MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod⇓⇓ C7

IME I PREZIME: Matea Čulina **BROJ INDEKSA:** 17-2-0206-2012

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

POPUNJAVA NASTAVNIK Broj ↓ bodova

1. Među kompleksnim brojevima odrediti rješenja jednadžbe $z^3 = -(-i)^{886}$. *Prikazati rješenja u kompleksnoj ravnini!* 10+5

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

$$\begin{aligned} 5x + 4z + 2t &= 3 \\ x - y + 2z + t &= 1 \\ 4x + y + 2z &= 1 \\ x + y + z + t &= 0 \end{aligned}$$

3. Odrediti kada je $\frac{x+1}{\sqrt{x^2-x}} - 1 > 0$. Obavezno uvrštavanjem provjeriti rješenje jednadžbi koje se javljaju tokom rješavanja nejednadžbe. 13+2

4. Za funkciju: $f(x) = \sqrt{x^2+8x+5}$ treba:
   (a) pronaći drugu derivaciju 10
   (b) na temelju ispitivanja toka funkcije skicirati graf 20(graf)

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

6. Riješiti jednadžbu $\log_{10} x = \arctan x$ grafičkom metodom. *Provjeriti uvrštavanjem!* 10+5

Ukupno: 0

4. $f(x) = \sqrt{x^2+8x+5}$

a) druga derivacija

$f'(x) = \left((x^2+8x+5)^{\frac{1}{2}}\right)'$

$= \frac{1}{2}(x^2+8x+5)^{-\frac{1}{2}} \cdot (x^2+8x+5)'$

$= \frac{1}{2}(x^2+8x+5)^{-\frac{1}{2}} \cdot (2x+8)$ ✓

$f''(x) = -\frac{1}{4}(x^2+8x+5)^{-\frac{3}{2}} \cdot (2x+8) \cdot 2$ ✗

$= -\frac{1}{2}(x^2+8x+5)^{-\frac{3}{2}}(2x+8)$

b) 1. domena

$x^2+8x+5 \geq 0$

$9x^2+5 \geq 0$

$9x^2 \geq 5 \mid^2$

$9x \geq \pm\sqrt{5} \mid :9$

$x \geq \frac{\pm\sqrt{5}}{9}$

$x \geq 0.24$

$x_1 = 0.24$

$x_2 = -0.24$

$D_f = \langle -\infty, -0.24\rangle \cup \langle -0.24, 0.24\rangle \cup \langle 0,24, +\infty\rangle$

GRAF.?

2. ZADATAK

$5x + 4z + 2t = 3$

$x - y + 2z + t = 1$

$4x + y + 2z = 1$

$x + y + z + t = 0$

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

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

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

$$\left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 0 \\ 0 & 1 & \frac{4}{3} & \frac{2}{3} & \frac{1}{3} \\ 0 & -2 & 1 & 0 & 1 \\ 0 & -5 & 0 & 2 & 3 \end{array}\right] \cdot(+2) \cdot(-1) \qquad \left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 0 \\ 0 & 2 & 11 & 8 & 1 \\ 0 & 1 & 0 & 3 & \frac{1}{3} \\ 0 & -5 & 9 & 2 & 3 \end{array}\right]$$

$$\left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 0 \\ 0 & 1 & \frac{4}{3} & \frac{2}{3} & \frac{1}{3} \\ 0 & 1 & \frac{1}{3} & 0 & -\frac{1}{2} \\ 0 & 0 & \frac{13}{2} & -2 & \frac{1}{2} \end{array}\right] - \qquad \left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 0 \\ 0 & 1 & \frac{4}{3} & \frac{2}{3} & \frac{1}{3} \\ 0 & 0 & 11 & 0 & 5 \\ 0 & 0 & \frac{13}{2} & 2 & 1 \end{array}\right] \cdot 6 \cdot 2$$

$$\left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 0 \\ 0 & 1 & \frac{4}{3} & \frac{2}{3} & \frac{1}{3} \\ 0 & 0 & 11 & 0 & 5 \\ 0 & 0 & 13 & 4 & 1 \end{array}\right] - \qquad \left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 0 \\ 0 & 1 & \frac{4}{3} & \frac{2}{3} & \frac{1}{3} \\ 0 & 0 & 11 & 0 & 5 \\ 0 & 0 & -2 & 4 & -4 \end{array}\right] \cdot 2$$

$$\left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 0 \\ 0 & 1 & \frac{4}{3} & \frac{2}{3} & \frac{1}{3} \\ 0 & 0 & 11 & 0 & 5 \\ 0 & 0 & 1 & -2 & 2 \end{array}\right] \qquad \left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 0 \\ 0 & 1 & \frac{4}{3} & \frac{2}{3} & \frac{1}{3} \\ 0 & 0 & 1 & -2 & 2 \\ 0 & 0 & 11 & 0 & 5 \end{array}\right]$$

$$\left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 0 \\ 0 & 1 & \frac{4}{3} & \frac{2}{3} & \frac{1}{3} \\ 0 & 0 & 1 & -2 & 2 \\ 0 & 0 & 0 & -22 & 17 \end{array}\right]$$

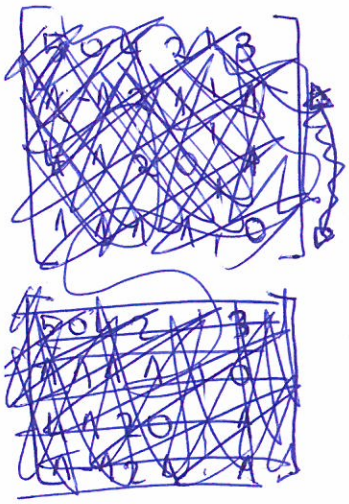
$x + y + z + t = 0$

$y + \frac{4}{3}z + \frac{2}{3}t = \frac{1}{3}$

$z - 2t = 2$

$-22t = 17$

$t = \frac{17}{22}$



$$x + \frac{8}{33} + \frac{5}{11} + \frac{17}{22} = 0$$

$$x + \frac{16 + 30 - 51}{66} = 0$$

$$x + \frac{-5}{66} = 0$$

$$x = \frac{5}{66}$$

VIDI RADAS

IME I PREZIME: Matea Čulina

BROJ INDEKSA: 17-2-0206-2012

1.) $z^3 = -(-i)^{886}$

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

$z^3 = -(2)^2$ ✗

$z^3 = -4 \mid^3$

$z = \sqrt[3]{-4}$

$|z| = r = \sqrt{x^2+y^2} = \sqrt{(-4)^2+0^2}$

$= \sqrt{16}$

$= 4$

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

$= \frac{0}{-4}$

$\varphi = 0°$

$360° - \varphi = 360°$

$x = -4$

$y = 0$

$n = 3$

$r = 4$

$\varphi = 360°$

17A

$k = 0$

$z = \sqrt[n]{r}\left(\cos\frac{\varphi + 2\pi \cdot k}{n} + i\sin\frac{\varphi + 360°}{n}\right)$

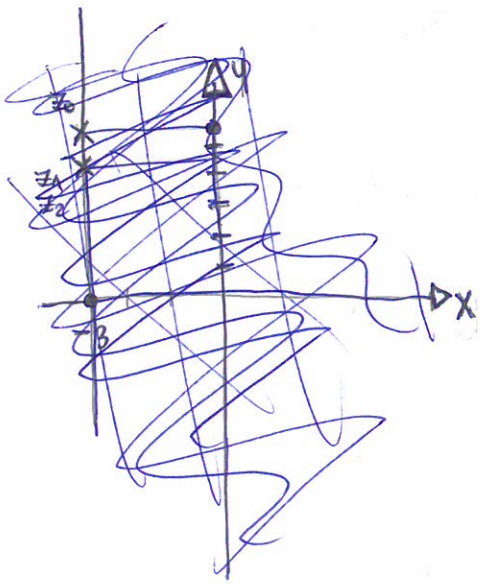
$z = \sqrt[3]{4}\left(\cos\frac{0+360°}{3} + i\sin\frac{0+360°}{3}\right)$

$z = 6(\cos 120 + i\sin 120)$

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

$z_0 = -3 + 5.19i$

x y



$k = 1$

$z = 6\left(\cos\frac{1+360°}{3} + i\sin\frac{1+360°}{3}\right)$

$z = 6(\cos 120.3 + i\sin 120.3)$

$z = 6(-0.5 + 0.8i)$

$z_1 = -3 + 4,8i$

x y

$k = 1$

$z = 6\left(\cos\frac{4+1+360}{3} + i\sin\right)$

$k = 2$

$z = 6\left(\cos\frac{2+360°}{3} + i\sin\frac{2+360°}{3}\right)$

$z = 6(-0.5 + 0.8)$

$z_2 = -3 + 4,8i$

x y

[redacted]

$k=0$

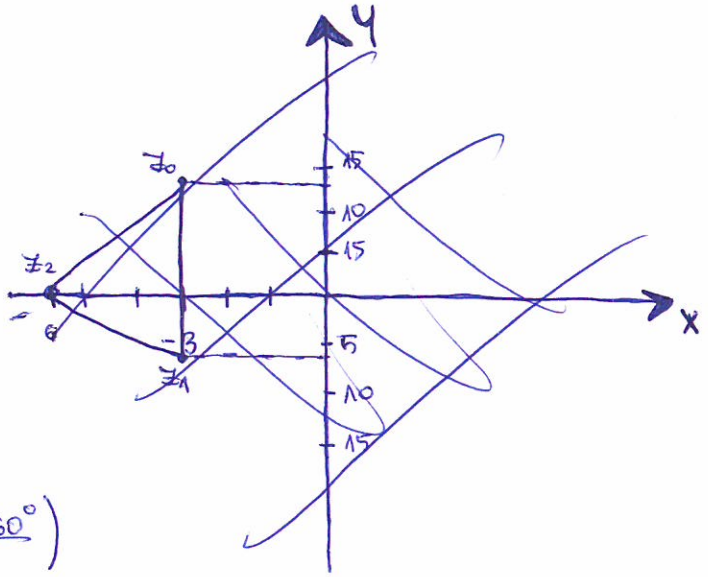
$z_0 = 6(\cos 120 + i \sin 120)$

$= 6(-0.5 + 0.86)$

$= -3 + 14.6$

x y

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



$k=1$

$z_1 = \sqrt[3]{4}\left(\cos \frac{360° \cdot 1 + 360°}{3} + i \sin \frac{360° \cdot 1 + 360°}{3}\right)$

$= 6(\cos 240 + i \sin 240)$

$= 6(-0.5 - 0.86i)$

$= -3 - 5.1i$

x y

[redacted]

$k=2$

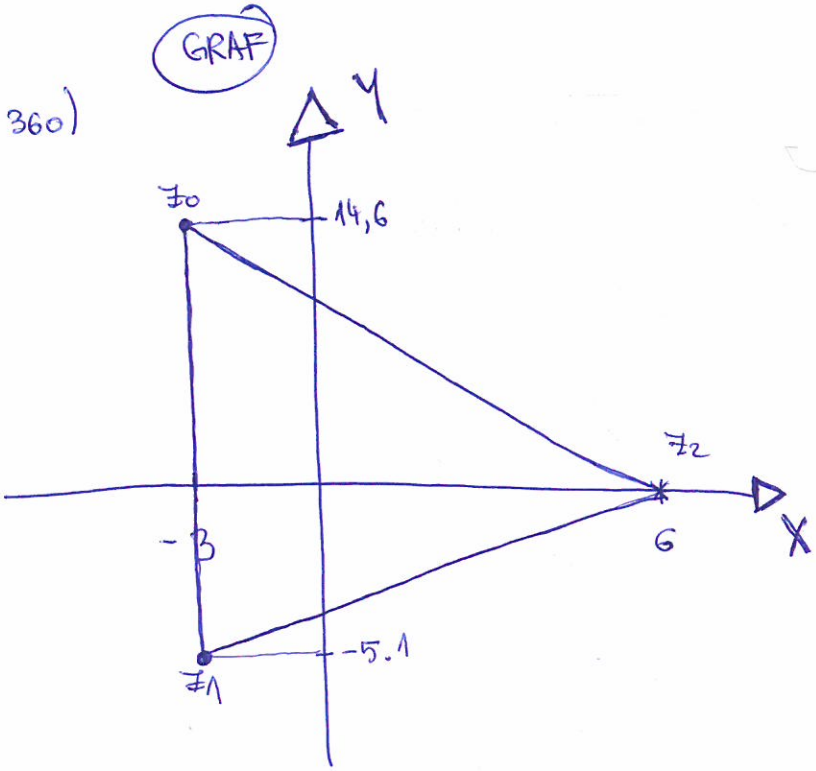
$z_2 = 6(\cos 360 + i \sin 360)$

$= 6(1 + 0)$

$= 6 + 0$

x y

GRAF



MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod⇊ C7

IME I PREZIME: MATE RADAŠ **BROJ INDEKSA:** 17-2-0183-2012

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

POPUNJAVA NASTAVNIK
Broj ↓ bodova

1. Među kompleksnim brojevima odrediti rješenja jednadžbe $z^3 = -(-i)^{886}$. *Prikazati rješenja u kompleksnoj ravnini!* 10+5

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4. Za funkciju: $f(x) = \sqrt{x^2 + 8x + 5}$ treba:

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

6. Riješiti jednadžbu $\log_{10} x = \arctan x$ grafičkom metodom. *Provjeriti uvrštavanjem!* 10+5

Ukupno: 48

2e) $5x + 4z + 2t = 3$

$x - y + 2z + t = 1$

$4x + y + 2z = 1$

$x + y + z + t = 0$

$$\left[\begin{array}{cccc|c} 5 & 0 & 4 & 2 & 3 \\ 1 & -1 & 2 & 1 & 1 \\ 4 & 1 & 2 & 0 & 1 \\ 1 & 1 & 1 & 1 & 0 \end{array}\right] \begin{array}{l} \\ \\ \\ 1.\text{A} \leftrightarrow 4.\text{A} \end{array} \sim \left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 0 \\ 1 & -1 & 2 & 1 & 1 \\ 4 & 1 & 2 & 0 & 1 \\ 5 & 0 & 4 & 2 & 3 \end{array}\right] \begin{array}{l} 2.\text{A} - 1.\text{A} \\ 3.\text{A} - 4 \times 1.\text{A} \\ 4.\text{A} - 5 \times 1.\text{A} \end{array}$$

$$\sim \left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 0 \\ 0 & -2 & 1 & 0 & 1 \\ 0 & -3 & -2 & -4 & -1 \\ 0 & -5 & -1 & -3 & 3 \end{array}\right] \begin{array}{l} \\ 2.\text{A} - 3.\text{A} \\ \\ \end{array} \sim \left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 0 \\ 0 & 1 & 3 & 4 & 0 \\ 0 & -3 & -2 & -4 & 1 \\ 0 & -5 & -1 & -3 & 3 \end{array}\right] \begin{array}{l} 1.\text{A} - 2.\text{A} \\ \\ 3.\text{A} + 3 \times 2.\text{A} \\ 4.\text{A} + 5 \times 2.\text{A} \end{array} \sim$$

$$\left[\begin{array}{cccc|c} 1 & 0 & -2 & -3 & 0 \\ 0 & 1 & 3 & 4 & 0 \\ 0 & 0 & 7 & 8 & 1 \\ 0 & 0 & 14 & 17 & 3 \end{array}\right] \begin{matrix} \\ \\ \\ L_4 - 2 \times L_3 \end{matrix} \left[\begin{array}{cccc|c} 1 & 0 & -2 & -3 & 0 \\ 0 & 1 & 3 & 4 & 0 \\ 0 & 0 & 7 & 8 & 1 \\ 0 & 0 & 0 & 1 & 1 \end{array}\right]$$

$x - 2z - 3t = 0 \Rightarrow x - 2 \cdot (-1) - 3 \cdot 1 = 0 \Rightarrow x + 2 - 3 = 0 \Rightarrow x = 1$ //

$y + 3z + 4t = 0 \Rightarrow y + 3 \cdot (-1) + 4 \cdot 1 = 0 \Rightarrow y = -1$ //

$7z + 8t = 1 \Rightarrow 7z + 8 = 1 \Rightarrow 7z = -7 \mid : 7 \Rightarrow z = -1$ //

$t = 1$ //

PROVJERA:

$5x + 4z + 2t = 3 \Rightarrow 5 \cdot 1 + 4 \cdot (-1) + 2 \cdot 1 = 3 \Rightarrow 3 = 3$ //

$x - y + 2z + t = 1 \Rightarrow 1 - (-1) + 2 \cdot (-1) + 1 = 1 \Rightarrow 2 - 2 + 1 = 1$ //

$4x + y + 2z = 1 \Rightarrow 4 \cdot 1 + (-1) + 2 \cdot (-1) - 1 = 1 \Rightarrow 4 - 3 = 1 \Rightarrow 1 = 1$ //

$x + y + 2t = 0$

$1 - 1 - 1 + 1 = 0 \Rightarrow 0 = 0$ //

Ime i prezime: MATE RADAŠ **Broj indeksa:** 17-2-0183-2012

1.)

$z^3 = -(-i)^{886}$ $\quad 886:4 = 221$ $\quad 2$

$z^3 = -(i^2)$ ✓

$z^3 = -(\sqrt{-1})^2$

$z^3 = 1$ ✓ $/\sqrt[3]{}$

$z = \sqrt[3]{1} = 1$

$r = \sqrt{x^2+y^2}$ $\quad tg\,\varphi = \frac{y}{x} = \frac{0}{1} = 0$

$r = \sqrt{1^2+0^2}$ $\quad tg\,\varphi = 0$ ✓

$r = 1$ ✓

$k=0$

$z_1 = \sqrt[n]{r}\left(\cos\frac{\varphi+2k\pi}{n} + i\sin\frac{\varphi+2k\pi}{n}\right)$

$k=0$

$z_1 = \sqrt[3]{1}\left(\cos\frac{0+2\cdot0\cdot\pi}{3} + i\sin\frac{0+2\cdot0\cdot\pi}{3}\right)$

$z_1 = 1(\cos 0 + i\sin 0)$

$z_1 = 1$

$k=1$

$z_2 = 1\left(\cos\frac{0+2\cdot1\cdot\pi}{3} + i\sin\frac{0+2\cdot1\cdot\pi}{3}\right)$

$z_2 = 1\left(\cos\frac{2\pi}{3} + i\sin\frac{2\pi}{3}\right)$

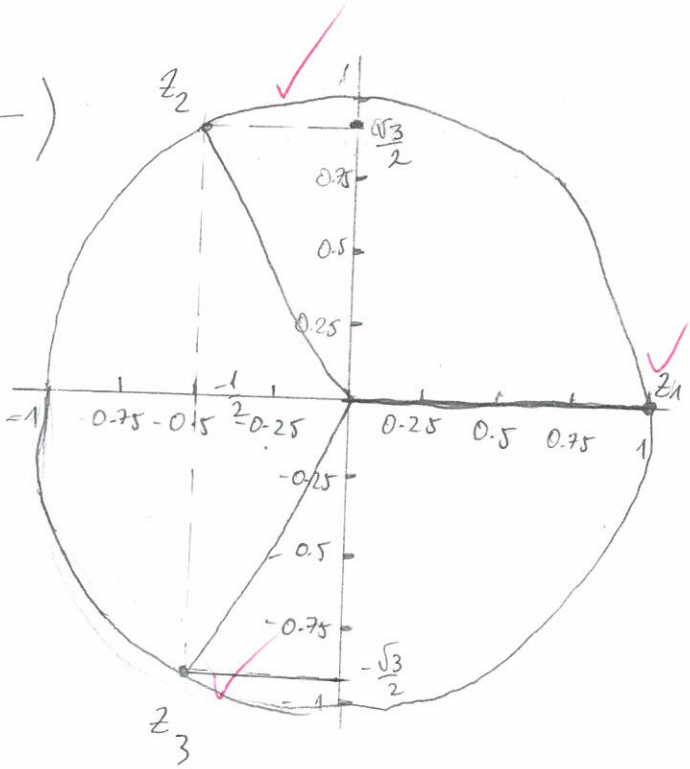
$z_2 = (\cos 120^\circ + i\sin 120^\circ) = -\frac{1}{2} + \frac{\sqrt{3}}{2}i$

$k=2$

$z_3 = 1\left(\cos\frac{0+2\cdot2\pi}{3} + i\sin\frac{0+2\cdot2\pi}{3}\right)$

$z_3 = \left(\cos\frac{4\pi}{3} + i\sin\frac{4\pi}{3}\right)$

$z_3 = \cos 240^\circ + i\sin 240^\circ = -\frac{1}{2} - \frac{\sqrt{3}}{2}i$



3) $\frac{x+1}{\sqrt{x^2-x}} - 1 > 0$

$x+1=0$

$x=-1$

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

$\sqrt{x^2-x} > 0 \,/^2$

$x^2-x \neq 0$

$x^2-x > 0$

$x^2-x \neq 0$

$x(x-1) > 0 \,/:x$

$x(x-1) \neq 0$

$x > 0$ ✗

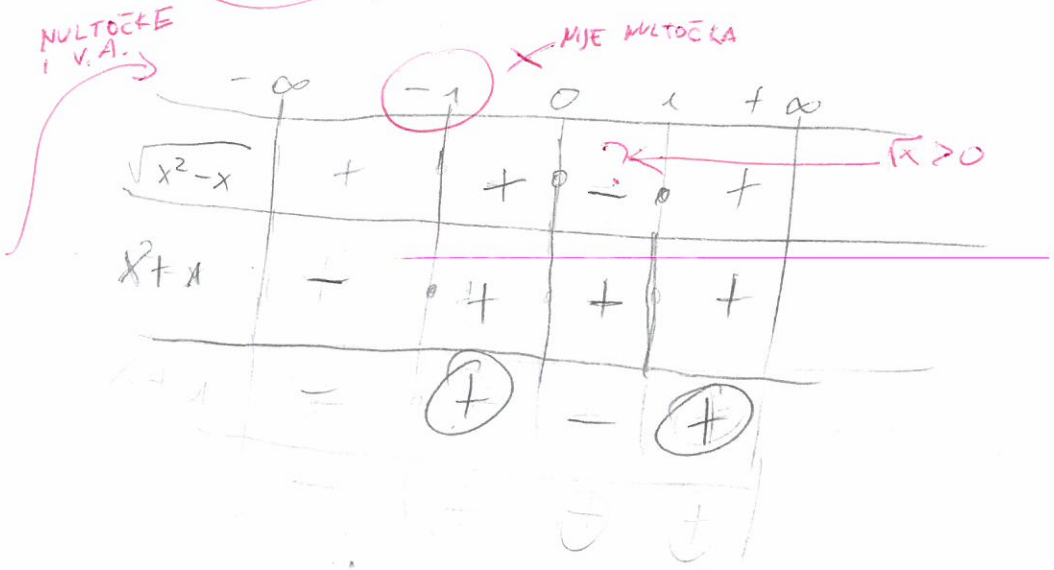
$x > 1$ ✗

$x_1 \neq 0$ ✓

$x_2 \neq 1$ ✓

$x \in \langle -1, 0 \rangle \cup \langle 1, +\infty \rangle$

TREBALO SE RADITI TABLICU ZA $f(x) = \frac{x+1-\sqrt{x^2-x}}{\sqrt{x^2-x}}$



PROVJERA: $x = -2$

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

$\frac{3}{\sqrt{2}} - 1 > 0$

$\frac{3\sqrt{2}}{2} - 1 > 0$

$2.12 - 1 > 0$

$1.12 > 0$ ✓

IME I PREZIME: MATE RADAŠ BROJ INDEKSA: 17-2-0183-2012

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

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

$= e^{\lim_{x\to+\infty}\frac{-4x}{x-4}\cdot\frac{1:x}{1:x}} = \lim_{x\to+\infty}\frac{-4}{1} = e^{-4}$ ✓

PROVJERA:

$\left(\frac{10}{10-4}\right)^{10} = \ldots$

$\left(\frac{100}{100-4}\right)^{100} = \ldots$

$\left(\frac{1000}{1000-4}\right)^{1000} = \ldots$

DA LI SE PRIBLIŽAVA LIMESU?

$e^{-4} = \ldots$

4.) $f(x) = \sqrt{x^2 + 8x + 5}$

a) $f'(x) = \left(\sqrt{x^2 + 8x + 5}\right)' = (\sqrt{x^2})' + (\sqrt{8x})' + (\sqrt{5})' = 1 + (8x^{-\frac{1}{2}})' + 0 =$

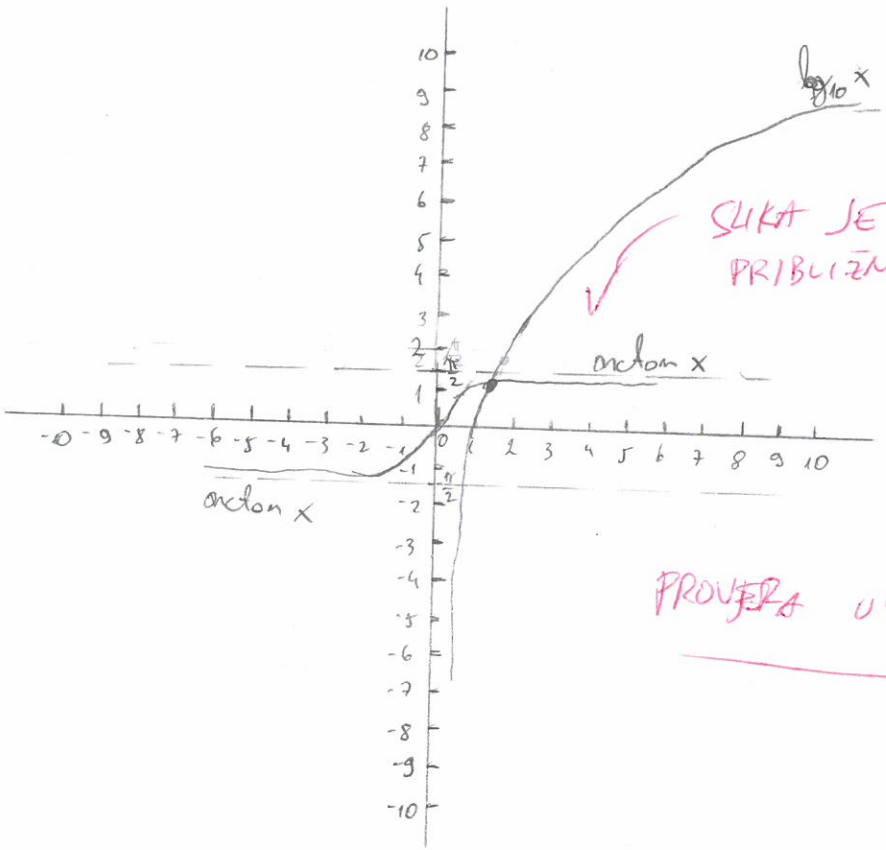
$= 1 + 4x^{-\frac{1}{2}} = 1 + \frac{1}{\sqrt{4x}} = 1 + \frac{1}{2\sqrt{x}} = (1 + (2\sqrt{x})^{-1})' = 0 - (2\sqrt{x})^{-2} =$

$f'(x) = \frac{1}{4x}$ $= \frac{1}{4x}$

b.)

6.) $\log_{10} x = \operatorname{arctan} x$

$x \approx 1.1$



SLIKA JE PRIBLIŽNO TOČNA.

PREVERA UVRŠTANJEM?

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod ⇓⇓ C7

IME I PREZIME: ŠIME-BORNA MAGAŠ **BROJ INDEKSA:** 17-2-0108-2011

ZAOKRUŽITI AKO ŽELITE: (ustmeni kod prof. Uglešića)

POPUNJAVA NASTAVNIK
Broj ↓ bodova

1. Među kompleksnim brojevima odrediti rješenja jednadžbe $z^3 = -(-i)^{886}$. *Prikazati rješenja u kompleksnoj ravnini!* 10+5

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4. Za funkciju: $f(x) = \sqrt{x^2 + 8x + 5}$ treba:
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6. Riješiti jednadžbu $\log_{10} x = \arctan x$ grafičkom metodom. *Provjeriti uvrštavanjem!* 10+5

Ukupno:

2) $5x+4z+2t=3$, $x-y+2z+t=1$, $4x+y+2z=1$, $x+y+z+t=0$

$$\left[\begin{array}{cccc|c} 5 & 0 & 4 & 2 & 3 \\ 1 & -1 & 2 & 1 & 1 \\ 4 & 1 & 2 & 0 & 1 \\ 1 & 1 & 1 & 1 & 0 \end{array}\right] \overset{(5)}{\sim} \left[\begin{array}{cccc|c} 1 & 0 & 4/5 & 2/5 & 3/5 \\ 1 & -1 & 2 & 1 & 1 \\ 4 & 1 & 2 & 0 & 1 \\ 1 & 1 & 1 & 1 & 0 \end{array}\right] \begin{array}{l} \\ R_2 - R_1 \\ R_3 - 4R_1 \\ R_4 - R_1 \end{array}$$

$$\sim \left[\begin{array}{cccc|c} 1 & 0 & 4/5 & 2/5 & 3/5 \\ 0 & -1 & 6/5 & 3/5 & 2/5 \\ 0 & 1 & -6/5 & 8/5 & -7/5 \\ 0 & 1 & 1/5 & 3/5 & -3/5 \end{array}\right] \cdot(-1) \sim \left[\begin{array}{cccc|c} 1 & 0 & 4/5 & 2/5 & 3/5 \\ 0 & 1 & -6/5 & -3/5 & -2/5 \\ 0 & 1 & -6/5 & 8/5 & -7/5 \\ 0 & 1 & 1/5 & 3/5 & -3/5 \end{array}\right] \begin{array}{l} \\ \\ R_3 - R_2 \\ R_4 - R_2 \end{array}$$

$$\sim \left[\begin{array}{cccc|c} 1 & 0 & 4/5 & 2/5 & 3/5 \\ 0 & 1 & -6/5 & -3/5 & -2/5 \\ 0 & 0 & 0 & 11/5 & -1 \\ 0 & 0 & 7/5 & 6/5 & -1/5 \end{array}\right] \sim$$

nema rješenja! ×

4) $f(x) = \sqrt{x^2+8x+5}$

$f'(x) = (\sqrt{x^2+8x+5})' = (\sqrt{5+x^2+8\cdot x})' = \frac{1}{2}\cdot(5+x^2+8\cdot x)' \cdot$

$\cdot \sqrt{(5+x^2+8\cdot x)^{-1}} = \frac{1}{2}\cdot\frac{(5+x^2+8\cdot x)'}{\sqrt{5+x^2+8\cdot x}} = \frac{1}{2}\cdot\frac{(5)'+(x^2+8\cdot x)'}{\sqrt{5+x^2+8\cdot x}} =$ ×

$= \frac{1}{2}\cdot\frac{0+(x^2)'+(8\cdot x)'}{\sqrt{5+x^2+8\cdot x}} = \frac{1}{2}\cdot\frac{(x^2)'+(8\cdot x)'}{\sqrt{5+x^2+8\cdot x}} =$

$= \frac{1}{2}\cdot\frac{2\cdot 1\cdot x+8\cdot 1}{\sqrt{5+x^2+8\cdot x}} = \frac{1}{2}\cdot\frac{8+2\cdot x}{\sqrt{5+x^2+8\cdot x}}$

$f''(x) = \frac{8+2\cdot x}{2\cdot\sqrt{5+x^2+8\cdot x}} = \frac{(8+2\cdot x)'}{2\cdot(\sqrt{5+8\cdot x+x^2})} = \frac{(8)'+(2\cdot x)'}{2\cdot(\sqrt{5+8\cdot x+x^2})} = \frac{0+2\cdot(x)'}{2\cdot(\sqrt{5+8\cdot x+x^2})} =$

$= \frac{2\cdot(x)'}{2\cdot(\sqrt{5+8\cdot x+x^2})} = \frac{2\cdot 1}{2\cdot(\sqrt{5+8\cdot x+x^2})} = \frac{2}{2\cdot(\sqrt{5+8\cdot x+x^2})}$

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

---

1) $z^3 = -(-i)^{886}$

$z = -\sqrt[3]{-1}$

$z = (-1)^{2/3}$ ×

$-1+z^3 = 0$

$(-1+z)(1+z+z^2) = 0$

$-1+z = 0$ | $1+z+z^2 = 0$

$\boxed{z = 1}$ | $1+z+z^2 = 0$

$z+z^2 = -1$

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

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

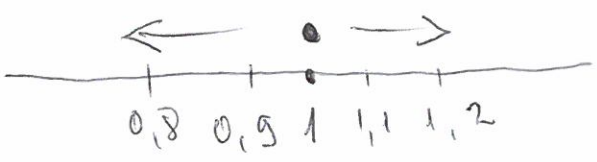
$\frac{1}{2}+z = \frac{i\sqrt{3}}{2}$

$z = -\frac{1}{2}+\frac{i\sqrt{3}}{2}$

$\frac{1}{2}+z = \frac{1}{2}(-i)\sqrt{3}$

$z = -\frac{1}{2}+\frac{i\sqrt{3}}{2}$

$\boxed{z = -\frac{1}{2}-\frac{i\sqrt{3}}{2}}$ ×



MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod⇊ C7

IME I PREZIME: Luka Žilić **BROJ INDEKSA:** 17-2-0208-2012

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

POPUNJAVA NASTAVNIK
Broj ↓ bodova

1. Među kompleksnim brojevima odrediti rješenja jednadžbe $z^3 = -(-i)^{886}$. *Prikazati rješenja u kompleksnoj ravnini!* 10+5

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

$$\begin{aligned} 5x + 4z + 2t &= 3 \\ x - y + 2z + t &= 1 \\ 4x + y + 2z &= 1 \\ x + y + z + t &= 0 \end{aligned}$$

3. Odrediti kada je $\frac{x+1}{\sqrt{x^2 - x}} - 1 > 0$. Obavezno uvrštavanjem provjeriti rješenje jednadžbi koje se javljaju tokom rješavanja nejednadžbe. 13+2

4. Za funkciju: $f(x) = \sqrt{x^2 + 8x + 5}$ treba:

   (a) pronaći drugu derivaciju 10

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

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

6. Riješiti jednadžbu $\log_{10} x = \arctan x$ grafičkom metodom. *Provjeriti uvrštavanjem!* 10+5

Ukupno: 15

1. $z^3 = -(-i)^{886}$

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

$z^3 = 1$ ✓

$z = \sqrt[3]{1}$

$w = \frac{x+yi}{1}$

$|w| = \sqrt{x^2 + y^2} = \sqrt{1^2 + 0^2} = \sqrt{1}$

$\operatorname{tg} \varphi = \frac{y}{x} = \frac{0}{1} = 0$

$\varphi = 0$

$z = \sqrt[3]{\sqrt{1}} \cdot \left(\cos \frac{\varphi + 2k\pi}{3} + i \sin \frac{\varphi + 2k\pi}{3}\right) \quad k = 0, 1, 2$

$k = 0$

$z_1 = \sqrt[6]{1} \cdot \left(\cos \frac{0 + 2 \cdot 0 \cdot \pi}{3} + i \sin \frac{0 + 2 \cdot 0 \cdot \pi}{3}\right) =$

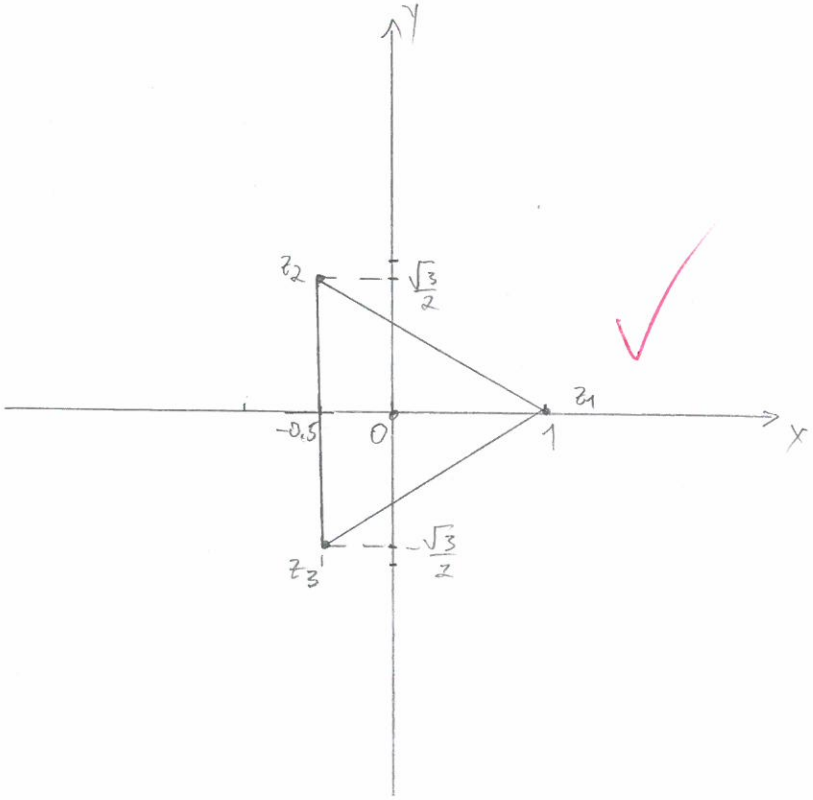
$= \sqrt[6]{1} \cdot (\cos 0 + i \sin 0) = 1 + 0i //$

$k = 1$

$z_2 = \sqrt[6]{1} \cdot \left(\cos \frac{2}{3}\pi + i \sin \frac{2}{3}\pi = -\frac{1}{2} + \frac{\sqrt{3}}{2} i //\right.$

$k = 2$

$z_3 = \sqrt[6]{1} \cdot \left(\cos \frac{4}{3}\pi + i \sin \frac{4}{3}\pi\right) = -\frac{1}{2} - \frac{\sqrt{3}}{2} i //$



2.

$$5x + 4z + 2t = 3$$
$$x - y + 2z + t = 1$$
$$4x + y + 2z = 1$$
$$x + y + z + t = 0$$

$$\begin{bmatrix} 5 & 0 & 4 & 2 & 3 \\ 1 & -1 & 2 & 1 & 1 \\ 4 & 1 & 2 & 0 & 1 \\ 1 & 1 & 1 & 1 & 0 \end{bmatrix} \sim \begin{bmatrix} 1 & -1 & 2 & 1 & 1 \\ 5 & 0 & 4 & 2 & 3 \\ 4 & 1 & 2 & 0 & 1 \\ 1 & 1 & 1 & 1 & 0 \end{bmatrix} \cdot(-5) \cdot(-4) \sim \begin{bmatrix} 1 & -1 & 2 & 1 & 1 \\ 0 & 5 & -6 & -3 & -2 \\ 0 & 5 & -6 & -4 & -3 \\ 1 & 1 & 1 & 1 & 0 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -1 & 2 & 1 & 1 \\ 0 & 5 & -6 & -3 & -2 \\ 0 & 5 & -6 & -4 & -3 \\ 1 & 1 & 1 & 1 & 0 \end{bmatrix} \sim \begin{bmatrix} 1 & -1 & 2 & 1 & 1 \\ 0 & 5 & -6 & -4 & -3 \\ 0 & 5 & -6 & -3 & -2 \\ 1 & 1 & 1 & 1 & 0 \end{bmatrix} \cdot(-1) \sim \begin{bmatrix} 1 & -1 & 2 & 1 & 1 \\ 0 & 5 & -6 & -4 & -3 \\ 0 & 0 & 0 & 1 & 1 \\ 1 & 1 & 1 & 1 & 0 \end{bmatrix}$$

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

IME I PREZIME: Luka Žilić BROJ INDEKSA: 17-I-0208-2012

4. $F(x) = \sqrt{x^2+8x+5} = (x^2+8x+5)^{\frac{1}{2}}$

$F'(x) = \frac{1}{2}(x^2+8x+5)^{-\frac{1}{2}} \cdot (2x+8)$

$f''(x) = -\frac{1}{4}(x^2+8x+5)^{-\frac{3}{2}} \cdot 2x+8$ ×

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

$\left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 0 \\ 0 & 1 & 3 & 4 & 0 \\ 0 & -3 & -2 & -4 & 1 \\ 0 & -5 & -1 & -3 & 3 \end{array}\right] \cdot(-3) \sim \left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 0 \\ 0 & 1 & 3 & 4 & 0 \\ 0 & -3 & -2 & -4 & 1 \\ 0 & 15 & 3 & 9 & -9 \end{array}\right] \begin{array}{l} \cdot 5 \\ + \end{array}$

$\left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 0 \\ 0 & 1 & 3 & 4 & 0 \\ 0 & -3 & -2 & -4 & 1 \\ 0 & 0 & -7 & -11 & -4 \end{array}\right] \begin{array}{l} \cdot 3 \\ + \end{array} \sim \left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 0 \\ 0 & 1 & 3 & 4 & 0 \\ 0 & 0 & 7 & 8 & 1 \\ 0 & 0 & -7 & -6 & -4 \end{array}\right] \begin{array}{l} \\ \\ \\ + \end{array}$

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

$\left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 0 \\ 0 & 1 & 3 & 1 & 0 \\ 0 & 0 & 1 & \frac{8}{7} & \frac{1}{7} \\ 0 & 0 & 0 & 1 & -2 \end{array}\right] \begin{array}{l} \\ \\ \\ \cdot\left(-\frac{8}{7}\right) + \end{array} \sim \left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 0 \\ 0 & 1 & 3 & 1 & 0 \\ 0 & 0 & 1 & 0 & \frac{17}{7} \\ 0 & 0 & 0 & 1 & -2 \end{array}\right] \begin{array}{l} + \\ \cdot(-1) \end{array} \sim \left[\begin{array}{cccc|c} 1 & 0 & -2 & 0 & 0 \\ 0 & 1 & 3 & 1 & 0 \\ 0 & 0 & 1 & 0 & -\frac{17}{7} \\ 0 & 0 & 0 & 1 & -2 \end{array}\right] \begin{array}{l} + \\ \\ \\ \cdot(2) \end{array}$

$\left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & -\frac{34}{7} \\ 0 & 1 & 3 & 1 & 0 \\ 0 & 0 & 1 & 0 & \frac{17}{7} \\ 0 & 0 & 0 & 1 & -2 \end{array}\right] \begin{array}{l} + \\ \\ \\ \cdot(-3) \end{array} \sim \left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & \frac{34}{7} \\ 0 & 1 & 0 & 1 & -\frac{51}{7} \\ 0 & 0 & 1 & 0 & \frac{17}{7} \\ 0 & 0 & 0 & 1 & -2 \end{array}\right] \begin{array}{l} + \\ \\ \\ \cdot(-1) \end{array} \sim \left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & -\frac{34}{7} \\ 0 & 1 & 0 & 0 & -\frac{37}{7} \\ 0 & 0 & 1 & 0 & \frac{17}{7} \\ 0 & 0 & 0 & 1 & -2 \end{array}\right]$

X

IME I PREZIME: Luka Žilić

BROJ INDEKSA: 17-2-0208-2012

b) $f(x) = \sqrt{x^2 + 8x + 5}$

DOMENA

$x^2 + 8x + 5 \geq 0$

$a = 1 \quad b = 8 \quad c = 5$

$x_{1,2} = \frac{-8 \pm \sqrt{64 - 20}}{2}$

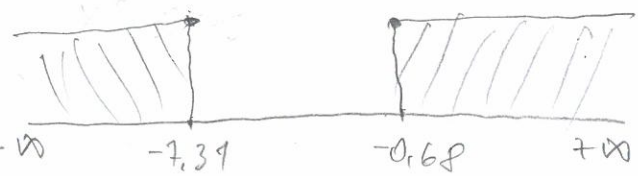
$x_{1,2} = \frac{-8 \pm \sqrt{44}}{2}$

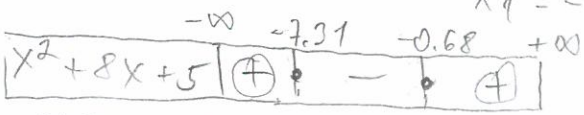
$x_1 = \frac{-8 + \sqrt{44}}{2}$

$x_1 = -0.68$

$x_2 = \frac{-8 - \sqrt{44}}{2}$

$x_2 = -7.31$





$D(f) = \langle -\infty, -7,31] \cup [-0.68, +\infty \rangle$

SJECISTA

$f(x) = 0$

$f(0) = x^2 + 8x + 5$

$= 5$

$S(0, 5)$

$INT(-0.68, -7.31)$

ASIMPTOTE:

LVA:

$\lim_{x \to -7.31^-} \sqrt{x^2 + 8x + 5} =$

GRAF?

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod ⇓⇓ C7

IME I PREZIME: Anamarija Jozić **BROJ INDEKSA:** 17-2-0104-2011

ZAOKRUŽITI AKO ŽELITE: (ustmeni kod prof. Uglešića)

POPUNJAVA NASTAVNIK Broj ↓ bodova

1. Među kompleksnim brojevima odrediti rješenja jednadžbe $z^3 = -(-i)^{886}$. *Prikazati rješenja u kompleksnoj ravnini!* 10+5
2. Riješi sustav Gaussovom metodom i obavezno provjeri rješenje: 10+5

$$\begin{aligned} 5x + 4z + 2t &= 3 \\ x - y + 2z + t &= 1 \\ 4x + y + 2z &= 1 \\ x + y + z + t &= 0 \end{aligned}$$

3. Odrediti kada je $\dfrac{x+1}{\sqrt{x^2-x}} - 1 > 0$. Obavezno uvrštavanjem provjeriti rješenje jednadžbi koje se javljaju tokom rješavanja nejednadžbe. 13+2
4. Za funkciju: $f(x) = \sqrt{x^2+8x+5}$ treba:
   (a) pronaći drugu derivaciju 10
   (b) na temelju ispitivanja toka funkcije skicirati graf 20(graf)
5. Odrediti i provjeriti rješenje $\lim_{x\to+\infty}\left(\dfrac{n}{n-4}\right)^n =$ 8+2
6. Riješiti jednadžbu $\log_{10} x = \arctan x$ grafičkom metodom. *Provjeriti uvrštavanjem!* 10+5

Ukupno: 0

(2.)

$$\begin{aligned} 5x + 4z + 2t &= 3 \\ x - y + 2z + t &= 1 \\ 4x + y + 2z &= 1 \\ x + y + z + t &= 0 \end{aligned}$$

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

$I.r \longleftrightarrow II.r$

$I.r \cdot (-5) + II.r$
$I.r \cdot (-4) + III.r$
$I.r \cdot (-1) + IV.r$

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

$II.r / :5$

$II.r \cdot (-5) + III.r$
$II.r \cdot (-2) + IV.r$

$III.r \longleftrightarrow IV.r$

22

$$\left[\begin{array}{cccc|c} 1 & -1 & 2 & 1 & 1 \\ 0 & 1 & -6/5 & -3/5 & -2/5 \\ 0 & 0 & 7/5 & 1/5 & -1/5 \\ 0 & 0 & 0 & -1 & -1 \end{array}\right] = \left[\begin{array}{cccc|c} 1 & -1 & 2 & 1 & 1 \\ 0 & 1 & -6/5 & -3/5 & -2/5 \\ 0 & 0 & 1 & 1/7 & -1/7 \\ 0 & 0 & 0 & -1 & -1 \end{array}\right] = \left[\begin{array}{cccc|c} 1 & -1 & 2 & 1 & 1 \\ 0 & 1 & -6/5 & -3/5 & -2/5 \\ 0 & 0 & 1 & 1/7 & -1/7 \\ 0 & 0 & 0 & 1 & 1 \end{array}\right] \approx$$

III r $\cdot \frac{5}{7}$

IV r $\cdot (-1)$

IV r $\cdot \left(-\frac{1}{7}\right)$ + III r

IV r $\cdot \frac{3}{5}$ + II r

IV r $\cdot (-1)$ + I r

22

$$\left[\begin{array}{cccc|c} 1 & -1 & 2 & 0 & 0 \\ 0 & 1 & -6/5 & 0 & -2/5 \\ 0 & 0 & 1 & 0 & -2/7 \\ 0 & 0 & 0 & 1 & 1 \end{array}\right] = \left[\begin{array}{cccc|c} 1 & -1 & 0 & 0 & 4/7 \\ 0 & 1 & 0 & 0 & -26/35 \\ 0 & 0 & 1 & 0 & -2/7 \\ 0 & 0 & 0 & 1 & 1 \end{array}\right] = \left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & -6/35 \\ 0 & 1 & 0 & 0 & -26/35 \\ 0 & 0 & 1 & 0 & -2/7 \\ 0 & 0 & 0 & 1 & 1 \end{array}\right]$$

III r $\cdot$ 6/5 + II r

III r $\cdot (-2)$ + I r

II r $\cdot$ 1 + I r

PROVJERA:

$$5x + 4z + 2t = 3$$
$$x - y + 2z + t = 1$$
$$4x + y + 2z = 1$$
$$x + y + z + t = 0$$

a) $5 \cdot \left(-\frac{6}{35}\right) + 0 \cdot \left(-\frac{26}{35}\right) + 4 \cdot \left(-\frac{2}{7}\right) + 2 \cdot 1 = 3$

$$-\frac{6}{7} + 0 - \frac{8}{7} + 2 = 3$$

$$0 \neq 3 \leftarrow$$

b) $-\frac{6}{35} - \left(-\frac{26}{35}\right) + 2 \cdot \left(-\frac{2}{7}\right) + 1 = 1$

$$1 = 1$$

c) $4 \cdot \left(-\frac{6}{35}\right) - \frac{26}{35} + 2 \cdot \left(-\frac{2}{7}\right) + 1 = 1$

$$-1 \neq 1$$

d) $-\frac{6}{35} - \frac{26}{35} - \frac{2}{7} + 1 = 1$

$$-\frac{1}{5} \neq 0$$

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod ⇊ C7

IME I PREZIME: Petra Ugrinić **BROJ INDEKSA:** 17-1-0123-2012

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

POPUNJAVA NASTAVNIK
Broj ↓ bodova

1. Među kompleksnim brojevima odrediti rješenja jednadžbe $z^3 = -(-i)^{886}$. *Prikazati rješenja u kompleksnoj ravnini!* 10+5

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4. Za funkciju: $f(x) = \sqrt{x^2 + 8x + 5}$ treba:

   (a) pronaći drugu derivaciju 10

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

6. Riješiti jednadžbu $\log_{10} x = \arctan x$ grafičkom metodom. *Provjeriti uvrštavanjem!* 10+5

Ukupno: 0

2.

$$\left[\begin{array}{cccc|c} 5 & 0 & 4 & 2 & 3 \\ 1 & -1 & 2 & 1 & 1 \\ 4 & 1 & 2 & 0 & 1 \\ 1 & 1 & 1 & 1 & 0 \end{array}\right] \begin{matrix} \text{I} - \text{II} \\ \sim \\ \text{III} - \text{IV} \end{matrix} \left[\begin{array}{cccc|c} 4 & 1 & 2 & 1 & 2 \\ 1 & -1 & 2 & 1 & 1 \\ 3 & 0 & 1 & -1 & 1 \\ 1 & 1 & 1 & 1 & 0 \end{array}\right] \begin{matrix} \text{I} - \text{II} \\ \sim \end{matrix} \left[\begin{array}{cccc|c} 3 & 0 & 0 & 0 & 1 \\ 1 & -1 & 2 & 1 & 1 \\ 3 & 0 & 1 & -1 & 1 \\ 1 & 1 & 1 & 1 & 0 \end{array}\right] \begin{matrix} \\ \\ \\ \\ \end{matrix} 1:2.$$

?

6. $\underbrace{\log_{10} x}_{x} = \underbrace{\arctan x}_{y}$

x	$\log_{10}$
0	UR
1	0
2	0,3
4	0,6

x	arctan
0	0
0,01	0,57
0,02	1,14
0,03	1,71