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: TONI ŠTOŠIĆ **BROJ INDEKSA:**

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

POPUNJAVA NASTAVNIK
Broj ↓ bodova

1. Među kompleksnim brojevima odrediti rješenja jednadžbe $z^3 = -(-i)^{843}$. *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: $f(x) = \sqrt{x^2+4x+5}$ 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: 10

1. $z^3 = -(-i)^{843}$

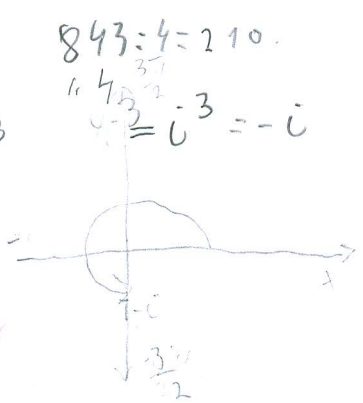
$z^3 = i^{843}$

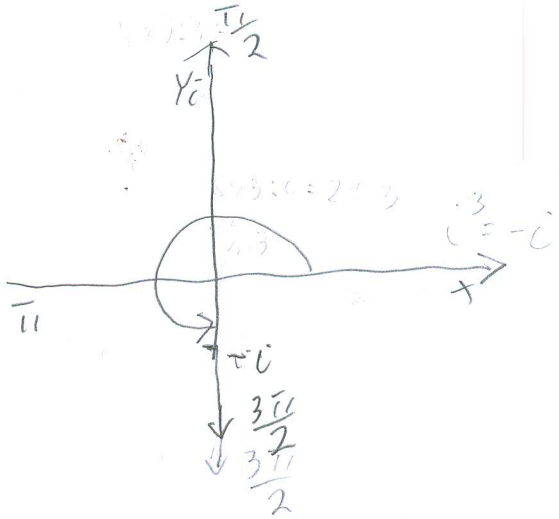
$z^3 = -i$

$z = \sqrt[3]{-i}$ ✓

$843 : 4 = 210$ (3)

$i^3 = -i$





za $k = 0, 1, 2$

$\varphi = \frac{3\pi}{2}$

a) $z_1 = \sqrt[3]{1}\left(\cos\frac{\varphi + k\cdot 2\pi}{n} + i\sin\frac{\varphi + k\cdot 2\pi}{n}\right)$

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

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

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

$|w| = \sqrt{1} = 1$

$z_1 = 1(\cos 1.57 + i \sin 1.57)$

$z_1 = 0.007 + i\,0.999$

$z_2 = ?$ $z_3 = ?$

2.

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

$1R \leftrightarrow 2R$

$1R \cdot (-5) + 2R$
$1R \cdot (-4) + 3R$
$1R \cdot (-1) + 4R$

$2R : 5$

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

$2R \cdot (-5) + 3R$

$3 \leftrightarrow 4$

$3R : (-1)$
$4R : (-1)$

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

$4R \cdot \left(\frac{3}{5}\right) + 2R$
$4R \cdot (-1) + 1R$

$3R \cdot \frac{6}{5} + 2R$
$3R \cdot (-2) + 1R$

$2R \cdot 1 + 1R$

$x = -\frac{3}{5}$

$y = \frac{7}{5}$

$z = 1$

$t = 1$

Provjera:

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

$-\frac{15}{5} + 0 + 4 + 2 = 3$

$3 = 3$

b) $1 \cdot \left(-\frac{3}{5}\right) - 1 \cdot \frac{7}{5} + 2 \cdot 1 + 1 \cdot 1 = 1$

$-\frac{3}{5} - \frac{7}{5} + 2 + 1 = 1$

$-\frac{10}{5} + 2 + 1 = 1$

$1 = 1$

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

$-\frac{12}{5} + \frac{7}{5} + 2 + 0 = 1$

$-\frac{5}{5} + 2 + 0 = 1$

$1 = 1$

d) $1 \cdot \left(-\frac{3}{5}\right) + 1 \cdot \frac{7}{5} + 1 \cdot 1 + 1 \cdot 1 = 0$

$-\frac{3}{5} + \frac{7}{5} + 1 + 1 = 0$

$\frac{-3 + 7 + 5 + 5}{5} = 0$?

$0 = 0$

TONI STOŠIĆ

4. NAJŠIRA DOMENA:

$x^2+4x+5 \geq 0$

$a=1,\ U$

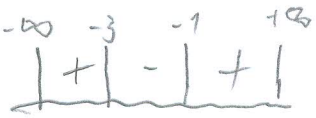
$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

$x=\frac{-4\pm\sqrt{4^2-4\cdot1\cdot5}}{2}$

$x_1=\frac{-4+\sqrt{-4}}{2}$

$x_1=\frac{-4+2}{2}=-1$

$x_2=\frac{-4-2}{2}=-3$



$D(f)=\langle-\infty,-3]\cup[-1,+\infty\rangle$

ASIMTOTI:

V.A NEMA jer točke nisu u domeni

H.A.

$\lim_{x\to+\infty}\sqrt{x^2+4x+2}=\lim_{x\to+\infty}\frac{x^2}{+2}+\frac{x}{4x^2}+\frac{2}{x^2}=1$

1 = D.H. 1

$\lim_{x\to-\infty}\sqrt{x^2+4x+2}\ \left[\begin{matrix}x\mapsto-x\\-\infty\to+\infty\end{matrix}\right]=$

$\lim_{x\to+\infty}\sqrt{x^2-4x+12.}=\lim_{x\to+\infty}\frac{x^2}{+2}-\frac{4x}{1}+\frac{2}{1}=1$

L.H.A

K.A NEMA jer ima H.A

3. Derivacija

=> PRE SLOŽENA

PARNOST:

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

$\sqrt{x^2+4x+5}=\sqrt{x^2-4x+5}$

NIJE PARNA

NIJE PERIODIČNA

GRAF? 0