1.

MENU → 6 → 2 → AC → OPTN → 3

a) $b_0 = 18.58$ $\quad r = 0.49$ $\quad \Sigma x = 737$ $\quad \Sigma y = 658$

$b_1 = 0.67$ $\quad \Sigma x^2 = 62477$ $\quad \Sigma y^2 = 51980$

$\hat{y} = b_0 + b_1 x$ $\quad \Sigma xy = 55298$

$S_{xx} = 2124.89$

b) $r^2 = 417.82$ $\quad S_{yy} = 3872.89$ $\quad S_{xy} = 1415.11$

c) Intervali pouzdanosti

Za β_0

$\text{inte na} - < \beta_0 < B_0 + t_{0.025} \cdot n\sqrt{\Sigma x^2 / n S_{xx}}$ $\quad V = n-2$

Za β_1

$B_1 - . < \beta_1 < B_1 + t_{0.025} \cdot n \sqrt{\frac{1}{S_{xx}}}$ $\quad V = n-2$

d) Interval pouzdanosti za srednju vr. $\mu_{Y|85}$

$- < \mu_{Y|85} < \hat{Y}(za\ x=85) \cdot t_{0.025} \cdot n \cdot \sqrt{\frac{1}{n} + \frac{(85-\bar{x})^2}{S_{xx}}}$

2.

$X_1 = X$	0	1	2	3	4	5	6
$X_2 = X^2$	0	1	4	9	16	25	36
Y	1	4	5	3	2	3	4

a)

$\hat{y} = b_0 + b_1 x + b_2 x^2$

može u kalk. isto kao prije

$b_0 = 2,238$

$b_1 = 0.714$

$b_2 = -0.095$

b)

$A = X^T X$

$$A = \begin{bmatrix} 7 & 21 & 91 \\ 21 & 91 & 441 \\ 91 & 441 & 2275 \end{bmatrix}$$

$$X = \begin{bmatrix} 1 & 0 & 0 \\ 1 & 1 & 1 \\ 1 & 2 & 4 \\ 1 & 3 & 9 \\ 1 & 4 & 16 \\ 1 & 5 & 25 \\ 1 & 6 & 36 \end{bmatrix}$$

$$X^T = \begin{bmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 0 & 1 & 2 & 3 & 4 & 5 & 6 \\ 0 & 1 & 4 & 9 & 16 & 25 & 36 \end{bmatrix}$$

$$X_0 = \begin{bmatrix} 1 \\ 2 \\ 4 \end{bmatrix}$$

$X_0^T = [1 \; 2 \; 4]$

$$A^{-1} = \begin{bmatrix} 0.7511 & -0.464 & 0.0595 \\ -0.464 & 0.4642 & -0.071 \\ 0.0595 & -0.071 & 0.0119 \end{bmatrix}$$

$\mu_{Y|2} < \hat{Y} + S\sqrt{X^T A \, X_0}$

može se u kalk

3.

ANOVA

a) $\alpha = 0.05$

$SSA = n \sum_{i=1}^{k} (\bar{Y}_i - \bar{Y})^2$

$= 1.33458 \cdot 4 = 5.33832$

$SSE = \sum_{i=1}^{k} \sum_{j=1}^{n} (Y_{ij} - \bar{Y}_i)^2$

$= 2.46 + 8.1275 + 11.3075 + 21.65 + 9.4675 + 7.9875 = 63$

$\bar{Y} = 17.792$

$\bar{Y}_1 = 17.2$

$\bar{Y}_2 = 17.175$

$\bar{Y}_3 = 18.175$

$\bar{Y}_4 = 17.75$

$\bar{Y}_5 = 18.425$

$\bar{Y}_6 = 18.025$

$\sigma_1^2 = \frac{SSA}{k-1} = 1.0677$

$\sigma_2^2 = \frac{SSE}{60} = 3.5$

$f = \frac{\sigma_1^2}{\sigma_2^2} = 0.305$

kritična vr. za $\alpha = 0.05$

$v_1 = 5$

$v_2 = 18$

$f_{0.05} = 2.7729$

$f < f_{0.05} \Rightarrow$ ne zavračamo H_0

H_0: $\mu_1 = \mu_2 = \dots = \mu_6$

H_1: Vsaj ena je različna

3. b)

Pretpostavke za ANOVU

→ normalnost podataka

→ homogenost varijance

→ nezavisnost grupa

4.

a) upareni podaci ⇒ Wilcoxon Signed-Rank

$H_0: \tilde{\mu}_1 - \tilde{\mu}_2 = 0$

$H_1: \tilde{\mu}_1 - \tilde{\mu}_2 \neq 0$

$\alpha = 0.05$

*odbacujemo ne rankovi bez obzira na -

$d_i - d_0$	4	-2	9	~~0~~	3	5	7	-3	2	-1	-3	15
Rank	7	2.5	10	/	5	8	9	5	2.5	1	5	11

n = 11 nakon micanja

$w_+ = 52.5$

$w_- = 13.5$

$w = w_- = 13.5$

Kritično područje

$w \leq 11$

⇒ Ne odbacujemo H_0

b) Za testiranje jednakosti parametara iz različitih populacija ⇒ Wilcoxon Rank-Sum

c) 1) Ako su zadovoljene pretpostavke (npr. t-testa) on će biti točniji od neparametarskog.

5. $\pi(p) = 1 \ , \ 0 < p < 1$

a) aposteriorna distribucija

$$\pi(p|X) = \frac{f(X|p)\pi(p)}{g(X)}$$

uzorak = {G, P, P} (X – sl. var koja broji broj glava, X = 1)

$$f(X|p) = \binom{3}{x} p^x q^{3-x} \ , \ x = 0, 1, 2, 3$$

, odnosno

$$f(1|p) = \binom{3}{x} p \cdot (1-p)^2$$

$$g(x) = \int_0^1 f(1|p)dp = \binom{3}{x}\int_0^1 p(1-2p+p^2)dp = \binom{3}{x}\int_0^1 (p-2p^2+p^3)dp$$

$$= \binom{3}{x} \cdot \left(\frac{p^2}{2}\Big|_0^1 - 2 \cdot \left(\frac{p^3}{3}\right)\Big|_0^1 + \frac{p^4}{4}\Big|_0^1 \right)$$

$$= \binom{3}{x}\left(\frac{1}{2} - \frac{2}{3} + \frac{1}{4}\right)$$

Tj. za $x = 1$

$$g(1) = \binom{3}{1}\left(\frac{1}{2} - \frac{2}{3} + \frac{1}{4}\right) = \frac{1}{4}$$

$$\pi(p|1) = \frac{3p(1-p)^2 \cdot 1}{1/4} \ , \ 0 < p < 1$$

$$E(\pi(p|1)) = 12\int_0^1 p(1-p)^2 \cdot p\,dp = 12 \cdot \frac{1}{30} = \boxed{\frac{2}{5}}$$

b) $\hat{p} = \frac{1}{3}$

c) 95% smo sigurni da je p bio unutar granica intervala (s obzirom na podatke koje imamo)