}}$.

A37: A. $0.3 \cdot 0.7 \cdot (2.6/0.03)^2 \approx \underline{\underline{1577.3}}$.

A38: C.

A39: B.

A40: B. $\mu = E(X_i) = 3\theta/2 \implies c = 2/3 \approx \underline{\underline{0.6667}}$.

A41: D. $\bar{x} = 10$, $(n-1)s^2 = 2.5$, $q_{4,0.025} = 0.4844$, $g_o = 2.5/0.4844 \approx \underline{\underline{5.161}}$.

A42: B. $\bar{x} = 81.5$, $s^2 = 4.5$, $t_{9,0.975} \approx 2.2622$, $g_o \approx 81.5 + 2.2622 \cdot \sqrt{4.5/10} \approx \underline{\underline{83.018}}$.

A43: B.

A44: A. 0.0375 gehört zu H_0.

A45: D. $1 - \Phi(t) \approx 1 - \Phi(1.79) \approx \underline{\underline{0.0367}}$.

A46: B.

A47: D. $g(0.5) \approx 0.4$, $1 - g(0.5) \approx \underline{\underline{0.6}}$.

A48: C. $H_1 : \mu > 65$.

A49: A. $t = \sqrt{4} \cdot (67.025 - 65)/\sqrt{9.2625} \approx \underline{\underline{1.3307}}$.

A50: A.

A51: C. $\pi_0 = 1/5$, $n = 70$, $x > n \cdot \pi_0 + z_{1-\alpha}\sqrt{n\pi_0(1-\pi_0)} \approx \underline{\underline{20.56}}$.

A52: C.

A53: B. $(152.3 - 148.6 - 2)/\sqrt{36/100 + 25/120} \approx \underline{\underline{2.255}}$.

A54: C. 11.111.

A55: C. 4.6052.

A56: B. $s_{xy} = -7.32$, $s_x^2 \approx 3.8667$, $\hat{\beta} \approx \underline{\underline{3.8667}}$.

A57: D. $s_y^2 \approx 14.3867$, $R^2 \approx 0.9632$.

A58: C. 89.4159.

A59: B. $(1.0405 - 0.8)/0.3122 \approx \underline{\underline{0.7703}}$.

A60: B. $s_x^2 = R^2 \cdot s_y^2/\hat{\beta}^2 \approx 0.6493 \cdot 62.5313/1.0405^2 \approx \underline{\underline{37.5023}}$.