

IME I PREZIME: LOVRE BUBALO

BROJ INDEKSA: 000675

17-2-0389-2019

C3

1. Odrediti kompleksne brojeve  $z$  koji zadovoljava jednadžbu  $\frac{|z|}{z-2i} = 3i$ . Na kraju provjeriti rješenja uvrštavanjem.

12+3

2. Riješi sustav Gaussovom metodom i obavezno provjeri rješenje:

10+5

$$\begin{array}{rccccrcr} 2x_1 & - & x_2 & + & x_3 & - & x_4 & = & 1 \\ 2x_1 & - & x_2 & & & - & 3x_4 & = & -1 \\ 3x_1 & & & - & x_3 & + & x_4 & = & 1 \\ 2x_1 & + & 2x_2 & - & 2x_3 & + & 5x_4 & = & 1 \end{array}$$

3. Ispitati domenu i sve asimptote funkcije  $g(x) = \sqrt{x^2 - 4x} + x$ .

5+15

4. Ispitati tok i nacrtati graf funkcije:  $f(x) = \frac{x-3}{x^2+4}$ .

15(graf)

5. Ispitati domenu, periodičnost, (ne)parnost i drugu derivaciju funkcije:  $h(x) = \arctan(e^x)$ . Skicirati graf funkcije

4+2+2+6+6

6. Zadana je funkcija  $f(x) = \sqrt{4+3x}$ . Kolika je derivacija  $f'(2)$ ? Koji su lokalni ekstremi?

10+5

Ukupno:

56

①  $\frac{|z|}{z-2i} = 3i$

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

$z_1 = 0 + \frac{3}{2}i$  ✓  
 $z_2 = 0 + 3i$

$$\frac{\sqrt{x^2+y^2}}{x+yi-2i} = 3i \cdot (x+yi-2i)$$

$$\sqrt{x^2+y^2} = 3i(x+yi-2i)$$

$$\sqrt{x^2+y^2} = 3xi - 3y + 6$$

Realni dio:  $\sqrt{x^2+y^2} = -3y + 6$

Imaginarni dio:  $0 = 3x$   
 $x = 0$

$$\sqrt{y^2} = -3y + 6$$

$$|y| = -3y + 6$$

$$y = -3y + 6$$

$$-y = -3y + 6$$

$$4y = 6$$

$$2y = 6$$

$$y = \frac{3}{2}$$

$$y = 3$$

UVRŠTAVAMO  $z_1$

$$\frac{|z_1|}{z_1 - 2i} = 3i$$

$$\frac{\sqrt{0^2 + (\frac{3}{2})^2}}{\frac{3}{2}i - 2i} = 3i$$

$$\frac{\frac{3}{2}}{\frac{3-4}{2}i} = 3i$$

$$\frac{\frac{3}{2}}{\frac{-1}{2}i} = 3i$$

$$\frac{3}{-i \cdot i} = 3i$$

$$3i = 3i$$

UVRŠTAVAMO  $z_2$

$$\frac{|z_2|}{z_2 - 2i} = 3i$$

$$\frac{\sqrt{0^2 + 3^2}}{3i - 2i} = 3i$$

$$\frac{3 \cdot (-i)}{i \cdot (-i)} = 3i$$

$$-3i = 3i$$

V.A.

$$\lim_{x \rightarrow 0} (\sqrt{x^2 - 4x} + x) = 0$$

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

nema V.A jer nema preklada funkcije

H.A.

-D.H.A.

$$\lim_{x \rightarrow \infty} (\sqrt{x^2 - 4x} + x) \cdot \frac{\sqrt{x^2 - 4x} - x}{\sqrt{x^2 - 4x} - x} = \lim_{x \rightarrow \infty} \frac{x^2 - 4x - x^2}{\sqrt{x^2 - 4x} - x} = \lim_{x \rightarrow \infty} \frac{-4x/x}{\sqrt{x^2 - 4x} - x/x} = \frac{-4}{0} = -\infty$$

$\rightarrow$  nema D.H.A.

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

$k = \lim_{x \rightarrow \infty} \frac{f(x)}{x}$   $l = \lim_{x \rightarrow \infty} [f(x) + kx]$   $Y=2 \rightarrow$  L.H.A

$Y=2x \rightarrow$  D.K.A

L.K.A  $\rightarrow$  nema jer bi k ispod 0

$$\frac{1}{1/x} = \frac{1+1}{1} = \frac{2}{1} = 2$$

$k=2$

$$\lim_{x \rightarrow \infty} (\sqrt{x^2 - 4x} + 3x) \cdot \frac{\sqrt{x^2 - 4x} - 3x}{\sqrt{x^2 - 4x} - 3x} = \lim_{x \rightarrow \infty} \frac{x^2 - 4x - 9x^2}{\sqrt{x^2 - 4x} - 3x} = \lim_{x \rightarrow \infty} \frac{-8x^2 - 4x/x^2}{\sqrt{x^2 - 4x} - 3x/x^2}$$

VRE BUBALO

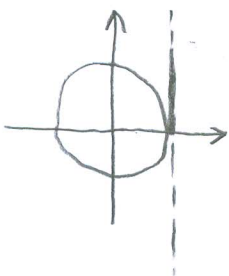
$$h(x) = \arctan(e^x)$$

PARNOST:

$$h(-x) = \arctan(e^{-x}) = \arctan(e^x)$$

↳ Funkcija je PARNJA. ✗

OMENA



DERIVACIJA:

$$h'(x) = \frac{1}{\arccos(e^x)} \cdot e^x = \frac{e^x}{\arccos(e^x)} \quad \times$$

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

PERIODIČNOST:

$$h(x) = \arctan(e^x)$$

$$h(x) = \arctan(x) = \arctan(x+P) \quad P = \frac{\pi}{2} \quad \times$$

$$f(x) = \sqrt{4+3x}$$

$$f'(x) = \frac{1}{2\sqrt{4+3x}} \cdot 3 = \frac{3}{2\sqrt{4+3x}} \cdot \frac{2\sqrt{4+3x}}{2\sqrt{4+3x}} = \frac{6\sqrt{4+3x}}{4(4+3x)} = \frac{6\sqrt{4+3x}}{12x+16}$$

$$f'(2) = \frac{6\sqrt{4+3 \cdot 2}}{12 \cdot 2 + 16} = \frac{6\sqrt{10}}{24+16} = \frac{6\sqrt{10}}{40} = \frac{3\sqrt{10}}{20} = 0.4743 \quad \checkmark$$

EKSTREMI

$$f'(x) = 0$$

$$\frac{6\sqrt{4+3x}}{12x+16} = 0$$

$$6\sqrt{4+3x} = 0 \quad | :6$$

$$\sqrt{4+3x} = 0 \quad | ^2$$

$$4+3x = 0 \quad 4+3(-x) = 0$$

$$3x = -4 \quad -3x = -4$$

$$x = -\frac{4}{3}$$

$$x = \frac{4}{3}$$

$$f\left(-\frac{4}{3}\right) = \sqrt{4+3\left(-\frac{4}{3}\right)} = \sqrt{4-4} = 0$$

$$f\left(\frac{4}{3}\right) = \sqrt{4+3 \cdot \frac{4}{3}} = \sqrt{8} = 2\sqrt{2} = 2.828$$

$$\begin{array}{l} T_1\left(-\frac{4}{3}, 0\right) \\ T_2\left(\frac{4}{3}, 2\sqrt{2}\right) \end{array}$$

↳ KAKVI SU OVO EKSTREMI?  
MIN? MAX?

②

RIJEŠENJE:

$$\begin{cases} x_1 = 0 \\ x_2 = -2 \\ x_3 = 0 \\ x_4 = 1 \end{cases}$$

$$2x_1 - x_2 + x_3 - x_4 = 1$$

$$2x_1 - x_2 + 0 - 3x_4 = -1$$

$$3x_1 + 0 - x_3 + x_4 = 1$$

$$2x_1 + 2x_2 - 2x_3 + 5x_4 = 1$$

$$\left[ \begin{array}{cccc|c} 2 & -1 & 1 & -1 & 1 \\ 2 & -1 & 0 & -3 & -1 \\ 3 & 0 & -1 & 1 & 1 \\ 2 & 2 & -2 & 5 & 1 \end{array} \right] \begin{array}{l} \text{I} \\ \text{II} \\ \text{III} \\ \text{IV} \end{array} \sim \left[ \begin{array}{cccc|c} 1 & 1 & -1 & \frac{5}{2} & \frac{1}{2} \\ 2 & -1 & 0 & -3 & -1 \\ 3 & 0 & -1 & 1 & 1 \\ 2 & -1 & 1 & -1 & 1 \end{array} \right] \begin{array}{l} \text{I} \\ \text{II} \\ \text{III} \\ \text{IV} \end{array}$$

/·(-2)+II /·(-3)+III /·(-2)+IV

$$\left[ \begin{array}{cccc|c} 1 & 1 & -1 & \frac{5}{2} & \frac{1}{2} \\ 0 & -3 & 2 & -8 & -2 \\ 0 & -3 & 2 & -\frac{13}{2} & -\frac{1}{2} \\ 0 & -3 & 3 & -6 & 0 \end{array} \right] \begin{array}{l} \text{I} \\ \text{II} \\ \text{III} \\ \text{IV} \end{array} \sim \left[ \begin{array}{cccc|c} 1 & 1 & -1 & \frac{5}{2} & \frac{1}{2} \\ 0 & 1 & -1 & 2 & 0 \\ 0 & 3 & 2 & -\frac{13}{2} & -\frac{1}{2} \\ 0 & -3 & 2 & -8 & -2 \end{array} \right] \begin{array}{l} \text{I} \\ \text{II} \\ \text{III} \\ \text{IV} \end{array}$$

/·(-1)+I /·3+III /·3+IV

$$\left[ \begin{array}{cccc|c} 1 & 0 & 0 & \frac{1}{2} & \frac{1}{2} \\ 0 & 1 & -1 & 2 & 0 \\ 0 & 0 & -1 & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 0 & -1 & -2 & -2 \end{array} \right] \begin{array}{l} \text{I} \\ \text{II} \\ \text{III} \\ \text{IV} \end{array} \sim \left[ \begin{array}{cccc|c} 1 & 0 & 0 & \frac{1}{2} & \frac{1}{2} \\ 0 & 1 & -1 & 2 & 0 \\ 0 & 0 & 1 & \frac{1}{2} & \frac{1}{2} \\ 0 & 0 & -1 & -2 & -2 \end{array} \right] \begin{array}{l} \text{I} \\ \text{II} \\ \text{III} \\ \text{IV} \end{array}$$

/·(-1) /·1+II /·1+IV /·(-1)+I

$$\left[ \begin{array}{cccc|c} 1 & 0 & -1 & 0 & 0 \\ 0 & 1 & 0 & \frac{5}{2} & \frac{1}{2} \\ 0 & 0 & 1 & \frac{1}{2} & \frac{1}{2} \\ 0 & 0 & 0 & -\frac{3}{2} & -\frac{3}{2} \end{array} \right] \begin{array}{l} \text{I} \\ \text{II} \\ \text{III} \\ \text{IV} \end{array} \sim \left[ \begin{array}{cccc|c} 1 & 0 & -1 & 0 & 0 \\ 0 & 1 & 0 & \frac{5}{2} & \frac{1}{2} \\ 0 & 0 & 1 & \frac{1}{2} & \frac{1}{2} \\ 0 & 0 & 0 & -\frac{3}{2} & -\frac{3}{2} \end{array} \right] \begin{array}{l} \text{I} \\ \text{II} \\ \text{III} \\ \text{IV} \end{array}$$

/·(-3)

$$\left[ \begin{array}{cccc|c} 1 & 0 & -1 & 0 & 0 \\ 0 & 1 & 0 & \frac{5}{2} & \frac{1}{2} \\ 0 & 0 & 1 & \frac{1}{2} & \frac{1}{2} \\ 0 & 0 & 1 & 1 & 1 \end{array} \right] \begin{array}{l} \text{I} \\ \text{II} \\ \text{III} \\ \text{IV} \end{array} \sim \left[ \begin{array}{cccc|c} 1 & 0 & -1 & 0 & 0 \\ 0 & 1 & 0 & 0 & -2 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 \end{array} \right] \begin{array}{l} \text{I} \\ \text{II} \\ \text{III} \\ \text{IV} \end{array}$$

/·(-1)+III /·(-5/2)+II

$$\left[ \begin{array}{cccc|c} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & -2 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 \end{array} \right] \begin{array}{l} \text{I} \\ \text{II} \\ \text{III} \\ \text{IV} \end{array} \sim \left[ \begin{array}{cccc|c} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & -2 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 \end{array} \right] \begin{array}{l} \text{I} \\ \text{II} \\ \text{III} \\ \text{IV} \end{array}$$

/·1+II

PROVJERA:

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

$$1 = 1 \quad \checkmark$$

$$3 \cdot 0 + 0 - 0 + 1 = 1$$

$$1 = 1 \quad \checkmark$$

$$2 \cdot 0 - (-2) + 0 - 3 \cdot 1 = -1$$

$$-1 = -1 \quad \checkmark$$

$$2 \cdot 0 + 2 \cdot (-2) - 2 \cdot 0 + 5 \cdot 1 = 1$$

$$1 = 1 \quad \checkmark$$

$$f(x) = \frac{x-3}{x^2+4}$$

DOMENA:

$$x^2+4 \neq 0$$

$$x^2 \neq -4$$

$$x \neq \sqrt{-4} \rightarrow \text{NIJE REALNO}$$

$$\boxed{D \in \mathbb{R}}$$

$$x-3=0$$

$$\boxed{x=3} \rightarrow \text{NULTOČKA}$$

V.A  
 $\rightarrow$  nema, jer nema prekida u funkciji

H.A

-D.H.A.

$$\lim_{x \rightarrow \infty} \frac{x-3 \cdot |x^2}{x^2+4 \cdot |x^2} = \frac{0}{1} = 0 \quad \boxed{y=0}$$

-L.H.A.

$$\lim_{x \rightarrow -\infty} \frac{-x-3 \cdot |x^2}{x^2+4 \cdot |x^2} = \frac{0}{1} = 0 \quad \checkmark$$

K.A

$$y = kx + l$$

$$k = \lim_{x \rightarrow \infty} \frac{f(x)}{x} \quad l = \lim_{x \rightarrow \infty} [f(x) + kx]$$

-D.K.A

$$k = \lim_{x \rightarrow \infty} \frac{x-3}{x^2+4} \cdot \frac{x}{x} = \lim_{x \rightarrow \infty} \frac{x-3 \cdot |x^3}{x^3+4 \cdot |x^3} = \frac{0}{1} = 0 \quad \boxed{k=0} \rightarrow \text{NEMA K.A.}$$

I ; II DERIVACIJA

$$f'(x) = \frac{1 \cdot (x^2+4) - (x-3) \cdot 2x}{(x^2+4)^2} = \frac{x^2+4-2x^2+6x}{(x^2+4)^2} = \frac{-x^2+6x+4}{(x^2+4)^2}$$

$$f''(x) = \frac{(-2x+6)(x^2+4)^2 - (-x^2+6x+4) \cdot 2(x^2+4) \cdot 2x}{(x^2+4)^4} = \frac{\cancel{(x^2+4)} [(-2x+6)(x^2+4) - (-2x^3+12x^2+8x)]}{(x^2+4)^4} =$$

$$= \frac{\cancel{-2x^3} - 8x + 6x^2 + 24 + \cancel{2x^3} - 12x^2 - 8x}{(x^2+4)^3} = \frac{-6x^2 - 16x + 24}{(x^2+4)^3}$$

KSTREMI

$$f'(x) = 0$$

$$\frac{-x^2 + 6x + 4}{(x^2 + 4)^2} = 0$$

$$-x^2 + 6x + 4 = 0$$

$$x_{1,2} = \frac{-6 \pm \sqrt{36 + 16}}{-2} = \frac{-6 \pm \sqrt{52}}{2}$$

$$x_1 = 0.61 \quad f(0.61) = \frac{0.61 - 3}{(0.61)^2 + 4} = -0.55$$

$$x_2 = -6.61 \quad f(-6.61) = -0.2$$

$(0.61, -0.55) \rightarrow$  MINIMUM

$(-6.61, -0.2) \rightarrow$  MINIMUM

$x_1 = -0.61$   
 $x_2 = 6.61$

$f'(x)$	-	+	+	+
$f(x)$	$\searrow$	$\nearrow$	$\nearrow$	$\nearrow$

TOČKE INFLEKSIJE

$$f''(x) = 0$$

$$\frac{-6x^2 - 16x + 24}{(x^2 + 4)^3} = 0$$

$$-6x^2 - 16x + 24 = 0 \quad /: (-2)$$

$$3x^2 + 8x - 12 = 0$$

$$x_{1,2} = \frac{-8 \pm \sqrt{64 + 144}}{6} = \frac{-8 \pm \sqrt{208}}{6}$$

$$x_1 = 1.07$$

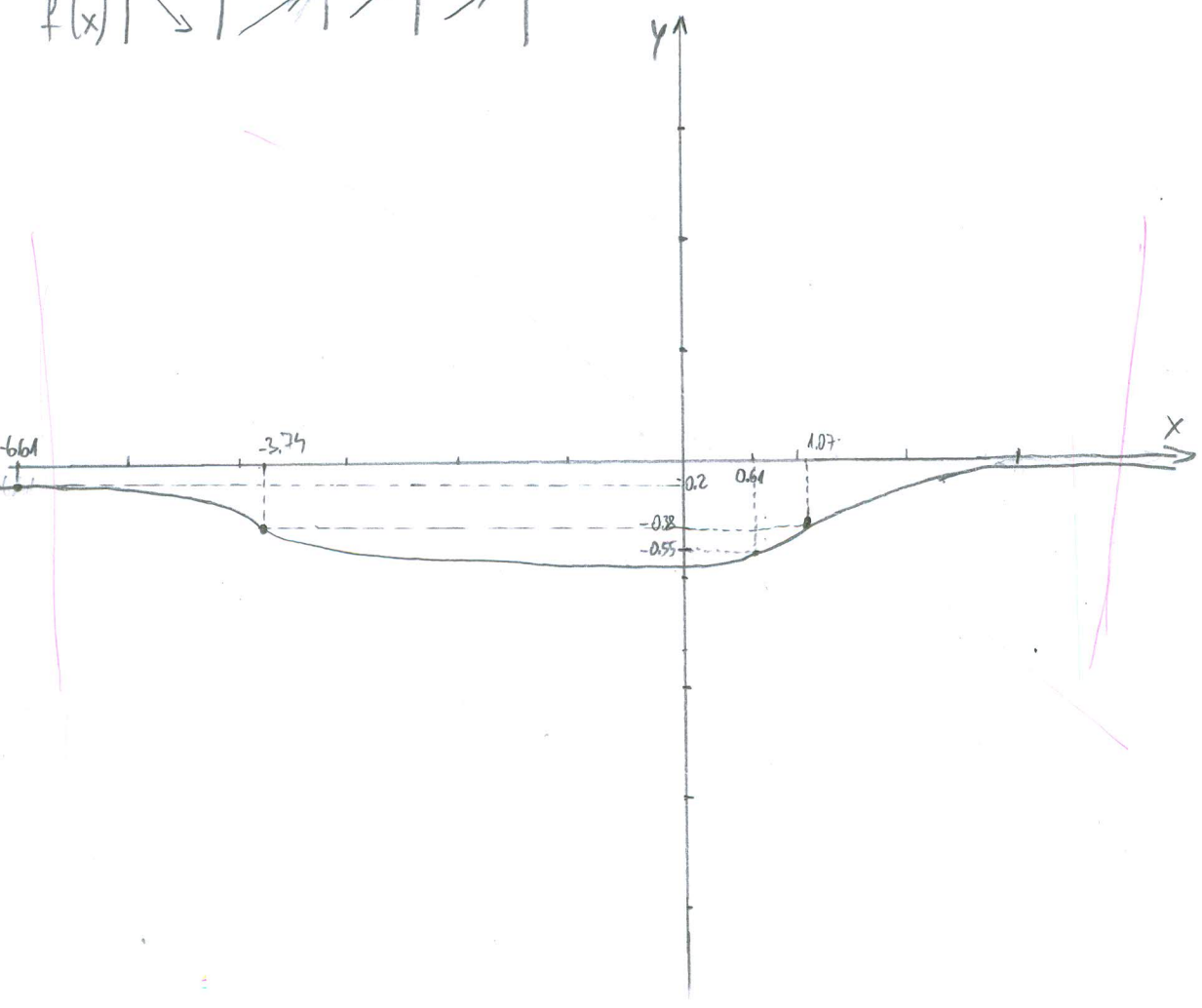
$$x_2 = -3.74$$

$(1.07, -0.38)$

$(-3.74, -0.37)$

$$f(1.07) = -0.38$$

$$f(-3.74) = -0.37$$



**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: **JURE LAPIĆ**

BROJ INDEKSA: **17-2-0426-2074**

C3

1. Odrediti kompleksne brojeve  $z$  koji zadovoljava jednadžbu  $\frac{|z|}{z-2i} = 3i$ . Na kraju provjeriti rješenja uvrštavanjem.

12+3

~~2.~~ Riješi sustav Gaussovom metodom i obavezno provjeri rješenje:

10+5

$$\begin{aligned} 2x_1 - x_2 + x_3 - x_4 &= 1 \\ 2x_1 - x_2 & - 3x_4 = -1 \\ 3x_1 & - x_3 + x_4 = 1 \\ 2x_1 + 2x_2 - 2x_3 + 5x_4 &= 1 \end{aligned}$$

~~3.~~ Ispitati domenu i sve asimptote funkcije  $g(x) = \sqrt{x^2 - 4x} + x$ .

5+15

4. Ispitati tok i nacrtati graf funkcije:  $f(x) = \frac{x-3}{x^2+4}$ .

15(graf)

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4+2+2+6+6

~~6.~~ Zadana je funkcija  $f(x) = \sqrt{4+3x}$ . Kolika je derivacija  $f'(2)$ ? Koji su lokalni ekstremi?

10+5

Ukupno:

**33**

~~2x<sub>1</sub> - x<sub>2</sub> + x<sub>3</sub> - x<sub>4</sub> = 1~~  
~~2x<sub>1</sub> - x<sub>2</sub> - 3x<sub>4</sub> = -1~~  
~~3x<sub>1</sub> - x<sub>3</sub> + x<sub>4</sub> = 1~~  
~~2x<sub>1</sub> + 2x<sub>2</sub> - 2x<sub>3</sub> + 5x<sub>4</sub> = 1~~

$$\left[ \begin{array}{cccc|c} 2 & -1 & 1 & -1 & 1 \\ 2 & -1 & 0 & -3 & -1 \\ 3 & 0 & -1 & 1 & 1 \\ 2 & 2 & -2 & 5 & 1 \end{array} \right]$$

~~3)  $g(x) = \sqrt{x^2 - 4x} + x$~~   
 ~~$x^2 - 4x \geq 0$~~   
 ~~$x(x-4) \geq 0$~~   
~~Df ... x ∈ ℝ~~

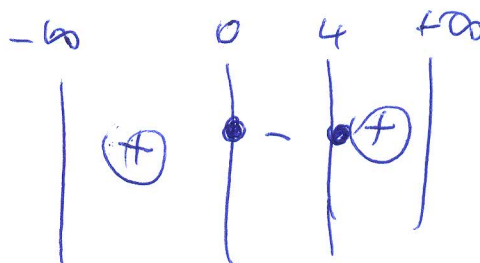
3)  $g(x) = \sqrt{x^2 - 4x} + x$

$x^2 - 4x \geq 0$   
 $x(x-4) \geq 0$

$x = 0$

$x - 4 = 0$

$x = 4$



$\{f \dots x \in \langle -\infty, 0 \rangle \cup [4, +\infty) \}$



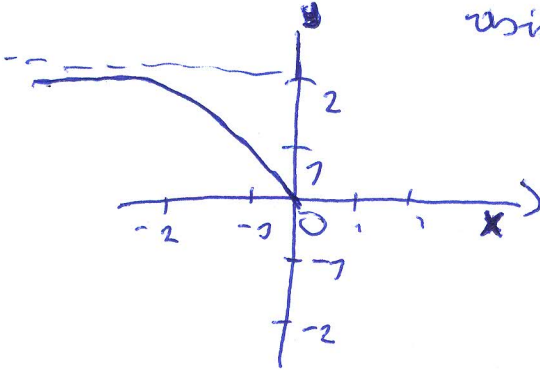
$$\lim_{x \rightarrow \infty} \sqrt{x^2 - 4x + x} \cdot \frac{\sqrt{x^2 - 4x + x}}{\sqrt{x^2 - 4x + x}}$$

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

rem  
asymptote  
horizontal

$$\lim_{x \rightarrow 0} \sqrt{x^2 - 4x + x} = 0$$

vertikale  
asymptote



$$1) \frac{|z|}{z - 2i} = 3i$$

$$x + yi = z$$

$$\frac{x + yi}{x + yi - 2i} = 3i$$

$$\frac{\sqrt{x^2 + y^2}}{x + (y - 2)i} = 3i$$

$$\frac{x + (y - 2)i}{\sqrt{x^2 + y^2}} = \frac{1}{3i} = \frac{3i}{3i}$$

$$\frac{x + (y - 2)i}{\sqrt{x^2 + y^2}} = \frac{-3i}{9}$$

$$y - 2 = \frac{1}{3}$$

$$y - 2 = -\frac{\sqrt{x^2 + y^2}}{3}$$

$$\frac{3}{3} y - 2 = -\frac{1}{3}$$

$$\frac{4}{3} y = 2$$

$$4y = 6$$

$$y = \frac{6}{4} = \frac{3}{2}$$



$$6) f(x) = \sqrt{4+3x}$$

$$f(x) = \frac{1}{2\sqrt{4+3x}} \cdot 3 = \frac{3}{2} \cdot \frac{1}{\sqrt{4+3x}} \quad \checkmark$$

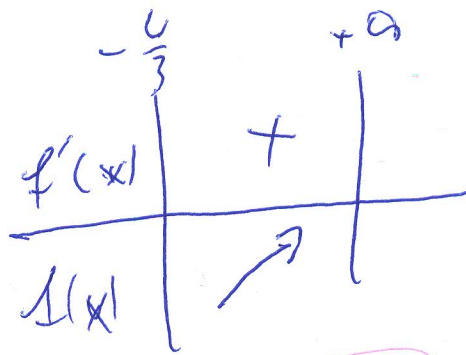
$$f'(2) = \frac{3}{2} \cdot \frac{1}{\sqrt{4+3x}} = \frac{3}{2} \cdot \frac{1}{\sqrt{10}} = \frac{3\sqrt{10}}{20}$$

$$= \frac{3\sqrt{10}}{20} \quad \checkmark$$

$$f'(x) = 0$$

$$\frac{3}{2\sqrt{4+3x}} = 0 \quad | \cdot 2\sqrt{4+3x}$$

$3=0$  nemá  
lokálního  
extrému



$\min\left(-\frac{4}{3}, 0\right)$

OVO JE  
LOKALNÍ  
EKSTREM

~~3)  $f(x) = \sqrt{x^2 - 4x + 4}$~~

$$4) f(x) = \frac{x-3}{x^2+4}$$

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

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

$$f'(x) = \frac{-x^2+6x+4}{(x^2+4)^2}$$

DAJE...?

IME I PREZIME: Jure Lepic

BROJ INDEKSA: 17-2-0426-2014

~~3~~

$$\begin{bmatrix} 2 & -1 & 1 & -1 & | & 1 \\ 0 & 0 & 1 & 2 & | & 2 \\ 3 & 0 & -1 & 1 & | & 1 \\ 0 & -3 & 3 & -6 & | & 0 \end{bmatrix} \xrightarrow{/:2} \begin{bmatrix} 1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & | & \frac{1}{2} \\ 0 & 0 & 1 & 2 & | & 2 \\ 3 & 0 & -1 & 1 & | & 1 \\ 0 & -3 & 3 & -6 & | & 0 \end{bmatrix} \xrightarrow{1 \cdot (-\frac{3}{2})} \sim$$

$$\begin{bmatrix} 1 & -1 & \frac{1}{2} & -\frac{1}{2} & | & \frac{1}{2} \\ 0 & 0 & 1 & 2 & | & 2 \\ 0 & 0 & -\frac{5}{2} & \frac{5}{2} & | & -\frac{1}{2} \\ 0 & 1 & -1 & 2 & | & 0 \end{bmatrix} \xrightarrow{/:2} \sim \begin{bmatrix} 2 & -2 & 1 & -1 & | & 1 \\ 0 & 1 & -1 & 2 & | & 0 \\ 0 & 3 & -5 & 5 & | & -1 \\ 0 & 0 & 1 & 2 & | & 2 \end{bmatrix} \xrightarrow{/:(-3)} \sim$$

$$\begin{bmatrix} 2 & 0 & -1 & 3 & | & 1 \\ 0 & 1 & -1 & 2 & | & 0 \\ 0 & 0 & -2 & -1 & | & -1 \\ 0 & 0 & 1 & 2 & | & 2 \end{bmatrix} \xrightarrow{/:2} \sim \begin{bmatrix} 2 & 0 & -1 & 3 & | & 1 \\ 0 & 1 & -1 & 2 & | & 0 \\ 0 & 0 & 1 & 2 & | & 2 \\ 0 & 0 & -2 & -1 & | & -1 \end{bmatrix} \xrightarrow{/:2} \sim$$

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

PROVERA:

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

$$1 = 1$$

$$2 \cdot 0 - (-2) - 3 \cdot 1 = -1$$

$$-1 = -1$$

$$3 \cdot 0 - 0 + 1 = 1$$

$$1 = 1$$

$$2 \cdot 0 + 2 \cdot (-1) - 2 \cdot 0 + 5 \cdot 1 = 1$$

2=1

$$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} 0 \\ -2 \\ 0 \\ 1 \end{bmatrix}$$

$x_4 = 1$

$x_3 + 2x_4 = 2$

$x_3 = 0$

$x_2 - x_3 + 2x_4 = 0$

$x_2 = -2$

$2x_1 - x_3 + 3x_4 = 1$

$x_1 = 0$

**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

C3

IME I PREZIME: JOSIP MIHOČ

BROJ INDEKSA: 026 9088763

1. Odrediti kompleksne brojeve  $z$  koji zadovoljava jednadžbu  $\frac{|z|}{z-2i} = 3i$ . Na kraju provjeriti rješenja uvrštavanjem.

12+3

2. Riješi sustav Gaussovom metodom i obavezno provjeri rješenje:

10+5

$$\begin{aligned} 2x_1 - x_2 + x_3 - x_4 &= 1 \\ 2x_1 - x_2 - 3x_4 &= -1 \\ 3x_1 - x_3 + x_4 &= 1 \\ 2x_1 + 2x_2 - 2x_3 + 5x_4 &= 1 \end{aligned}$$

3. Ispitati domenu i sve asimptote funkcije  $g(x) = \sqrt{x^2 - 4x} + x$ .

5+15

4. Ispitati tok i nacrtati graf funkcije:  $f(x) = \frac{x-3}{x^2+4}$ .

15(graf)

5. Ispitati domenu, periodičnost, (ne)parnost i drugu derivaciju funkcije:  $h(x) = \arctan(e^x)$ . Skicirati graf funkcije

4+2+2+6+6

6. Zadana je funkcija  $f(x) = \sqrt{4+3x}$ . Kolika je derivacija  $f'(2)$ ? Koji su lokalni ekstremi?

10+5

Ukupno:

6





$$4. f(x) = \frac{x-3}{x^2+4} \quad / \cdot x^2+4 \quad x^2+4 \neq 0$$

$$x^2 \neq -4$$

$$D \in ]-\infty, -2]$$

$$+\infty \cup ]0, +\infty[$$

$$= x - 3$$

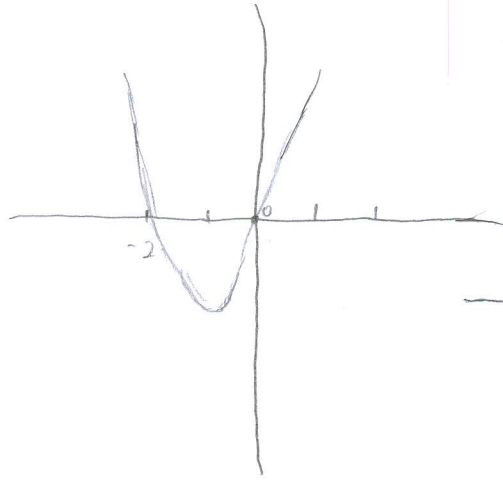
$$x_{1/2} = \frac{-1 \pm \sqrt{1^2 - 4 \cdot 0 \cdot (-3)}}{2 \cdot 0}$$

$$x_{1/2} = \frac{-1 \pm \sqrt{1}}{0}$$

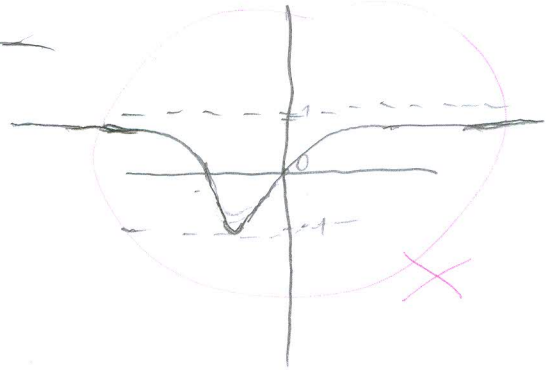
$$x_{1/2} = \frac{-1 \pm 1}{0}$$

$$x_1 = -2$$

$$x_2 = 0$$



$$\begin{array}{c} -2 \\ - \\ 0 \\ - \\ + \end{array}$$



5. Domain  $D(f) = \mathbb{R}$  ✓

~~Unges~~ Nije periodična ✓

$$h(x) = \arctan(e^x) = \arctan\left(\frac{1}{e^{-x}}\right) \neq h(x)$$

nije parna

NEPARNA?

6)

**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

C3

IME I PREZIME:

BOŽIDAR FRANJO

BROJ INDEKSA:

0269080926

1. Odrediti kompleksne brojeve  $z$  koji zadovoljava jednadžbu  $\frac{|z|}{z-2i} = 3i$ . Na kraju provjeriti rješenja uvrštavanjem.

12+3

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10+5

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5+15

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10+5

③  $h(x) = \arctan(e^x)$   
 ↓ NEPA PRAVILA  
 $D = \mathbb{R}$  ✓  
 $D: (-\infty, +\infty)$  ✓

$h(-x) = -\arctan(e^{-x}) = \arctan(e^x) = h(x)$  Ukupno:  
 $h(-x) = -e^{-x} = e^{-x} = h(x)$  NEPARNA ✗  
 $h'(x) = (e^x)' \cdot (e^x)^{-1} = e^x \cdot e^{-x} = 1$

4

$f'(x) = \arctan(e^x)' = e^x \cdot (e^x)^{-1} = 1$  ✗  
 $f''(x) = e^x \cdot e^{-x} = 1$

3)  $g(x) = \sqrt{x^2 - 4x} + x$

$x^2 - 4x + x > 0$   
 $x_{1,2} = \frac{4 \pm \sqrt{16+4}}{(-4)^2} = \frac{4 \pm \sqrt{-12}}{16} = \frac{4}{16} \pm \frac{\sqrt{-12}}{16} = \frac{1}{4} \pm \frac{\sqrt{-12}}{16}$

$-\infty$				$+\infty$
$\frac{1}{4} + \frac{\sqrt{-12}}{16}$				
$\frac{1}{4} - \frac{\sqrt{-12}}{16}$				

$h(-x) = \arctan(e^{-x}) = \arctan(e^x) = h(x)$   
 $h(-x) = e^{-x} = \arctan(e^x) = h(x)$  NEPARNA

$D_f: (-\infty, 4] \cup [4, +\infty)$

③  $g(x) = \sqrt{x^2 - 4x} + x$

$x \neq 0$   
 $x^2 - 4x > 0$   
 $x^2 - 4x > 0$   
 $x - 4 > 0$   
 $x = 4$


$$r = \frac{y}{x} = \frac{-4}{1} = -4 + 360^\circ = 356^\circ$$

$$\textcircled{1} \frac{|z|}{z-2i} = 3i$$

$$z = \sqrt{1^2 + 2^2}$$

$$\frac{|z|}{z} = \frac{3i}{2i}$$

$$\frac{|z|}{z-2i} = 3i \quad |z-2i$$

$$|z| = \frac{3i}{z-2i}$$

~~$$z = 2i = 3i$$~~

$$z = \sqrt{1 - 4i^2}$$

~~$$z = 3 + 2i$$~~

$$z = 1 - 4i$$

~~$$z = 5i$$~~

X

$$\textcircled{2} f(x) = \sqrt{4+3x}$$

$$f(x) = \sqrt{4+3 \cdot 2} = \sqrt{10}$$

$$f'(x) = \frac{1}{2\sqrt{4+3x}}$$

$$= \frac{1}{2\sqrt{4+3x}} \cdot (4+3x)' = \frac{3}{2\sqrt{4+3x}}$$

~~CA~~

$$f'(2) = ?$$



**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

C3

IME I PREZIME: JOSIPA JOZEJIĆ

BROJ INDEKSA: 0265078354

1. Odrediti kompleksne brojeve  $z$  koji zadovoljava jednadžbu  $\frac{|z|}{z-2i} = 3i$ . Na kraju provjeriti rješenja uvrštavanjem.

~~12+3~~

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$$\begin{aligned} 2x_1 - x_2 + x_3 - x_4 &= 1 \\ 2x_1 - x_2 &- 3x_4 = -1 \\ 3x_1 &- x_3 + x_4 = 1 \\ 2x_1 + 2x_2 - 2x_3 + 5x_4 &= 1 \end{aligned}$$

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~~4+2+2+6+6~~

6. Zadata je funkcija  $f(x) = \sqrt{4+3x}$ . Kolika je derivacija  $f'(2)$ ? Koji su lokalni ekstremi?

~~10+5~~

Ukupno:

~~0~~



$$\textcircled{1} \frac{|z|}{z-2i} = 3i$$

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

$$z = x+yi$$

$$\frac{\sqrt{x^2+y^2}}{x+yi-2i} = 3i \cdot (x+yi-2i)$$

$$\sqrt{x^2+y^2} = 3i(x+yi-2i)$$

$$\sqrt{x^2+y^2} = 3ix + 3yi - 6i^2 / 2$$

$$x^2+y^2 = 9i^2x^2 + 9yi^2 - 36i^4$$

$$x^2+y^2 = -9x^2 - 9y^2 - 36$$

$$\text{Re/dio} \Rightarrow x^2 = -9x^2 - 36 / \sqrt{\quad} \Rightarrow x = -3x - 6 \Rightarrow 4x = -6 / :4 \Rightarrow x = -\frac{6}{4} = \boxed{-\frac{3}{2}}$$

$$\text{Im/dio} \Rightarrow y^2 = -9y^2 / \sqrt{\quad} \Rightarrow y = -3y$$

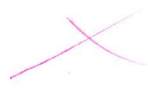


$$\frac{\sqrt{\left(-\frac{3}{2}\right)^2 + (-3y)^2}}{-\frac{3}{2} - 3yi - 2i} = 3i \cdot \left(-\frac{3}{2} - 3yi - 2i\right)$$

$$\sqrt{\left(-\frac{3}{2}\right)^2 + (-3y)^2} = -\frac{9}{2}i + 9yi - 6i / 2$$

$$\left(-\frac{3}{2}\right)^2 + 9y^2 = -\frac{81}{4} + 81y^2 - 36i^2$$

$$-\frac{9}{4} + 9y^2 = -\frac{81}{4} + 81y^2 + 36$$



$$\begin{aligned} \textcircled{2} \quad & 2x_1 - x_2 + x_3 - x_4 = 1 \\ & 2x_1 - x_2 - 3x_4 = -1 \\ & 3x_1 - x_3 + x_4 = 1 \\ & 2x_1 + 2x_2 - 2x_3 + 5x_4 = 1 \end{aligned}$$

$$\begin{bmatrix} \textcircled{2} & -1 & 1 & -1 & 1 & 1 \\ 2 & -1 & 0 & -3 & 1 & -1 \\ 3 & 0 & -1 & 1 & 1 & 1 \\ 2 & 2 & -2 & 5 & 1 & 1 \end{bmatrix} \xrightarrow{R1-R3} \begin{bmatrix} -1 & -1 & 2 & -2 & 0 \\ 2 & -1 & 0 & -3 & 1 & -1 \\ 3 & 0 & -1 & 1 & 1 & 1 \\ 2 & 2 & -2 & 5 & 1 & 1 \end{bmatrix} \cdot (1) \sim \begin{bmatrix} 1 & 1 & -2 & 2 & 0 \\ 2 & -1 & 0 & -3 & 1 & -1 \\ 3 & 0 & -1 & 1 & 1 & 1 \\ 2 & 2 & -2 & 5 & 1 & 1 \end{bmatrix}$$

$$\begin{aligned} & R2 - 2 \cdot R1 \\ & R3 - 3 \cdot R1 \\ & R4 - 2 \cdot R1 \end{aligned} \sim \begin{bmatrix} 1 & 1 & -2 & 2 & 0 \\ 0 & -3 & 4 & -7 & -1 \\ 0 & -3 & 5 & -5 & 1 \\ 0 & 0 & 2 & 1 & 1 \end{bmatrix} \xrightarrow{R2+4 \cdot R1} \begin{bmatrix} 1 & 1 & -2 & 2 & 0 \\ 0 & 1 & -4 & 1 & -1 \\ 0 & -3 & 5 & -5 & 1 \\ 0 & 0 & 2 & 1 & 1 \end{bmatrix} \xrightarrow{R3+3 \cdot R2} \begin{bmatrix} 1 & 1 & -2 & 2 & 0 \\ 0 & 1 & -4 & 1 & -1 \\ 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 2 & 1 & 1 \end{bmatrix} \xrightarrow{R4-2 \cdot R3} \sim$$

$$\begin{bmatrix} 1 & 1 & -2 & 2 & 0 \\ 0 & 1 & -4 & 1 & -1 \\ 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & -1 & -1 \end{bmatrix} \cdot (1) \sim \begin{bmatrix} 1 & 1 & -2 & 2 & 0 \\ 0 & 1 & -4 & 1 & -1 \\ 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & -1 & -1 \end{bmatrix} \quad X = \begin{pmatrix} 0 \\ -1 \\ 1 \\ 1 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{pmatrix}$$

$$x_1 = 0$$

$$x_2 = -1$$

$$x_3 = 1$$

$$x_4 = 1$$

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

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

$$2 - 1 = 1$$

$$1 = 1$$

③  $g(x) = \sqrt{x^2 - 4x} + x$

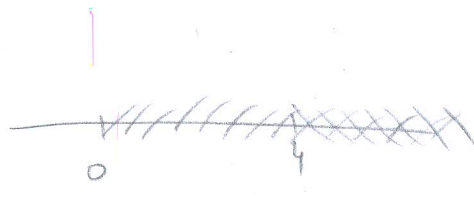
$x^2 - 4x \geq 0$

$x(x - 4) \geq 0$

$x \geq 0$

$(x - 4) \geq 0$

$x \geq 4$



$Df(x) | \mathbb{R} [4, +\infty)$  ~~X~~

V.A.  $\lim_{x \rightarrow 4} \sqrt{x^2 - 4x} + x = (4 - 4) \sqrt{60 - 4} = 0 \Rightarrow \sqrt{x^2 - 4x} + x \cdot \frac{\sqrt{x^2 - 4x} - x}{\sqrt{x^2 - 4x} - x} = \frac{x^2 - 4x - x^2}{\sqrt{x^2 - 4x}} = \frac{-4x}{\sqrt{x^2 - 4x}}$

$\lim_{x \rightarrow 4} \frac{-4x}{\sqrt{x^2 - 4x}} = \frac{-4 \cdot 4}{\sqrt{16 - 4 \cdot 4}} = \frac{-16}{\sqrt{16 - 16}} = \frac{16}{0} \Rightarrow \text{neima}$

H.A.  $\lim_{x \rightarrow -\infty} \frac{-4x}{\sqrt{x^2 - 4x}} \cdot \frac{1}{x} = \frac{-4}{\sqrt{1 - \frac{4}{x}}}$

$\frac{-4}{\sqrt{1 - \frac{4}{x}}} \xrightarrow{x \rightarrow -\infty} \frac{-4}{1} = -4$

$y = -4$   $\rightarrow$  s lijeve strane ~~X~~

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

$\frac{-4}{\sqrt{1 - \frac{4}{x}}} \xrightarrow{x \rightarrow +\infty} \frac{-4}{1} = -4 \Rightarrow \text{neima s desne strane}$

④  $f(x) = \frac{x - 3}{x^2 + 4}$

①  $x^2 + 4 \neq 0$

$x^2 \neq -4/\sqrt{-}$

$x \neq \pm 2$

$Df(x) : x \in \mathbb{R} \setminus \{\pm 2\}$

②  $\frac{x - 3}{x^2 + 4} = 0 / x^2 + 4$

$x - 3 = 0$

$x = 3$

$N_1(3, 0)$

③ V.A.

$\lim_{x \rightarrow 2^+} \frac{x - 3}{x^2 + 4} = \lim_{x \rightarrow 2^+} \frac{2^+ - 3}{(2^+)^2 + 4} = \frac{-1}{8}$

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

$\lim_{x \rightarrow 2^-} \frac{x - 3}{x^2 + 4} = \frac{2^- - 3}{(2^-)^2 + 4} = \frac{-1}{8^-} = \frac{-1}{8}$   $\rightarrow$  s desne strane  $\text{neima}$

$\lim_{x \rightarrow -2^+} \frac{x - 3}{x^2 + 4} = \frac{-2^+ - 3}{(-2^+)^2 + 4} = \frac{-5}{8}$   $\rightarrow$  s lijeve strane

$$\text{H.A. } \lim_{x \rightarrow -\infty} \frac{x-3}{x^2+4} = \lim_{x \rightarrow -\infty} \frac{1 - \frac{3}{x}}{1 + \frac{4}{x^2}} = \frac{1-0}{1+0} = 1$$

$$\lim_{x \rightarrow +\infty} \frac{x-3}{x^2+4} = \lim_{x \rightarrow +\infty} \frac{1 - \frac{3}{x}}{1 + \frac{4}{x^2}} = \frac{1-0}{1+0} = 1$$

$$① f(x) = \frac{x-3}{x^2+4}$$

$$f(-x) = \frac{-x-3}{(-x)^2+4} = \frac{-x-3}{x^2+4} \Rightarrow f(-x) = -\left(\frac{x+3}{x^2+4}\right) \Rightarrow \text{nije ni parna ni neparna}$$

$$⑤ f(x) = \frac{x-3}{x^2+4}$$

$$f'(x) = \frac{(x-3)' \cdot (x^2+4) - (x-3) \cdot (x^2+4)'}{(x^2+4)^2} = \frac{1(x^2+4) - (x-3) \cdot 2x}{(x^2+4)^2} = \frac{x^2+4-2x^2+6x}{(x^2+4)^2} =$$

$$\frac{-x^2+6x+4}{(x^2+4)^2}$$

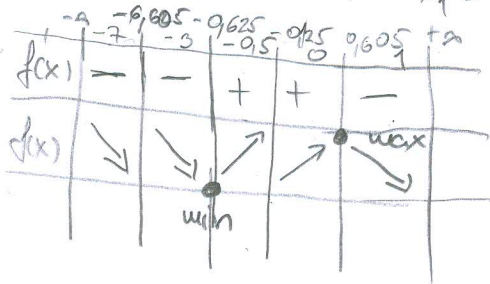
$$-x^2+6x+4 = 0$$

$$x_{1/2} = \frac{-6 \pm \sqrt{36-4ac}}{2a}$$

$$x_{1/2} = \frac{-6 \pm \sqrt{36+16}}{-2} = \frac{-6 \pm 2\sqrt{13}}{-2}$$

$$x_1 = \frac{-6+2\sqrt{13}}{-2} = -6,605$$

$$x_2 = \frac{-6-2\sqrt{13}}{-2} = 0,605$$



min (-6,605, -0,625)  
max (0,605, 0,605)

-x = -0,625  
-y = -0,625

GRAF?

⑥ 2 derivacija

$$f'(x) = \frac{-x^2+6x+4}{(x^2+4)^2}$$

$$f''(x) = \frac{(-x^2+6x+4)'(x^2+4)^2 - (-x^2+6x+4)((x^2+4)^2)'}{(x^2+4)^4}$$

$$\frac{(-2x+6)(x^2+4)^2 - (-x^2+6x+4)(2(x^2+4) \cdot 2x)}{(x^2+4)^4} = \frac{(-2x+6)(x^2+4)^2 - (-x^2+6x+4)(2x^2+4) \cdot 2x}{(x^2+4)^4}$$

$$= \frac{(-2x^5+16x^3-32x+6x^4-48x^2+96) - (4x^5+16x^2+24x^4+36x+16x^3-64)}{(x^2+4)^4}$$

$$f''(x) = \frac{2x^5-8x^4-64x^2-64x+32}{(x^2+4)^4}$$

$$f''(x) = \frac{2x^5 - 8x^4 - 64x^2 - 64x + 32}{4x^3 - 16x}$$

$$2x^5 - 8x^4 - 64x^2 - 64x + 32 = 0$$

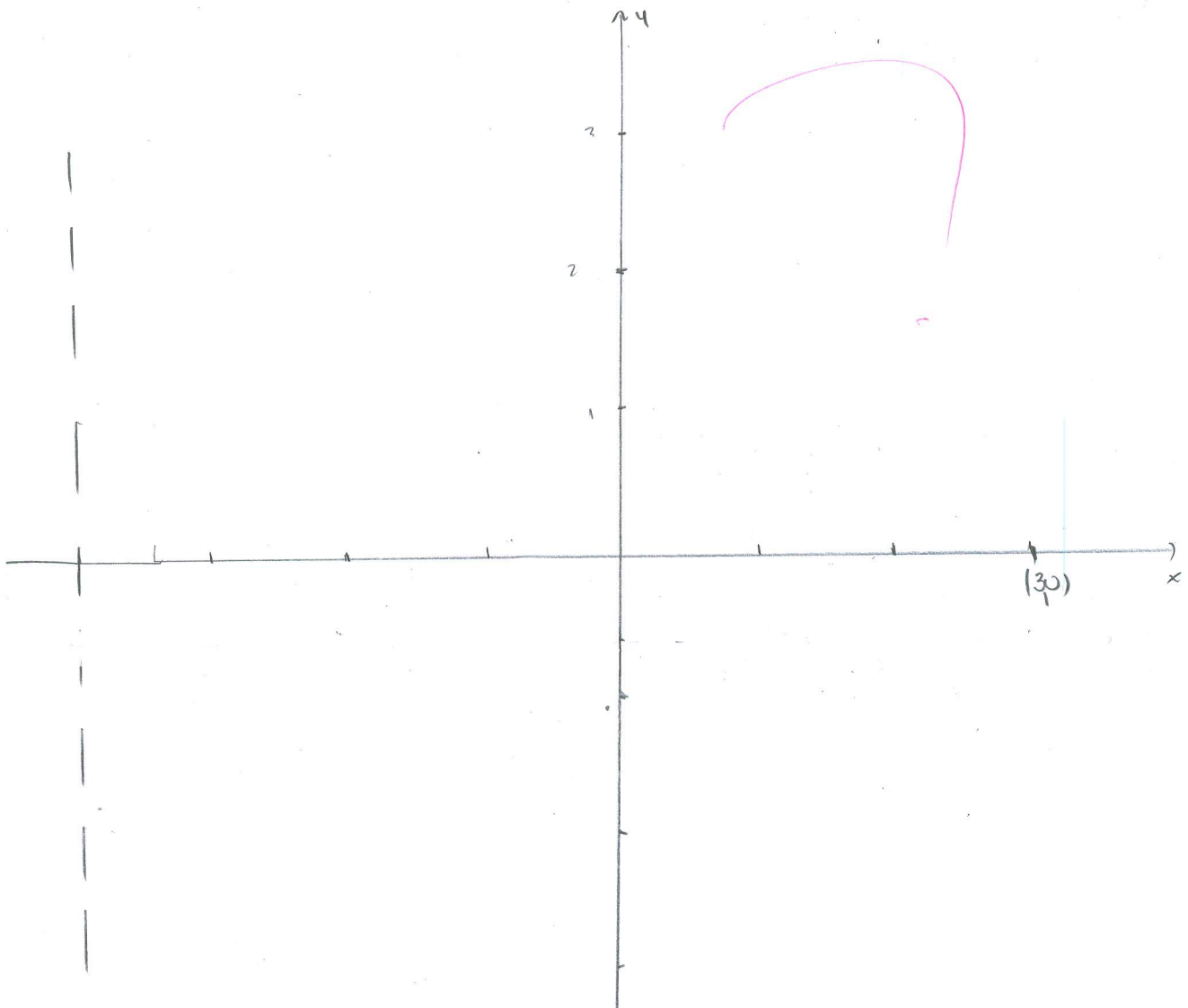
$$2x^5 - 8x^4 - 64x^2 - 64x = -32$$

$$-2x(-x^4 + 4x^3 + 32x + 32) = -32$$

$$-2x = -32 \quad | : -2$$

$$\boxed{x_1 = 16}$$

$$-x^4 + 4x^3 + 32x = -32$$



6)  $f(x) = \sqrt{4+3x}$  JOSEPA JOZEVIC

$n\sqrt{x^m} = \frac{m}{n} x^{\frac{m}{n}-1}$

$$f'(x) = (\sqrt{4+3x})' \cdot (4+3x)' = \left(\frac{1}{2} (4+3x)^{-\frac{1}{2}}\right) \cdot 3 = \frac{(4+3x)^{-\frac{1}{2}}}{2} \cdot 3 = \frac{3}{2\sqrt{4+3x}} \quad \checkmark$$

$$\frac{3}{2\sqrt{4+3x}} = \frac{3}{4\sqrt{3}}$$

$$f'(2) = ?$$

$$f''(x) = \left(\frac{3}{4\sqrt{3}}\right)' = \frac{(3) \cdot (4\sqrt{3})' - (3) \cdot (4\sqrt{3})'}{(4\sqrt{3})^2} = \frac{0 - 3 \cdot \frac{1}{2} \cdot 4\sqrt{3}^{-\frac{1}{2}}}{(16 \cdot 3)} = \frac{-3 \cdot \frac{4\sqrt{3}^{-\frac{1}{2}}}{2}}{48} = \frac{-3 \cdot \frac{1}{2\sqrt{3}}}{48}$$

$$-\frac{\frac{3}{2\sqrt{3}}}{48} = \frac{-3}{48 \cdot 2\sqrt{3}} = \frac{-3}{96\sqrt{3}} = \frac{-1}{32\sqrt{3}}$$



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POPUNJAVA  
NASTAVNIK  
Broj ↓  
bodova

C3

IME I PREZIME:

MATEO RADOLIĆ

BROJ INDEKSA:

17-2-0369-2014

1. Odrediti kompleksne brojeve  $z$  koji zadovoljava jednadžbu  $\frac{|z|}{z-2i} = 3i$ . Na kraju provjeriti rješenja uvrštavanjem.

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3. Ispitati domenu i sve asimptote funkcije  $g(x) = \sqrt{x^2 - 4x} + x$ .

5+15

4. Ispitati tok i nacrtati graf funkcije:  $f(x) = \frac{x-3}{x^2+4}$ .

15(graf)

5. Ispitati domenu, periodičnost, (ne)parnost i drugu derivaciju funkcije:  $h(x) = \arctan(e^x)$ . Skicirati graf funkcije

4+2+2+6+6

6. Zadana je funkcija  $f(x) = \sqrt{4+3x}$ . Kolika je derivacija  $f'(2)$ ? Koji su lokalni ekstremi?

10+5

Ukupno:

~~100~~



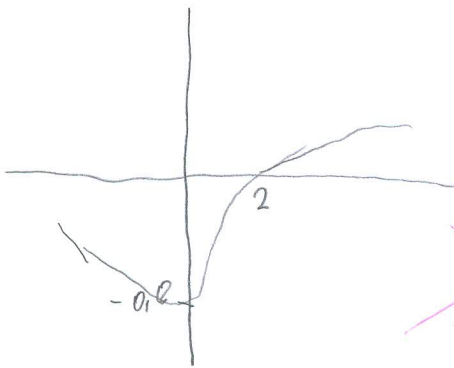
4)  $f(x) = \frac{x-3}{x^2+4}$

$$\frac{x-3}{x^2+4} = \frac{x}{x^2+4} - \frac{3}{x^2+4}$$

$$f(x) = \frac{x}{x^2+4} - \frac{3}{x^2+4}$$

R - SIVI R EOLNI

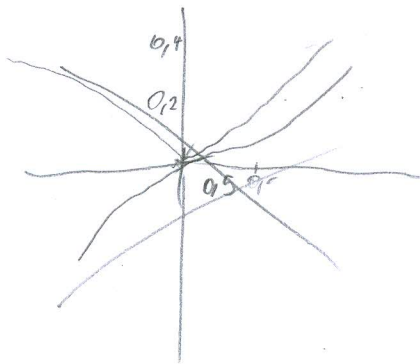
$$(x^2+4)(x+9) = x$$



-2,7 10

NISTE ISPIJALI TOK F-JE...

1)  $\frac{|z|}{z-2i} = \frac{z}{z-2i}$   
 $-2i + z + 0$   
 $z = 0$



$$\frac{-1,5}{-9} = 1,5$$

$$\frac{|z|}{z-2i} = 3i$$

$$\frac{z}{z-2i} = 3i$$

$$z = \frac{3i}{2}$$

KAKO?

Ø

3)  $x + \sqrt{(x-4)x} = g(x)$

$x \in \mathbb{R} \leq 0 \quad x \geq 4$

