Popuniti odmah!

Ime i prezime: ANTONIO PERINIĆ **Broj indeksa:** 17-2-0116-204

Datum: 21.2.2012. Vrijeme: od do

MATEMATIKA 1: Trajanje 120 minuta. Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata.

5

Broj ↓ bodova

1. Izračunati inverz dane matrice (ako postoji) i provjeriti matričnim množenjem da je inverz dobro izračunat. 15+5

$$A = \begin{bmatrix} 0 & 1 & 0 & -1 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ -1 & 0 & 1 & 0 \end{bmatrix}$$

2. Ako su z_1 i z_2 rjesenja kvadratne jednadzbe $z^2 - 2z + 2 = 0$, izracunati: $\overline{\left(\frac{z_1 - z_2}{z_2 - 2}\right)}$ i $Re\left(\overline{\left(\frac{z_2}{z_1}\right)}\right)$. 10+10

3. Zadana je funkcija $f(x) = e^{-x^2}$. Odrediti domenu, prvu derivaciju i sve asimptote funkcije. 5+5+5+5

4. Ispitati periodičnost, (ne)parnost i drugu derivaciju funkcije $g(x) = \arccos(3x)$. 5+5+10

5. Na temelju ispitivanja toka napraviti skicu grafa funkcije $h(x) = x - \frac{1}{x+1}$. 20

(2) $z^2 - 2z + 2 = 0$

$z_{1,2} = \frac{2 \pm \sqrt{4-8}}{2}$

$z_{1,2} = \frac{2 \pm \sqrt{-4}}{2}$

$z_1 = 1 + i$ ✓

$z_2 = 1 - i$ ✓

GDJE JE NESTALO KOMPL. KONJUG.

$\frac{z_1 - z_2}{z_2 - 2} = \frac{1+i-1-i}{1-i-2} =$

$= \frac{2i}{-1-i} \cdot \frac{-1+i}{-1+i} = \frac{-2i+2i^2}{1+i} = \frac{-2i-2}{2}$

$\frac{z_1 - z_2}{z_2 - 2} = \frac{-2i-2}{2}$ ✗

$Re = \left(\overline{\left(\frac{z_2}{z_1}\right)}\right)$

$Re = \frac{1-i}{1+i} \cdot \frac{1-i}{1-i}$

$Re = \left(\frac{1-i-i-1}{1+1}\right)$

$Re = \left(\frac{-2i}{2}\right) = 0$

$Re = X$ ✗

(3.) $f(x) = -e^{-x^2}$

$f(x) = e^{-x^2} \cdot (-2x)$

$f(x) = -2x e^{-2x}$ ✓

$D_f = \langle 0, +\infty \rangle$ $D_f \in \mathbb{R}$ ✗

VERTIKALNIH ASIMPTOTA NEMA JER JE $D_f \in \mathbb{R}$

HORIZONTALNE ASIMPTOTE: $f(x) = \text{cctan } 0$

(4.) $g(x) = \cos(3x)$ ✗

PARNOST:

$f(x) = -2\sin 3x \cdot 3$

$f'(x) = -3\sin 3x$

$f'(x) = -3\cos 3x \cdot 3$

$f''(x) = -9\cos(3x)$

$f(x) = f(-x)$

$\cos(3x) = \cos(-3x)$

FUNKCIJA JE PARNA.

NEPARNOST!

$f(x) = -f(x)$

$\cos(3x) = \cos(-3x)$

FUNKCIJA NIJE NEPARNA.

Popuniti odmah!

IME I PREZIME: Lucija Ivančić **BROJ INDEKSA:** 0237

DATUM: 21.2.2012. VRIJEME: OD 13:30h DO

MATEMATIKA 1: Trajanje 120 minuta. Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata.

	Broj bodova
1. Izračunati inverz dane matrice (ako postoji) i provjeriti matričnim množenjem da je inverz dobro izračunat. $$A = \begin{bmatrix} 0 & 1 & 0 & -1 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ -1 & 0 & 1 & 0 \end{bmatrix}$$	15+5
2. Ako su z_1 i z_2 rjesenja kvadratne jednadzbe $z^2 - 2z + 2 = 0$, izracunati: $\overline{\left(\frac{z_1 - z_2}{z_2 - 2}\right)}$ i $Re\left(\overline{\left(\frac{z_2}{z_1}\right)}\right)$.	10+10
3. Zadana je funkcija $f(x) = e^{-x^2}$. Odrediti domenu, prvu derivaciju i sve asimptote funkcije.	5+5+5+5
4. Ispitati periodičnost, (ne)parnost i drugu derivaciju funkcije $g(x) = \arccos(3x)$.	5+5+10
5. Na temelju ispitivanja toka napraviti skicu grafa funkcije $h(x) = x - \frac{1}{x+1}$.	20

(1.)

$$A = \begin{bmatrix} 0 & 1 & 0 & -1 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ -1 & 0 & 1 & 0 \end{bmatrix}$$

(4) $g(x) = \arccos(3x)$

- funkcija je: periodična (arccos) ✗
- (ne)parnost: $g(x) = \arccos(3 \cdot (-x))$
  $= -\arccos(3x)$

⇒ funkcija je neparna ✗

Popuniti odmah!

Ime i prezime: JASMIN NEKIĆ **Broj indeksa:** 17-1-0058-2011 (35)

Datum: 21.2.2012. Vrijeme: od 13:00 do .

MATEMATIKA 1: Trajanje 120 minuta. Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. 5

Broj ↓ bodova

1. Izračunati inverz dane matrice (ako postoji) i provjeriti matričnim množenjem da je inverz dobro izračunat. 15+5

$$A = \begin{bmatrix} 0 & 1 & 0 & -1 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ -1 & 0 & 1 & 0 \end{bmatrix}$$

2. Ako su z_1 i z_2 rjesenja kvadratne jednadzbe $z^2 - 2z + 2 = 0$, izracunati: $\overline{\left(\frac{z_1 - z_2}{z_2 - 2}\right)}$ i $Re\left(\overline{\left(\frac{z_2}{z_1}\right)}\right)$. 10+10

3. Zadana je funkcija $f(x) = e^{-x^2}$. Odrediti domenu, prvu derivaciju i sve asimptote funkcije. 5+5+5+5

4. Ispitati periodičnost, (ne)parnost i drugu derivaciju funkcije $g(x) = \arccos(3x)$. 5+5+10

5. Na temelju ispitivanja toka napraviti skicu grafa funkcije $h(x) = x - \frac{1}{x+1}$. 20

1.

$$\left[\begin{array}{cccc|cccc} 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 1 & 0 & 0 & 1 & 0 \\ -1 & 0 & 1 & 0 & 0 & 0 & 0 & 1 \end{array}\right] \overset{R_1 \leftrightarrow R_2}{\approx} \left[\begin{array}{cccc|cccc} 1 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 & 0 & 0 & 1 & 0 \\ -1 & 0 & 1 & 0 & 0 & 0 & 0 & 1 \end{array}\right] \overset{R_4+R_1}{\approx} \left[\begin{array}{cccc|cccc} 1 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 & 0 & 0 & 1 & 0 \\ 0 & 0 & 2 & 0 & 0 & 1 & 0 & 1 \end{array}\right] \overset{R_3-R_2}{\approx}$$

$$\left[\begin{array}{cccc|cccc} 1 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 2 & 0 & 0 & 1 & 0 & 1 \end{array}\right] \overset{R_4 \leftrightarrow R_3}{\approx} \left[\begin{array}{cccc|cccc} 1 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 2 & 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 2 & 0 & -1 & 1 & 0 \end{array}\right] \overset{:2}{\approx} \left[\begin{array}{cccc|cccc} 1 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 2 & 0 & -1 & 1 & 0 \end{array}\right] \overset{R_1-R_3}{\approx}$$

$$\left[\begin{array}{cccc|cccc} 1 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & -\frac{1}{2} \\ 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 2 & 0 & -1 & 1 & 0 \end{array}\right] \overset{:2}{\approx} \left[\begin{array}{cccc|cccc} 1 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & -\frac{1}{2} \\ 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 1 & 0 & -\frac{1}{2} & \frac{1}{2} & 0 \end{array}\right] \overset{R_2+R_4}{\approx} \left[\begin{array}{cccc|cccc} 1 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & -\frac{1}{2} \\ 0 & 1 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 1 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 1 & -\frac{1}{2} & 0 & \frac{1}{2} & 0 \end{array}\right] \checkmark$$

A^{-1}

$$\begin{bmatrix} 0 & 1 & 0 & -1 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ -1 & 0 & 1 & 0 \end{bmatrix} \cdot \begin{bmatrix} 0 & \frac{1}{2} & 0 & -\frac{1}{2} \\ \frac{1}{2} & 0 & \frac{1}{2} & 0 \\ 0 & \frac{1}{2} & 0 & \frac{1}{2} \\ -\frac{1}{2} & 0 & \frac{1}{2} & 0 \end{bmatrix}$$

$$\left|\begin{array}{c} 0+\frac{1}{2}+0+\frac{1}{2} \\ 0+0+0+0 \\ 0+\frac{1}{2}+0-\frac{1}{2} \\ 0+0+0+0 \end{array}\right| \begin{matrix} 1 \\ 0 \\ 0 \\ 0 \end{matrix} \qquad \left|\begin{array}{c} 0+0+0+0 \\ \frac{1}{2}+0+\frac{1}{2}+0 \\ 0+0+0+0 \\ -\frac{1}{2}+0+\frac{1}{2}+0 \end{array}\right| \begin{matrix} 0 \\ 1 \\ 0 \\ 0 \end{matrix} \qquad \left|\begin{array}{c} 0+\frac{1}{2}+0-\frac{1}{2} \\ 0+0+0+0 \\ 0+\frac{1}{2}+0+\frac{1}{2} \\ 0+0+0+0 \end{array}\right| \begin{matrix} 0 \\ 0 \\ 1 \\ 0 \end{matrix}$$

$$\left|\begin{array}{c} 0+0+0+0 \\ -\frac{1}{2}+0+\frac{1}{2}+0 \\ 0+0+0+0 \\ \frac{1}{2}+0+\frac{1}{2}+0 \end{array}\right| \begin{matrix} 0 \\ 0 \\ 0 \\ 1 \end{matrix} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \checkmark$$

2. $z^2 - 2z + 2 = 0$

$$z_{1,2} = \frac{2 \pm \sqrt{(-2)^2 - 4 \cdot 1 \cdot 2}}{2 \cdot 1}$$

$$z_{1,2} = \frac{2 \pm \sqrt{4 - 8}}{2}$$

$$z_{1,2} = \frac{2 \pm \sqrt{-4}}{2} \qquad i^2 = -1$$

$$z_{1,2} = \frac{2 \pm \sqrt{4 i^2}}{2}$$

$$z_{1,2} = \frac{2 \pm 2i}{2}$$

$$z_1 = \frac{2 + 2i}{2} \qquad z_2 = \frac{2 - 2i}{2}$$

$$= \frac{2}{2} + \frac{2i}{2} \qquad = \frac{2}{2} - \frac{2i}{2}$$

$$= 1 + i \qquad = 1 - i$$

$$\left(\frac{z_1 - z_2}{z_2 - 2} \right)$$

$$\left(\frac{(1+i) - (1-i)}{1 - i - 2} \right) =$$

$$= \left(\frac{1 + i - 1 + i}{-1 - i} \right)$$

$$= \left(\frac{2i}{-1 - i} \right) \cdot \frac{-1 + i}{-1 + i}$$

$$= \left(\frac{-2i + 2i^2}{1 - i + i - i^2} \right)$$

$$= \left(\frac{-2i - 2}{1 + 1} \right)$$

$$= -i + 1$$

✗

$$Re\left(\frac{z_2}{z_1} \right)$$

$$Re\left(\left(\frac{1 - i}{1 + i} \right) \cdot \frac{1 - i}{1 - i} \right)$$

$$Re\left(\left(\frac{1 - i - i + i^2}{1 - i + i - i^2} \right) \right)$$

$$Re\left(\left(\frac{1 - 2i - 1}{1 + 1} \right) \right)$$

$$Re\left(\left(\frac{-2i}{2} \right) \right)$$

$$Re(i) \qquad Re = 0$$ ✓

3. $f(x) = e^{-x^2}$

$$f'(x) = -2x\, e^{-x^2} \cdot e^{-x^2}$$

4. $g(x) = \arccos(3x)$

$\arccos(3x) = \arccos(3(x+p))$

$\arccos(3x) = \arccos(3x+3p)$

$3p = \pi$

$p = \frac{\pi}{3}$ ✗

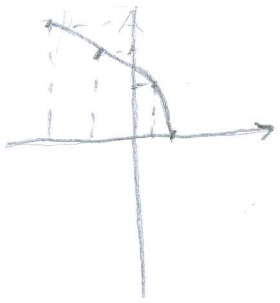
$g(x)' = -\frac{1}{\sqrt{1-(3x)}}$ ✗

$g(x)'' = \frac{0-\left(-\frac{1}{2\sqrt{1-3x}}\right)}{\left(\sqrt{1-3x}\right)^2} = \frac{\frac{1}{2\sqrt{1-3x}}}{1-3x}$

$g(x) \neq g(-x) = \arccos(-3x)$

$g(x) \neq -g(x) = -\arccos(3x)$

NIJE PARNA NI NEPARNA ✓

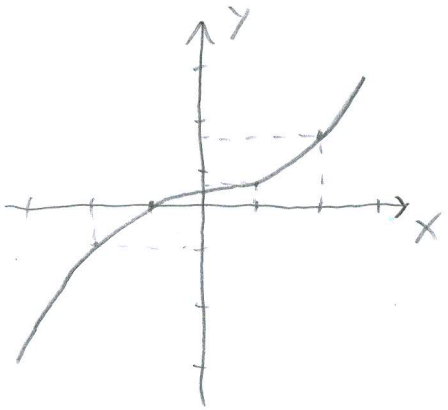


5. $h(x) = x - \frac{1}{x+1}$

$x+1 \neq 0$

$x \neq -1$

$D(h) = \langle -\infty, -1 \rangle \cup \langle -1, +\infty \rangle$ ✓



✗

$h'(x) = 1 - \frac{-1 \cdot 1}{(x+1)^2}$

$= 1 + \frac{1}{(x+1)^2}$

	$-\infty$	-2	-1	0	$+\infty$
$h'(x)$		$-$		$+$	
$h(x)$		↘		↗	

$\lim_{x \to -\infty} = x - \frac{1}{x+1} = -\infty - \frac{1}{-\infty+1} = -\infty - \infty = -\infty$ L. V. A.

$\lim_{x \to +\infty} = x - \frac{1}{x+1} = +\infty - \frac{1}{+\infty+1} = +\infty$ D. V. A.

$\lim_{x \to -1} = \frac{x^2+x-1}{x+1} = \frac{0}{0}$ ✗ $\lim_{x \to -1} = \frac{(x^2+x-1)'}{(x+1)'}$ $\lim_{x \to -1} = \frac{2x+1}{1} = \frac{2 \cdot (-1)+1}{1}$

$= -1$

TOČKA INFLEKSIJE

$\frac{x(x+1)}{x+1} - \frac{1}{x+1} = \frac{x^2+x}{x+1} - \frac{1}{x+1} = \frac{x^2+x-1}{x+1}$

Popuniti odmah!

IME I PREZIME: Josip Šimičev **BROJ INDEKSA:** 17-1-0101-204

DATUM: 21.2.2012. VRIJEME: OD 13:05 DO

MATEMATIKA 1: Trajanje 120 minuta. Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata.

25

5

Broj ↓ bodova

1. Izračunati inverz dane matrice (ako postoji) i provjeriti matričnim množenjem da je inverz dobro izračunat. 15+5

$$A = \begin{bmatrix} 0 & 1 & 0 & -1 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ -1 & 0 & 1 & 0 \end{bmatrix}$$

2. Ako su z_1 i z_2 rjesenja kvadratne jednadzbe $z^2 - 2z + 2 = 0$, izracunati: $\overline{\left(\frac{z_1 - z_2}{z_2 - 2}\right)}$ i $Re\left(\overline{\left(\frac{z_2}{z_1}\right)}\right)$. 10+10

3. Zadana je funkcija $f(x) = \mathrm{e}^{-x^2}$. Odrediti domenu, prvu derivaciju i sve asimptote funkcije. 5+5+5+5

4. Ispitati periodičnost, (ne)parnost i drugu derivaciju funkcije $g(x) = \arccos(3x)$. 5+5+10

5. Na temelju ispitivanja toka napraviti skicu grafa funkcije $h(x) = x - \frac{1}{x+1}$. 20

1.

$$A = \begin{bmatrix} 0 & 1 & 0 & -1 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ -1 & 0 & 1 & 0 \end{bmatrix} \sim \begin{bmatrix} 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 1 & 0 & 0 & 1 & 0 \\ -1 & 0 & 1 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} \sim$$

$$\begin{bmatrix} 1 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ -1 & 0 & 1 & 0 & 0 & 0 & 0 & 1 \\ 0 & 1 & 0 & 1 & 0 & 0 & 1 & 0 \end{bmatrix} \begin{matrix} \\ \\ 3+1\cdot 1 \\ \\ \end{matrix} \sim \begin{bmatrix} 1 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 2 & 0 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 1 & 0 & 0 & 1 & 0 \end{bmatrix} \begin{matrix} \\ \\ \\ 4-2 \end{matrix}$$

$$\begin{bmatrix} 1 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 2 & 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 2 & -1 & 0 & 1 & 0 \end{bmatrix} \begin{matrix} \\ \\ \cdot\frac{1}{2} \\ \cdot\frac{1}{2} \end{matrix} \sim \begin{bmatrix} 1 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 1 & -\frac{1}{2} & 0 & \frac{1}{2} & 0 \end{bmatrix} \begin{matrix} \\ \\ 1-3 \\ 2+4 \end{matrix} \sim \begin{bmatrix} 1 & 0 & 0 & 0 & \frac{1}{2} & 0 & -\frac{1}{2} & 0 \\ 0 & 1 & 0 & 0 & \frac{1}{2} & 1 & \frac{1}{2} & 0 \\ 0 & 0 & 1 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 1 & -\frac{1}{2} & 0 & \frac{1}{2} & 0 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 1 & 0 & -1 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ -1 & 0 & 1 & 0 \end{bmatrix} \cdot \begin{bmatrix} 0 & \frac{1}{2} & 0 & -\frac{1}{2} \\ \frac{1}{2} & 0 & \frac{1}{2} & 0 \\ 0 & \frac{1}{2} & 0 & \frac{1}{2} \\ -\frac{1}{2} & 0 & \frac{1}{2} & 0 \end{bmatrix} = \begin{bmatrix} 0+\frac{1}{2}+0+\frac{1}{2} & 0+0+0+0 & 0+\frac{1}{2}+0-\frac{1}{2} & 0+0+0+0 \\ 0+0+0+0 & \frac{1}{2}+0+\frac{1}{2}+0 & 0+0+0+0 & -\frac{1}{2}+0+\frac{1}{2}+0 \\ 0+\frac{1}{2}+0-\frac{1}{2} & 0+0+0+0 & 0+\frac{1}{2}+0+\frac{1}{2} & 0+0+0+0 \\ 0+0+0+0 & -\frac{1}{2}+0+\frac{1}{2}+0 & 0+0+0+0 & \frac{1}{2}+0+\frac{1}{2}+0 \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \checkmark$$

② $z^2 - 2z + 2 = 0$ $\left(\frac{z_1 - z_2}{z_2 - 2}\right)$, $2 \in \left(\frac{z_2}{z_1}\right)$

$z^2 - 2z + 2 = 0$

$z^2 - 2z + 2 = 0$

$z_{1,2} = \frac{2 \pm \sqrt{4 - 4 \cdot 1 \cdot 2}}{2 \cdot 1}$ = NEMA Rj

NEMA $z_1 ; z_2$

③ $f(x) = e^{-x^2}$

$e \neq 0$
$x \neq 1$
$D_f \langle 0, +\infty \rangle \setminus \{1\}$ ✗

$f'(x) = e^{-x^2} = e^{-x^2} \cdot (-x^2)'$
$= e^{-x^2} \cdot (-2x)$ // ✓

D.H.A.

$\lim_{x \to \infty} e^{-x^2} = \lim_{x \to \infty} e^{-\infty} = +\infty$

NEMA D.H.A ✗

L.H.A.

$\lim_{x \to -\infty} e^{-x^2} \Rightarrow \begin{matrix} x \to -x \\ -\infty \to +\infty \end{matrix} \Rightarrow \lim_{x \to \infty} e^{-(-x)^2} = \lim_{x \to \infty} e^{x^2} = e^{\infty} = +\infty$

NEMA L.H.A. ✗

V.A

$\lim_{x \to 0} e^{-x^2} = \lim_{x \to 0} e^{-0^2} = 1$ NEMA V.A. ✗

$\lim_{x \to 1} e^{-x^2} = \lim_{x \to 1} e^{-1^2} = 0.36$ NEMA V.A ✗

D.K.A.

$\lim_{x \to \infty} \frac{f(x)}{x} = \lim_{x \to \infty} \frac{e^{-x^2}}{x} = \left[\frac{\infty}{\infty}\right]$ NEMA ASIMPTOTA

L.K.A

$\lim_{x \to -\infty} \frac{e^{-x^2}}{x} \Rightarrow \begin{matrix} x \to -x \\ -\infty \to +\infty \end{matrix} \Rightarrow \lim_{x \to \infty} \frac{e^{-(-x)^2}}{-x} = \frac{e^{x^2}}{-x} = \left[\frac{\infty}{-\infty}\right]$

4) $g(x) = \arccos(3x)$

$$g'(x) = \arccos(3x) = \frac{1}{\sqrt{1-\sin 3x}} \cdot (3x)' = \frac{3}{\sqrt{1-\sin 3x}}$$ X

$$g''(x) = \frac{3}{\sqrt{1-\sin 3x}} \Rightarrow \frac{3 \cdot (\sqrt{1-\sin 3x})' - 3' \cdot (\sqrt{1-\sin 3x})}{(\sqrt{1-\sin 3x})}$$

$$= \frac{\frac{3}{2\sqrt{1-\sin 3x}} - 0}{(\sqrt{1-\sin 3x})^2} = \frac{3}{\frac{2\sqrt{1-\sin 3x}}{1-\sin 3x}}$$

$g(-x) = \arccos(-3x)$

$= -\arccos(3x)$

FUNKCIJA JE NERAZNA X

$-g(x) = -\arccos(3x)$ //

$$h(x) = x - \frac{1}{x+1}$$

$D(f)$ $D(f) \in \langle -\infty, -1] \cup [-1, +\infty \rangle$

$x+1 \geq 0$

$x \geq -1$

V.A.

$$\lim_{x \to -1} x - \frac{1}{x+1} = \lim_{x \to -1} -1 - \frac{1}{(-1)+1} = \infty \quad \text{V.A } x = -1$$

D.H.A

$$\lim_{x \to +\infty} x - \frac{1}{x+1} \overset{1:x}{=} \lim_{1:x \, x \to \infty} 1 - \frac{0}{1} = 1 \quad \text{D.H.A } y = 1$$

L.H.A

$$\lim_{x \to -\infty} x - \frac{1}{x+1} \Rightarrow \begin{matrix} x \to -x \\ -\infty \to +\infty \end{matrix} \Rightarrow \lim_{x \to \infty} -x - \frac{1}{-x+1} \overset{1:x}{\underset{1:x}{}} = -1 - \frac{0}{-1} = -1 \quad \text{L.H.A. } y = -1$$

$$h'(x) = x - \frac{1}{x+1} \Rightarrow x' - \frac{1 \cdot (x+1)' - 1' \cdot (x+1)}{(x+1)^2} = 1 - \frac{1}{(x+1)^2}$$

$$h'(x) = \frac{(x+1)^2 - 1}{(x+1)^2} = \frac{x^2 + 2x}{(x+1)^2}$$

$$h''(x) = \frac{(x^2+2x)\,(x+1)^{2\prime} - (x^2+2x)\,(x+1)^2}{\left((x+1)^2\right)^2} = \frac{(x^2+2x) \cdot 2x + 2 - (2x+2)(x+1)^2}{\left((x+1)^2\right)^2}$$

$$= \frac{(x^2+2x) \cdot 2(x+1) - (2x+2) \cdot (x+1)^2}{(x+1)^{4/3}} = \frac{2x^2 + 4x - 2x^2 - 2x - 2x + 2}{(x+1)^3}$$

$$= \frac{2}{(x+1)^3} \qquad \frac{2}{(x+1)^3} = 0 \,/\cdot (x+1)^3$$

$2 \neq 0$ nema x_3 i x_4

$$\frac{x^2+2x}{(x+1)^2} = 0 \,/\cdot (x+1)^2$$

$$x^2 + 2x = 0$$

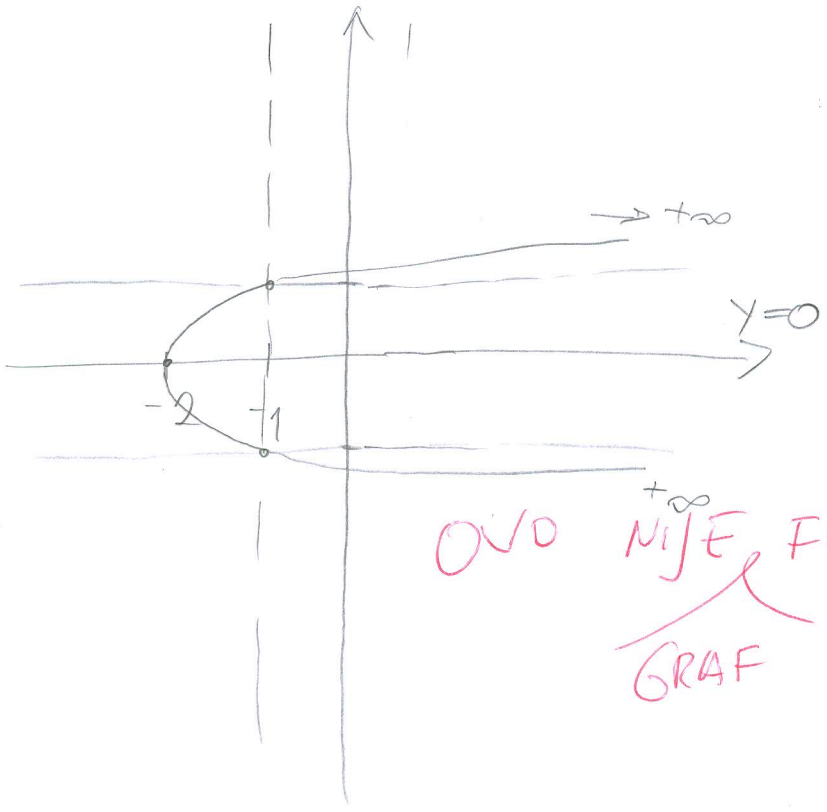
$$x^2 + 2x = 0$$

$$x_{1,2} = \frac{-2 \pm \sqrt{4 - 4 \cdot 1 \cdot 0}}{2} = \frac{-2 \pm \sqrt{4}}{2}$$

$$x_1 = \frac{-2+2}{2} = \frac{0}{2} = 0$$

$$x_2 = \frac{-2-2}{2} = \frac{-4}{2} = -2$$

	$-\infty$	-3	-2	-1	0	1	$+\infty$
$f'(x)$		$-$	N/D		$+$		
$f(x)$		$\searrow$			$\nearrow$		



OVO NIJE FUNKCIJA

GRAF

Popuniti odmah!

Ime i prezime: TONI UGLEŠIĆ **Broj indeksa:** 17-1-0065-2011

Datum: 21.2.2012. Vrijeme: od 13:00 do 15:00

MATEMATIKA 1: Trajanje 120 minuta. Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata.

5

Broj ↓ bodova

0

1. Izračunati inverz dane matrice (ako postoji) i provjeriti matričnim množenjem da je inverz dobro izračunat. 15+5

$$A = \begin{bmatrix} 0 & 1 & 0 & -1 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ -1 & 0 & 1 & 0 \end{bmatrix}$$

2. Ako su z_1 i z_2 rjesenja kvadratne jednadzbe $z^2 - 2z + 2 = 0$, izracunati: $\overline{\left(\frac{z_1 - z_2}{z_2 - 2}\right)}$ i $Re\left(\overline{\left(\frac{z_2}{z_1}\right)}\right)$. 10+10

3. Zadana je funkcija $f(x) = e^{-x^2}$. Odrediti domenu, prvu derivaciju i sve asimptote funkcije. 5+5+5+5

4. Ispitati periodičnost, (ne)parnost i drugu derivaciju funkcije $g(x) = \arccos(3x)$. 5+5+10

5. Na temelju ispitivanja toka napraviti skicu grafa funkcije $h(x) = x - \frac{1}{x+1}$. 20

1.

$$A = \begin{vmatrix} 0 & 1 & 0 & -1 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ -1 & 0 & 1 & 0 \end{vmatrix} = \begin{vmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & -1 \\ 0 & 1 & 0 & 1 \\ -1 & 0 & 1 & 0 \end{vmatrix} \quad \times R1 = \begin{vmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & -1 \\ 1 & 0 & 1 & 0 \\ -1 & 0 & 1 & 0 \end{vmatrix}$$