

Popuniti odmah!

IME I PREZIME: GREGOR HUNYARIĆ

BROJ INDEKSA: 54650

DATUM: VRIJEME: OD 12:20 DO 13:10

MATEMATIKA 1: Trajanje 100 minuta. Zabranjen je razgovor sa drugim studentima. ZADATKE RIJEŠAVATE JEDNOSTRANO NA PAPIRE KOJE DOBIJETE OD NASTAVNIKA.

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Broj ↓
bodova

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

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

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2. Pronaći sve kompleksne brojeve z takve da je $z^3 + |3i + 4| = \frac{5}{i^{233}}$.

~~0~~

3. Odrediti domenu i sve asimptote funkcije $f(x) = \ln\left(\frac{x+5}{1-x}\right)$.

4. Ispitati domenu, periodičnost, (ne)parnost i prvu derivaciju funkcije $g(x) = \cos(\sin(3x))$.

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5. Na temelju ispitivanja toka funkcije napraviti skicu grafa funkcije f iz zadatka 3.

UKUPNO

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

$$\det A = \begin{bmatrix} 2 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 2 \end{bmatrix} \cdot (-2)$$

$$\begin{bmatrix} 0 & 0 & 0 & -3 \\ 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 2 \end{bmatrix}$$

$$\det A = 1 \cdot (-1)^5 \cdot \begin{vmatrix} 0 & 0 & -3 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{vmatrix} = -1 \cdot \begin{vmatrix} 0 & -3 \\ 1 & 0 \end{vmatrix} = -1 \cdot (0+3) = -3$$

$$A = \left[\begin{array}{cccc|cccc} 2 & 0 & 0 & 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & 2 & 0 & 0 & 0 & 1 \end{array} \right] = \left[\begin{array}{cccc|cccc} 1 & 0 & 0 & 2 & 0 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 2 & 0 & 0 & 1 & 1 & 0 & 0 & 0 \end{array} \right] \cdot (-2)$$

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

$$= \left[\begin{array}{cccc|cccc} 1 & 0 & 0 & 2 & 0 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & -\frac{1}{3} & 0 & 0 & \frac{2}{3} \end{array} \right] \cdot (-2) = \left[\begin{array}{cccc|cccc} 1 & 0 & 0 & 0 & \frac{2}{3} & 0 & 0 & -\frac{1}{3} \\ 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & -\frac{1}{3} & 0 & 0 & \frac{2}{3} \end{array} \right] \checkmark$$

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PROVJERA $AA^{-1} = I$.

2. $z^3 + |3i + 4| = \frac{5}{i^2 334}$

$$z^3 + 3i + 4 = \frac{5}{i} / 2$$

$$z^6 - 9i^2 + 16 = \frac{25}{i^2}$$

VIDI NEKIĆ

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4. $g(x) = \cos(\sin(3x))$

$$g'(x) = -\sin(\sin(3x)) \cdot \cos(3x) \cdot 3 \checkmark$$

Popunite odmah!

JURE POETANA

IME I PREZIME:

BRJ INDEKSA:

DATUM: 10.02.2011 VRIJEME: OD 13:00 DO 14:45

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MATEMATIKA 1: Trajanje 100 minuta. Zabranjen je razgovor sa drugim studentima. ZADATKE RIJEŠAVATE JEDNOSTRANO NA PAPIRE KOJE DOBIJETE OD NASTAVNIKA.

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

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5. Na temelju ispitivanja toka funkcije napraviti skicu grafa funkcije f iz zadatka 3.

$$1) A = \left[\begin{array}{cccc|cccc} 2 & 0 & 0 & 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & 2 & 0 & 0 & 0 & 1 \end{array} \right] \sim \left[\begin{array}{cccc|cccc} 1 & 0 & 0 & 2 & 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 1 & 0 \\ 2 & 0 & 0 & 1 & 1 & 0 & 0 & 0 \end{array} \right] R_4 - 2R_1$$

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

$$\left[\begin{array}{cccc|cccc} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & -1/3 & 0 & 0 & 2/3 \end{array} \right] \times \left[\begin{array}{cccc|cccc} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 & 0 & 0 & -2 \end{array} \right] R_4 - 2R_1$$

DA STE PROVJERILI $AA^{-1} = I$ ZNALI BI DA JAM INVERZ NIJE TOČAN: MOGLI

3) $f(x) = \ln\left(\frac{x+5}{1-x}\right)$ $1-x=0$ $D(f) = (-\infty, 1)$ \times VIDI NEKIĆ $B1$ PROVJERITI!

$\lim_{x \rightarrow \infty} \ln\left(\frac{x+5}{1-x}\right) = \ln \lim_{x \rightarrow \infty} \frac{x+5}{1-x} = \ln \frac{1}{-1} = \ln -1$
 $\lim_{x \rightarrow -\infty} \ln\left(\frac{x+5}{1-x}\right) = \ln \lim_{x \rightarrow -\infty} \frac{-x+5}{1+x} = \ln \frac{-1}{1} = \ln -1$ NEMA MA 5

$\lim_{x \rightarrow 1^+} \ln\left(\frac{x+5}{1-x}\right) = \ln \lim_{x \rightarrow 1^+} \frac{x+5}{1-x} = \ln \lim_{x \rightarrow 1^+} \frac{6}{0^-} = \ln -\infty$
 $\lim_{x \rightarrow 1^-} \ln\left(\frac{x+5}{1-x}\right) = \ln \lim_{x \rightarrow 1^-} \frac{x+5}{1-x} = \ln \lim_{x \rightarrow 1^-} \frac{6}{0^+} = \ln \frac{6}{0^+} = ?$ V. A

IME I PREZIME: PORTADA #11

BROJ INDEKSA:

$$z^3 + |3i+4| = \frac{5}{i^{2+3}}$$

VIDI NEKIĆ, CVITAN

$$z^3 + |3i+4| = \frac{5}{i} \quad \checkmark$$

$$z^3 = \frac{5}{i} - |3i+4| = \frac{5-i(3i+4)}{i} = \frac{5+3-4i}{i} = \frac{8-4i}{i} = \frac{8-4i}{i} \cdot \frac{-i}{-i}$$

$$= \frac{-i(8-4i)}{i^2} = \frac{-8i-4}{-1}$$

$$r = \sqrt{(-8)^2 + (-4)^2} = \sqrt{64+16} = \sqrt{80}$$

$$\varphi = \arctan \frac{-8}{-4} = 1,107 \quad \times$$

ZA $\operatorname{Re}(z) < 0$ VRIJEDI $\varphi = \pi + \arctan \frac{y}{x}$

$$z^3 =$$

$$-8i-4 = \sqrt{80} (\cos 1,107 + i \sin 1,107)$$

$$(-8i-4)^3 = \sqrt[3]{80} \left(\cos \frac{1,107+4 \cdot 2\pi}{3} + i \sin \frac{1,107+4 \cdot 2\pi}{3} \right)$$

$$W_1 = 4,31 \left(\cos \frac{1,107}{3} + i \sin 0,369 \right) = 4,02 + 1,555i$$

$$W_2 = 4,31 \left(\cos \frac{1,107+2\pi}{3} + i \sin 2,463 \right) = -3,355 + 2,705i$$

$$W_3 = 4,31 \left(\cos \frac{1,107+4\pi}{3} + i \sin 4,558 \right) = -0,663 + (-4,259i)$$

PREVIŠE GREŠAKA.



$$f(x) = \ln\left(\frac{x+5}{1-x}\right)$$

$$\lim_{x \rightarrow \infty} \frac{x+5}{1-x} = \ln \lim_{x \rightarrow \infty} \frac{x+5}{1-x} \stackrel{1}{=} \ln \frac{0}{-1} = \ln 0$$

NEMA L: D.K.A. ~~NEMA~~

$$\lim_{x \rightarrow \infty} \ln \frac{x+5}{1-x} = \ln \lim_{x \rightarrow \infty} \frac{-x+5}{1+x} = \ln \lim_{x \rightarrow \infty} \frac{-x+5}{1-x^2/x^2} \stackrel{0}{=} \ln \frac{0}{-1}$$

D.K.A. NEMA

VIDI NEKIĆ

4) $g(x) = \cos(\sin(3x))$

$D = \mathbb{R}$ ✓

$g(-x) = g(x)$

$-\cos(-\sin(3x)) = \cos(\sin(3x))$

PARNA ✓

-0,9300

$$\begin{aligned} g(-x) &= \cos(\sin(-3x)) \\ &= \cos(-\sin(3x)) \\ &= \cos(\sin(3x)) = g(x) \end{aligned}$$

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$$g(x)' = (\cos(\sin(3x)))' = \begin{cases} g(x) = \sin(3x) \\ f(x) = \cos x \rightarrow -\sin x \end{cases}$$

$$g(x)' = -\sin(\sin(3x)) \cdot (\sin(3x))' = \begin{cases} g(x) = 3x \rightarrow 3 \\ f(x) = \sin x \rightarrow \cos x \end{cases}$$

$$g(x)' = -\sin(\sin(3x)) \cdot \cos(3x) \cdot 3$$

$$g(x)' = -3 \sin^2(3x) \cdot \cos(3x) \quad \times$$

$$\cos(\sin(x)) = \cos(\sin(\pi + x))$$

$$\cos(\sin(3x)) = \cos(\sin(3\pi + 3x))$$

$P = \pi \quad \times$

ZA PERIOD P VRIJEDI

$$g(x+P) = g(x)$$

$$g(x+P) = \cos(\sin(3x+3P))$$

ZBOG PERIODIČNOSTI OD SINUS VRIJEDI

$$\sin(3x+2\pi) = \sin(3x)$$

$$\text{STOGA ZA } 3P = 2\pi \Rightarrow P = \frac{2\pi}{3}$$

VRIJEDI

$$\begin{aligned} g(x + \frac{2\pi}{3}) &= \cos(\sin(3x+2\pi)) \\ &= \cos(\sin(3x)) \\ &= g(x) \end{aligned}$$

PORTADA

IME I PREZIME:

BROJ INDEKSA:

5) ASIMPTOTE

$$\lim_{x \rightarrow \infty} \cos(\sin(3x)) \rightarrow \text{NEMA H. A}$$

NEMA NI VERTIKALNIH
JER JE $DH = \mathbb{R}$

$$\lim_{x \rightarrow \infty} \frac{\cos(\sin(3x))}{x} = \frac{0}{\infty} = 0 \quad \lim_{x \rightarrow \infty} \frac{\cos(\sin(3x))}{x} = 0$$

NEMA NI KOŠIH ASIMPTOTA

PARNA FUNKCIJA

$$f'(x) = -\sin(\sin(3x)) \cdot \cos(3x) \cdot 3 = -3 \sin^2(3x) \cdot \cos(3x)$$

$$f''(x) = (-3 \sin^2(3x))' \cdot \cos(3x) + (-3 \sin^2(3x)) \cdot (\cos(3x))'$$

$$f''(x) = (-6 \sin(3x) \cdot 3) \cdot \cos(3x) + (-3 \sin^2(3x)) \cdot (-\sin(3x) \cdot 3)$$

$$f''(x) = -18 \sin(3x) \cdot \cos(3x) + 9 \sin^2(3x) \cdot \sin(3x)$$

$$f''(x) = -18 \sin(3x) \cdot \cos(3x) + 9 \sin^3(3x)$$

KRITIČNE TOČKE

$$-3 \sin^2(3x) \cdot \cos(3x) = 0$$

$$3x = 0$$

$$x = 0$$

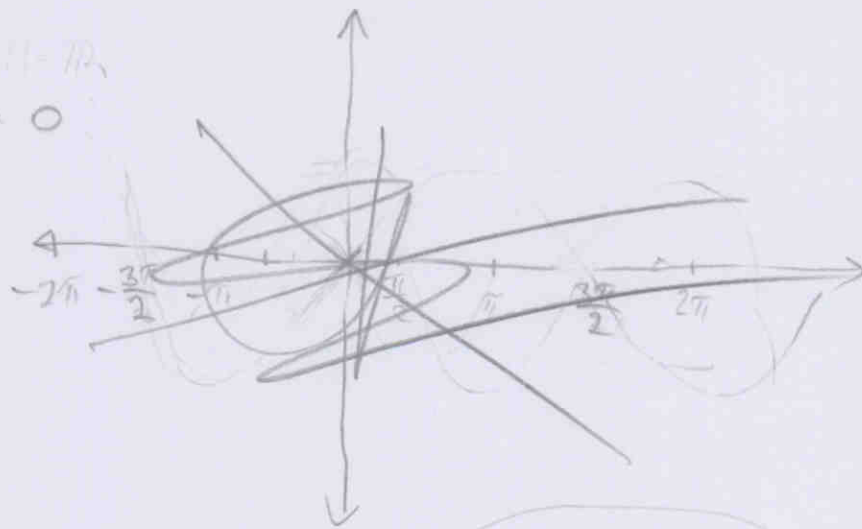
$$f(x) = 0$$

$$\cos(\sin(3x)) = 0$$

$$3x = 0$$

$$x = 0$$

$$f(0) = f(x) \quad \cos(\sin(0)) = \cos(\sin(3x))$$

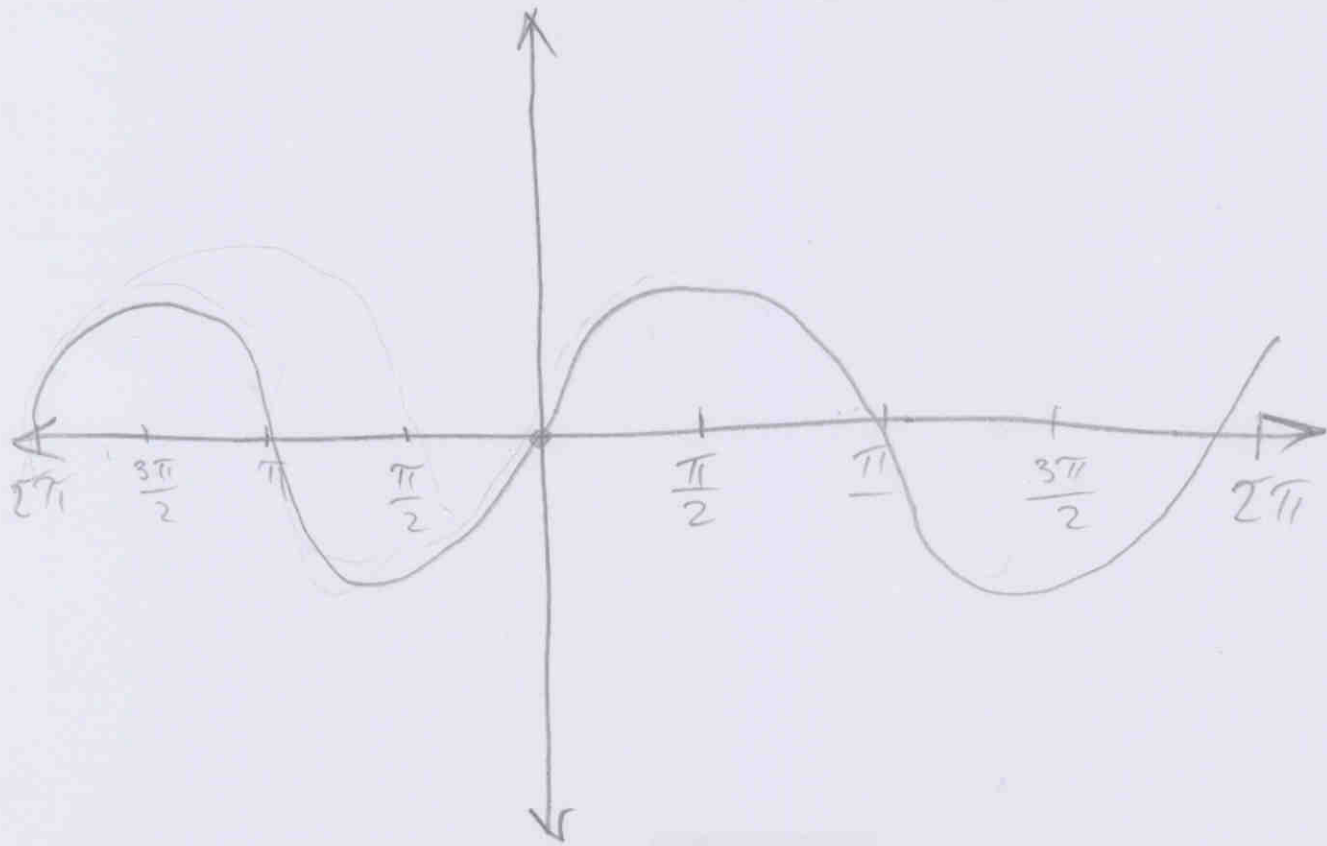


$$\begin{aligned} \sin 0 &= \sin 3x \\ 3 \cdot 3x &= 0 \\ x &= 0 \end{aligned}$$

IME I PREZIME:

PORTADA

BROJ INDEKSA:



TOK SE TRAŽIO ZA $f(x) = \ln\left(\frac{x+5}{1-x}\right)$