MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod⇓⇓ $\mathcal{E}5$

IME I PREZIME: Mateo Ćelina **BROJ INDEKSA:** 17-2-0206-2012

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

POPUNJAVA NASTAVNIK
Broj ↓ bodova

1. Među kompleksnim brojevima odrediti $\sqrt[3]{\frac{8+6i}{8-6i}}$. *Prikazati rješenja u kompleksnoj ravnini!* 10+5

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

$$\begin{array}{rcrcrcl} 4x & - & y & + & z & + & 2u = 14 \\ 2x & + & y & & & - & 3u = 2 \\ x & - & y & + & 2z & + & u = 3 \\ 2x & + & y & + & z & - & 4u = 0 \end{array}$$

3. Odrediti kada je $\frac{x+1}{\sqrt{x^2-x}} + 1 > 0$ i obavezno provjeriti rješenje. 13+2

4. Za funkciju: $f(x) = \sqrt{x^2+6x+6}$ treba:
   (a) pronaći drugu derivaciju 10
   (b) na temelju ispitivanja toka funkcije skicirati graf 20(graf)

5. Odrediti i provjeriti rješenje $\lim_{x\to+\infty}\left(\frac{n-4}{n}\right)^n =$ 8+2

6. Riješiti jednadžbu $\arccos x = e^x$ grafičkom metodom. *Provjeriti uvrštavanjem!* 10+5

Ukupno:

(4.) $f(x) = \sqrt{x^2+6x+6}$

1.) DOMENA

$\sqrt{x^2+6x+6} \geq 0$

$x^2+6x+6 \geq 0$

$x_{1/2} = \frac{-b \pm \sqrt{b^2-4\cdot a\cdot c}}{2a}$

$x_{1/2} = \frac{-6 \pm \sqrt{6^2-4\cdot 6}}{2}$

$x_{1/2} = \frac{-6 \pm \sqrt{36-24}}{2}$

$x_{1/2} = \frac{-6 \pm \sqrt{12}}{2}$

$x_1 = \frac{-6+\sqrt{12}}{2} = -1.27$

$x_2 = \frac{-6-\sqrt{12}}{2} = -4.73$

$Df: \langle -\infty, -4.73] \cup [-4.73, -1.27] \cup [-1.27, +\infty \rangle$

(2.) ASIMPTOTE

V.A

$\lim_{x\to -1.27^+} \sqrt{x^2+6x+6} = \sqrt{(-1.27)^2+6\cdot(-1.27)+6} = \sqrt{1.61-7.62+6}$

$= \sqrt{-0.01} = (0.1)^+ = +\infty$

$\lim_{x\to -1.27^-} \sqrt{x^2+6x+6} = \sqrt{(-1.27)^2+6\cdot(-1.27)+6} = \sqrt{1.61-7.62+6} = \sqrt{-0.01} = (0.1)^-$ $-\infty$

$\lim_{x\to -4.73^+} \sqrt{x^2+6x+6} = \sqrt{(-4.73)^2+6\cdot(-4.73)+6} = \sqrt{22.37-28.38+6} = \sqrt{-0.01}$

$= (0.1)^+ = +\infty$

$\lim_{x\to -4.73^-} \sqrt{x^2+6x+6} = \sqrt{(-4.73)^2+6\cdot(-4.73)+6} = \sqrt{22.37-28.38+6} = \sqrt{-0.01} = 0.1^-$ $-\infty$

$x_1 = 0.1 \quad y_2 = -0.1$

H.A

$\lim_{x\to\pm\infty} \sqrt{x^2+6x+6} \,/\, \sqrt{\quad}$ $\lim_{y\to\pm\infty} x^2+6x+6 \,/\, :x^2$

$= 1 + \frac{x^2}{6x} + \frac{x^2}{6}$

$= 1$

H.A = 1

(3.) GLOB. SUOJ.

Parnost

$f(x) = \sqrt{x^2+6x+6}$

$f(-x) = \sqrt{(-x)^2+6\cdot(-x)+6}$

$= \sqrt{x-6x+6}$

funkcija nije parna, a nije ni neparna, promijenio se samo jedan predznak.

funkcija nije periodična jer nema cos i sin.

(4.) NULTOČKE

$f(x) = \sqrt{x^2+6x+6}$

$\sqrt{x^2+6x+6}\ /$

$x^2+6x+6 = 0$

$1x^2+6x=-6$

$7x^2 = -6\ /:7$

$x^2 = -\frac{7}{6}\ /^2$

$x = \frac{49}{36}$

$f(x) = \sqrt{\left(\frac{49}{36}\right)^2+6\cdot\left(\frac{49}{36}\right)+6}$

$= \sqrt{\frac{2401}{1296}+\frac{49}{6}+6}$

$= \sqrt{16.01}$

$= 4$

(5.) DERIVACIJA $\frac{1}{2\sqrt{x}}\cdot(x)'$

$f'(x) = \sqrt{x^2+6x+6}$

$f'(x) = \frac{1}{2\sqrt{x^2+6x+6}}\cdot(x^2+6x+6)'$

$= \frac{1}{2\sqrt{x^2+6x+6}}\cdot 2x+6$

$= \boxed{\frac{2x+6}{2\sqrt{x^2+6x+6}}}$

$f''(x) = \frac{2x+6}{2\sqrt{x^2+6x+6}}$

$= \frac{(2x+6)'\cdot(2\sqrt{x^2+6x+6}) - (2x+6)\cdot(2\sqrt{x^2+6x+6})'}{(2\sqrt{x^2+6x+6})^2}$

NE

$= \frac{2\cdot(2\sqrt{x^2+6x+6}) - (2x+6)\cdot(2\cdot x+6x+6)'}{(2\sqrt{x^2+6x+6})^2}$

$= \frac{2(2\sqrt{x^2+6x+6}) - (2x+6)\cdot 8}{(2\cdot x^2+6x+6)^2}$

(6.) KRITIČNE TOČKE

$\frac{2x+6}{2\sqrt{x^2+6x+6}} = 0$

$2x+6 = 0$

$2x = -6\ /:2$

$x = -\frac{2}{6}\ /\frac{1}{3}$

$T\left(-\frac{1}{3}, 2\right)$

$f(x) = \sqrt{x^2+6x+6}$

$= \sqrt{\left(-\frac{1}{3}\right)^2+6\cdot\left(-\frac{1}{3}\right)+6}$

$= \sqrt{\frac{1}{9}-2+6}$

$= \sqrt{\frac{1}{9}+4} = \sqrt{\frac{37}{9}}$ (= 2)

$= \frac{2(2x+6x+6) - (2x+6)\cdot 8}{(2x+6x+6)^2}$

$= \frac{2\cdot 8\cdot(2x+6)(2x+6x+6)}{(2x+6x+6)^2}$

$= \frac{16(2x+6)}{8x+6}$ //

Nataša Čeligoj

7. MONOTONOST

$$\frac{2x+6}{2\sqrt{x^2+6x+6}} \geq 0$$

$2x+6 \geq 0$

$2x \geq -6 \mid :2$

$x \geq -\frac{2}{6}\frac{1}{3}$

$x \geq -\frac{1}{3}$

$2\sqrt{x^2+6x+6} \geq 0$

$2 \cdot x+6x+6 \geq 0$

$2x+6x+6 \geq 0$

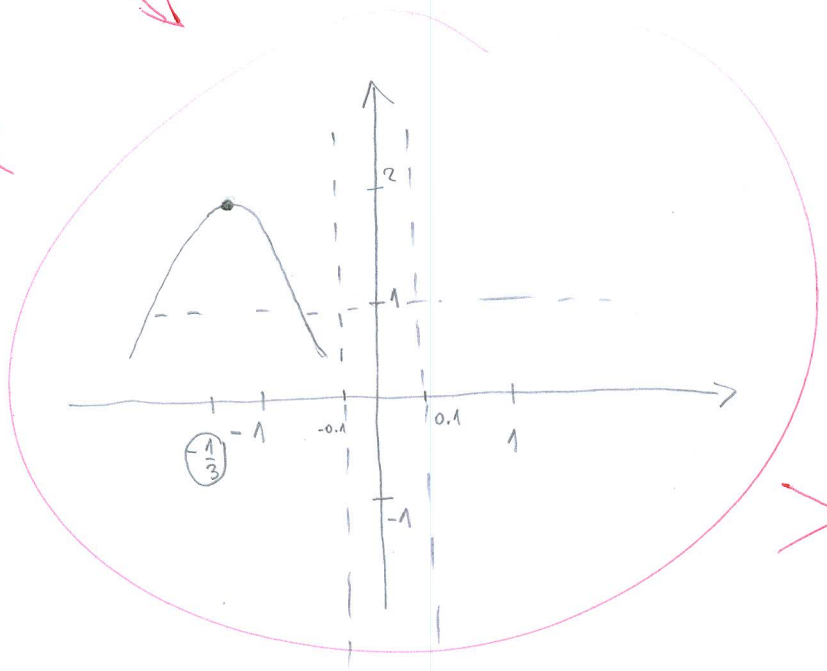
$8x+6 \geq 0$

$8x \geq -6 \mid :8$

$x \geq -\frac{8}{6}$

$x \geq -\frac{4}{3}$

	$-\infty$	$-\frac{5}{3}$	$-\frac{4}{3}$	$-\frac{3}{3}$	$-\frac{1}{3}$	0	$+\infty$
$2x+6$		$-$	$-$		$-$	$+$	
$2\sqrt{x^2+6x+6}$		$\cap$	$\cap$		$\cap$	$\cup$	



5. $\lim_{x \to +\infty} \left(\frac{n-4}{n}\right)^n \mid :n = \frac{1-\frac{n}{4}}{1} = \frac{0}{1} = 1$

(2.) $4x - y + z + 2u = 14$

$2x + y \quad 0 \quad - 3u = 2$

$x - y + 2z + u = 3$

$2x + y + z - 4u = 0$

4	−1	1	2	14
0	3	1	−1	−10
0	−5	7	2	22
0	3	0	6	−10

IV.−II

4	−1	1	2	14
2	1	0	−3	2
1	−1	2	1	3
2	1	1	−4	0

III−IV.

4	−1	1	2	14
0	0	−1	7	0
0	−5	7	2	22
0	3	0	6	−10

/:5

4	−1	1	2	14
2	1	0	−3	2
1	−1	2	1	3
0	0	−1	−7	0

/·2 −1

4	−1	1	2	14
0	0	−1	7	0
0	−1	$\frac{5}{7}$	$\frac{5}{2}$	$\frac{5}{22}$
0	3	0	6	−10

4	−1	1	2	14
4	2	0	−5	4
1	−1	2	1	3
0	0	−1	−7	0

II − I

4	−1	1	2	14
0	3	0	6	−10
0	−1	$\frac{5}{7}$	$\frac{5}{2}$	$\frac{5}{22}$
0	0	−1	7	0

4	−1	1	2	14
0	3	1	−1	−10
1	−1	2	1	3
0	0	−1	−7	0

/·4

4	−1	1	2	14
4	−4	8	4	12
0	0	−1	−7	0

I − III

4	−1	1	2	14
0	3	1	−1	−10
0	−5	7	2	22
0	0	−1	−7	0

/·(−1) II−IV

RJEŠENJE ?

1.

$\sqrt[3]{\frac{8+6i}{8-6i}} \quad / \cdot (8-6i)$

$\sqrt[3]{8+6i}$ ✗

$x = 8$

$y = 6i$

$n = 3$

$\varphi = 323^\circ 7' 48{,}37''$

$r = 10$

$tg\varphi = \frac{y}{x}$

$tg\varphi = \frac{6}{8}$

$\varphi = 36^\circ 52' 11.63''$

$360^\circ - \varphi = 323^\circ 7' 48{,}37''$

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

$= \sqrt{8^2 + 6^2}$

$= \sqrt{64 + 36}$

$= \sqrt{100}$

$= 10$

Kontrolle

$\sqrt[3]{\frac{8+6i}{8-6i}} = \sqrt[3]{\frac{8+6i}{8-6i} \cdot \frac{8+6i}{8+6i}} = \sqrt[3]{64+36} = \dots$

---

k = 0

$z_0 = \sqrt[n]{r}\left(\cos\frac{\varphi + k\cdot 360^\circ}{n} + i\sin\frac{\varphi + k\cdot 360^\circ}{n}\right)$

$z_0 = \sqrt[3]{10}\left(\cos\frac{323^\circ 7' 48{,}37'' + 0\cdot 360^\circ}{3} + i\sin\frac{323^\circ 7' 48{,}37'' + 0\cdot 360}{3}\right)$

$z_0 = 2.15(\cos 107.71 + i\sin 107.71)$

$z_0 = 2.15(-0.30 + 0.95i)$

$= \boxed{-0.6 + 2.0i}$

x y

k = 1

$z_1 = \sqrt[n]{r}\left(\cos\frac{\varphi + k\cdot 360^\circ}{n} + i\sin\frac{\varphi + k\cdot 360^\circ}{n}\right)$

$= 2.15\left(\cos\frac{323^\circ 7' 48{,}37'' + 1\cdot 360^\circ}{3} + i\sin\frac{323^\circ 7' 48{,}37'' + 1\cdot 360^\circ}{3}\right)$

$= 2.15(\cos 227.71 + i\sin 227.71)$

$= 2.15(-0.67 - 0.73i)$

$= \boxed{-1.4 - 1.5i}$

x y

k = 2

$z_2 = \sqrt[n]{r}\left(\cos\frac{\varphi + k\cdot 360^\circ}{n} + i\sin\frac{\varphi + k\cdot 360^\circ}{n}\right)$

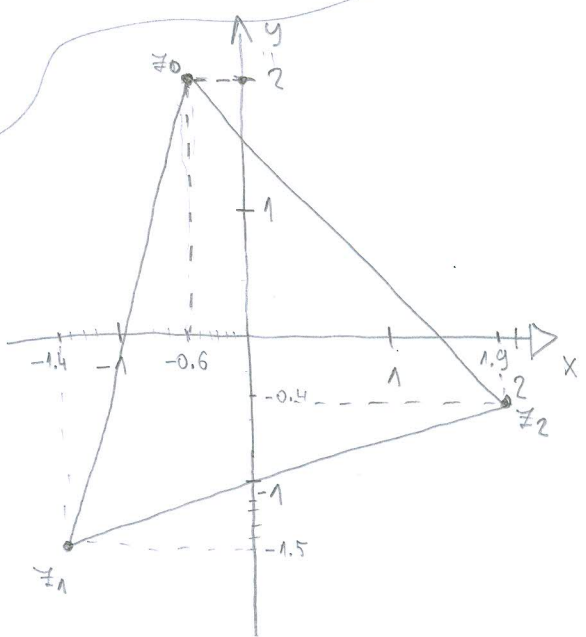
$= 2.15\left(\cos\frac{323^\circ 7' 48{,}37'' + 2\cdot 360^\circ}{3} + i\sin\frac{323^\circ 7' 48{,}37'' + 2\cdot 360^\circ}{3}\right)$

$= 2.15(\cos 347.71 + i\sin 347.71)$

$= 2.15(0.9 - 0.2i)$

$= \boxed{1.9 - 0.4i}$

x y



MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod⇊ $\mathcal{E}5$

IME I PREZIME: Ćosić Krešimir **BROJ INDEKSA:** IZ-2-0207-2012

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

POPUNJAVA NASTAVNIK Broj ↓ bodova

1. Među kompleksnim brojevima odrediti $\sqrt[3]{\frac{8+6i}{8-6i}}$. *Prikazati rješenja u kompleksnoj ravnini!* 10+5

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Ukupno: 23

5) $\lim_{n\to\infty} \left(\frac{n-4}{n}\right)^n = \lim_{n\to\pm\infty} \left(\frac{n}{n} + \frac{-4}{n}\right)^n$

$\lim_{n\to\pm\infty} \left(1 + \frac{-4}{n}\right)^n = \lim_{n\to\infty} \left(1 + \frac{1}{\frac{n}{-4}}\right)^{n\cdot\frac{-4}{-4}}$

$\lim_{n\to\infty} \left(\left(1 + \frac{1}{\frac{n}{-4}}\right)^{\frac{n}{-4}}\right)^{-4} = e^{-4} = \frac{1}{e^4}$ ✓

PROVJERA UVRŠTAVANJEM ?

2) $4x - y + z + 2v = 14$

$2x + y - 3v = 2$

$x - y + 2z + v = 3$

$2x + y + z - 4v = 0$

$$\begin{bmatrix} 4 & -1 & 1 & 2 & | & 14 \\ 2 & 1 & 0 & -3 & | & 12 \\ 1 & -1 & 2 & 1 & | & 3 \\ 2 & 1 & 1 & -4 & | & 0 \end{bmatrix} \sim \begin{bmatrix} 1 & -1 & 2 & 1 & | & 3 \\ 2 & 1 & 0 & -3 & | & 12 \\ 4 & -1 & 1 & 2 & | & 14 \\ 2 & 1 & 1 & -4 & | & 0 \end{bmatrix} \sim \begin{bmatrix} 1 & -1 & 2 & 1 & | & 3 \\ 0 & 3 & -4 & -4 & | & 6 \\ 0 & 3 & -3 & -2 & | & 2 \\ 0 & 3 & -3 & -6 & | & -6 \end{bmatrix} \sim$$

$$\sim \begin{bmatrix} 1 & -1 & 2 & 1 & | & 3 \\ 0 & 1 & -\frac{4}{3} & -\frac{4}{3} & | & 2 \\ 0 & 3 & -3 & -2 & | & 2 \\ 0 & 3 & -3 & -6 & | & -6 \end{bmatrix} \sim \begin{bmatrix} 1 & 0 & \frac{2}{3} & -\frac{1}{3} & | & 5 \\ 0 & 1 & -\frac{4}{3} & -\frac{4}{3} & | & 2 \\ 0 & 0 & -3 & 2 & | & -4 \\ 0 & 0 & 1 & -2 & | & -12 \end{bmatrix} \sim \begin{bmatrix} 1 & 0 & \frac{2}{3} & -\frac{1}{3} & | & 5 \\ 0 & 1 & -\frac{4}{3} & -\frac{4}{3} & | & 2 \\ 0 & 0 & 1 & -\frac{2}{3} & | & -12 \\ 0 & 0 & -3 & 2 & | & -4 \end{bmatrix} \sim$$

$$\sim \begin{bmatrix} 1 & 0 & 0 & 1 & | & 13 \\ 0 & 1 & 0 & -4 & | & -14 \\ 0 & 0 & 1 & -2 & | & -12 \\ 0 & 0 & 0 & -4 & | & -10 \end{bmatrix} \sim \begin{bmatrix} 1 & 0 & 0 & 0 & | & 3 \\ 0 & 1 & 0 & 0 & | & 26 \\ 0 & 0 & 1 & 0 & | & 8 \\ 0 & 0 & 0 & 1 & | & 10 \end{bmatrix}$$

$x = 3$

$y = 26$

$z = 8$

$v = 10$ ✓

Provjera:

$4x - y + z + 2v = 14$

$4 \cdot 3 - 26 + 8 + 2 \cdot 10 = 14$

$12 - 26 + 8 + 20 = 14$

$-14 + 28 = 14$

$14 = 14$ ✓

$2x + y - 3v = 2$

$2 \cdot 3 + 26 - 3 \cdot 10 = 2$

$6 + 26 - 30 = 2$

$2 = 2$ ✓

$x - y + 2z + v = 3$

$3 - 26 + 2 \cdot 8 + 10 = 3$

$-23 + 26 = 3$

$3 = 3$ ✓

$2x + y + z - 4v = 0$

$2 \cdot 3 + 26 + 8 - 4 \cdot 10 = 0$

$6 + 26 + 8 - 40 = 0$

$0 = 0$ ✓

g) $f(x) = \sqrt{x^2+6x+6} - (x^2+6x+6)^{\frac{1}{2}}$

$f'(x) = \frac{1}{2}(x^2+6x+6)^{-\frac{1}{2}} \cdot (2x+6) = \frac{2x+6}{2(x^2+6x+6)^{\frac{1}{2}}} = \frac{2x+6}{2\cdot\sqrt{x^2+6x+6}}$ ✓

$f''(x) = \frac{(2x+6)' \cdot \sqrt{4x^2+24x+24} - (2x+6)(\sqrt{4x^2+24x+24})'}{(2\sqrt{x^2+6x+6})^2}$

$= \frac{2\cdot 2\sqrt{x^2+6x+6} - (2x+6)\frac{1}{2}(4x^2+24x+24)^{-\frac{1}{2}}}{4x^2+24x+24}$ ✗

$= \frac{4\sqrt{x^2+6x+6} - \frac{16x^2+48x+48x+144}{2\sqrt{4x^2+24x+24}}}{4x^2+24x+24}$ ✗

$= \frac{4\sqrt{x^2+6x+6} - \frac{+(12^2+24x+24+36)}{+\sqrt{x^2+6x+6}}}{4x^2+24x+24}$

$= \frac{4x^2+24x+24 - 4x^2-24x-36}{4\sqrt{x^2+6x+6}}$

$= \frac{-12}{\sqrt{x^2+6x+6}}$

$\frac{-12}{4x^2+24x+24} = \frac{-12}{(4x^2+24x+24)\cdot\sqrt{x^2+6x+6}}$

Ćosić Krešimir

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IME I PREZIME: FLAVIO ABATINOVIĆ **BROJ INDEKSA:** 17-2-0162-2012

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

POPUNJAVA NASTAVNIK
Broj ↓ bodova

1. Među kompleksnim brojevima odrediti $\sqrt[3]{\frac{8+6i}{8-6i}}$. *Prikazati rješenja u kompleksnoj ravnini!* 10+5

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6. Riješiti jednadžbu $\arccos x = e^x$ grafičkom metodom. *Provjeriti uvrštavanjem!* 10+5

Ukupno:

4. $f(x) = \sqrt{x^2+6x+6}$ → kvadratna, parabola u grafu

1. DOMENA

$x^2+6x+6 \geq 0$

$x^2+6x \geq -6$

$x(x+6) \geq -6$

$x \geq -6 \quad x+6 \geq -6$

$D(f) = [-6, +\infty\rangle$

2. NULTOČKE

$x^2+6x+6=0$

$\sqrt{12} = \sqrt{4\cdot 3} = 2\sqrt{3}$

$x_{1,2} = \frac{-6 \pm \sqrt{36-24}}{2}$

$x_{1,2} = \frac{-6 \pm \sqrt{12}}{2}$

$x_{1,2} = \frac{-6 \pm 2\sqrt{3}}{2}$

$x_1 = \frac{-6-2\sqrt{3}}{2} = -3-\sqrt{3} \approx -4,7$

$x_2 = \frac{-6+2\sqrt{3}}{2} = -3+\sqrt{3} \approx -1,27$

$N_1(-4,7, 0)$

$N_2(-1,27, 0)$

3. EKSTREMI

$f(x)=\sqrt{x^2+6x+6}$

$f'(x)=\frac{1}{2\sqrt{x^2+6x+6}}\cdot 2x+6$

$f'(x)=\frac{2x+6}{2\sqrt{x^2+6x+6}}$

$2x+6=0$

$2x=-6/2$

$x=-\frac{6}{2}=-3$

$\boxed{x=-3}$

$y=\sqrt{(-3)^2+6\cdot(-3)+6}$

$y=\sqrt{9-18+6}$

$y=\sqrt{-3}$

Nemoguće $y=-3i$

Se uvrstiti $-b$ pod korijen, jer dobije i :

f'' = ?

GRAF ?

	$-\infty$	->	$+\infty$
$f'(x)$			
$f(x)$			

5. $\frac{x+1}{\sqrt{x^2-x}}+1>0$

$x=1$

$\frac{1+1}{\sqrt{1-1}}+\frac{1}{1}>0$

$\frac{1+1}{\sqrt{0}}+\frac{1}{1}$

$\frac{1+1}{+0}+\frac{1}{1}$

$\frac{+\infty+1}{1}=\frac{1}{1}=1>0$

2. $4x - y + z + 2u = 14$

$2x + y - 3u = 2$

$x - y + 2z + u = 3$

$2x + y + z - 4u = 0$

$$\left[\begin{array}{cccc|c} 4 & -1 & 1 & 2 & 14 \\ 2 & 1 & 0 & -3 & 2 \\ 1 & -1 & 2 & 1 & 3 \\ 2 & 1 & 1 & -4 & 0 \end{array}\right] \leftarrow \left[\begin{array}{cccc|c} 1 & -1 & 2 & 1 & 3 \\ 2 & 1 & 0 & -3 & 2 \\ 4 & -1 & 1 & 2 & 14 \\ 2 & 1 & 1 & -4 & 0 \end{array}\right] \begin{array}{l} \\ \cdot(-2) \\ \cdot(-4) \\ \cdot(-2) \end{array} \left[\begin{array}{cccc|c} 1 & -1 & 2 & 1 & 3 \\ 0 & 2 & -4 & -5 & -4 \\ 0 & 3 & -7 & -2 & 2 \\ 0 & 3 & -3 & -6 & -6 \end{array}\right] \begin{array}{l} \\ :3 \\ \\ \end{array}$$

I $\cdot(-2)$ II

$$\left[\begin{array}{cccc|c} 1 & -1 & 2 & 1 & 3 \\ 0 & 2 & -4 & -5 & -4 \\ 0 & 3 & -7 & -2 & 2 \\ 0 & 1 & -1 & -2 & -2 \end{array}\right] \leftarrow \left[\begin{array}{cccc|c} 1 & 0 & 1 & -1 & 1 \\ 0 & 2 & -4 & -5 & -4 \\ 0 & 3 & -7 & -2 & 2 \\ 0 & 1 & -1 & -2 & 2 \end{array}\right] \begin{array}{l} \\ \\ \\ \cdot(-1) \end{array} \left[\begin{array}{cccc|c} 1 & 0 & 1 & -1 & 1 \\ 0 & 1 & -3 & -3 & -6 \\ 0 & 3 & -7 & -2 & 2 \\ 0 & 1 & -1 & -2 & 2 \end{array}\right] \begin{array}{l} \\ \\ \\ \cdot(-3) \end{array}$$

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

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

$$\left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & -6 \\ 0 & 1 & 0 & 0 & 6 \\ 0 & 0 & 1 & 0 & 5 \\ 0 & 0 & 0 & 1 & -2 \end{array}\right] \qquad \begin{array}{l} x = -6 \\ y = 6 \\ z = 5 \\ u = -2 \end{array}$$

PROVJERA?

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod⇊ ε5

IME I PREZIME: IVAN DOMAĆ ORŠAN **BROJ INDEKSA:** 57 668

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

POPUNJAVA NASTAVNIK Broj ↓ bodova

1. Među kompleksnim brojevima odrediti $\sqrt[3]{\frac{8+6i}{8-6i}}$. *Prikazati rješenja u kompleksnoj ravnini!* 10+5

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

$$\begin{array}{rcrcrcrcl} 4x & - & y & + & z & + & 2u & = & 14 \\ 2x & + & y & & & - & 3u & = & 2 \\ x & - & y & + & 2z & + & u & = & 3 \\ 2x & + & y & + & z & - & 4u & = & 0 \end{array}$$

3. Odrediti kada je $\frac{x+1}{\sqrt{x^2-x}} + 1 > 0$ i obavezno provjeriti rješenje. 13+2

4. Za funkciju: $f(x) = \sqrt{x^2+6x+6}$ treba:

   (a) pronaći drugu derivaciju 10

   (b) na temelju ispitivanja toka funkcije skicirati graf 20(graf)

5. Odrediti i provjeriti rješenje $\lim_{x\to+\infty}\left(\frac{n-4}{n}\right)^n =$ 8+2

6. Riješiti jednadžbu $\arccos x = e^x$ grafičkom metodom. *Provjeriti uvrštavanjem!* 10+5

Ukupno:

4. $f(x) = \sqrt{x^2+6x+6}$

$f'(x) = \frac{1}{2\sqrt{x^2+6x+6}} \cdot 2x + 6$

$f'(x) = \frac{x+6}{\sqrt{x^2+6x+6}}$

$f''(x) = \frac{1\cdot\sqrt{x^2+6x+6} - (x+6)\cdot\frac{1}{2\sqrt{x^2+6x+6}}\cdot(2x+6)}{(\sqrt{x^2+6x+6})^2}$

$f''(x) = \frac{\sqrt{x^2+6x+6} - \frac{x+6}{2\sqrt{x^2+6x+6}}\cdot(2x+6)}{(\sqrt{x^2+6x+6})^2}$

$f''(x) = \frac{\sqrt{x^2+6x+6} - \frac{2x^2+12x+6x+36}{2\sqrt{x^2+6x+6}}}{(\sqrt{x^2+6x+6})^2}$

$f''(x) = \frac{\sqrt{x^2+6x+6} - 2x^2+12x+36}{x^2+6}$

GRAF?

$D: 1 \cup$

$x^2+6x+6 \geq 0$

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

$x_{1,2} = \frac{-6 \pm \sqrt{6^2-4\cdot1\cdot6}}{2}$

$x_{1,2} = \frac{-6 \pm \sqrt{36-24}}{2}$

$x_1 = \frac{-6+\sqrt{12}}{2}$

$x_1 = -1{,}27$

$x_2 = \frac{-6-\sqrt{12}}{2}$

$x_2 = -4{,}73$

$x+6 = 0$

$x = -6$

$-4{,}73 \quad -1{,}27$

$f'(x)$	+	+	+
$f(x)$	↗	↗	↗

$D: x \in \langle -\infty, -4{,}73] \cup [-1{,}27, +\infty\rangle$

$$\left[\begin{array}{cccc|c} 4 & -1 & 1 & 2 & 14 \\ 2 & 1 & 0 & -3 & 2 \\ 1 & -1 & 2 & 1 & 3 \\ 2 & 1 & 1 & -4 & 0 \end{array}\right] \sim \left[\begin{array}{cccc|c} 1 & -1 & 2 & 1 & 3 \\ 2 & 1 & 0 & -3 & 2 \\ 4 & -1 & 1 & 2 & 14 \\ 2 & 1 & 1 & -4 & 0 \end{array}\right] \begin{array}{l} /\cdot(-2) \\ + \\ + \\ /\cdot(-4) \end{array}$$

$$\left[\begin{array}{cccc|c} 1 & -1 & 2 & 1 & 3 \\ 0 & 3 & -4 & -5 & -4 \\ 0 & 3 & -7 & -2 & 8 \\ 0 & 3 & -4 & -6 & -6 \end{array}\right] \begin{array}{l} /\cdot\frac{1}{3} \\ \sim \\ /\cdot(-1) \end{array} \left[\begin{array}{cccc|c} 1 & -1 & 2 & 1 & 3 \\ 0 & 1 & -\frac{4}{3} & -\frac{5}{3} & -\frac{4}{3} \\ 0 & 0 & -3 & 3 & 12 \\ 0 & 3 & -4 & -6 & -6 \end{array}\right] /\cdot\left(-\frac{1}{3}\right)$$

$$\left[\begin{array}{cccc|c} 1 & -1 & 2 & 1 & 3 \\ 0 & 1 & -\frac{4}{3} & -\frac{5}{3} & -\frac{4}{3} \\ 0 & 0 & 1 & -1 & -4 \\ 0 & 3 & -4 & -6 & -6 \end{array}\right] \begin{array}{l} /\cdot 1 \\ /\cdot \\ \sim \end{array} \left[\begin{array}{cccc|c} 1 & 0 & -\frac{2}{3} & \frac{2}{3} & -\frac{5}{3} \\ 0 & 1 & -\frac{4}{3} & -\frac{5}{3} & -\frac{4}{3} \\ 0 & 0 & 1 & -1 & -4 \\ 0 & 3 & -4 & -6 & -6 \end{array}\right] -3$$

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

RJEŠENJE