Lösungen zur Klausur vom 27.08.12

Disclaimer: Schreibfehler sind nicht auszuschließen.

A1: B: $\binom{4}{2}\binom{4}{2}\binom{24}{6} = 4.845$ Mill.

A2: C: $\binom{6}{1}\binom{7}{2}5!/6^7 = 0.054$.

A3: C.

A4: D: $P(B) = 15/36 \approx 0.4167$

A5: A: $P(A) = 27/36$, $P(A \cap B) = 9/36$ (‚Abzählen').

A6: A: Definition anwenden.

A7: C: $B \subset A$.

A8: C: $0.75 \cdot 0.2 + 0.25 \cdot 0.05 = 0.1625$.

A9: B: $1 - 0.8^{15} \cdot 0.9^5 = 0.973$.

A10: D: 0.3+0.2+0.4=0.9.

A11: A: $(-1) \cdot 0.1 + 1 \cdot 0.3 + 1.5 \cdot 0.2 + 2 \cdot 0.4 = 1.3$.

A12: A. $F(1) = 0.1 + 0.3 = 0.4$.

A13: D: $p = P(X = 1)$, $p + 2 \cdot 0.1 + 3 \cdot 0.3 = 1.55$, $p = 0.45$.

A14: B:

A15: C: $\int_0^{0.9} x^2 dx = \frac{1}{3}x^3|_0^{0.9} = 0.243$.

A16: B: $\int x^3 f(x) dx = \int_0^1 x^5 dx + \frac{2}{3}\int_2^3 x^3 dx = \cdots = 11$.

A17: A: $P(X > 8) = \int_8^{10} f(x) dx = \cdots = 0.4$, $P(X < 7) = \cdots = 0.267$.

A18: D: $\int_5^{10} x f(x) dx = \frac{2}{15}(\frac{1}{3}x^3 - \frac{5}{2}x^2)|_5^8 + ... = 7.667$.

A19: B.

A20: C.

A21: A: $X \sim B(6, 1/3)$, $P(X = 2) + P(X = 3) = \cdots = 0.5486$.

A22: A: $15 \cdot 0.2 + 5 \cdot 0.05 = 3.25$.

A23: B: $X \sim Po(3.25)$ (Summe von Poisson-verteilten ZV ist Poisson-verteilt).
$P(X \geq 2) = 1 - P(X \leq 1) = 1 - e^{-3.25}(1 + 3.25) = 0.835$.

A24: A:

A25: B: $X \sim N(\mu, 0.4^2)$, $P(X > \mu + 0.75) = 1 - \Phi(0.75/0.4) \approx 0.0301$.

A26: C: $1 + 2 \cdot \frac{1}{2} + 1 \cdot 3 = 5$.

A27: D: $E(Y(Y-X)) = Var(Y) + (E(Y))^2 - E(X)E(Y) = 4.5$.

A28: A: $P(X \cdot Y = 1) = P(X = 2, Y = 0.5) = 0.42$.

A29: B.

A30: D.

A31: B: $15/36 \approx 0.4167$.

A32: A: $\int_0^{0.3} \int_0^{0.6} f(x,y)dydx = 0.150$.

A33: B: $\int_0^{0.3} \int_0^{0.6} x \cdot f(x,y)dydx \approx 0.5333$.

A34: C: $X \sim B(120, 1/6)$, $P(18 \leq X \leq 25) = \cdots \approx 0.640$.

A35: B: $E(Y_i) = P(X_i > 2) = e^{-2 \cdot 0.6} = 0.301$.

A36: A.

A37: B.

A38: C: $E(X) = \int_0^1 x^2 dx + \frac{1}{2} \int_\theta^{\theta+1} x dx = \frac{1}{2}\theta + \frac{7}{12}$, $\theta = 2\mu - 7/6$.

A39: B: $\bar{x} + 1.7291 \cdot \sqrt{80/20} = 203.458$.

A40: C: $2 \cdot 1.6 \cdot 0.5/\sqrt{400} = 0.08$.

A41: C: $135/300 = 0.45$.

A42: A: $0.45 + 1.64\sqrt{0.45 \cdot 0.55/300} = 0.4971$.

A43: A: θ_0 zu H_0, $92/100 = 0.92$ richtig.

A44: C: $2(1 - \Phi(|2.17|)) = 0.0292$.

A45: C: $\pi_0 = 0.1$, $X \sim B(64, 0.2)$, Lieferung annehmen: $P((X - n\pi_0)/\sqrt{n\pi_0(1-\pi_0)} \leq z_{1-\alpha}) = P(X \leq 11.2) \approx \Phi(-0.41) = 0.3409$ Lieferung ablehnen: $1 - 0.3409 = 0.6591$.

A46: D: $t = \sqrt{10} \cdot (1.015 - 1)/\sqrt{0.0003833} \approx 2.433$.

A47: A.

A48: B: $0.3406^2 = 0.116$.

A49: B: $t_{17,0.95} = 1.7396$.

A50: A.

A51: D: $t = (55 - 140 \cdot 0.3)/\sqrt{140 \cdot 0.3 \cdot 0.7} = 2.398$.

A52: C: $z_{0.98} = 2.05$.

A53: D:

A54: B: $s_p \approx 0.2031$, $t = (4.928 - 4.444)/(0.2031 \cdot \sqrt{2/10}) \approx 2.025$.

A55: B: $t_{18,0.95} = 1.7341$.

A56: C: $Z = X - Y \sim N(1, 3.25)$, $4 + 2.25 - 2 \cdot 0.5 \cdot 2 \cdot 1.5 = 3.25$, $P(Z > 0) = 1 - \Phi(-1/\sqrt{3.25}) = \Phi(0.55) = 0.7088$.

A57: D: $E(S_n^2) = \sigma^2$, $E(\sum_i (X_i - \bar{X}_n)^2) = (n-1)\sigma^2$,

A58: B: $7.7 + 1.7823 \cdot 4.7 = 16.08$.

A59: B:

A60: A.