

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj

POPUNJAVA

odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod!!

T1

NASTAVNIK

IME I PREZIME: *Antonio Tomušić*

BROJ INDEKSA: *17-2-0186-2012*

Broj ↓

bodova

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

1. Riješi jednadžbu među kompleksnim brojevima: $z^4 - 4 + 2i = 0$. *Prikaži rješenja u kompleksnoj ravnini!* ~~12+3~~
2. Riješi jednadžbu $\ln(x-4) = x-2$ grafičkom metodom. *Provjeri uvrštavanjem!* ~~12+3~~
3. Ispitati domenu i sve asimptote funkcije $g(x) = (\sqrt{x^2+x} - x)$. ~~5+15~~
4. Ispitati tok i nacrtati graf funkcije: $h(x) = \frac{x^2-4}{x^2+2}$. ~~20(graf)~~
5. Odrediti prvu derivaciju funkcije: $f(x) = \ln(\sin(4x-2))$. ~~15~~
6. Da li red $\sum_n \frac{3^n}{n^2}$ konvergira i zašto? ~~10~~ *5*

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

~~5~~

Ukupno:

45

7

$$\begin{bmatrix} 2 & 3 & 0 & -3 & 0 \\ 0 & 1 & 4 & -2 & 1 \\ 1 & 1 & 0 & 4 & -2 \\ 0 & 1 & 0 & 2 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 0 & 4 & -2 \\ 0 & 1 & 4 & -2 & 1 \\ 2 & 3 & 0 & -3 & 0 \\ 0 & 1 & 0 & 2 & 4 \end{bmatrix}$$

$1R \cdot 0 + 2R$

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

$1R \cdot 0 + 4R$

$$\begin{bmatrix} 1 & 1 & 0 & 4 & -2 \\ 0 & 1 & 4 & -2 & 1 \\ 0 & 1 & 0 & -11 & 4 \\ 0 & 1 & 0 & 2 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 0 & 4 & -2 \\ 0 & 1 & 4 & -2 & 1 \\ 0 & 0 & -4 & -9 & 3 \\ 0 & 0 & -4 & 4 & 3 \end{bmatrix} \begin{matrix} \\ \\ \div (-4) \\ \end{matrix} \sim$$

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

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

$$\begin{bmatrix} 1 & 1 & 0 & 4 & -2 \\ 0 & 1 & 4 & -2 & 1 \\ 0 & 0 & 1 & \frac{9}{4} & -\frac{3}{4} \\ 0 & 0 & -4 & 4 & 3 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 0 & 4 & -2 \\ 0 & 1 & 4 & -2 & 1 \\ 0 & 0 & 1 & \frac{9}{4} & -\frac{3}{4} \\ 0 & 0 & 0 & 13 & 0 \end{bmatrix} \begin{matrix} \\ \\ \div 13 \\ \end{matrix} \sim$$

$3R \cdot 4 + 4R$

$$\begin{bmatrix} 1 & 1 & 0 & 4 & -2 \\ 0 & 1 & 4 & -2 & 1 \\ 0 & 0 & 1 & \frac{9}{4} & -\frac{3}{4} \\ 0 & 0 & 0 & 1 & 0 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 0 & 0 & -2 \\ 0 & 1 & 4 & 0 & 1 \\ 0 & 0 & 1 & 0 & -\frac{3}{4} \\ 0 & 0 & 0 & 1 & 0 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 0 & 0 & -2 \\ 0 & 1 & 0 & 0 & 4 \\ 0 & 0 & 1 & 0 & -\frac{3}{4} \\ 0 & 0 & 0 & 1 & 0 \end{bmatrix}$$

$$4R \cdot \left(-\frac{9}{4}\right) + 3R$$

$$4R \cdot 2 + 3R$$

$$4R \cdot (-4) + 1R$$

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

$$3R \cdot 0 + 1R$$

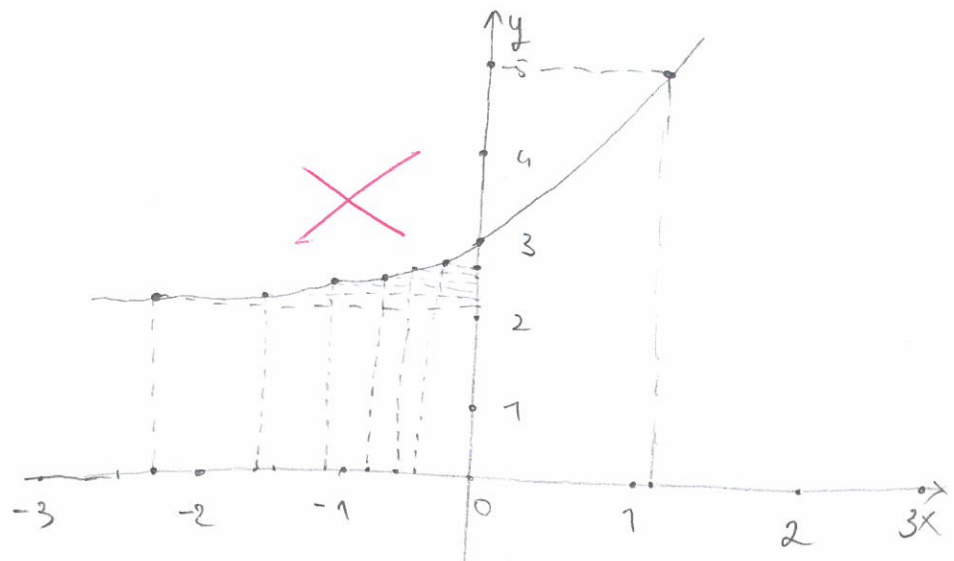
$$2R \cdot (-1) + 1R$$

$$\begin{bmatrix} 1 & 0 & 0 & 0 & -6 \\ 0 & 1 & 0 & 0 & 4 \\ 0 & 0 & 1 & 0 & -\frac{3}{4} \\ 0 & 0 & 0 & 1 & 0 \end{bmatrix}$$

Rang matrice je ~~1~~

② $P_n(x-4) = x-2$

x	y
4.1	-2.30
4.2	-1.61
4.3	-1.2
4.4	-0.92
4.5	-0.69
4.6	-0.51
5	0
7	1.10



NIKAD OVAKO RIJEŠAVATI!

NAUČITI GRAFOVE ELEMENTARNIH FUNKCIJA!

IME I PREZIME: Antonia Horušić

BROJ INDEKSA: 17-2-0186-2012

$$\textcircled{3} \quad g(x) = (\sqrt{x^2+x} - x)$$

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

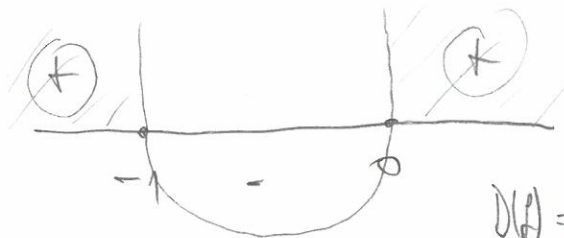
$$x^2+x+1 = 0$$

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

$$x = 0$$

$$x+1 = 0$$

$$x = -1$$



$$D(g) = \langle -\infty, -1 \rangle \cup [0, +\infty) \checkmark$$

$$\text{H.o.A} \quad \lim_{x \rightarrow +\infty} (\sqrt{x^2+x} - x) = +\infty \quad \times$$

$$\lim_{x \rightarrow -\infty} (\sqrt{x^2+x} - x) = \lim_{x \rightarrow +\infty} (\sqrt{(x)^2-x} + x) = +\infty \quad \checkmark$$

ASIMPTOTE ?

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

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

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

$$f'(x) = \frac{4 \cos(4x-2)}{\sin(4x-2)} = 4 \operatorname{ctg}(4x-2)$$

$$1.) \quad h(x) = \frac{x^2 - 4}{x^2 + 2}$$

1. DOMÉNA

$$x^2 + 2 \neq 0 \quad D(f) = \mathbb{R}$$

$$x^2 \neq -2$$

2. NULTOČKĚ

$$x^2 - 4 = 0$$

$$x^2 = 4$$

$$x^2 = \pm\sqrt{4}$$

$$x = \pm 2$$

$$x_1 = 2$$

$$x_2 = -2$$

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

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

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

$$h'(x) = \frac{\cancel{2x} + 4x - \cancel{2x}^3 - 8x}{(x^2 + 2)^2}$$

$$h'(x) = \frac{12x}{(x^2 + 2)^2} = 0 \quad / : (x^2 + 2)^2$$

$$h'(x) = 12x = 0 \quad / : 12$$

$$x = 0$$

	$-\infty$	0	$+\infty$
$h(x)$		\searrow	\nearrow
$h'(x)$		-	+

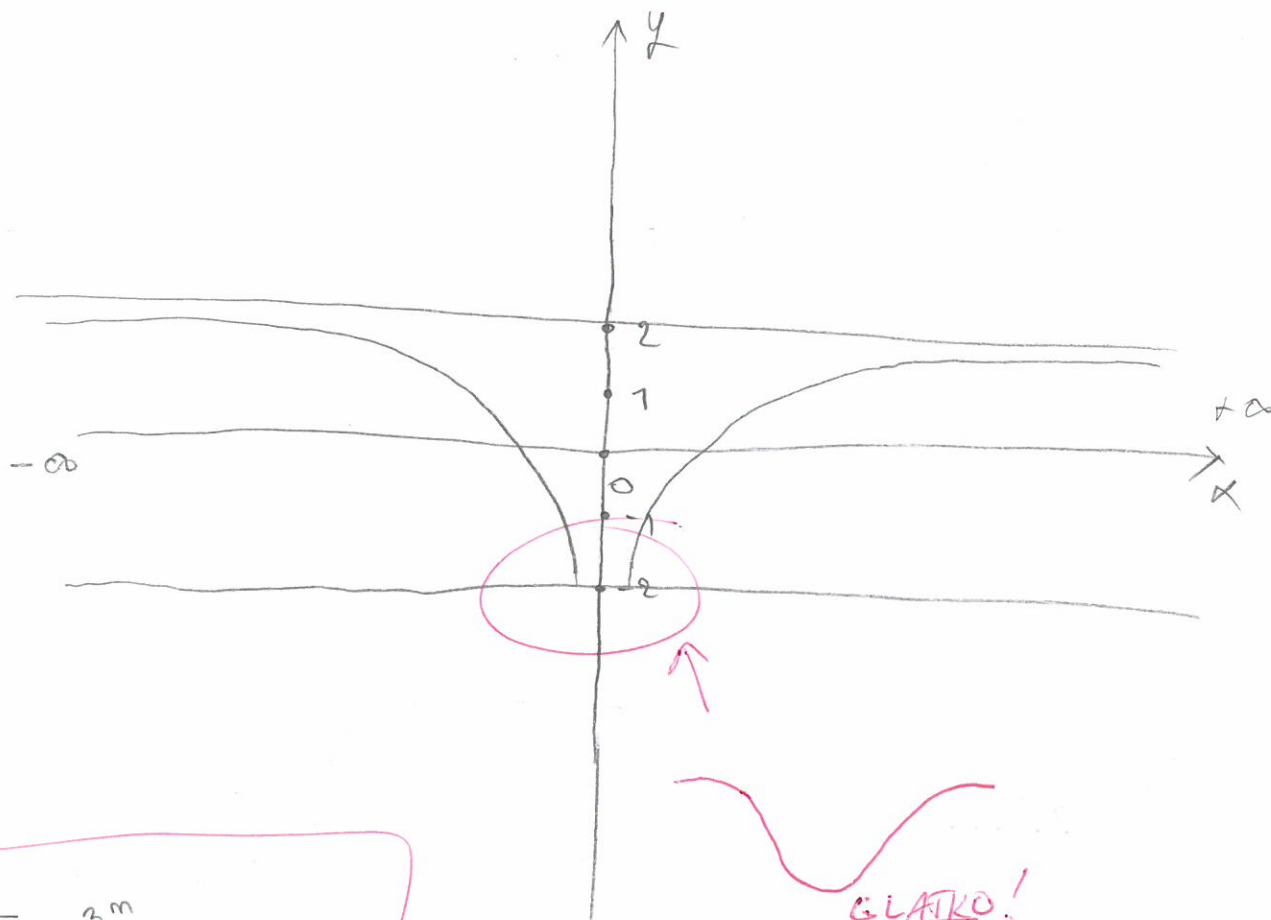
U $x = 0$ POSTIŽE SE

MINIMUM 1 ON 12NOSI

$$h(0) = \frac{-4}{2} = -2$$

MINIMUM $(0, -2)$

4



6. $\sum_{n=3}^{\infty} \frac{3^n}{3 \cdot 2 \cdot 3^n}$

Red me konvergira zato jer nema bomačnu sumu za $x \in \left(-\frac{1}{3}, \frac{1}{3}\right)$ ~~KAKAV X?~~ 5
 AHA, MISLIO NA R

$$R = \lim_{n \rightarrow \infty} \frac{3^n}{3 \cdot 2 \cdot 3^n} = \lim_{n \rightarrow \infty} \frac{3^n \cdot (n+1)^2}{3 \cdot 2 \cdot 3^{n+1}} = \lim_{n \rightarrow \infty} \frac{(n+1)^2}{3 \cdot 2 \cdot 3} = \lim_{n \rightarrow \infty} \frac{(n+1)^2}{6n}$$

$$= \left[\frac{\infty}{\infty} \right]^{L'H} = \lim_{n \rightarrow \infty} \frac{2(n+1)}{6n} = \left[\frac{\infty}{\infty} \right]^{L'H} = \frac{2}{6} = \frac{1}{3} < 1$$

BITNO DA D'ALAMBERTOV KRITERIJ DAJE ~~KONVERGENCIJU~~ ^{DI} DIVERGENCIJU U OVOM SLUCAJU.

$$\textcircled{1} \quad z^4 - 4 + 2i = 0$$

$$z^4 = 4 - 2i$$

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

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

$$z_3 = i\sqrt[4]{4-2i}$$

$$z_4 = \sqrt[4]{4-2i}$$

NE

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: BORIS UGLEŠIĆ

BROJ INDEKSA: 17-1-0022-2018

I1

ZAOKRUŽITI AKO ŽELITE:

ustmeni kod prof. Uglešića

1. Riješi jednadžbu među kompleksnim brojevima: $z^4 - 4 + 2i = 0$. Prikaži rješenja u kompleksnoj ravnini! 12+3
2. Riješi jednadžbu $\ln(x-4) = x-2$ grafičkom metodom. Provjeri uvrštavanjem! 12+3
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5. Odrediti prvu derivaciju funkcije: $f(x) = \ln(\sin(4x-2))$. 15
6. Da li red $\sum_n \frac{3^n}{n^2}$ konvergira i zašto? 10

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

5

Ukupno:

15

5

$$\begin{aligned} f'(x) &= \ln(\sin(4x-2)) \\ &= \frac{1}{\sin(4x-2)} \cdot \cos(4x-2) \cdot 4 \\ &= 4 \frac{\cos(4x-2)}{\sin(4x-2)} \quad \checkmark \end{aligned}$$

3

$$g(x) = (\sqrt{x^2+x} - x)$$

$$Df = \sqrt{x^2+x} \geq 0$$

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj

odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod!!

IME I PREZIME: **VESNA ŽARIĆ**

BROJ INDEKSA:

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

POPUNJAVA
NASTAVNIK
Broj ↓
bodova

Z1

- Riješi jednačbu među kompleksnim brojevima: $z^4 - 4 + 2i = 0$. Prikaži rješenja u kompleksnoj ravnini! ~~12+3~~
- Riješi jednačbu $\ln(x-4) = x-2$ grafičkom metodom. Provjeri vrštavanjem! 12+3
- Ispitati domenu i sve asimptote funkcije $g(x) = (\sqrt{x^2+x} - x)$. 5+15
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ZAŠTO?

Ukupno:

15

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

$x = 4$

$z^4 = 4 - 2i$

$y = -2$

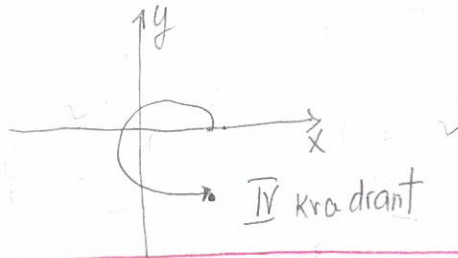
$z = \sqrt[4]{4-2i}$

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

$|z| = \sqrt{4^2 + (-2)^2}$

$|z| = \sqrt{16+4}$

$|z| = 5$ ✘



$\operatorname{tg} \varphi = 2\pi - \arctg \left| \frac{y}{x} \right|$

$\operatorname{tg} \varphi = 2\pi - \arctg \left| \frac{-2}{4} \right|$

$\operatorname{tg} \varphi = 2\pi - \arctg \frac{1}{2}$

KAKVA JE OVA FORMULA?

1) $k=0$

$z_k = \sqrt[4]{5} \left(\cos \frac{\varphi + 2k\pi}{4} + i \sin \frac{\varphi + 2k\pi}{4} \right) \operatorname{tg} \varphi = -20.28$ $k=0, 1, 2, 3$

STUPNJEVI 141?

$z_0 = \sqrt[4]{5} \left(\cos \frac{-20.28}{4} + i \sin \frac{-20.28}{4} \right) = \sqrt[4]{5} (0.99 + i(-0.088))$
 $= 1.49(0.99 + i(-0.088))$

2) $k=1$

$z_1 = \sqrt[4]{5} \left(\cos \frac{-20.28 + 2 \cdot 1 \cdot \pi}{4} + i \sin \frac{-20.28 + 2 \cdot 1 \cdot \pi}{4} \right) = 1.4751 + i(-0.131)$

$z_2 = \sqrt[4]{5} (\cos -3.49 + i \sin -3.49)$

$z_2 = 1.49(0.99 + i(-0.060))$

$z_2 = 1.47 + i(-0.08)$

$$3) \boxed{k=2}$$

$$z_3 = 4\sqrt{5} \left(\cos \frac{-20.28 + 2 \cdot 2 \cdot \tilde{\pi}}{4} + i \sin \frac{-20.28 + 2 \cdot 2 \cdot \tilde{\pi}}{4} \right)$$

$$z_3 = 4\sqrt{5} \left(\cos(-1.9) + i \sin(-1.9) \right) = 1.49(0.99 + i(-0.033)) \\ = 1.47 + i(-0.4917)$$

$$4) \boxed{k=3}$$

$$z_4 = 4\sqrt{5} \left(\cos \frac{-20.28 + 2 \cdot 3 \cdot \tilde{\pi}}{4} + i \sin \frac{-20.28 + 2 \cdot 3 \cdot \tilde{\pi}}{4} \right) = 1.49(0.99 + i(-6.10))$$

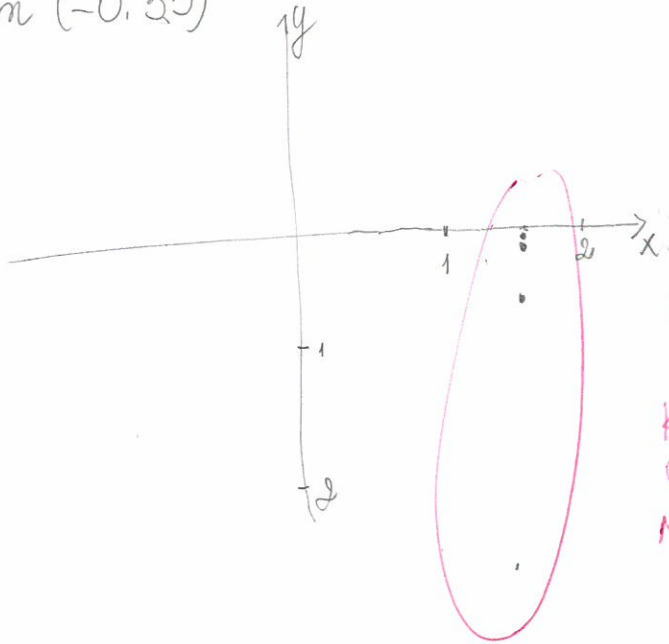
$$z_4 = 4\sqrt{5} \left(\cos(-0.35) + i \sin(-0.35) \right)$$

$$\boxed{z_1 = 1.47 + i(-0.131)}$$

$$\boxed{z_2 = 1.47 + i(-0.08)}$$

$$\boxed{z_3 = 1.47 + i(-0.4917)}$$

$$\boxed{z_4 = 1.47 + (-9.089)i}$$



OVAKAV
POLOŽAJ
KORIJENA
UKAZUJE
NA GREŠKU!

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

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

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

$$f'(x) = \frac{4 \cos(4x-2)}{\sin(4x-2)} = 4 \operatorname{tang} \frac{(4x-2)}{(4x-2)} \quad \checkmark$$

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POPUNJAVA
NASTAVNIK
Broj ↓
bodova

I1

IME I PREZIME: MASAR JOSIP

BROJ INDEKSA: 57818-2009

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

1. Riješi jednačbu među kompleksnim brojevima: $z^4 - 4 + 2i = 0$. Prikaži rješenja u kompleksnoj ravni! 12+3
2. Riješi jednačbu $\ln(x - 4) = x - 2$ grafičkom metodom. Provjeri uvrštavanjem! 12+3
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Ukupno:

15

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

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

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

$$\frac{f' \cdot g - g' \cdot f}{g^2}$$

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

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

$$h''(x) = \frac{4x^3(x^2 + 2) - 2x \cdot x^4 - 2}{(x^2 + 2)^3}$$

$$h''(x) = \frac{4x^5 + 8x^3 - 2x^5 - 2}{(x^2 + 2)^3}$$

$$h''(x) = \frac{12x^3 - 4x}{(x^2 + 2)^3}$$

GRAF?

$$\begin{pmatrix} 7 & 2 & 3 & 0 & -3 & 0 \\ 0 & 1 & 4 & -2 & 1 & \\ 1 & 1 & 0 & 4 & -2 & \\ 0 & 1 & 0 & 2 & 4 & \end{pmatrix}$$

broj redova - broj nepoznavica
 $n=4$ $m=4$

$$4-4=0$$

matrica



$$q(x) = \sqrt{x^2+x} - x$$

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

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

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

$$D(f) \setminus \{2, -4\}$$

ASIMPTOTE

$$\lim_{x \rightarrow \pm\infty} \frac{\sqrt{x^2+x} - x}{1} \cdot \frac{x^2+x}{x^2+x+x}$$

$$\lim_{x \rightarrow \pm\infty} \frac{x^2+x}{x^2+x+x} \cdot \frac{x^2+x}{x^2+x+x} /: x^2$$

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

ima desne V.A



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

nema lijeve V.ASIMP TOTE

odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod!!

Z1

NASTAVNIK

Broj ↓

bodova

IME I PREZIME: Klara Postnužin

BROJ INDEKSA: 17-1-0117-2012

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

1. Riješi jednačbu među kompleksnim brojevima: $z^4 - 4 + 2i = 0$. Prikaži rješenja u kompleksnoj ravnini! ~~12+3~~
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5

Ukupno:

13

3. $g(x) = (\sqrt{x^2+x} - x)$

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

$$x(x+1) \geq 0$$

$$x = 0$$

$$x+1 = 0$$

$$x = -1$$

	$-\infty$	-1	0	$+\infty$
x	-	-	+	+
$x+1$	-	+	+	+
	⊕	-	⊕	

$$D_g = \langle -\infty, -1 \rangle \cup [0, +\infty) \checkmark$$

V.A. $\lim_{x \rightarrow -1} (\sqrt{x^2+x} - x) = \lim_{x \rightarrow -1} (\sqrt{(-1)^2+(-1)} - (-1)) = 1$ nema vertikalne asimptote

$\lim_{x \rightarrow 0} (\sqrt{x^2+x} - x) = \lim_{x \rightarrow 0} (\sqrt{0^2+0} - 0) = 0$

H.A. $\lim_{x \rightarrow +\infty} (\sqrt{x^2+x} - x) = \lim_{x \rightarrow +\infty} (\sqrt{x^2+x} - x) \cdot \frac{\sqrt{x^2+x} + x}{\sqrt{x^2+x} + x} = \lim_{x \rightarrow +\infty} \frac{(\sqrt{x^2+x})^2 - x^2}{\sqrt{x^2+x} + x} =$

$\lim_{x \rightarrow +\infty} \frac{x}{\sqrt{x^2+x} + x} \stackrel{/:x}{=} \lim_{x \rightarrow +\infty} \frac{\frac{x}{x}}{\sqrt{\frac{x^2}{x^2} + \frac{x}{x}} + \frac{x}{x}} = \frac{1}{\sqrt{1+0} + 1} = \frac{1}{2}$

$y = \frac{1}{2}$ je horizontalna asimptota ~~X~~
DESNA H.A.

-funkcija nema kosih asimptota jer ima horizontalnu

LIJEVA KOSA ASIMPTOTA?

$$(\ln|x|)' = \frac{1}{x}$$

IME I PREZIME: Klara Postnužin

BROJ INDEKSA:

4. $h(x) = \frac{x^2 - 4}{x^2 + 2}$ $D_h = \mathbb{R}$

- nema vertikalne asimptote jer nema tačka prekid

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

$$x^2 \neq -2$$

H.A.

$$\lim_{x \rightarrow \pm\infty} \frac{x^2 - 4}{x^2 + 2} = \lim_{x \rightarrow \pm\infty} \frac{x^2 - 4}{x^2 + 2} \cdot \frac{1/x^2}{1/x^2} = \lim_{x \rightarrow \pm\infty} \frac{1 - \frac{4}{x^2}}{1 + \frac{2}{x^2}} = 1$$

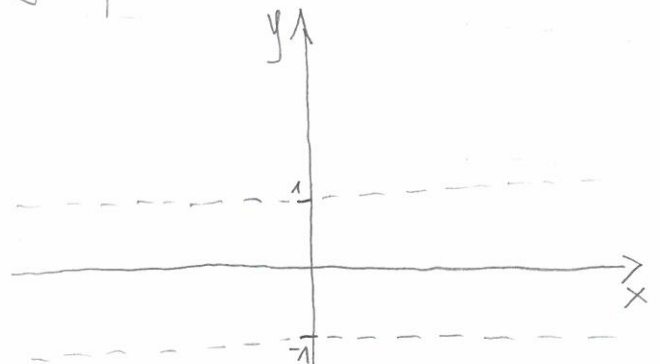
$y = 1$ i $y = -1$ su horizontalne asimptote

- nema kosih asimptota

- funkcija nije periodična jer nije trigonometrijska

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

funkcija je parna



BODUJE SE SA MO
GRAF?

Postnušín

$$3. f(x) = \ln(\sin(4x-2))$$

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

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

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

$$f'(x) = \frac{16 \cos(4x-2)}{\sin(4x-2)}$$

$$(\ln x)' = \frac{1}{x} \quad (\sin x)' = \cos x$$

$$[\sin(4x-2)]' = \dots$$

$$\cos(4x-2) \cdot (4x-2)' =$$

$$\cos(4x-2) \cdot 4 = \underline{4 \cos(4x-2)}$$

$$\sqrt[n]{\frac{3^n}{n^2}}$$

$$\frac{3^n}{n^2} \ln \frac{3^n}{n^2} = \frac{3^n}{n^2} \cdot \frac{3^n}{1}$$

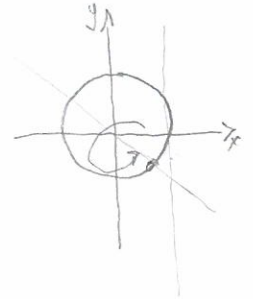
IME I PREZIME: Klara Postnužin

$$z = r(\cos\varphi + i\sin\varphi)$$

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

$$\sqrt[n]{z} = \sqrt[n]{w} \left(\cos \frac{\varphi + 2k\pi}{n} + i \sin \frac{\varphi + 2k\pi}{n} \right)$$

BROJ INDEKSA:



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

$$z^4 = 4 - 2i$$

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

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

$$\operatorname{tg} \varphi = \frac{-2}{4} = -\frac{1}{2}$$

$$\varphi' = -26^\circ 33' 54''$$

$$\varphi = 360^\circ - 26^\circ 33' 54''$$

$$\varphi = 333^\circ 26' 6''$$

$$w = |z| = \sqrt{x^2 + y^2} = \sqrt{16 + 4i^2} = \sqrt{12}$$

$$w = \sqrt{16 - 4} = \sqrt{12}$$

$$\sqrt[8]{w} = \sqrt[8]{12}$$

k=0

$$z_1 = \sqrt[8]{12} \left(\cos \frac{333^\circ 26' 6'' + 2 \cdot 0 \cdot 180^\circ}{4} + i \sin \frac{333^\circ 26' 6'' + 2 \cdot 0 \cdot 180^\circ}{4} \right)$$

$$z_1 = \sqrt[8]{12} \left(\cos 83^\circ 21' 31'' + i \sin 83^\circ 21' 31'' \right)$$

k=1

$$z_2 = \sqrt[8]{12} \left(\cos \frac{333^\circ 26' 6'' + 360^\circ}{4} + i \sin \frac{333^\circ 26' 6'' + 360^\circ}{4} \right)$$

$$z_2 = \sqrt[8]{12} \left(\cos \frac{346^\circ 43' 3''}{4} + i \sin \frac{346^\circ 43' 3''}{4} \right)$$

$$z_2 = \sqrt[8]{12} \left(\cos 86^\circ 40' 46'' + i \sin 86^\circ 40' 46'' \right)$$

$$z_2 = \sqrt[8]{12} (0,0579 + 0,9983i)$$

$$2k\pi$$

$$2 \cdot 1 \cdot 180$$

k=2

$$z_3 = \sqrt[8]{12} \left(\cos \frac{333^\circ 26' 6'' + 720^\circ}{4} + i \sin \frac{333^\circ 26' 6'' + 720^\circ}{4} \right)$$

$$z_3 = \sqrt[8]{12} \left(\cos 131^\circ 40' 46'' + i \sin 131^\circ 40' 46'' \right)$$

$$2 \cdot 2 \cdot 180$$

$$z_3 = \sqrt[8]{12} (-0,6650 + 0,7468i)$$

k=3

$$z_4 = \sqrt[8]{12} \left(\cos \frac{333^\circ 26' 6'' + 1080^\circ}{4} + i \sin \frac{333^\circ 26' 6'' + 1080^\circ}{4} \right)$$

$$z_4 = \sqrt[8]{12} \left(\cos 83^\circ 21' 31'' + i \sin 83^\circ 21' 31'' \right)$$

