

**MATEMATIKA I - KOLOKVIJ #1:**

**PRAVILA** Studentima koji posjeduju mobitel treba biti ugašen. Studentima na ispitu nisu dopuštene nikakve formule. Nikakvo posuđivanje pribora nije dopušteno. U vrijeme trajanja ispita studenti ne mogu izlaziti van bez predaje ispita. Na snazi je Pravilnik o stegovnoj odgovornosti studenata.

**TRAJANJE: 45 MINUTA. PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod. U pitanjima s višestrukim ponuđenim odgovorima može biti više tačnih.

**IME I PREZIME:** IVAN KOVAČEVIĆ

**BROJ INDEKSA:**

**VRIJEME POČETKA:**

**VRIJEME ZAVRŠETKA:**

10:57

POPUNJAVA  
NASTAVNIK  
Broj ↓  
bodova

Ukupno:

7

1. Po definici funkcija se sastoji od:

- (a) grafa
- (b) domene
- (c) kodomene
- (d) inverza
- (e) slike
- (f) pravila
- (g) ništa od navedenog

2. Rang matrice ne može biti manji od:

- (a) broja stupaca
- (b) broja redaka
- (c) ništa od navedenog

$R = 3$  MOŽE BITI  
MANJI OD BROJA REDAKA  
I OD BROJA STUPACA

3. Zaokružiti sve neparne funkcije: kvadratna, kubna, drugi korijen, treći korijen, eksponencijalna, logaritamska, sinus, arkus sinus, kosinus, arkus kosinus, tangens, arkus tangens.

4. Grafički odrediti rješenja nejednadžbe:  $\ln(x-1) < \arccos x$

1  
5

$\ln(x-1) < \arccos x$

$f_1(x) = \ln(x-1)$

UVJET JE:  $\ln(x) > 0$

$(x-1) \neq 0$   
 $x \neq 1$

$D_{f_1} < 1, +\infty$

x	-1	-0,5	0	0,5	1	2	3	4	5										
$f_1(x)$	/	/	/	/	/	0	0,6	1,1	1,3										

$f_2(x) = \arccos x$

	1,1	1,5	1,7
	-2,3	-0,6	0,3

UVJET JE:  $\arccos x \rightarrow$

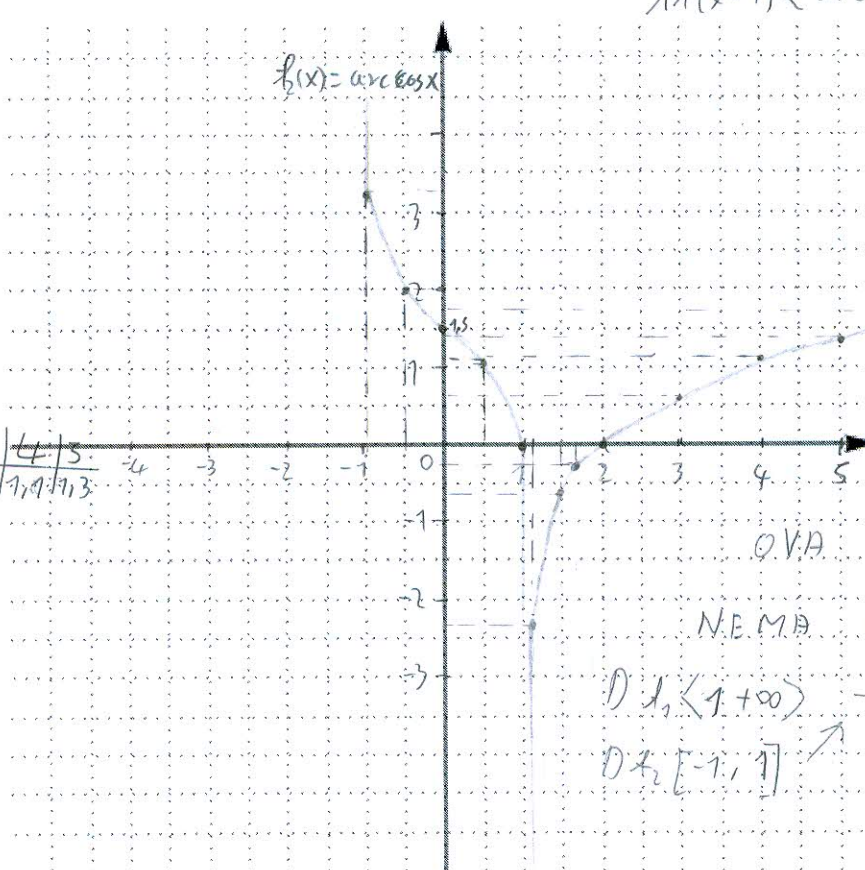
na osi x postoji

samo  $[-1, 1]$

$D_{f_2} [-1, 1]$

x	-1	-0,5	0	0,5	1	2
$f_2(x)$	3,14	2,0	1,5	1,04	0	/

$f_2(x) = \arccos x$



$\ln(x-1) < \arccos x$

$-2,30 < /$

$f_1(x) \ln(x-1)$

NEJEDNADŽBA  
FUNKCIJA

NEMA RIJEŠENJA ✓

$D_{f_1} < 1, +\infty \rightarrow$  NEMA  
 $D_{f_2} [-1, 1] \rightarrow$  NITI JEDNOG  
REALNOG  
BROJA ZA

KOJEG VRIJEDI ✓

$\ln(x-1) < \arccos x$

5. Riješiti u skupu realnih brojeva:  $e^{\sqrt{x}} = 0.7$

6

$$e^{\sqrt{x}} = 0.7$$

$$f_1(x) = e^{\sqrt{x}}$$

Pod korijenom nesmije biti  $\rightarrow$   ~~$x$~~   $f_2(x) = 0.7$

$$x \geq 0$$

$$e^{\sqrt{x}} = 0.7$$

$$\sqrt{x} = \frac{1}{x}$$

$$e^{\sqrt{x}} = 0.7 \quad | \ln$$

$$\sqrt{x} = \ln(0.7) = -0.36$$

-0.36 NIJE u SLICUOD  $\sqrt{\quad}$ .

$\Rightarrow$  NEMA RJEŠENJA

6. Riješiti jednačbu u kompleksnim brojevima:  $z^3 + i = \overline{2+i}$ .

$$z^3 + i = \overline{2+i}$$

$$z^3 + i = 2 - i$$

$$z^3 = 2 - i - i$$

$$z^3 = 2$$

$$z = \sqrt[3]{2} \rightarrow w$$

$$z = x + yi$$

$$x = 2$$

$$y = 0$$

$$\rho = \tan \frac{y}{x}$$

$$\rho = 0$$

$$r = \sqrt{x^2 + y^2}$$

$$r = \sqrt{4}$$

$$k = 2$$

$$w = r \cdot (\cos \rho + i \sin \rho)$$

$$z = \sqrt[3]{r} \cdot (\cos \frac{\rho}{3} + i \sin \frac{\rho}{3})$$

$$k_1 = 0$$

$$z_1 = \sqrt[3]{r} \left( \cos \frac{0-2 \cdot 0 \cdot \pi}{3} + i \sin \frac{0-2 \cdot 0 \cdot \pi}{3} \right) = 1.25 \cdot (1 + i0) = 1.25$$

$$k_2 = 1$$

$$z_2 = \sqrt[3]{r} \left( \cos \frac{0-2 \cdot 1 \cdot \pi}{3} + i \sin \frac{0-2 \cdot 1 \cdot \pi}{3} \right) = 1.25 \cdot (-0.5 - i0.85) = -0.625 - i1.06$$

$$k_3 = 2$$

$$z_3 = \sqrt[3]{r} \left( \cos \frac{0-2 \cdot 2 \cdot \pi}{3} + i \sin \frac{0-2 \cdot 2 \cdot \pi}{3} \right) = 1.25 \cdot (-0.5 + i0.86) = -0.625 + i1.07$$

$$z_1 \rightarrow x = 1.25$$

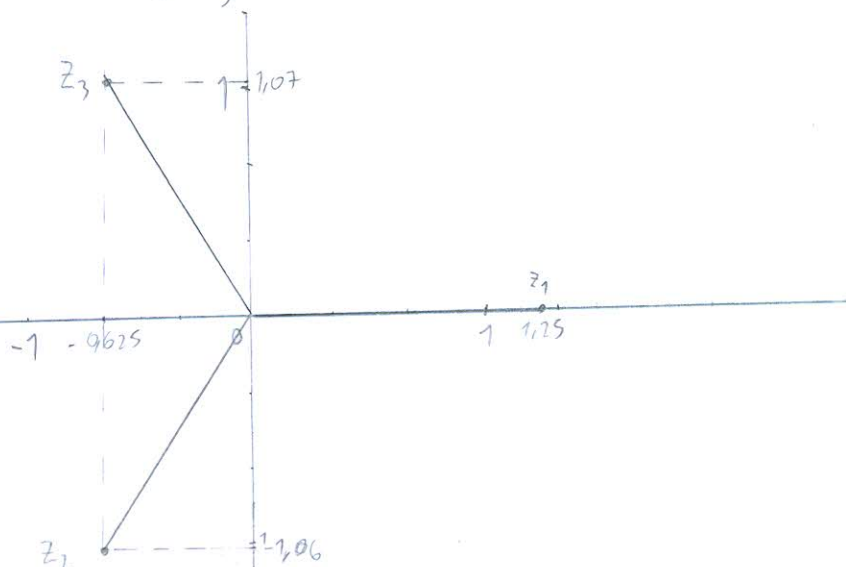
$$y = 0$$

$$z_2 \rightarrow x = -0.625$$

$$y = -1.06$$

$$z_3 \rightarrow x = -0.625$$

$$y = 1.07$$



7. Gaussovom metodom riješi sustav linearnih jednačnji:

$$\begin{aligned} \frac{5}{2}x + y - 7z - 7u &= 5 \\ 5x + 4y + 5u &= 5 \\ -2y + 5z + 7u &= 0 \\ -7x - 3y - 7u &= -7 \end{aligned}$$

$$\left[ \begin{array}{cccc|c} \frac{5}{2} & 1 & -7 & -7 & 5 \\ 5 & 4 & 0 & 5 & 5 \\ 0 & -2 & 5 & 7 & 0 \\ -7 & -3 & 0 & -7 & -7 \end{array} \right] \cdot \frac{2}{5}$$

$$\left[ \begin{array}{cccc|c} 1 & \frac{2}{5} & -\frac{7}{5} & -\frac{7}{5} & 2 \\ 5 & 4 & 0 & 5 & 5 \\ 0 & -2 & 5 & 7 & 0 \\ -7 & -3 & 0 & -7 & -7 \end{array} \right] \begin{array}{l} \text{II} - 5\text{I} \\ \text{IV} + 7\text{I} \end{array}$$

$$\left[ \begin{array}{cccc|c} 1 & \frac{2}{5} & -\frac{7}{5} & -\frac{7}{5} & 2 \\ 0 & 2 & 14 & 19 & -5 \\ 0 & -2 & 5 & 7 & 0 \\ 0 & -\frac{1}{5} & -\frac{98}{5} & -\frac{133}{5} & 7 \end{array} \right] \cdot \frac{1}{2}$$

$$\left[ \begin{array}{cccc|c} 1 & \frac{2}{5} & -\frac{7}{5} & -\frac{7}{5} & 2 \\ 0 & 1 & 7 & \frac{19}{2} & -\frac{5}{2} \\ 0 & -2 & 5 & 7 & 0 \\ 0 & -\frac{1}{5} & -\frac{98}{5} & -\frac{133}{5} & 7 \end{array} \right] \begin{array}{l} \text{I} - \frac{2}{5}\text{II} \\ \text{III} + 2\text{II} \\ \text{IV} + \frac{1}{5}\text{II} \end{array}$$

$$\left[ \begin{array}{cccc|c} 1 & 0 & -\frac{28}{5} & -\frac{33}{5} & 3 \\ 0 & 1 & 7 & \frac{19}{2} & -\frac{5}{2} \\ 0 & 0 & 15 & 26 & -5 \\ 0 & 0 & -\frac{91}{5} & -\frac{247}{10} & \frac{13}{2} \end{array} \right] \cdot \frac{1}{15}$$

$$\left[ \begin{array}{cccc|c} 1 & 0 & -\frac{28}{5} & -\frac{33}{5} & 3 \\ 0 & 1 & 7 & \frac{19}{2} & -\frac{5}{2} \\ 0 & 0 & 1 & \frac{26}{15} & -\frac{1}{3} \\ 0 & 0 & -\frac{91}{5} & -\frac{247}{10} & \frac{13}{2} \end{array} \right]$$

$$\text{I} + \frac{28}{5}\text{III}$$

$$\text{II} + 7\text{III}$$

$$\text{IV} + \frac{91}{5}\text{III}$$

$$\left[ \begin{array}{cccc|c} 1 & 0 & 0 & \frac{233}{75} & \frac{17}{75} \\ 0 & 1 & 0 & \frac{2881}{150} & -\frac{43}{75} \\ 0 & 0 & 1 & \frac{26}{75} & -\frac{1}{3} \\ 0 & 0 & 0 & \frac{1027}{150} & \frac{624}{5} \end{array} \right] \cdot \frac{150}{1027}$$

$$\left[ \begin{array}{cccc|c} 1 & 0 & 0 & \frac{233}{75} & \frac{17}{75} \\ 0 & 1 & 0 & \frac{2881}{150} & -\frac{43}{75} \\ 0 & 0 & 1 & \frac{26}{75} & -\frac{1}{3} \\ 0 & 0 & 0 & 1 & \frac{17440}{79} \end{array} \right] \begin{array}{l} \text{I} - \frac{233}{75}\text{IV} \\ \text{II} - \frac{2881}{150}\text{IV} \\ \text{III} - \frac{26}{75}\text{IV} \end{array}$$

$$\left[ \begin{array}{cccc|c} 1 & 0 & 0 & 0 & -55,494 \\ 0 & 1 & 0 & 0 & -13,9473 \\ 0 & 0 & 1 & 0 & -7,567 \\ 0 & 0 & 0 & 1 & \frac{237}{79} \end{array} \right] \times$$

PROVJERA?

*Ako vam nedostaje mjesta za neki zadatak slobodno nastavite pisati ovdje (samo istaknite broj zadatka)...*

