MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod⇓⇓ B1

IME I PREZIME: Dino Marković **BROJ INDEKSA:** 0269075721

POPUNJAVA NASTAVNIK
Broj ↓ bodova

1. Neka su z_1 i z_2 rjesenja kvadratne jednadzbe $z^2 - z + 4 = 0$. *Prikaži ih u kompleksnoj ravnini i provjeri uvrštavanjem!* Dalje izracunaj: $\left(\frac{z_1 - z_2}{z_2 + 4}\right)$. — 4+3+8

2. Riješi sustav Gaussovom metodom i obavezno provjeri rješenje: — 10+5

$$\begin{array}{rcrcrcr} x_1 & - & 2x_2 & + & 3x_3 & - & 4x_4 = & 8 \\ & & x_2 & - & x_3 & + & x_4 = & -2 \\ x_1 & + & 3x_2 & & & - & 3x_4 = & 6 \\ & - & 7x_2 & + & 3x_3 & + & x_4 = & -2 \end{array}$$

3. Odrediti domenu i prvu derivaciju funkcije: $f(x) = \ln(x^2 + 4) + \sin(2x - 3)$. — 5+15

4. Odrediti tok funkcije $f(x) = x - \frac{1}{x}$. — 15(graf)

5. Odrediti i provjeriti uvrštavanjem: $\lim_{x \to -4} \frac{x^2 - 4}{x^2 + 8x + 16} =$ — 4+1

6. Odredi derivaciju funkcije $f(x) = \frac{4}{\sin(4x)}$ — 10

7. Odrediti tangentu na funkciju $f(x) = \cos x$ tamo gdje je $x = \frac{\pi}{4}$. Nacrtati graf funkcije i nacrtati izračunatu tangentu. — 15+3+2

Ukupno: 85

③ $f(x) = \ln(x^2+4) + \sin(2x-3)$

$x^2+4 > 0$

$x^2 > -4$ Df: $\mathbb{R}$ ✓

$f'(x) = \ln(x^2+4) + \sin(2x-3)$

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

$f'(x) = \frac{2x}{x^2+4} + 2\cos(2x-3)$ ✓

⑤ $\lim_{x \to -4} \frac{x^2-4}{x^2+8x+16} = \frac{(-4)^2-4}{(-4)^2+8(-4)+16} = \left[\frac{16-4}{0}\right] = \left[\frac{12}{0}\right] = \infty$? $+\infty$ ili $-\infty$

3

⑥ $f(x) = \frac{4}{\sin(4x)}$; $f'(x) = 4 \cdot \sin^{-1}(4x)$

$f'(x) = 4 \cdot (-1)\sin^{-2}(4x) \cdot \cos(4x) \cdot 4$

$f'(x) = \frac{-16\cos(4x)}{\sin^2(4x)}$ ✓

② $\left|\begin{array}{l} x_1 - 2x_2 + 3x_3 - 4x_4 = 8 \\ x_2 - x_3 + x_4 = -2 \\ x_1 + 3x_2 - 3x_4 = 6 \\ -7x_2 + 3x_3 + x_4 = -2 \end{array}\right.$ ~

$\left[\begin{array}{cccc:c} 1 & -2 & 3 & -4 & 8 \\ 0 & 1 & -1 & 1 & -2 \\ 1 & 3 & 0 & 0 & 6 \\ 0 & -7 & 3 & 1 & -2 \end{array}\right]$ III − I

$\left[\begin{array}{cccc:c} 1 & -2 & 3 & -4 & 8 \\ 0 & 1 & -1 & 1 & -2 \\ 0 & 5 & -3 & 1 & -2 \\ 0 & -7 & 3 & 1 & -2 \end{array}\right]$ III − 5II, IV − 7II

$\left[\begin{array}{cccc:c} 1 & -2 & 3 & -4 & 8 \\ 0 & 1 & -1 & 1 & -2 \\ 0 & 0 & 2 & -4 & 8 \\ 0 & 0 & -4 & 8 & 16 \end{array}\right]$ IV + 2III ~

$\left[\begin{array}{cccc:c} 1 & -2 & 3 & -4 & 8 \\ 0 & 1 & -1 & 1 & -2 \\ 0 & 0 & 2 & -4 & 8 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right]$

jednoparametarsko rješenje

$x_4 = t$

$2x_3 - 4t = 8$

$2x_3 = 8 + 4t$

$x_3 = 4 + 2t$ ✓

$x_2 - 4 - 2t + t = -2$

$x_2 = 2 + t$ ✓

$x_1 - 4 - 2t + 12 + 6t - 4t = 8$

$x_1 = 0$ ✓

Provjera:

$0 - 2(2+t) + 3(4+2t) - 4t = 8$

$0 - 4 - 2t + 12 + 6t - 4t = 8$

$8 = 8$ ✓

Jes provjerio

⑦ $f(x)=\cos x$

gdje je $x=\frac{\pi}{4}$

$f\left(\frac{\pi}{4}\right)=\cos\left(\frac{\pi}{4}\right)=\frac{\sqrt{2}}{2}$

$T_0=\left(\frac{\pi}{4},\frac{\sqrt{2}}{2}\right)$

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

$k=f'(x_0)=-\sin\left(\frac{\pi}{4}\right)$

$k=y-\frac{\sqrt{2}}{2}=-\frac{\sqrt{2}}{2}\left(x-\frac{\pi}{4}\right)$

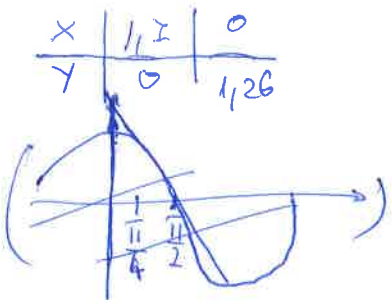
$t\ldots\ y-\frac{\sqrt{2}}{2}=-\frac{\sqrt{2}}{2}\left(x-\frac{\pi}{4}\right)$

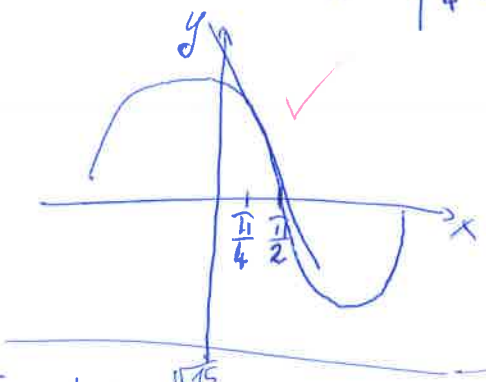
$y-\frac{\sqrt{2}}{2}=-\frac{\sqrt{2}}{2}\left(x-\frac{\pi}{4}\right)$

$y-\frac{\sqrt{2}}{2}=-\frac{\sqrt{2}}{2}x+\frac{\sqrt{2}\pi}{8}$

$y=-\frac{\sqrt{2}}{2}x+1{,}26$

x	1,1	0
y	0	1,26





⑪ $z_1,z_2\quad\left(\frac{z_1-z_2}{z_2+4}\right)$

$z^2-z+4=0$

$z_{1/2}=\frac{+1\pm\sqrt{1-16}}{2}$

$z_{1/2}=\frac{+1\pm\sqrt{-15}}{2}$

$z_1=\frac{1}{2}+i\frac{\sqrt{15}}{2}$

$z_2=\frac{1}{2}-i\frac{\sqrt{15}}{2}$

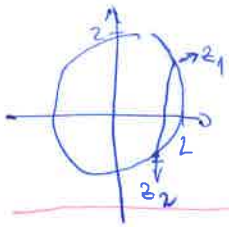
$r_1=\sqrt{\left(\frac{1}{2}\right)^2+\left(\frac{15}{2}\right)^2}$

$r_1=\sqrt{\frac{1}{4}+\frac{15}{4}}$

$r_1=2$

$\operatorname{tg}\varphi=\frac{\frac{\sqrt{15}}{2}}{\frac{1}{2}}=\sqrt{15}$

$\varphi_1=75{,}5°$

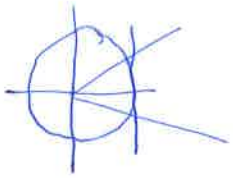


$z_1=2(\cos 75{,}5°+i\sin 75{,}5°)$

$z_2=2(\cos 284{,}47°+i\sin 284{,}47°)$

$\operatorname{tg}\varphi=\frac{-\frac{\sqrt{15}}{2}}{\frac{1}{2}}=-\sqrt{15}$

$\varphi=284{,}47°$



$\left(\frac{\frac{1}{2}+i\frac{\sqrt{15}}{2}-\frac{1}{2}+i\frac{\sqrt{15}}{2}}{\frac{1}{2}-i\frac{\sqrt{15}}{2}+4}\right)=\left(\frac{\sqrt{15}\,i}{\frac{9}{2}-i\frac{\sqrt{15}}{2}}\right)$

$=\frac{-15i}{\frac{9}{2}+i\frac{15}{2}}\cdot\frac{\frac{9}{2}-i\frac{\sqrt{15}}{2}}{\frac{9}{2}-i\frac{\sqrt{15}}{2}}=\frac{-\frac{15}{2}-i\frac{9\sqrt{15}}{2}}{\frac{81}{4}+\frac{15}{4}}=\frac{-\frac{15}{2}-i\frac{9\sqrt{15}}{2}}{24}=\frac{-\frac{15}{2}+i\frac{9\sqrt{15}}{2}}{24}$

IME I PREZIME: Dino Marka

BROJ INDEKSA: 0269075721

(4) tok funkcije

$f(x) = x - \frac{1}{x}$

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

Nultočke

$f(x) = 0 \quad x^2 - 1 = 0$

$x_1 = 1$

$x_2 = -1$

ASIMPTOTE

V. A.

$\lim_{x \to 0^-} \frac{x^2-1}{x} = +\infty$

$\lim_{x \to 0^+} \frac{x^2-1}{x} = -\infty$

$\Big\} \; x = 0$

H. A. $\lim_{x \to \infty} \frac{x^2-1}{x} \; \Big| :x^2 = \lim_{x \to \infty} \frac{\frac{x^2}{x^2} - \frac{1}{x^2}}{\frac{x}{x^2}}$

$= \lim_{x \to \infty} \infty$ Nema H. A.

KOSA

$k = \lim_{x \to \infty} \left(\frac{x^2-1}{x} - x \right) = \lim_{x \to \infty} \left(\frac{x^2-1-x^2}{x} \right)$

$= 0 \Rightarrow \boxed{y = x}$ kosa asimptota

Domena $x \in \mathbb{R} \setminus \{0\}$

EKSTREMI:

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

$x^2 + 1 \neq 0$ Nema ekstrema

Intervali monotonost

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

Točka infleksije: $-2 \neq 0$ Nema

	$-\infty$		0		$+\infty$
-2		$-$		$-$	
x^3		$-$		$+$	
$\frac{-2}{x^3}$		$+$		$-$	
		$\cup$		$\cap$	

konveksna / konkavna

PARNOST / NEPARNOST

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

funkcija je neparna.

Graf funkcije $y = 0 \Rightarrow$ V. A.

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod⇊ B1

IME I PREZIME: DUJE SURAĆ **BROJ INDEKSA:** 17-1-0118-2012

POPUNJAVA NASTAVNIK Broj ↓ bodova

1. Neka su z_1 i z_2 rjesenja kvadratne jednadzbe $z^2 - z + 4 = 0$. *Prikaži ih u kompleksnoj ravnini i provjeri uvrštavanjem!* Dalje izracunaj: $\left(\frac{z_1 - z_2}{z_2 + 4}\right)$. 4+3+8

2. Riješi sustav Gaussovom metodom i obavezno provjeri rješenje: 10+5

$$\begin{array}{rcrcrcr} x_1 & - & 2x_2 & + & 3x_3 & - & 4x_4 = & 8 \\ & & x_2 & - & x_3 & + & x_4 = & -2 \\ x_1 & + & 3x_2 & & & - & 3x_4 = & 6 \\ & - & 7x_2 & + & 3x_3 & + & x_4 = & -2 \end{array}$$

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4. Odrediti tok funkcije $f(x) = x - \frac{1}{x}$. 15(graf)

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6. Odredi derivaciju funkcije $f(x) = \frac{4}{\sin(4x)}$ 10

7. Odrediti tangentu na funkciju $f(x) = \cos x$ tamo gdje je $x = \frac{\pi}{4}$. Nacrtati graf funkcije i nacrtati izračunatu tangentu. 15+3+2

Ukupno: 55

3. $f(x) = \ln(x^2+4) + \sin(2x-3)$

$f'(x) =$

$x^2 + 4 \neq 0$

$x^2 \neq -4$

$D_f = \mathbb{R}$ ✓

$f'(x) =$

$f'(x) = \frac{2x}{x^2+4} + \cos(2x+3) \cdot 2$ ✓

8

-2

$8 - 2 \cdot 2 + 3 \cdot 2 - 4 \cdot (-2) = 8$

$8 - 4 + 6 + 8 =$

$0 - 2 \cdot 2 + 3 \cdot 4 - 4 \cdot 0 = 8$

$0 - 4 + 12 - 0 = 8$

$2 - 4 + 0 = -2$

$0 + 3 \cdot 2 - 3 \cdot 0 = 6$

$6 - 0 = 6$

$-7 \cdot 2 + 3 \cdot 4 + 4 \cdot 0 = -2$

$-14 + 12 = -2$

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

2.

$$x_1 - 2x_2 + 3x_3 - 4x_4 = 8$$
$$x_2 - x_3 + x_4 = -2$$
$$x_1 + 3x_2 - 3x_4 = 6$$
$$-7x_2 + 3x_3 + x_4 = -2$$

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$$\left[\begin{array}{cccc|c} 1 & 0 & 1 & -2 & 4 \\ 0 & 1 & -1 & 1 & -2 \\ 0 & 0 & 1 & -2 & 4 \\ 0 & 0 & -4 & 8 & -16 \end{array}\right] \sim \left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & -1 & 2 \\ 0 & 0 & 1 & -2 & 4 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right]$$

BESKONAČNO RJEŠENJA

$x_4 = 0$

$x_2 = 2 + x_4$

$x_3 = 4 + 2x_4$

$x_1 = 0$

$x_2 = 2$

$x_3 = 4$

$x_4 = 0$

$0 - 2 \cdot 2 + 3 \cdot 4 - 4 \cdot 0 = 8 \quad = 0 - 4 + 12 - 0 = 8$ w

$2 - 4 + 0 = -2$ w

$0 + 3 \cdot 2 - 3 \cdot 0 = 6$ w

$-7 \cdot 2 + 3 \cdot 4 + 4 \cdot 0 = -2$ w

IME I PREZIME: DUJE Surać BROJ INDEKSA: 17 - 1 - 0118 - 2012

7. $f(x) = \cos x \qquad x = \frac{\pi}{4}$

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

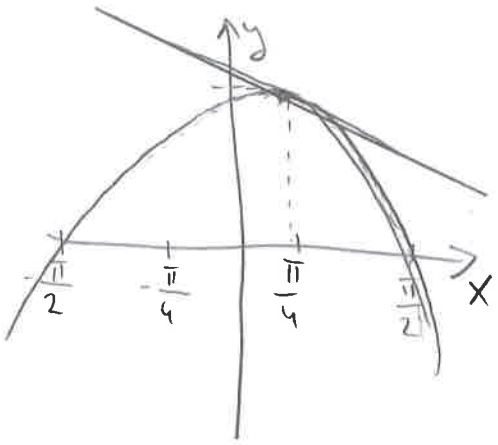
$f'\left(\frac{\pi}{4}\right) = \frac{-\sqrt{2}}{2}$

$x_0 = \frac{\pi}{4}$

$y_0 = \frac{\sqrt{2}}{2}$

$y - \frac{\sqrt{2}}{2} = \frac{-\sqrt{2}}{2}\left(x - \frac{\pi}{4}\right)$

$= -\frac{\sqrt{2}}{2}x + \frac{\pi\sqrt{2}}{8} + \frac{\sqrt{2}}{2}$ ✓



6. $f(x) = \frac{4}{\sin(4x)}$

$f'(x) = -4(\sin(4x))^{-2} \cdot \cos(4x) \cdot 4$

$= \frac{-16\cos(4x)}{\sin^2(4x)}$ ✓

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod⇊ B1

IME I PREZIME: MATIJA BULJAN **BROJ INDEKSA:** 17-2-0221-2012

POPUNJAVA NASTAVNIK Broj ↓ bodova

1. Neka su z_1 i z_2 rjesenja kvadratne jednadzbe $z^2 - z + 4 = 0$. *Prikaži ih u kompleksnoj ravnini i provjeri uvrštavanjem!* Dalje izracunaj: $\overline{\left(\frac{z_1 - z_2}{z_2 + 4}\right)}$. 4+3+8

2. Riješi sustav Gaussovom metodom i obavezno provjeri rješenje: 10+5

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Ukupno: 47

4.

1. DOMENA

$x \neq 0$

$\langle -\infty, 0 \rangle \cup \langle 0, +\infty \rangle$

2. ASIMPTOTE

a) V.A

$\lim_{x \to 0} x - \frac{1}{x} = 0 - \infty = -\infty$

$\lim_{x \to 0^+} 0^+ - \frac{1}{0^+} = -\infty$

b) H.A

$\lim_{x \to \infty} x - \frac{1}{x} = \infty$

$\lim_{x \to \infty} x - \frac{1}{x} = y \rightarrow$ HORIZONTALNA ASIMPTOTA!

3. G.S

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

4. NULTOČKE

$f(x) = 0$

$\frac{x^2 - 1}{x} = 0$

$x_1 = -1, \quad x_2 = 1, \quad x_3 = 0$

5. DERIVACIJA

$$f'(x) = \left(\frac{x^2-1}{x}\right)' = \frac{2x(x) - (x^2-1)}{x^2}$$

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

$$f''(x) = \left(\frac{x^2+1}{x}\right) = \frac{2x + (x^2) - 2x(x^2+1)}{x^4} =$$

$$= \frac{2x^3 - 2x^3 - 1}{x^4} = \frac{1}{x^4}$$

6. KRITIČNE TOČKE

$f'(x) = 0$

$$\frac{x^2+1}{x^2} = 0$$

NEMA KRITIČNIH TOČAKA!

7. MONOTONOST

	$-\infty$		0		$+\infty$
$f'(x)$		$+$		$+$	
$f(x)$		↗		↗	

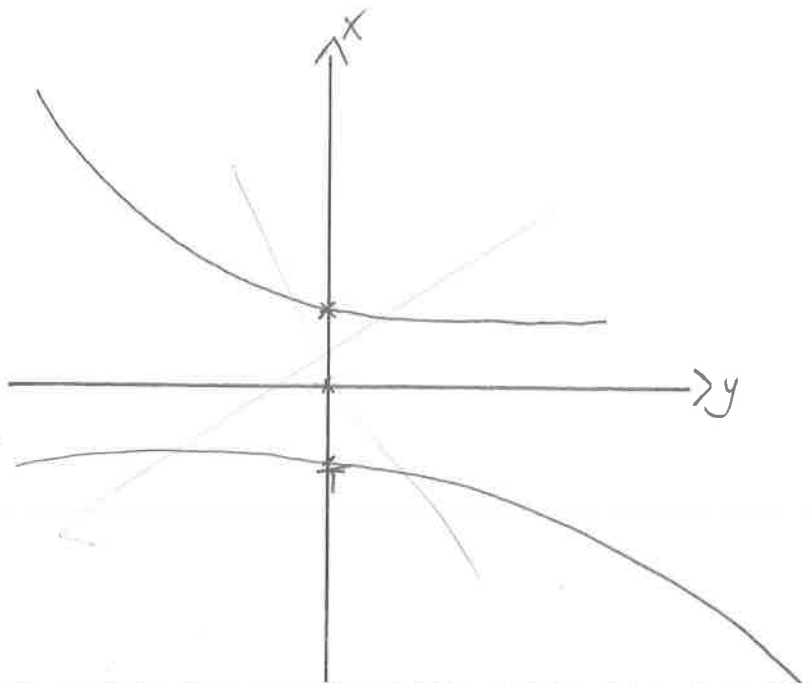
8. ZAKRIVLJENOST

$f''(x) = 0$

$$\frac{-1}{x^4} = 0$$

NEMA RJEŠENJA!

	$-\infty$		0		$+\infty$
$f''(x)$		$+$		$-$	
$f(x)$		∪		∩	



7. $f(x) = \cos x$

$x_0 = \frac{\pi}{4}$, $y_0 = \frac{\sqrt{2}}{2}$

t... $y - y_0 = f'(x_0) \cdot (x - x_0)$

$f'(x_0) = -\sin x_0 = -\sin\left(\frac{\pi}{4}\right) = \frac{-\sqrt{2}}{2}$

$y_0 = \cos\left(\frac{\pi}{4}\right) = \frac{\sqrt{2}}{2}$

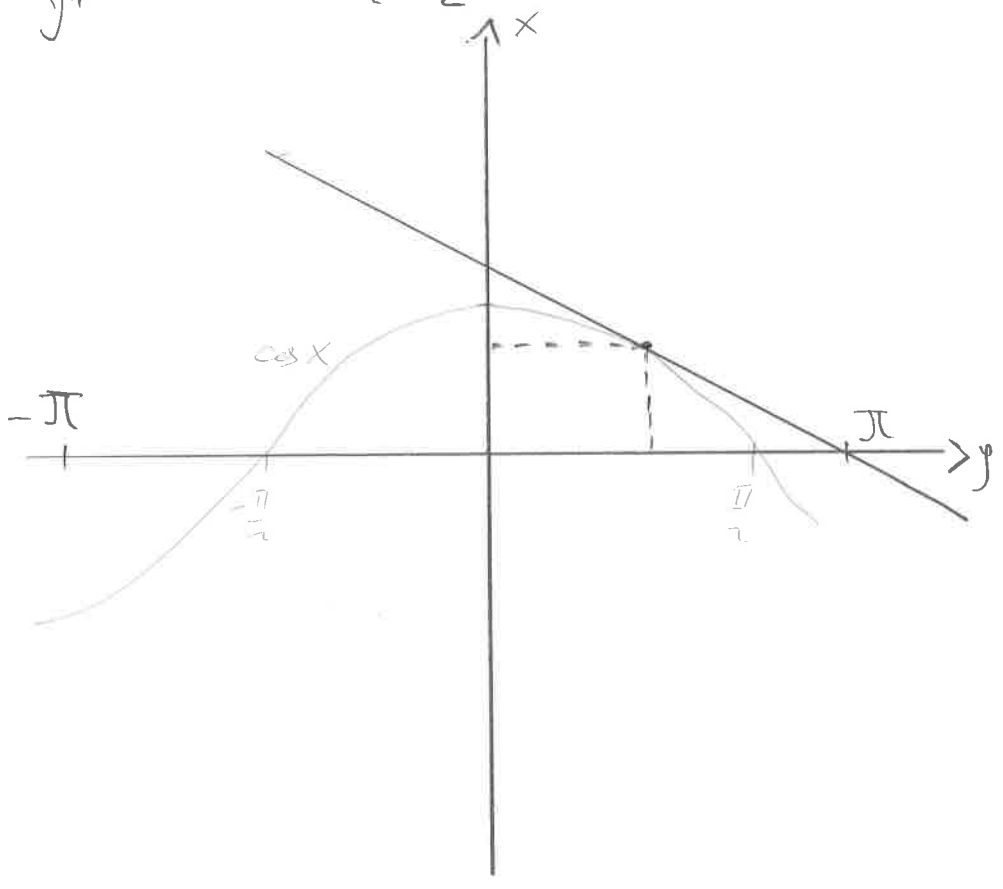
$y - \frac{\sqrt{2}}{2} = \frac{-\sqrt{2}}{2}\left(x - \frac{\pi}{4}\right)$

$y = \frac{-\sqrt{2}}{2}x + \frac{\sqrt{2}}{2} \cdot \frac{\pi}{4} + \frac{\sqrt{2}}{2}$

$y = -\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} \cdot \frac{\pi}{4}$

$x_1 = 0$ $\quad y_1 = 1$

$y_1 = 0$ $\quad x_2 = \frac{\pi}{2}$



IME I PREZIME: MATIJA BUJAN BROJ INDEKSA: 17-2-0221-2012

6. $f(x) = \frac{4}{\sin(4x)}$

$f'(x) = \frac{0 - 4(\cos(4x)) \cdot (4x)^2}{\sin^2} = \frac{-16\cos(4x)}{\sin^2(4x)}$ ✓

3. $f(x) = \ln(x^2+4) + \sin(2x-3)$

DOMENA:

$\ln(x^2+4) > 0$

$x^2+4 > 0$

$\langle -\infty, +\infty \rangle$ ✓

DERIVACIJA:

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

$= \frac{2x}{x^2+4} + 2\cos(2x-3)$ ✓

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod⇊ B1

IME I PREZIME: Stipe Ombla **BROJ INDEKSA:** 0269085639

POPUNJAVA NASTAVNIK Broj ↓ bodova

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4. Odrediti tok funkcije $f(x) = x - \frac{1}{x}$. 15(graf)

5. Odrediti i provjeriti uvrštavanjem: $\lim_{x \to -4} \dfrac{x^2 - 4}{x^2 + 8x + 16} =$ 4+1

6. Odredi derivaciju funkcije $f(x) = \dfrac{4}{\sin(4x)}$ 10

7. Odrediti tangentu na funkciju $f(x) = \cos x$ tamo gdje je $x = \frac{\pi}{4}$. Nacrtati graf funkcije i nacrtati izračunatu tangentu. 15+3+2

Ukupno: 40

④ $f(x) = x - \frac{1}{x}$

$x \neq 0$

$D_f = \langle -\infty, 0 \rangle \cup \langle 0, +\infty \rangle$

$f(0) = N/P$

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

$f'(x) = 0$ NIKAD

$x^2 > 0$ UVIJEK

FUNKCIJA RASTE NA CIJELOJ DOMENI

$f''(x) = -2x^{-3} = -\frac{2}{x^3}$

$f''(x) = 0$ NIKAD

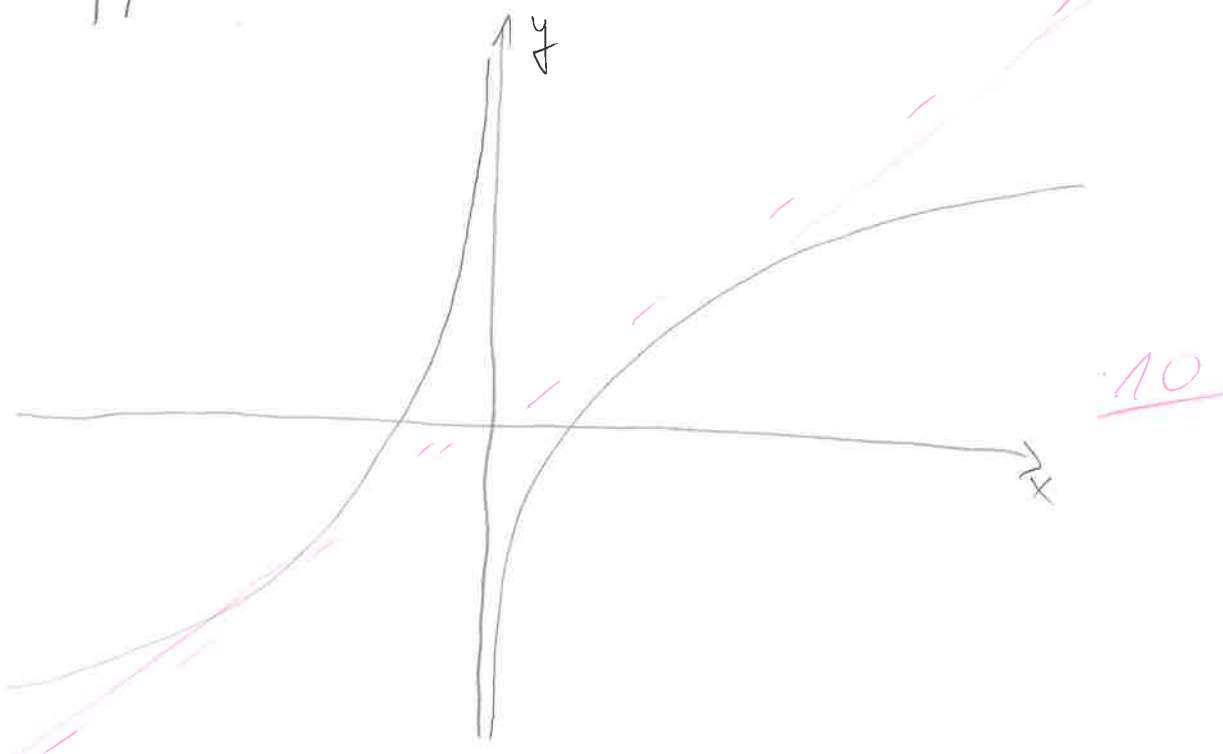
$x^3 = 0$

$x = 0$

KOSE ASIMPTOTE?

		0	
$f'(x)$	+		+
$f''(x)$	+		−
$f(x)$	↗		↘

		0	
x^3	−	0	+
$-\frac{2}{x^3}$	+		−



10

Stipe Omblo

③ $f(x) = \ln(x^2+4) + \sin(2x-3)$ $\quad D_f = \mathbb{R}$ ✓

$x^2+4>0 \qquad \mathbb{R}$

$x^2 > -4$

$\mathbb{R}$

$f'(x) = \frac{1}{x^2+4} \cdot 2x + \cos(2x-3) \cdot 2$ ✓ ✓

$f'(x) = \frac{2x}{x^2+4} + 2\cos(2x-3)$

⑯ $f(x) = \frac{4}{\sin(4x)}$

$f'(x) = \frac{0 \cdot \sin 4x - 4 \cdot \cos 4x \cdot 4}{\sin^2(4x)} = \frac{-16\cos(4x)}{\sin^2(4x)}$ ✓

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod⇊ B1

IME I PREZIME: IVAN KOKIĆ **BROJ INDEKSA:** 0269086090

POPUNJAVA NASTAVNIK Broj ↓ bodova

1. Neka su z_1 i z_2 rjesenja kvadratne jednadzbe $z^2 - z + 4 = 0$. *Prikaži ih u kompleksnoj ravnini i provjeri uvrštavanjem!* Dalje izracunaj: $\overline{\left(\frac{z_1 - z_2}{z_2 + 4}\right)}$. 4+3+8

2. Riješi sustav Gaussovom metodom i obavezno provjeri rješenje: 10+5

$$\begin{array}{rcrcrcr} x_1 & - & 2x_2 & + & 3x_3 & - & 4x_4 = & 8 \\ & & x_2 & - & x_3 & + & x_4 = & -2 \\ x_1 & + & 3x_2 & & & - & 3x_4 = & 6 \\ & - & 7x_2 & + & 3x_3 & + & x_4 = & -2 \end{array}$$

3. Odrediti domenu i prvu derivaciju funkcije: $f(x) = \ln(x^2 + 4) + \sin(2x - 3)$. 5+15

4. Odrediti tok funkcije $f(x) = x - \frac{1}{x}$. 15(graf)

5. Odrediti i provjeriti uvrštavanjem: $\lim_{x \to -4} \frac{x^2 - 4}{x^2 + 8x + 16} =$ 4+1

6. Odredi derivaciju funkcije $f(x) = \frac{4}{\sin(4x)}$ 10

7. Odrediti tangentu na funkciju $f(x) = \cos x$ tamo gdje je $x = \frac{\pi}{4}$. Nacrtati graf funkcije i nacrtati izračunatu tangentu. 15+3+2

Ukupno: 25

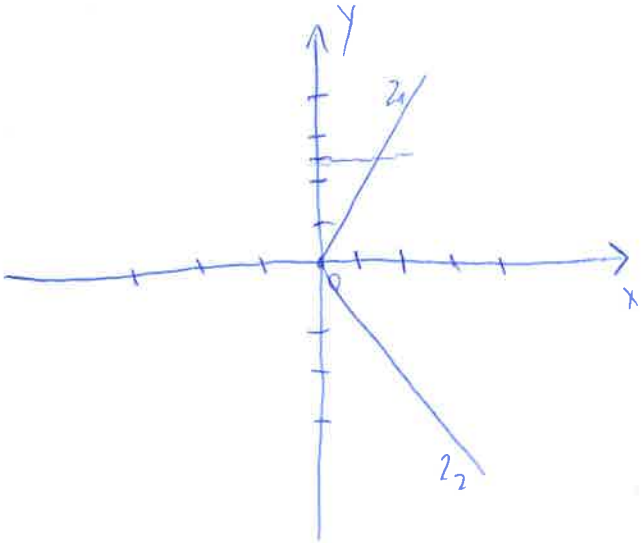
1. $z^2 - z + 4 = 0$

$z_{1,2} = \frac{1 \pm \sqrt{16}}{2}$

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

$z_1 = \frac{5}{2}$

$z_2 = -\frac{3}{2}$



$z = r(\cos\varphi + i\sin\varphi)$

$\overline{\left(\frac{z_1 - z_2}{z_2 + 4}\right)} = \left(\frac{\frac{5}{2} + \frac{3}{2}}{-\frac{3}{2} + 4}\right) = \left(\frac{\frac{8}{2}}{\frac{5}{2}}\right) = \left(\frac{4}{\frac{5}{2}}\right) = \left(\frac{8}{5}\right)$

$= -\frac{8}{5}$

6.

$$f(x) = \frac{4}{\sin(4x)}$$

$$f(x)' = \frac{(4)'(\sin(4x)) - 4(\sin(4x))'}{(\sin(4x))^2}$$

$$f(x)' = \frac{\sin(4x) - 4(\cos(4x))}{(\sin(4x))^2}$$

$$f(x)' = \frac{-4\cos(4x)}{\sin(4x)}$$ ×

$$f(x)' = -4\,\mathrm{ctg}(4x)$$

IVAN KORIĆ

2. $x_1 - 2x_2 + 3x_3 - 4x_4 = 8$

$x_2 - x_3 + x_4 = -2$

$x_1 + 3x_2 - 3x_4 = 6$

$-7x_2 + 3x_3 + x_4 = -2$

$x_1 - 20 + 60 - 32 = 8$

$x_1 = 20 - 60 + 32 + 8$

$x_1 = 0$

1	-2	3	-4	8
	1	-1	1	-2
	0	-1	2	-4
0	0		1	8

$x_4 = 8$

$-x_3 + 16 = -4$

$-x_3 = -20$

$x_3 = 20$

$x_2 = 20 - 8 - 2$

$x_2 = 10$

1	-2	3	-4	8
	1	-1	1	-2
1	3		-3	6
	-7	3	1	-2

/·(-1) +

1	-2	3	-4	8
	1	-1	1	-2
0	5		1	-2
	-7	3	1	-2

/·(-5) +

1	-2	3	-4	8
	1	-1	1	-2
0	0		1	8
	-7	3	1	-2

/·7 +

1	-2	3	-4	8
	1	-1	1	-2
0	0		1	8
	0	-4	8	-16

/:4

1	-2	3	-4	8
	1	-1	1	-2
0	0		1	8
	0	-1	2	-4

·(-1) +

1	-2	3	-4	8
	1	-1	1	-2
0	0		1	8
	0	1	-2	4

·(-1) +

1	-2	3	-4	8
	1	-1	1	-2
0	0		1	8
	0	0	-1	12

/·(-1)

1	-2	3	-4	8
	1	-1	1	-2
0	0		1	8
	0	0	1	-12

1	-2	3	-4	8
	1	-1	1	-2
0	0		1	8
	0	0	1	-12

$x_4 = -12$

$x_3 + 8 = -12$

$x_3 = -20$

$x_2 - 20 - 12 = -2$

$x_2 = 30$

$x_1 - 2 \cdot 30 + 3 \cdot (-20) - 4 \cdot (-12) = 8$

$x_1 - 60 - 60 + 48 = 8$

$x_1 = 8 + 60 + 60 - 48$

$x_1 = 120 - 48$

$x_1 = 72$

3. $f(x) = \ln(x^2+4) + \sin(2x-3)$

$x^2 + 4 \geq 0$

$x^2 \geq -4$

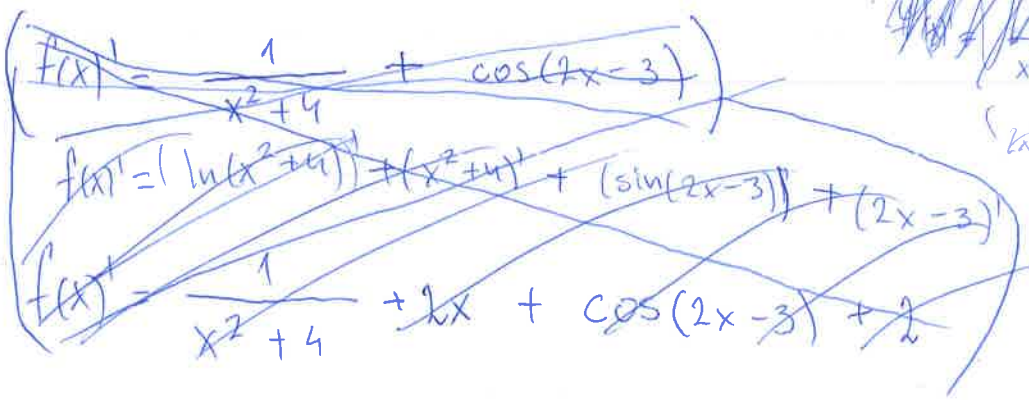
$x \in \mathbb{R}$ ✓

$2x - 3 \geq 0$

$2x \geq 3$

$x \in \mathbb{R}$ ✓

$f(x) = \ln(x^2+4) + \sin(2x-3)$



$f(x)' = \frac{1}{x^2+4} \cdot 2x + \cos(2x-3) \cdot 2$ ✓

$f(x)' = \frac{2x}{x^2+4} + 2\cos(2x-3)$

---

2. PROVJERA

$x_1 - 2x_2 + 3x_3 - 4x_4 = 8$

$0 - (2 \cdot 10) + (3 \cdot 20) - (4 \cdot 8) = 8$

$8 = 8$

$x_2 - x_3 + x_4 = -2$

$10 - 20 + 8 = -2$

$-2 = -2$ ✓

$x_1 + 3x_2 - 3x_4 = 6$

$0 + 30 - 24 = 6$

$6 = 6$

$-7x_2 + 3x_3 + x_4 = -2$

$-70 + 60 + 8 = -2$

$-2 = -2$

IVAN KOKIĆ

5. $\lim\limits_{x\to -4} \dfrac{x^2-4 \;/:x^2}{x^2+8x+16 /:x^2} = \dfrac{\frac{x^2}{x^2}1 - \frac{4}{x^2}}{\frac{x^2}{x^2} - \frac{8x}{x^2} + \frac{16}{x^2}} = \dfrac{1}{1} = 1$

$\lim\limits_{x\to -4} \dfrac{16-4}{16+(-32)+16} = \lim\limits_{x\to -4} \dfrac{12}{0} = \lim\limits_{x\to -4} +\infty$

4. $f(x) = x - \dfrac{1}{x}$

$x - \dfrac{1}{x} \geq 0 \;/\cdot x$

$x^2 - 1 \geq 0$

$x^2 \geq 1$

$x \neq 1$

$x \in \mathbb{R}$

PARNOST

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

$x - \dfrac{1}{x} = -x - \dfrac{1}{(-x)}$

$x - \dfrac{1}{x} = -x + \dfrac{1}{x}$

NITI PARNA NI NEPARNA

7. $f(x) = \cos x \qquad x = \frac{\pi}{4}$

$f\left(\frac{\pi}{4}\right) = \cos \frac{\pi}{4}$ ×

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod⇊ B1

IME I PREZIME: Marina Bešker

BROJ INDEKSA: 17-2-0193-2012

POPUNJAVA NASTAVNIK Broj ↓ bodova

1. Neka su z_1 i z_2 rjesenja kvadratne jednadzbe $z^2 - z + 4 = 0$. *Prikaži ih u kompleksnoj ravnini i provjeri uvrštavanjem!* Dalje izracunaj: $\overline{\left(\frac{z_1 - z_2}{z_2 + 4}\right)}$. 4+3+8

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Ukupno: 20

MB
Marina Bešta

② $x_1 - 2x_2 + 3x_3 - 4x_4 = 8$

$x_2 - x_3 + x_4 = -2$

$x_1 + 3x_2 - 3x_4 = 6$

$-7x_2 + 3x_3 + x_4 = -2$

$$\left[\begin{array}{cccc|c} 1 & -2 & 3 & -4 & 8 \\ 0 & 1 & -1 & 1 & -2 \\ 1 & 3 & 0 & -3 & 6 \\ 0 & -7 & 3 & 1 & -2 \end{array}\right] \cdot(-1) + \sim \left[\begin{array}{cccc|c} 1 & -2 & 3 & -4 & 8 \\ 0 & 1 & -1 & 1 & -2 \\ 0 & 2 & 1 & -4 & 8 \\ 0 & -7 & 3 & 1 & -2 \end{array}\right] \cdot(-2) + \sim$$

$$\left[\begin{array}{cccc|c} 1 & -2 & 3 & -4 & 8 \\ 0 & 1 & -1 & 1 & -2 \\ 0 & 0 & 3 & -6 & 12 \\ 0 & -7 & 3 & 1 & -2 \end{array}\right] \cdot 7 + \sim \left[\begin{array}{cccc|c} 1 & -2 & 3 & -4 & 8 \\ 0 & 1 & -1 & 1 & -2 \\ 0 & 0 & 3 & -6 & 12 \\ 0 & 0 & -4 & 8 & -16 \end{array}\right] \cdot(2) \sim$$

$$\left[\begin{array}{cccc|c} 1 & -2 & 3 & -4 & 8 \\ 0 & 1 & -1 & 1 & -2 \\ 0 & 0 & 3 & -6 & 12 \\ 0 & 0 & 2 & -4 & 4 \end{array}\right]$$

(4)

$$\left(\begin{array}{cccc|c} 1 & -2 & 3 & 4 & 8 \\ 0 & 1 & -1 & 1 & -2 \\ 1 & 3 & 0 & -3 & 6 \\ 0 & -7 & 3 & 1 & -2 \end{array}\right) \overset{\text{I+III}}{\sim} \left(\begin{array}{cccc|c} 1 & -2 & 3 & 4 & 8 \\ 0 & 1 & -1 & 1 & -2 \\ 1 & 2 & 1 & -4 & 8 \\ 0 & -7 & 3 & 1 & -2 \end{array}\right) \overset{\cdot(-1)}{\sim} \left(\begin{array}{cccc|c} 1 & -2 & 3 & 4 & 8 \\ 0 & 1 & -1 & 1 & -2 \\ 0 & 4 & -2 & -4 & 0 \\ 0 & -7 & 3 & 1 & -2 \end{array}\right) \overset{:2}{\sim}$$

$$\sim \left(\begin{array}{cccc|c} 1 & -2 & 3 & 4 & 8 \\ 0 & 1 & -1 & 1 & -2 \\ 0 & 2 & 2 & -4 & 0 \\ 0 & -7 & 3 & 1 & -2 \end{array}\right) \overset{\cdot(-2)+}{\sim} \left(\begin{array}{cccc|c} 1 & -2 & 3 & 4 & 8 \\ 0 & 1 & -1 & 1 & -2 \\ 0 & 0 & 4 & -6 & -4 \\ 0 & -7 & 3 & 1 & -2 \end{array}\right) \overset{:2}{\sim} \left(\begin{array}{cccc|c} 1 & -2 & 3 & 4 & 8 \\ 0 & 1 & -1 & 1 & -2 \\ 0 & 0 & 2 & -3 & -2 \\ 0 & -7 & 3 & 1 & -2 \end{array}\right) \overset{\cdot 7+}{\sim}$$

$$\sim \left(\begin{array}{cccc|c} 1 & -2 & 3 & 4 & 8 \\ 0 & 1 & -1 & 1 & -2 \\ 0 & 0 & 2 & -3 & -2 \\ 0 & 0 & -4 & 8 & -12 \end{array}\right) \overset{:(-4)}{\sim} \left(\begin{array}{cccc|c} 1 & -2 & 3 & 4 & 8 \\ 0 & 1 & -1 & 1 & -2 \\ 0 & 0 & 2 & -3 & -2 \\ 0 & 0 & 1 & -2 & 3 \end{array}\right) \overset{\cdot 3+}{\sim} \left(\begin{array}{cccc|c} 1 & -2 & 3 & 4 & 8 \\ 0 & 1 & -1 & 1 & -2 \\ 0 & 0 & 1 & -2 & 3 \\ 0 & 0 & 2 & -3 & -2 \end{array}\right) \overset{\cdot(-2)+}{\sim}$$

$$\left(\begin{array}{cccc|c} 1 & -2 & 3 & 4 & 8 \\ 0 & 1 & -1 & 1 & -2 \\ 0 & 0 & 1 & -2 & 3 \\ 0 & 0 & 0 & -1 & -8 \end{array}\right) \overset{\cdot(-1)}{\sim} \left(\begin{array}{cccc|c} 1 & -2 & 3 & 4 & 8 \\ 0 & 1 & -1 & 1 & -2 \\ 0 & 0 & 1 & -2 & 3 \\ 0 & 0 & 0 & 1 & 8 \end{array}\right) \overset{\cdot(-1)}{\sim} \left(\begin{array}{cccc|c} 1 & -2 & 3 & 4 & 8 \\ 0 & 1 & 0 & 3 & -1 \\ 0 & 0 & 1 & -2 & 3 \\ 0 & 0 & 0 & 1 & 8 \end{array}\right) \overset{:2}{\sim}$$

$$\left(\begin{array}{cccc|c} 1 & -2 & 3 & 4 & 8 \\ 0 & 1 & 0 & 3 & -1 \\ 0 & 0 & 1 & 0 & 19 \\ 0 & 0 & 0 & 1 & 8 \end{array}\right) \overset{\cdot 2+}{\sim} \left(\begin{array}{cccc|c} 1 & 0 & 3 & 10 & 6 \\ 0 & 1 & 0 & 3 & -1 \\ 0 & 0 & 1 & 0 & 19 \\ 0 & 0 & 0 & 1 & 8 \end{array}\right) \overset{\cdot(-3)+}{\sim} \left(\begin{array}{cccc|c} 1 & 0 & 3 & 10 & 6 \\ 0 & 1 & 0 & 0 & -25 \\ 0 & 0 & 1 & 0 & 19 \\ 0 & 0 & 0 & 1 & 8 \end{array}\right) \overset{\cdot(-10)+}{\sim}$$

$$\sim \left(\begin{array}{cccc|c} 1 & 0 & 3 & 0 & -74 \\ 0 & 1 & 0 & 0 & -25 \\ 0 & 0 & 1 & 0 & 19 \\ 0 & 0 & 0 & 1 & 8 \end{array}\right) \overset{\cdot(-3)+}{\sim} \left(\begin{array}{cccc|c} 1 & 0 & 0 & 0 & -131 \\ 0 & 1 & 0 & 0 & -25 \\ 0 & 0 & 1 & 0 & 19 \\ 0 & 0 & 0 & 1 & 8 \end{array}\right)$$

6. DERIVACIJA DRUGA I TOČKE INFLEKSIJE

MB

Marcela Bašić

$f'(x) = 1x$

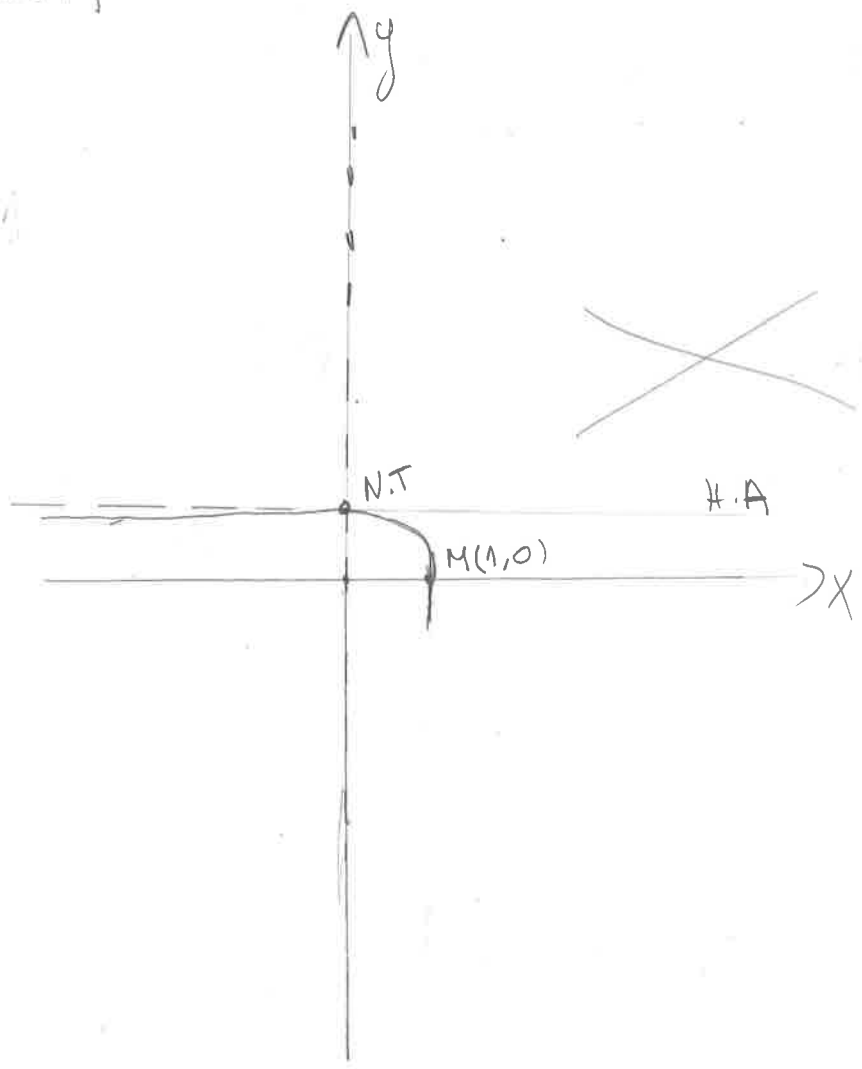
$f''(x) = ((1 \cdot x)' + (1 \cdot x)$

$f''(x) = 1x$

	$-\infty$		0		1		$+\infty$
f'		+		−		+	
f		∪		∩		∪	

$1x = 0$ NE ✓ POSTOJE

$x = 0$



1. $z^2 - z + 4 = 0$ $\quad a=1,\ b=-1,\ c=4$

$$z_{1,2} = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

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

$$z_{1,2} = \frac{1 \pm \sqrt{1-16}}{2}$$

$$z_{1,2} = \frac{1 \pm \sqrt{-15}}{2}$$

X $\qquad$ Y

$z_1 = \frac{1}{2}$ $\qquad$ $z_2 = \frac{\sqrt{15}}{2} i$

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

$$r = \sqrt{\left(\frac{1}{2}\right)^2 + \left(\frac{\sqrt{15}}{2}\right)^2}$$

$$r = \frac{\sqrt{226}}{2} = 7.52$$

$$\left(\frac{z_1 - z_2}{z_2 + z_1}\right) = \left(\frac{\frac{1}{2} - \frac{\sqrt{15}}{2}}{\frac{\sqrt{15}}{2} + 4}\right) = \left(\frac{\frac{1-\sqrt{15}}{2}}{\frac{8+\sqrt{15}}{2}}\right) = \left(\frac{1-2\sqrt{15}}{16+\sqrt{15}}\right)$$

$$\left(\frac{1+2\sqrt{15}}{16-\sqrt{15}}\right) = -0.72.$$

1. $z^2 - z + 4 = 0$

6. $f(x) = \frac{4}{\sin(4x)}$

$f'(x) = \frac{(4)' \cdot \sin(4x) - (4) \cdot (\sin(4x))'}{}$

$f'(x) = -4 \cdot \cos(4x) \cdot (4x)'$

$f'(x) = -16 \cos(4x)$ ✗

(5) $\lim_{x \to -4} \frac{x^2 - 4}{x^2 + 8x + 16} : x^2 = \frac{1 - \frac{4}{x^2}}{1 + \frac{8x}{x^2} + \frac{16}{x^2}} = \frac{1}{1} = 1$

$\lim_{x \to -4} = \frac{(-4)^2 - 4}{(-4)^2 + 8(-4) + 16} = \frac{5}{8}$ ✗

(3.) $f(x) = \ln(x^2 + 4) + \sin(2x - 3)$

$f'(x) = (\ln(x^2+4))' + (\sin(2x-3))'$

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

$f'(x) = \frac{1}{x^2+4} \cdot 2x + \cos(2x-3) \cdot 2x$ ✓

$f'(x) = \frac{2x + \cos 2x(2x-3)}{x^2+4}$

Df ... $x \in \mathbb{R}$ ✓

④ $f(x) = \frac{x}{1} - \frac{1}{x}$ Marina Bešker MB

1. $f(x) = \frac{x-1}{x}$

Domena

1. $N \neq 0$ Df... $x \in \mathbb{R} \setminus \{0\}$

$x \neq 0$

Prijevoj nula

2. N.T N.T(0,1)

$x - 1 = 0$

$x = 1$

3. PARNOST / NEPARNOST

$f(-x) = \frac{-x-1}{-x} = \frac{x-1}{x}$ funkcija je parna

4. ASIMPTOTE

V.A

$\lim_{x \to 0^+} \frac{x-1}{x} = \frac{0-1}{+0} = +\infty$

$\lim_{x \to 0^-} \frac{x-1}{x} = \frac{0-1}{-0} = -\infty$

V.A

$x = 0$

$(2x-0)^1$

$2x$

H.A

$\lim_{x \to \pm\infty} \frac{x-1}{x} : x = \lim_{x \to \pm\infty} \frac{1 - \frac{1}{x}}{1} = \frac{1}{1} = 1$

H.A

$y = 1$

K.A nema jer ima H.A

5. DERIVACIJA i STACIONARNE TOČKE

$f(x) = \frac{x-1}{x}$

$f'(x) = (x-1)' \cdot x - (x-1) \cdot (x)'$

$f'(x) = 1x \cdot (x - (x-1))$

$f'(x) = 1x \cdot (x - x + 1)$

$f'(x) = x^2 - x^2 + 1x$

$f'(x) = 1x //$

$1x = 0$

$x = \frac{0}{1}$

$M(x, y)$ $M(1, 0)$

$x = 1$

$y = \frac{x-1}{x}$

$y = \frac{1-1}{1} = 0$

	$-\infty$		0		1		$+\infty$
$f'(x)$		+		−		+	
f		↗		↘		↗	

M

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IME I PREZIME: PINO KOTLAR **BROJ INDEKSA:** 0269088672

POPUNJAVA NASTAVNIK Broj ↓ bodova

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3. Odrediti domenu i prvu derivaciju funkcije: $f(x) = \ln(x^2 + 4) + \sin(2x - 3)$. 5+15

4. Odrediti tok funkcije $f(x) = x - \frac{1}{x}$. 15(graf)

5. Odrediti i provjeriti uvrštavanjem: $\lim_{x \to -4} \frac{x^2 - 4}{x^2 + 8x + 16} =$ 3 4+1

6. Odredi derivaciju funkcije $f(x) = \frac{4}{\sin(4x)}$ 10

7. Odrediti tangentu na funkciju $f(x) = \cos x$ tamo gdje je $x = \frac{\pi}{4}$. Nacrtati graf funkcije i nacrtati izračunatu tangentu. 15+3+2

Ukupno: (8)

1. $a\ b\ c$

$z^2 - z + 4 = 0$

$z_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

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

$\frac{1 \pm \sqrt{-17}}{2}$ ✗

$z_1 = \frac{1}{2} + \frac{(-\sqrt{17}i)}{2}$

$z_1 = \frac{1}{2} - \frac{\sqrt{17}i}{2}$

$z_2 = \frac{1}{2} + \frac{\sqrt{17}}{2}i$

$\left(\frac{\frac{1}{2} - \frac{\sqrt{17}}{2}i - \left(\frac{1}{2} + \frac{\sqrt{17}}{2}i\right)}{\frac{1}{2} + \frac{\sqrt{17}}{2}i + 4} \right) =$

$\frac{1}{2} + \frac{8}{2} = \frac{9}{2}$

$= \left(\frac{\frac{1}{2} - \frac{\sqrt{17}}{2}i - \frac{1}{2} - \frac{\sqrt{17}}{2}i}{\frac{9}{2} + \frac{\sqrt{17}}{2}i} \right) = -\left(\frac{-2.06i - 2.06i}{4.5 + 2.06i} \right)$

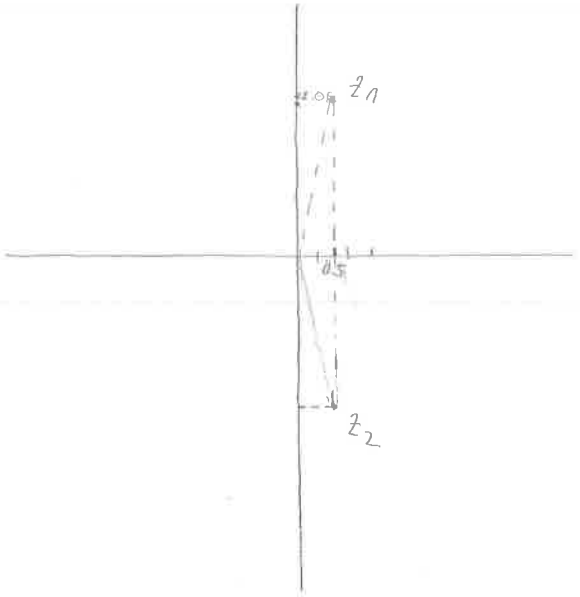
$\left(\frac{-4.12i}{(4.5 + 2.06i)} \cdot \frac{(4.5 - 2.06i)}{(4.5 - 2.06i)} \right)$

$\left(\frac{-18.05i + 8.5i^2}{20.25 - 9.27i + 9.27i - 4.24i^2} \right)$

$\left(\frac{-18.05i - 8.5}{20.25 + 4.24} \right)$

$$\left(\frac{-8.5-18.05i}{24.5}\right) : \left(\frac{-8.5}{24.5} - \frac{18.05i}{24.5}\right)$$

$z = -0.35 + 0.75i$



3.)

$$f(x) = \ln|x^2+4| + \sin(2x-3)$$ ✗

$$f'(x) = \frac{1}{|x^2+4|} \cdot (x^2+4)' + \cos(2x-3) \cdot (2x-3)'$$

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

$x^2+4 > 0$

$x^2 > -4$

$x \in \mathbb{R}$

$2x-3 \neq 0$

$2x \neq 3$

$x \neq \frac{3}{2}$

$D(f) = \mathbb{R} \setminus \left\{\frac{3}{2}\right\}$

6. PINO KOTLAR

$$f(x) = \frac{4}{\sin(4x)}$$

$$f'(x) = \frac{4' \cdot \sin(4x) - 4 \cdot \sin(4x)'}{(\sin(4x))^2} = \frac{0 \cdot \sin(4x) - 4 \cdot \cos(4x) \cdot (4x)'}{(\sin(4x))^2} = \frac{\sin(4x) - 4 \cdot \cos(4x) \cdot 4}{(\sin(4x))^2}$$

2. MATRICA

$$\begin{bmatrix} 1 & -2 & 3 & -4 & | & 8 \\ 0 & 1 & -1 & 1 & | & -2 \\ 1 & 3 & 0 & 3 & | & 6 \\ 0 & -7 & 3 & 1 & | & -2 \end{bmatrix} \sim \begin{bmatrix} 1 & -2 & 3 & -4 & | & 8 \\ 0 & 1 & -1 & 1 & | & -2 \\ 0 & 5 & -3 & 7 & | & -2 \\ 0 & -7 & 3 & 1 & | & -2 \end{bmatrix} \sim \begin{bmatrix} 1 & 0 & 1 & -2 & | & 4 \\ 0 & 1 & -1 & 1 & | & -2 \\ 0 & 0 & 2 & 2 & | & 8 \\ 0 & 0 & -4 & 8 & | & -16 \end{bmatrix} \sim$$

1.R · (-1) + 3.R

2.R · (2) + 1.R
2.R · (-5) + 3.R
2.R · 7 + 4.R

3.R : 2

$$\sim \begin{bmatrix} 1 & 0 & 1 & -2 & | & 4 \\ 0 & 1 & -1 & 1 & | & -2 \\ 0 & 0 & 1 & 1 & | & 4 \\ 0 & 0 & -4 & 8 & | & -16 \end{bmatrix} \sim \begin{bmatrix} 1 & 0 & 0 & -3 & | & 0 \\ 0 & 1 & 0 & 2 & | & 2 \\ 0 & 0 & 1 & 1 & | & 4 \\ 0 & 0 & 0 & 12 & | & 0 \end{bmatrix} \sim \begin{bmatrix} 1 & 0 & 0 & -3 & | & 0 \\ 0 & 1 & 0 & 2 & | & 2 \\ 0 & 0 & 1 & 1 & | & 4 \\ 0 & 0 & 0 & 1 & | & 0 \end{bmatrix} \sim$$

3.R · (-1) + 1.R
3.R + 2.R
3.R · 4 + 4.R

4.R : 12

4.R · (4) + 3.R
4.R · (-2) + 2.R
4.R · 3 + 1.R

$$\sim \begin{bmatrix} 1 & 0 & 0 & 0 & | & 0 \\ 0 & 1 & 0 & 0 & | & 2 \\ 0 & 0 & 1 & 0 & | & 4 \\ 0 & 0 & 0 & 1 & | & 0 \end{bmatrix}$$

$x_1 = 0$
$x_2 = 2$
$x_3 = 4$
$x_4 = 0$

PROVJERA

1. $x_1 - 2x_2 + 3x_3 - 4x_4 = 8$
$0 - 4 + 12 - 0 = 8$
$8 = 8$ ✓

2. $x_2 - x_3 + x_4 = -2$
$2 - 4 + 0 = -2$
$-2 = -2$ ✓

3. $x_1 + 3x_2 - 3x_4$
$0 + 6 - 0 = 6$
$6 = 6$ ✓

4. $-2x_2 + 3x_3 + x_4 = -2$
$-14 + 12 + 0 = -2$
$-2 = -2$ ✓

5.

$$\lim_{x \to -4} \frac{x^2 - 4}{x^2 + 8x + 16} = \lim_{x \to -4} = \frac{(-4)^2 - 4}{(-4)^2 - 32 + 16} = \frac{16 - 4}{16 - 32 + 16} = \frac{12}{0} = \infty$$

$+\infty$ $-\infty$

14

3

6.

$$f(x) = \frac{4}{\sin(4x)}$$

$$f'(x) = \frac{4' \cdot \sin(4x) - 4 \cdot (\sin(4x))'}{(\sin(4x))^2} = \frac{0 \cdot \sin(4x) - 4 \cdot \cos(4x) \cdot (4x)'}{(\sin(4x))^2} = X$$

$$= \frac{\sin(4x) - 4 \cdot \cos(4x) \cdot 4}{(\sin(4x))^2}$$

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod⇊ B1

IME I PREZIME: Sime Labus **BROJ INDEKSA:** 0269033263

POPUNJAVA NASTAVNIK Broj ↓ bodova

1. Neka su z_1 i z_2 rjesenja kvadratne jednadzbe $z^2 - z + 4 = 0$. *Prikaži ih u kompleksnoj ravnini i provjeri uvrštavanjem!* Dalje izracunaj: $\overline{\left(\frac{z_1 - z_2}{z_2 + 4}\right)}$. 4+3+8

2. Riješi sustav Gaussovom metodom i obavezno provjeri rješenje: 10+5

$$\begin{array}{rcrcrcr} x_1 & - & 2x_2 & + & 3x_3 & - & 4x_4 = & 8 \\ & & x_2 & - & x_3 & + & x_4 = & -2 \\ x_1 & + & 3x_2 & & & - & 3x_4 = & 6 \\ & - & 7x_2 & + & 3x_3 & + & x_4 = & -2 \end{array}$$

3. Odrediti domenu i prvu derivaciju funkcije: $f(x) = \ln(x^2 + 4) + \sin(2x - 3)$. 5+15

4. Odrediti tok funkcije $f(x) = x - \frac{1}{x}$. 15(graf)

5. Odrediti i provjeriti uvrštavanjem: $\lim_{x \to -4} \frac{x^2 - 4}{x^2 + 8x + 16} =$ 4+1

6. Odredi derivaciju funkcije $f(x) = \frac{4}{\sin(4x)}$ 10

7. Odrediti tangentu na funkciju $f(x) = \cos x$ tamo gdje je $x = \frac{\pi}{4}$. Nacrtati graf funkcije i nacrtati izračunatu tangentu. 15+3+2

Ukupno: 5

(6) $f(x) = \frac{4}{\sin(4x)}$

$f'(x) = \frac{4' \cdot \sin(4x) - 4 \cdot (\sin(4x))'}{(\sin(4x))^2} =$

$= \frac{0 \cdot \sin(4x) - 4 \cdot \cos 4 \cdot (4x)'}{(\sin(4x))^2}$

$= \frac{-16 \cos}{(\sin(4x))^2}$

(3) $D = \mathbb{R}$ ✓

②
$$\left[\begin{array}{cccc|c} 1 & -2 & 3 & -4 & 8 \\ 0 & 1 & -1 & 1 & -2 \\ 1 & 3 & 0 & -3 & 6 \\ 0 & -7 & 3 & 1 & -2 \end{array}\right] \sim \left[\begin{array}{cccc|c} 1 & -2 & +3 & -4 & +8 \\ 0 & 1 & -1 & 1 & -2 \\ 0 & -5 & 3 & -1 & 2 \\ 0 & -7 & 3 & 1 & -2 \end{array}\right] \sim$$

3. r. · (−1) + 1. r.

1. r. · 2 +

$$\left[\begin{array}{cccc|c} & & & & \\ & & & & \\ & & & & \\ & & & & \end{array}\right]$$

LÁTUS

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod⇊ B1

IME I PREZIME: Josip Barić **BROJ INDEKSA:** 17-1-0298-2014

POPUNJAVA NASTAVNIK
Broj ↓ bodova

1. Neka su z_1 i z_2 rjesenja kvadratne jednadzbe $z^2 - z + 4 = 0$. *Prikaži ih u kompleksnoj ravnini i provjeri uvrštavanjem!* Dalje izracunaj: $\overline{\left(\frac{z_1 - z_2}{z_2 + 4}\right)}$. 4+3+8

2. Riješi sustav Gaussovom metodom i obavezno provjeri rješenje: 10+5

$$\begin{array}{rcrcrcr} x_1 & - & 2x_2 & + & 3x_3 & - & 4x_4 = & 8 \\ & & x_2 & - & x_3 & + & x_4 = & -2 \\ x_1 & + & 3x_2 & & & - & 3x_4 = & 6 \\ & - & 7x_2 & + & 3x_3 & + & x_4 = & -2 \end{array}$$

3. Odrediti domenu i prvu derivaciju funkcije: $f(x) = \ln(x^2 + 4) + \sin(2x - 3)$. 5+15

4. Odrediti tok funkcije $f(x) = x - \frac{1}{x}$. 15(graf)

5. Odrediti i provjeriti uvrštavanjem: $\lim_{x \to -4} \frac{x^2 - 4}{x^2 + 8x + 16} =$ 4+1

6. Odredi derivaciju funkcije $f(x) = \frac{4}{\sin(4x)}$ 10

7. Odrediti tangentu na funkciju $f(x) = \cos x$ tamo gdje je $x = \frac{\pi}{4}$. Nacrtati graf funkcije i nacrtati izračunatu tangentu. 15+3+2

Ukupno: Ø

Ime i prezime: Josip Borić **Broj indeksa:** 17-1-0228-2014

1.) $\bar{z}^2 - z + 4 = 0$

$\left(\frac{\overline{z_1 - z_2}}{z_2 + 4}\right)$

6) $f(x) = \frac{4}{\sin(4x)}$

$f'(x) = \frac{2 \cdot \sin(4x)}{2\sin(4x)}$ ✗

$f'(x) = \frac{2\sin(8x)}{\sin(8x)}$

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod⇊ B1

IME I PREZIME: DANIEL NOVOSEL **BROJ INDEKSA:** 17-1-0262-2014 0269088807

POPUNJAVA NASTAVNIK Broj ↓ bodova

1. Neka su z_1 i z_2 rjesenja kvadratne jednadzbe $z^2 - z + 4 = 0$. *Prikaži ih u kompleksnoj ravnini i provjeri uvrštavanjem!* Dalje izracunaj: $\overline{\left(\frac{z_1 - z_2}{z_2 + 4}\right)}$. 4+3+8

2. Riješi sustav Gaussovom metodom i obavezno provjeri rješenje: 10+5

$$\begin{array}{rcrcrcr} x_1 & - & 2x_2 & + & 3x_3 & - & 4x_4 = & 8 \\ & & x_2 & - & x_3 & + & x_4 = & -2 \\ x_1 & + & 3x_2 & & & - & 3x_4 = & 6 \\ & - & 7x_2 & + & 3x_3 & + & x_4 = & -2 \end{array}$$

3. Odrediti domenu i prvu derivaciju funkcije: $f(x) = \ln(x^2 + 4) + \sin(2x - 3)$. 5+15

4. Odrediti tok funkcije $f(x) = x - \frac{1}{x}$. 15(graf)

5. Odrediti i provjeriti uvrštavanjem: $\lim_{x \to -4} \frac{x^2 - 4}{x^2 + 8x + 16} =$ 4+1

6. Odredi derivaciju funkcije $f(x) = \frac{4}{\sin(4x)}$ 10

7. Odrediti tangentu na funkciju $f(x) = \cos x$ tamo gdje je $x = \frac{\pi}{4}$. Nacrtati graf funkcije i nacrtati izračunatu tangentu. 15+3+2

Ukupno:

0

1. $\overline{\frac{z_1 - z_2}{z_2 + 4}}$ $\quad z^2 - z + 4 = 0$

NOVOSEL

$$f(x) = \frac{4}{\sin(4x)}$$

2.

$$x_1 - 2x_2 + 3x_3 - 3x_4 = 8$$
$$x_2 - x_3 + x_4 = -2 \mid \cdot 2$$
$$x_1 + 3x_2 + 0 - 3x_4 = 6$$
$$-7x_2 + 3x_3 + x_4 = -2$$

$$x_1 - 2x_2 + 3x_3 - 3x_4 = 8$$
$$2x_2 - 2x_3 + 2x_4 = -4$$
$$x_1 + x_3 - x_4 = 4 \quad \mid \cdot (-1)$$
$$x_1 + 3x_2 - 3x_4 = 6$$
$$-x_1 - x_3 + x_4 = -4$$

$$3x_2 - x_3 - 2x_4 = 2 \mid \cdot (-3)$$
$$-7x_2 + 3x_3 + x_4 = -2$$
$$-9x_2 - 3x_3 - 2x_4 = -6$$
$$-16x_2 - x_4 = -8$$

$f(x) = \cos x$, $x = \frac{\pi}{4}$

$f(x) = \ln(x^2 + 4) + \sin(2x - 3)$