

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

POPUNJAVA
NASTAVNIK
Broj ↓
bodova

IME I PREZIME: **IVAN ANDRIJAŠEVIĆ**

BROJ INDEKSA: **0269075298**

I1

- Riješi jednačbu među kompleksnim brojevima: $z^4 - 4 + 2i = 0$. Prikaži rješenja u kompleksnoj ravnini! 15+3
- Gaussovom metodom riješi sustav linearnih jednačbi, a zatim provjeri uvrštavanjem:

$$\begin{aligned} x + 2y - z + u &= -1 \\ 2x + 5y - z + 2u &= -2 \\ 3x - y - 2z + u &= 5 \\ x - y + 3z - 5u &= 6 \end{aligned}$$

Provjeri uvrštavanjem!

- Ispitati domenu i sve asimptote funkcije $g(x) = (\sqrt{x^2 + x} - x)$.
- Ispitati tok i nacrtati graf funkcije: $h(x) = \frac{x^2 - 4}{x^2 + 2}$.
- Odrediti prvu derivaciju funkcije: $f(x) = \ln(\sin(4x - 2))$.

6. Izračunati rang matrice:
$$\begin{bmatrix} 2 & 3 & 0 & -2 & 0 \\ 0 & 1 & 4 & -2 & 1 \\ 1 & 1 & 0 & 4 & -2 \\ 0 & 1 & 0 & 2 & 4 \end{bmatrix}$$

~~16+3~~

~~5+15~~

~~20(graf)~~

~~15~~

8

Ukupno:

~~0~~

2.
$$\begin{cases} x = -4 \\ y = 1 \\ z = 1 \\ u = 0 \end{cases}$$

X

VIDI IZA
PROVJERU

5. $f(x) = \ln(\sin(4x - 2))$

$f'(x) = \frac{1}{\sqrt{1-x}} \cdot (\sin(4x - 2)) \cdot \cos(4x - 2)$

3. $D(f) = \mathbb{R}$

V. A. ~~X~~ = \mathbb{R}

H. L. ~~X~~ = \emptyset

4. $D(f) = \sqrt{2}$

V. A. ~~X~~ = $-\frac{1}{2}$

H. L. ~~X~~ = \emptyset

$f'(x) = 2x^3 + 2 - x^2 - 8x$

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

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

$$\left[\begin{array}{cccc|c} 1 & 2 & -1 & 1 & -1 \\ 0 & 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 4 & 1 \\ 0 & 0 & 7 & 6 & 7 \end{array} \right] \begin{array}{l} \cdot(-7) \\ \leftarrow + \end{array} \sim \left[\begin{array}{cccc|c} 1 & 2 & -1 & 1 & -1 \\ 0 & 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 4 & 1 \\ 0 & 0 & 0 & -22 & -22 \end{array} \right] \begin{array}{l} \cdot(-22) \end{array}$$

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

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

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

$$-1 + 2 - 1 + 0 = 0$$

$$2x + 5y - z + 2w = -2$$

$$-2 + 5 - 1 + 0 = 2$$

PROVERA: $3 \cdot (-4) - 1 - 2 \cdot 1 + 0 = -15 \neq 5$

$$3.1 \quad y(x) = \sqrt{x^2 + x} - x \quad D(f) = \mathbb{R}$$

$$1^\circ \quad \lim_{x \rightarrow 2} = \sqrt{x^2 + x} - x = 2 \quad \text{V.A.} = 2$$

$$2^\circ \quad \lim_{x \rightarrow \infty} = \sqrt{x^2 + x} - x \stackrel{?}{\neq} x^2$$

$$\lim_{x \rightarrow \infty} = x + 1 - 1 = 1 - 1 = 0$$

$$\text{H.A.} = 0$$

$$5) \quad f(x) = \ln(\sin(4x - 2))$$

$$f'(x) = \frac{1}{\sqrt{1-x}} \cdot (\sin(4x - 2)) \cdot \cos(4x - 2)$$

~~$$f'(x) = \frac{1}{\sqrt{1-x}} \cdot 4x - 2 (\sin \cdot \cos)$$~~

$$f) f(x) = \frac{x^2 - 4}{x^2 + 2}$$

$$x^2 + 2 \neq 0$$

$$x^2 \neq -2$$

$$x \neq \sqrt{-2}$$

$$D(f) = \mathbb{R} \setminus \{\pm\sqrt{2}\}$$

VA

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

$$V.A. = x = -\frac{1}{2}$$

MA

$$\lim_{x \rightarrow \infty} = \frac{x^2 - 4}{x^2 + 2} \stackrel{\frac{\infty}{\infty}}{\sim} \frac{x^2 / x^2 - 4/x^2}{x^2/x^2 + 2/x^2} = \frac{1 - 0}{1 + 0} = 1$$

$$M.A. = x = 1$$

I DERIVACIJA

$$f(x) = \frac{x^2 - 4}{x^2 + 2}$$

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

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

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

SKICA GRAFA?

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

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T1

1. Riješi jednačbu među kompleksnim brojevima: $z^4 - 4 + 2i = 0$. Prikaži rješenja u kompleksnoj ravnini! 15+3
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5. $f(x) = \ln(\sin(4x-2))$

$f'(x) = \ln'(\sin(4x-2)) + \ln(\sin(4x-2))'$ ✗

$f'(x) = \frac{1}{x}(\sin(4x-2)) + \ln(\cos(0.1-0))$

$f'(x) = \frac{1}{x} \sin(4x-2) + \ln(\cos 0)$

$f(x) = \frac{1}{x} \sin(4x-2) + \ln$

1. $z^4 - 4 + 2i = 0$

$z^4 = 4 - 2i$

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

$z = \sqrt[4]{16 - 4i^2}$

$z =$

