

Popuniti odmah!

IME I PREZIME:

DANIJELO SORIC

BROJ INDEKSA:

DATUM:

VRIJEME: OD 8:20

DO 9:50

MATEMATIKA 1: Trajanje 100 minuta. Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata.

45

xxxxx
Broj ↓
bodova

1. Koja je definicija inverza matrice? Izračunati inverz dane matrice (ako postoji) i provjeriti relaciju iz definicije.

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

20

2. Ako su z_1 i z_2 rjesenja kvadratne jednadzbe $z^2 - 2z + 2 = 0$, izracunati: $\overline{\left(\frac{z_1 - z_2}{z_2 - 2}\right)}$ i $Re\left(\overline{\left(\frac{z_2}{z_1}\right)}\right)$.

15

3. Zadana je funkcija $f(x) = e^{-x^2}$. Odrediti domenu, prvu derivaciju i sve asimptote funkcije.

5

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

5

5. Na temelju ispitivanja toka napraviti skicu grafa funkcije $h(x) = x - \frac{1}{x+1}$.

~~5~~

2.

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

$$z_{1,2} = \frac{2 \pm \sqrt{(-2)^2 - 4 \cdot 1 \cdot 2}}{2 \cdot 1} = \frac{2 \pm \sqrt{4 - 8}}{2}$$

$$\overline{\left(\frac{z_1 - z_2}{z_2 - 2}\right)} =$$

$$z_{1,2} = \frac{2 \pm \sqrt{-4}}{2} = \frac{2 \pm 4i}{2}$$

$$\overline{\left(\frac{1+2i - (1-2i)}{1-2i - 2}\right)} = \overline{\left(\frac{1+2i - 1 + 2i}{-1 - 2i}\right)}$$

$$z_1 = \frac{2+4i}{2} = \frac{2}{2} + \frac{4i}{2} = 1+2i$$

$$= \overline{\left(\frac{4i}{-1-2i}\right)} = \overline{\left(\frac{4i}{-1-2i} \cdot \frac{-1+2i}{-1+2i}\right)}$$

$$z_2 = \frac{2-4i}{2} = \frac{2}{2} - \frac{4i}{2} = 1-2i$$

$$\overline{\left(\frac{z_2}{z_1}\right)} = \overline{\left(\frac{1-2i}{1+2i}\right)}$$

$$= \overline{\left(\frac{-4i + 8i^2}{1 - 2i^2 + 4i - 4i^2}\right)} = \overline{\left(\frac{-4i - 8}{1 + 4}\right)}$$

$$= \overline{\left(\frac{1 - 2i - 2i + 4i^2}{1 - 2i^2 + 2i - 4i^2}\right)} = \overline{\left(\frac{-4i - 3}{5}\right)}$$

$$= \overline{\left(\frac{-4i - 8}{5}\right)} = \overline{\left(\frac{-4i}{5} - \frac{8}{5}\right)} = \frac{4i}{5} - \frac{8}{5}$$

$$= \left(\frac{4i - 3}{5}\right) = \frac{4i - 3}{5} = \frac{4i}{5} - \frac{3}{5}$$

15

DAMIĆ SORIĆ

IME I PREZIME:

BROJ INDEKSA:

$$1. \quad A = \begin{bmatrix} 0 & 1 & 0 & -1 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ -1 & 0 & 1 & 0 \end{bmatrix}$$

$$\left[\begin{array}{cccc|cccc} 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 1 & 0 & 0 & 1 & 0 \\ -1 & 0 & 1 & 0 & 0 & 0 & 0 & 1 \end{array} \right] \begin{array}{l} \updownarrow \\ \updownarrow \\ \updownarrow \\ \updownarrow \end{array}$$

$$\left[\begin{array}{cccc|cccc} 1 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ -1 & 0 & 1 & 0 & 0 & 0 & 0 & 1 \\ 0 & 1 & 0 & 1 & 0 & 0 & 1 & 0 \end{array} \right] R_3+R_1$$

$$\left[\begin{array}{cccc|cccc} 1 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 2 & 0 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 1 & 0 & 0 & 1 & 0 \end{array} \right] R_4-R_2$$

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

$$\left[\begin{array}{cccc|cccc} 1 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 2 & -1 & 0 & 1 & 0 \end{array} \right] R_1-R_3$$

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

$$\left[\begin{array}{cccc|cccc} 1 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & -\frac{1}{2} \\ 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 1 & -\frac{1}{2} & 0 & \frac{1}{2} & 0 \end{array} \right] R_2+R_4$$

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

$$\begin{bmatrix} 0 & \frac{1}{2} & 0 & -\frac{1}{2} \\ \frac{1}{2} & 0 & \frac{1}{2} & 0 \\ 0 & \frac{1}{2} & 0 & \frac{1}{2} \\ -\frac{1}{2} & 0 & \frac{1}{2} & 0 \end{bmatrix} \cdot \begin{bmatrix} 0 & 1 & 0 & -1 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ -1 & 0 & 1 & 0 \end{bmatrix} = \begin{bmatrix} 0 + \frac{1}{2} + 0 + \frac{1}{2} & 0 + 0 + 0 + 0 & 0 + \frac{1}{2} + 0 - \frac{1}{2} & 0 + 0 + 0 + 0 \\ 0 + 0 + 0 + 0 & \frac{1}{2} + 0 + \frac{1}{2} + 0 & 0 + 0 + 0 + 0 & \frac{1}{2} + 0 + \frac{1}{2} + 0 \\ 0 + \frac{1}{2} + 0 - \frac{1}{2} & 0 + 0 + 0 + 0 & 0 + \frac{1}{2} + 0 + \frac{1}{2} & 0 + 0 + 0 + 0 \\ 0 + 0 + 0 + 0 & -\frac{1}{2} + 0 + \frac{1}{2} + 0 & 0 + 0 + 0 + 0 & \frac{1}{2} + 0 + \frac{1}{2} + 0 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$



TO JE DEFINICIJA

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3.

$$f(x) = e^{-x^2}$$

$$f'(x) = e^{-x^2} \cdot (-2x)$$



5

4.

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

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

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



FUNKCIJA JE PERIODIČNA IER JE TRIGONOMETRISKA ?

5

PARNOST: $g(x) = \cos(3x) = g(-x) = \cos(3x)$

FUNKCIJA NIJE PARNI ~~X~~

NEPARNOST: $g(-x) = \cos(3x) = -g(x) = -\cos(3x)$

FUNKCIJA JE NEPARNI

5.

$$h(x) = x - \frac{1}{x+1}$$

$$D_f = \mathbb{R} \setminus \{-1\}$$

$$x+1=0$$

$$x=-1$$

V.A.

$$\begin{aligned} \lim_{x \rightarrow -1} x - \frac{1}{x+1} &= \lim_{x \rightarrow -1} \frac{x^2+x-1}{x+1} = \frac{(-1)^2-1-1}{-1+1} \\ &= \frac{1+1-1}{-1+1} = \frac{-1}{0} = -\infty \end{aligned}$$

H.A.

$$\lim_{x \rightarrow \infty} x - \frac{1}{x+1} = \lim_{x \rightarrow \infty} \frac{x^2+x-1}{x+1} \cdot \frac{1}{x^2} = \frac{1}{0} = \infty \text{ NEMA H.A.}$$

K.A.

D.K.A.

$$K = \lim_{x \rightarrow \infty} \frac{x - \frac{1}{x+1}}{x} = \lim_{x \rightarrow \infty} \frac{\frac{x^2+x-1}{x+1}}{\frac{x}{1}} = \lim_{x \rightarrow \infty} \frac{x^2+x-1}{x^2+x} = \frac{1}{1} = 1$$

$$l = \lim_{x \rightarrow \infty} x - \frac{1}{x+1} - x = \lim_{x \rightarrow \infty} \frac{x^2+x-1-x^2}{x+1} = \frac{-1}{x+1} = \frac{0}{1} = 0$$

$$y=1$$

L.K.A.

$$\begin{aligned} K &= \lim_{x \rightarrow -\infty} \frac{x - \frac{1}{x+1}}{x} = \lim_{x \rightarrow -\infty} \frac{-x - \frac{1}{x+1}}{-x} = \lim_{x \rightarrow -\infty} \frac{\frac{x^2-x-1}{-x+1}}{\frac{-x}{1}} = \lim_{x \rightarrow -\infty} \frac{x^2-x-1}{x^2-x} \\ &= \frac{1}{1} = 1 \end{aligned}$$

$$\begin{aligned} l &= \lim_{x \rightarrow -\infty} x - \frac{1}{x+1} - x = \lim_{x \rightarrow -\infty} -x - \frac{1}{x+1} + x = \lim_{x \rightarrow -\infty} \frac{x^2-x-1+x^2+x}{-x+1} = \lim_{x \rightarrow -\infty} \frac{-1}{-x+1} \\ &= \frac{0}{1} = 0 \quad y=1 \end{aligned}$$

NULTOČKE:

$$h(x) = x - \frac{1}{x+1}$$

$$x - \frac{1}{x+1} = 0 \quad | \cdot (x+1)$$

$$x^2 + x - 1 = 0$$

$$x_{1,2} = \frac{-1 \pm \sqrt{1^2 - 4 \cdot 1 \cdot (-1)}}{2 \cdot 1}$$

$$x_{1,2} = \frac{-1 \pm \sqrt{1+4}}{2} = \frac{-1 \pm \sqrt{5}}{2} = \frac{-1 \pm 2,24}{2}$$

$$x_1 = \frac{-1 + 2,24}{2} = 0,62$$

$$x_2 = \frac{-1 - 2,24}{2} = -1,62$$

EKSTREMI:

$$h(x) = x - \frac{1}{x+1} =$$

$$h(x) = \frac{x^2 + x - 1}{x+1}$$

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

$$(x+1)^2 = 0$$

$$(x+1)^2 = x^2 + 2x + 1^2 = x^2 + 2x + 1$$

$$x^2 + 2x + 1 = 0$$

$$x_{1,2} = \frac{-2 \pm \sqrt{2^2 - 4 \cdot 1 \cdot 1}}{2 \cdot 1} = \frac{-2 \pm 0}{2}$$

$$x_1 = -1 \quad \text{— PRVA KRITIČNE}$$

$$x_2 = -1 \quad \text{— TOČKA}$$

SKICA GRAFA ?

BODUJE SE SAMO GRAF.

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

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

$$x_{1,2} = \frac{-2 \pm \sqrt{4-8}}{2}$$

$$x_{1,2} = \frac{-2 \pm \sqrt{-4}}{2}$$

$$x_{1,2} = \frac{-2 \pm 2i}{2}$$

$$x_1 = \frac{-2+2i}{2} = -1+i \quad \text{— DRUGA}$$

$$x_2 = \frac{-2-2i}{2} = -1-i \quad \text{— KRITIČNA TOČKA}$$

Popuniti odmah!

IME I PREZIME: FRANK ĐUVAT

BROJ INDEKSA: 17-2-0020

40

DATUM: 24.6.2019. VRIJEME: OD 8:15 DO 9:25

MATEMATIKA 1: Trajanje 100 minuta. Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata.

xxxxx
Broj ↓
bodova

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

5. Na temelju ispitivanja toka napraviti skicu grafa funkcije $h(x) = x - \frac{1}{x+1}$.

①

$$\left[\begin{array}{ccc|ccc} 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 & 0 & 0 & 1 & 0 \\ -1 & 0 & 1 & 0 & 0 & 0 & 0 & 1 \end{array} \right] \xrightarrow{\substack{R_1 \leftrightarrow R_2 \\ R_3 \leftrightarrow R_4}} = \left[\begin{array}{ccc|ccc} 1 & 0 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ -1 & 0 & 1 & 0 & 0 & 0 & 0 & 1 \\ 0 & 1 & 0 & 1 & 0 & 0 & 1 & 0 \end{array} \right] \xrightarrow{R_3 + R_1} =$$

$$= \left[\begin{array}{ccc|ccc} 1 & 0 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 2 & 0 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 1 & 0 & 0 & 1 & 0 \end{array} \right] \xrightarrow{R_4 - R_2} = \left[\begin{array}{ccc|ccc} 1 & 0 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 2 & 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 2 & -1 & 0 & 1 & 0 \end{array} \right] \xrightarrow{\substack{R_3 : 2 \\ R_4 : 2}} =$$

$$= \left[\begin{array}{ccc|ccc} 1 & 0 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 1 & -\frac{1}{2} & 0 & \frac{1}{2} & 0 \end{array} \right] \xrightarrow{R_1 - R_3} = \left[\begin{array}{ccc|ccc} 1 & 0 & 0 & 0 & 1 & 0 & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 1 & 0 & -1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 1 & -\frac{1}{2} & 0 & \frac{1}{2} & 0 \end{array} \right] \xrightarrow{R_1 + \frac{1}{2}R_3} =$$

$$= \left[\begin{array}{ccc|ccc} 1 & 0 & 0 & 0 & 1 & 0 & 0 & -\frac{1}{2} \\ 0 & 1 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 1 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 1 & -\frac{1}{2} & 0 & \frac{1}{2} & 0 \end{array} \right]$$

PROVJE RA INVERZA

$$\begin{bmatrix} 0 & 1 & 0 & -1 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ -1 & 0 & 1 & 0 \end{bmatrix} \cdot \begin{bmatrix} 0 & \frac{1}{2} & 0 & -\frac{1}{2} \\ \frac{1}{2} & 0 & \frac{1}{2} & 0 \\ 0 & \frac{1}{2} & 0 & \frac{1}{2} \\ -\frac{1}{2} & 0 & \frac{1}{2} & 0 \end{bmatrix} \Rightarrow \text{DEFINICIVA}$$

$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

INVERZ

MATRICE

20

(3.)

$$f(x) = e^{-x^2}$$

$$f'(x) = e^{-2x}$$

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

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

$$z = \frac{2 \pm \sqrt{4 - 8}}{2}$$

$$z = \frac{2 \pm 2i}{2}$$

$$z_1 = \frac{2 - 2i}{2} = \frac{2(1 - i)}{2} = 1 - i$$

$$z_2 = \frac{2 + 2i}{2} = \frac{2(1 + i)}{2} = 1 + i$$

$$\left(\frac{\overline{z_1 - z_2}}{z_2 - z_1} \right) = \left(\frac{\overline{1 - i - (1 + i)}}{1 + i - 2} \right) = \left(\frac{\overline{1 - i - 1 - i}}{-1 + i} \right) = \left(\frac{\overline{-2i}}{-1 + i} \right) = \left(\frac{-2i}{-1 + i} \right)$$

$$= \left(\frac{\overline{2i + 2i^2}}{1 + i - 1 - i^2} \right) = \left(\frac{\overline{2i - 2}}{1 + 1} \right) = \left(\frac{\overline{2i - 2}}{2} \right) = \left(\frac{\overline{2(i - 1)}}{2} \right) = \overline{(i - 1)} = i - 1 \quad \checkmark$$

$$\left(\left(\frac{\overline{z_2}}{z_1} \right) \right) = \left(\left(\frac{\overline{1 + i}}{1 - i} \cdot \frac{1 + i}{1 + i} \right) \right) = \left(\left(\frac{\overline{1 + i + i + i^2}}{1 - i + i - i^2} \right) \right) = \left(\left(\frac{\overline{1 + 2i - 1}}{1 + 1} \right) \right) =$$

$$= \left(\left(\frac{\overline{2i}}{2} \right) \right) = \left(\overline{i} \right) = -i \quad \checkmark \quad \underline{20}$$

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

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

$$A \cdot A^{-1} = I \text{ (provjera)}$$

$$\begin{bmatrix} 0 & 1 & 0 & -1 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ -1 & 0 & 1 & 0 \end{bmatrix} \times \begin{bmatrix} 0 & \frac{1}{2} & 0 & -\frac{1}{2} \\ \frac{1}{2} & 0 & \frac{1}{2} & 0 \\ 0 & \frac{1}{2} & 0 & \frac{1}{2} \\ -\frac{1}{2} & 0 & \frac{1}{2} & 0 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$0 \cdot 0 + 1 \cdot \frac{1}{2} + 0 \cdot 0 + (-1 \cdot (-\frac{1}{2})) = \frac{1}{2} + \frac{1}{2} = \frac{1+1}{2} = \frac{2}{2} = 1 \checkmark$$

$$0 \cdot \frac{1}{2} + 1 \cdot 0 + 0 \cdot \frac{1}{2} + (-1 \cdot 0) = 0 \checkmark$$

$$0 \cdot 0 + 1 \cdot \frac{1}{2} + 0 \cdot 0 + (-1 \cdot \frac{1}{2}) = \frac{1}{2} - \frac{1}{2} = \frac{1-1}{2} = \frac{0}{2} = 0$$

$$0 \cdot (-\frac{1}{2}) + 1 \cdot 0 + 0 \cdot \frac{1}{2} + (-1 \cdot 0) = 0 \dots \text{ itd}$$

③ $f(x) = e^{-x^2}$ $g(x) = e^{-x^2} z = x^2$ $f(g(x)) = f'(g(x)) \cdot f(g(x))'$

$$f'(x) = e^{-x^2} \cdot -2x \checkmark$$

$$g'(x) = e^{-x^2}$$

$$z'(x) = -2x$$

$$f(x) = -2x \cdot e^{-x^2}$$

$D(f) = \text{ni broj}$

$Df = \mathbb{R} \setminus \{0\}$

$e^0 = 1$

5

④ $g(x) = \cos(3x)$
 $g'(x) = -\sin(3x) \cdot 3$
 $g'(x) = -3 \sin(3x) \checkmark$
 $g''(x) = -3 \cdot (-\cos(3x)) \cdot 3 \times$
 $g''(x) = -9(-\cos(3x))$
 $= 9 \cos(3x) \times$

funkcija je periodična 5

ZAŠTO?
KOJI JE PERIOD?

Popuniti odmah!

IME I PREZIME:

DOVA SIMICIC

BROJ INDEKSA:

20

DATUM:

VRIJEME: OD

10:00

DO

10:40

MATEMATIKA 1: Trajanje 100 minuta. Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata.

xoxo
Broj ↓
bodova

1. Koja je definicija inverza matrice? Izračunati inverz dane matrice (ako postoji) i provjeriti relaciju iz definicije.

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

~~0~~

2. Ako su z_1 i z_2 rjesenja kvadratne jednadzbe $z^2 - 2z + 2 = 0$, izracunati: $\overline{\left(\frac{z_1 - z_2}{z_2 - 2}\right)}$ i $Re\left(\overline{\left(\frac{z_2}{z_1}\right)}\right)$.

3. Zadana je funkcija $f(x) = e^{-x^2}$. Odrediti domenu, prvu derivaciju i sve asimptote funkcije.

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

5. Na temelju ispitivanja toka napraviti skicu grafa funkcije $h(x) = x - \frac{1}{x+1}$.

~~0~~

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

$\rightarrow \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix} \rightarrow -2 \cdot [-1(1-1) = -2[-1 \cdot 0] = -2 \cdot 0$

matrica nema inverz jer je determinanta jednaka 0. $\sqrt{}$ $\sqrt{}$ $\sqrt{}$ ~~0~~

3. $f(x) = e^{-x^2}$

$Df = \mathbb{R}$ ✓

10

$f'(x) = (e^{-x^2})' = (e^{-x^2})' \cdot (-x^2)' = e^{-x^2} \cdot (-2x)$ ✓

$$A. g(x) = \cos(3x)$$

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

$$= \cos 3x$$

funkcija je neparna \times

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

$$g'(x) = -\sin(3x) \cdot 3 = \underline{\underline{-3 \sin(3x) \checkmark}}$$

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

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

$$= -3 \cos(3x) \cdot 3 = \underline{\underline{-9 \cos(3x) \quad 10}}$$

5. $h(x) = x - \frac{1}{x+1}$

← NULTOČKA NAZIVNIKA
JE $x = -1$

~~$x \neq -1$~~ $D_f = \mathbb{R} \times D(f) = \mathbb{R} \setminus \{-1\}$

$h(x) = x - \frac{1}{x+1} = \frac{x}{1} - \frac{1}{x+1} = \frac{x-1}{1-x+1} = \boxed{\frac{x-1}{-x+2}}$

nultočke:

ZBRAJANJE?
RAZLOŽAKA?

$h(x) = \frac{x-1}{-x+2}$

$\frac{x-1}{-x+2} = 0 \quad | \cdot (-x+2)$

$(x-1) \cdot (-x+2) = 0$

$-x^2 + 2x + x - 2 = 0$

$-x^2 + 3x - 2 = 0$

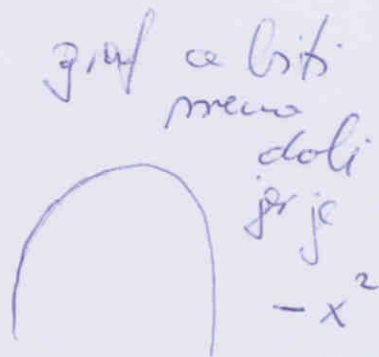
$x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x_{1,2} = \frac{-3 \pm \sqrt{3^2 - 4 \cdot (-1) \cdot (-2)}}{2 \cdot (-1)}$

$x_{1,2} = \frac{-3 \pm \sqrt{9-8}}{-2}$

$x_1 = \frac{-3+1}{-2} = \frac{-2}{-2} = 1$

$x_2 = \frac{-3-1}{-2} = \frac{-4}{-2} = 2$



IME I PREZIME:

ĐORĐIĆ SIMIĆIĆ

BROJ INDEKSA:

~~$f(x) = x^2 + 3x$~~ $h(x) = \left(\frac{x-1}{-x+2}\right)'$

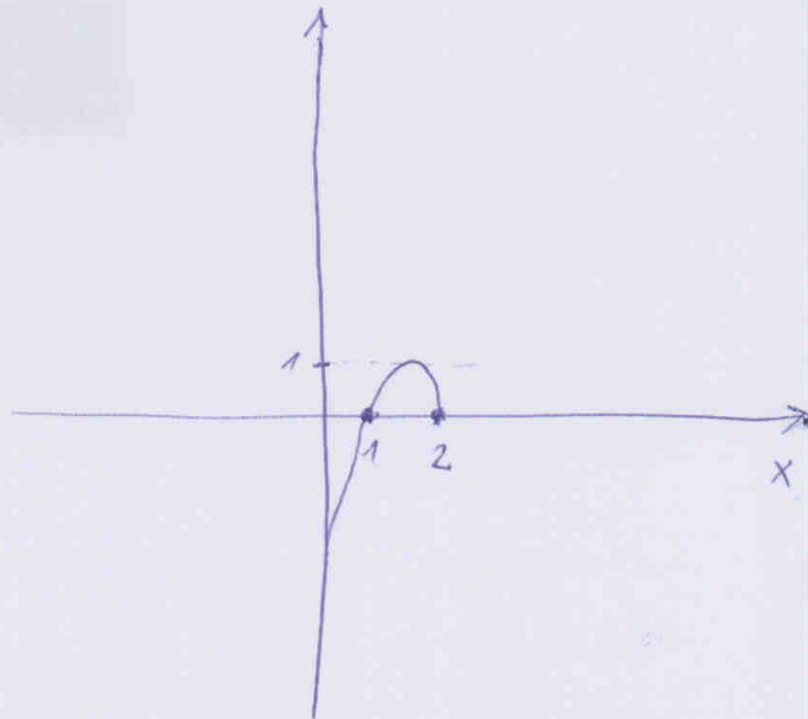
$$h'(x) = \frac{(x-1)' \cdot (-x+2) - (x-1) \cdot (-x+2)'}{(-x+2)^2}$$

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

$$h'(x) = \frac{1}{(-x+2)^2} = (-x+2)^{-2}$$



x	0	1	2
$h(x)$	0.25	1	0
	↗	M	↘



Popuniti odmah!

IME I PREZIME: BORIS KREŠIĆ

BROJ INDEKSA: ~~0~~

DATUM: 24.06.2011.

VRIJEME: OD

9:10

DO

9:25

MATEMATIKA 1: Trajanje 100 minuta. Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata.

xoxo
Broj ↓
bodova

1. Koja je definicija inverza matrice? Izračunati inverz dane matrice (ako postoji) i provjeriti relaciju iz definicije.

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

2. Ako su z_1 i z_2 rjesenja kvadratne jednadzbe $z^2 - 2z + 2 = 0$, izracunati: $\overline{\left(\frac{z_1 - z_2}{z_2 - 2}\right)}$ i $Re\left(\overline{\left(\frac{z_2}{z_1}\right)}\right)$.

3. Zadana je funkcija $f(x) = e^{-x^2}$. Odrediti domenu, prvu derivaciju i sve asimptote funkcije.

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

5. Na temelju ispitivanja toka napraviti skicu grafa funkcije $h(x) = x - \frac{1}{x+1}$.

③ $f(x) = e^{-x^2}$

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