

Popuniti odmah!

IME I PREZIME: GOMAN BASICOLI

BROJ INDEKSA: 17-1-0031-2010

DATUM: 28.09.2011 VRIJEME: OD 12:05 DO

MATEMATIKA 1: Trajanje 100 minuta. Zabranjen je razgovor sa drugim studentima. ZADATKE RIJEŠAVATE

OXOO

JEDNOSTRANO NA PAPIRE KOJE DOBIJETE OD NASTAVNIKA.

Broj ↓
bodova

1. Koju relaciju zadovoljava inverz matrice? Provjeriti tu relaciju za inverz matrice (ako postoji)

$$A = \begin{bmatrix} 0 & 1 & 0 & 2 \\ 1 & 0 & 2 & 0 \\ 0 & 2 & 0 & 1 \\ 2 & 0 & 1 & 0 \end{bmatrix}$$

2. Među kompleksnim brojevima odrediti $\sqrt[4]{\frac{3+2i}{2-3i}}$.

3. Zadana je funkcija $f(x) = e^x$ i funkcija $g(x) = \frac{-1}{x^2}$. Odrediti domenu i sve asimptote funkcije $h(x) = f(g(x))$.

4. Ispitati domenu i drugu derivaciju funkcije $S(x) = \ln\left(\frac{x+1}{x-1}\right)$.

5. Na temelju ispitivanja toka napraviti skicu grafa funkcije $S(x)$ iz zadatka 4.

$$2) \sqrt[4]{\frac{3+2i}{2-3i}} = \frac{\sqrt[4]{3+2i}}{\sqrt[4]{2-3i}}$$

$$z_1 = \sqrt[4]{3+2i}$$

$$z_2 = \sqrt[4]{2-3i}$$

$$z_A = z_1$$

$$z_1^4 = 3+2i$$

$$|z_1| = r = \sqrt{x^2+y^2}$$

$$= \sqrt{3^2+2^2}$$

$$= \sqrt{13}$$

$$= \sqrt{13}$$

$$z_1 \Rightarrow k=0$$

$$z_1 \Rightarrow k=1$$

TREBALO JE RAČUNATI

$$z = \sqrt[4]{\frac{3+2i}{2-3i}} = \sqrt[4]{\frac{3+2i}{2-3i} \cdot \frac{2+3i}{2+3i}} = \sqrt[4]{\frac{6+9i+4i}{4+9}}$$

$$= \sqrt[4]{\frac{13i}{13}} = \sqrt[4]{i} = \sqrt[4]{\cos\frac{\pi}{2} + i\sin\frac{\pi}{2}}$$

$$\begin{matrix} \Downarrow \\ r=1 \\ \varphi=\frac{\pi}{2} \end{matrix}$$

$$z_1 = \sqrt[4]{1} \left(\cos\frac{\pi}{8} + i\sin\frac{\pi}{8} \right)$$

$$z_2 = \sqrt[4]{1} \left(\cos\frac{5\pi}{8} + i\sin\frac{5\pi}{8} \right)$$

$$z_3 = 1 \left(\cos\frac{9\pi}{8} + i\sin\frac{9\pi}{8} \right)$$

$$z_4 = \cos\frac{13\pi}{8} + i\sin\frac{13\pi}{8}$$

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

$$\operatorname{tg} \varphi = \frac{2}{3} = 0,66 \Rightarrow \varphi = 34,15'$$

$$z_1^4 = |z_1|^4 \cdot (\cos \varphi + i \sin \varphi)$$

$$z_1^4 = \sqrt{13} \cdot (0,827 + 0,56i)$$

$$z_1 = \sqrt[4]{\sqrt{13} \cdot (0,827 + 0,56i)}$$

$$z_1 = |z_1| \cdot \left(\cos \varphi \cdot \frac{2k\pi}{4} + i \sin \varphi \cdot \frac{2k\pi}{4} \right)$$

$$= |z_1| \cdot \left(0,827 \cdot \frac{2 \cdot 0 \cdot \pi}{4} + i \sin \varphi \cdot \frac{2 \cdot 0 \cdot \pi}{4} \right) = 0$$

$$z_1 = |z_1| \cdot \left(\cos \varphi \cdot \frac{2k\pi}{4} + i \sin \varphi \cdot \frac{2k\pi}{4} \right)$$

$$= \sqrt{13} \cdot \left(0,827 \cdot \frac{2 \cdot 1 \cdot \pi}{4} + 0,56i \cdot \frac{2 \cdot 1 \cdot \pi}{4} \right)$$

$$= \sqrt{13} \cdot (1,3 + 0,88i)$$

$$= 4,687 + 3,17i$$

$$z_2 \Rightarrow k=1$$

$$\begin{aligned} z_2 &= |z_2| \left(\cos \varphi \cdot \frac{2k\pi}{4} + i \sin \frac{2k\pi}{4} \right) \\ &= \sqrt{13} \left(0,55 \cdot \frac{2 \cdot 1 \cdot \pi}{4} - 0,833i \frac{2 \cdot 1 \cdot \pi}{4} \right) \\ &= \sqrt{13} (0,863 - 1,3i) \\ &= 3,1 - 4,68i \end{aligned}$$

$$z_2 \Rightarrow k=2$$

$$\begin{aligned} z_2 &= |z_2| \left(\cos \varphi \cdot \frac{2k\pi}{4} + i \sin \frac{2k\pi}{4} \right) \\ &= \sqrt{13} \left(0,55 \cdot \frac{2 \cdot 2 \cdot \pi}{4} - 0,833i \frac{2 \cdot 2 \cdot \pi}{4} \right) \\ &= \sqrt{13} (1,72 - 2,6i) \\ &= 6,2 - 9,37i \end{aligned}$$

$$z_2 \Rightarrow k=3$$

$$\begin{aligned} z_2 &= |z_2| \left(\cos \varphi \cdot \frac{2k\pi}{4} + i \sin \frac{2k\pi}{4} \right) \\ z_2 &= \sqrt{13} \cdot \left(0,55 \cdot \frac{2 \cdot 3 \cdot \pi}{4} - 0,833i \frac{2 \cdot 3 \cdot \pi}{4} \right) \\ z_2 &= \sqrt{13} \cdot (2,59 - 3,9i) \\ z_2 &= 9,33 - 14,06i \end{aligned}$$

$$z_1 \Rightarrow k=2$$

$$z_1 = |z_1| \cdot \left(\cos \varphi \cdot \frac{2k\pi}{n} + i \sin \varphi \cdot \frac{2k\pi}{n} \right)$$

$$= \sqrt{13} \cdot (0,827 \cdot 3,14 + 0,56i \cdot 3,14)$$

$$= \sqrt{13} \cdot (2,6 + 1,76i)$$

$$= 9,37 + 6,33i$$

$$z_1 \Rightarrow k=3$$

$$z_1 = |z_1| \cdot \left(\cos \varphi \cdot \frac{2k\pi}{n} + i \sin \varphi \cdot \frac{2k\pi}{n} \right)$$

$$= \sqrt{13} \cdot \left(0,827 \cdot \frac{2 \cdot 3 \cdot \pi}{4} + 0,56i \cdot \frac{2 \cdot 3 \cdot \pi}{4} \right)$$

$$= 3,9 + 2,64i$$

$$z_2 = \sqrt[4]{2-3i}$$

$$|z_2| = \sqrt{2^2 + (-3)^2}$$

$$= \sqrt{13}$$

$$= \sqrt{13}$$

$$\operatorname{tg} \varphi = \frac{y}{x} = \frac{-3}{2} \Rightarrow \varphi = 303,47 \approx 303,5$$

$$z_2^4 = |z_2| \cdot (\cos \varphi + i \sin \varphi)$$

$$z_2^4 = \sqrt{13} \cdot (0,55 + (-0,833)i)$$

$$z_2 = \sqrt[4]{\sqrt{13} \cdot (0,55 - 0,833i)}$$

$$z_2 \Rightarrow k=0$$

$$z_2 = |z_2| \cdot \left(\cos \varphi \frac{2k\pi}{n} + i \sin \varphi \frac{2k\pi}{n} \right) \Rightarrow 0 \quad \underline{k=0}$$

$$z_2 = \sqrt[4]{13} \cdot 1$$

$$A = \begin{bmatrix} 0 & 1 & 0 & 2 \\ 1 & 0 & 2 & 0 \\ 0 & 2 & 0 & 1 \\ 2 & 0 & 1 & 0 \end{bmatrix} = 2$$

$$A^{-1} = \frac{1}{-11} \cdot 2$$

$$A^{-1} = \frac{2}{-11}$$

$$\det A = \begin{vmatrix} 0 & 1 & 0 & 2 \\ 1 & 0 & 2 & 0 \\ 0 & 2 & 0 & 1 \\ 2 & 0 & 1 & 0 \end{vmatrix} = 3 - 14 = -11$$



TREBALO JE RAČUNATI INVERZ MATRICE
RELACIJA:

$$A A^{-1} = I$$

ILI

$$A^{-1} A = I$$

NAUČITI OSTATAK GRADIVA !!!