Popuniti odmah!

IME I PREZIME: VANJA HRASTIĆ - CAR (NIJE PRIJAVIO) **BROJ INDEKSA:** 71

DATUM: VRIJEME: OD DO

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

xoxxx Broj ↓ bodova

1. Gaussovom metodom riješiti matrični sustav:

$$\begin{bmatrix} 4 & -1 & 1 & 2 \\ 2 & 1 & 0 & -3 \\ 1 & -1 & 2 & 1 \\ 2 & 1 & 1 & -4 \end{bmatrix} \begin{bmatrix} a \\ b \\ c \\ d \end{bmatrix} = \begin{bmatrix} 14 \\ 2 \\ 3 \\ 0 \end{bmatrix}$$

20

2. Odrediti domenu, derivaciju i sve asimptote funkcije $f(x) = \ln(3 + 2x - x^2)$ 16

3. Istražiti konvergenciju reda: $\sum_{n=1}^{\infty} \left(\frac{3+2n}{3n+3}\right)^{n^2}$ 5

4. Odrediti (ako postoji) minimum funkcije $g(x) = \arctan(x^2)$. 20

5. Na temelju ispitivanja toka funkcije napraviti skicu grafa funkcije $h(x) = \frac{x^2-1}{x^2-4}$. 10

POGREŠNO PREPISAN ZADATAK

1)

$$\left[\begin{array}{cccc|c} 4 & -1 & 1 & 2 & 14 \\ 2 & 1 & 0 & 3 & 2 \\ 1 & -1 & 2 & 1 & 3 \\ 2 & 1 & 1 & -4 & 0 \end{array}\right] = \left[\begin{array}{cccc|c} 1 & -1 & 2 & 1 & 3 \\ 2 & 1 & 0 & 3 & 2 \\ 4 & -1 & 1 & 2 & 14 \\ 2 & 1 & 1 & -4 & 0 \end{array}\right] \begin{matrix} \\ R_2 - 2\cdot R_1 \\ R_3 - 4\cdot R_1 \\ R_4 - 2\cdot R_1 \end{matrix}$$

$$\left[\begin{array}{cccc|c} 1 & -1 & 2 & 1 & 3 \\ 0 & 3 & -4 & 1 & -4 \\ 0 & 3 & -7 & -2 & 2 \\ 0 & 3 & -3 & -6 & -6 \end{array}\right] \cdot \frac{1}{3}\cdot R_2 \left[\begin{array}{cccc|c} 1 & -1 & 2 & 1 & 3 \\ 0 & 1 & -\frac{4}{3} & \frac{1}{3} & -\frac{4}{3} \\ 0 & 3 & -7 & -2 & 2 \\ 0 & 3 & -3 & -6 & -6 \end{array}\right] \begin{matrix} R_1 + 1\cdot R_2 \\ \\ R_3 - 3\cdot R_2 \\ R_4 - 3\cdot R_2 \end{matrix}$$

$$\left[\begin{array}{cccc|c} 1 & 0 & \frac{2}{3} & \frac{5}{3} & \frac{5}{3} \\ 0 & 1 & -\frac{4}{3} & \frac{1}{3} & -\frac{4}{3} \\ 0 & 0 & -3 & -3 & 6 \\ 0 & 0 & 1 & -7 & -2 \end{array}\right] \cdot -\frac{1}{3}\cdot R_3 \left[\begin{array}{cccc|c} 1 & 0 & \frac{2}{3} & \frac{5}{3} & \frac{5}{3} \\ 0 & 1 & -\frac{4}{3} & \frac{1}{3} & -\frac{4}{3} \\ 0 & 0 & 1 & 1 & -2 \\ 0 & 0 & 1 & -7 & -2 \end{array}\right] \begin{matrix} R_1 - \frac{2}{3}\cdot R_3 \\ R_2 + \frac{4}{3}\cdot R_3 \\ \\ R_4 - 1\cdot R_3 \end{matrix}$$

$$\left[\begin{array}{cccc|c} 1 & 0 & 0 & \frac{2}{3} & 3 \\ 0 & 1 & 0 & \frac{5}{3} & -4 \\ 0 & 0 & 1 & 1 & -2 \\ 0 & 0 & 0 & -8 & 0 \end{array}\right] \cdot -\frac{1}{8} \left[\begin{array}{cccc|c} 1 & 0 & 0 & \frac{2}{3} & 3 \\ 0 & 1 & 0 & \frac{5}{3} & -4 \\ 0 & 0 & 1 & 1 & -2 \\ 0 & 0 & 0 & 1 & 0 \end{array}\right] \begin{matrix} R_1 - \frac{2}{3}\cdot R_4 \\ R_2 - \frac{5}{3}\cdot R_4 \\ R_3 - 1\cdot R_4 \\ \\ \end{matrix}$$

$$\left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & 3 \\ 0 & 1 & 0 & 0 & -4 \\ 0 & 0 & 1 & 0 & -2 \\ 0 & 0 & 0 & 1 & 0 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 4 & -1 & 1 & 2 & 3 \\ 2 & 1 & 0 & -3 & -4 \\ 1 & -1 & 2 & 1 & -2 \\ 2 & 1 & 1 & -4 & 0 \end{array}\right]$$

$$\begin{bmatrix} 14 \\ 2 \\ 3 \\ 0 \end{bmatrix} = \quad 20$$

IME I PREZIME: VANJA HRLOŽIĆ - CSR BROJ INDEKSA:

2.) $f(x) = \ln(3+2x-x^2)$

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

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

$x > 0$

$\ln x > 0$

$-x^2+2x+3 > 0$ ✓ $Df = \langle -1, 3 \rangle$ ✓

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

$x_1 = \frac{-2+4}{-2} = \frac{2}{-2} = \boxed{-1}$

$x_2 = \frac{-2-4}{-2} = \frac{-6}{-2} = \boxed{3}$

16

$\lim_{x \to \infty} f(x) = \ln(3+2x-x^2) =$ H.A. nema ✓

$\lim_{x \to -1}$ ✓ $= \ln(3+2\cdot(1)-1^2) = \ln(0) = -\infty$

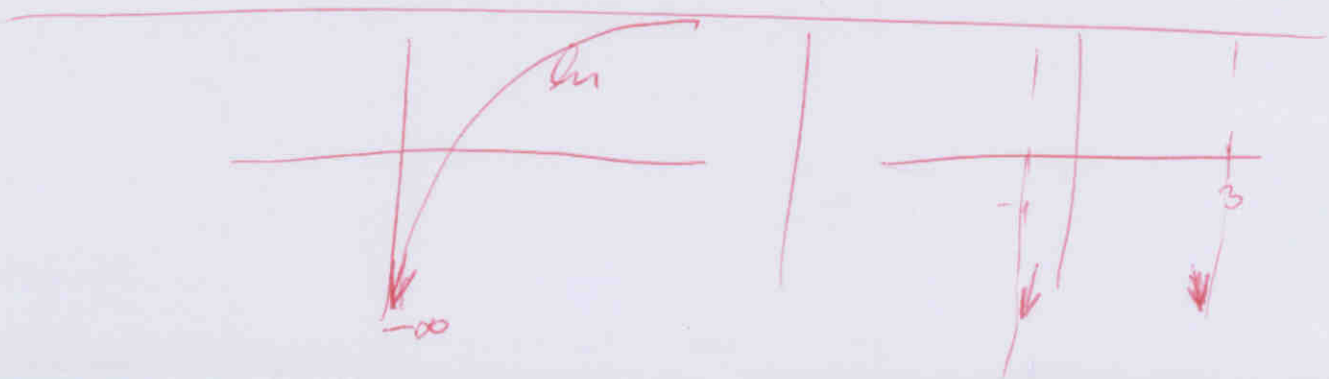
$\Rightarrow -1 =$ nije V.A.

$\lim_{x \to 3}$ ✓ $= \ln(3+2\cdot 3-3^2) = \ln(0) = 0$ JEST V.A.

$\Rightarrow 3 =$ nije V.A

$\lim_{x \to \infty} \frac{f(x)}{x} = \frac{\ln(3+2x-x^2)}{x} = \frac{1}{(3+2x-x^2)} \cdot -2x+2$ JEST. V.A.

$= \frac{-2x+2}{(3+2x-x^2)} \Big/ x^2 = \frac{0}{-1} = \infty$ nema K.A. ✓



IME I PREZIME: VANJA HRASTIĆ - CSR

BROJ INDEKSA:

3.) $\sum_{n=1}^{\infty} \left(\frac{3+2n}{3n+3}\right)^{n^2}$ > $\lim_{x\to\infty} \sqrt[n]{\left(\frac{3+2n}{3n+3}\right)^{n^2}}$

$= \lim_{n\to\infty} \left(\frac{3+2n}{3n+3}\right)^{n} = /n \quad /n = \left(\frac{2}{3}\right)^{1} = \frac{2}{3}$ ✗

$\lim_{n\to\infty} \left(\frac{3+2n}{3n+3}\right)^{n} =$

$= \left(\lim_{n\to\infty} \frac{3+2n}{3n+3}\right)^{\lim_{n\to\infty} n}$

$= \left(\frac{2}{3}\right)^{\infty} = 0$

5

$\frac{2}{3} < 1$ - konvergira

ZAKLJUČAK ✓

4.) $g(x) = \arctan(x^2)$

$g'(x) = \frac{1}{1+(x^4)} \cdot 2x$

$g'(x) = \frac{2x}{1+x^4} = 2x = 0$

minimum je u 0 ✓

$-\infty \quad 0 \quad +\infty$

↘ ↗

0 ✓

⇒ zato jer funkcija od $-\infty$ do 0 pada a od 0 - do $+\infty$ raste

20

IME I PREZIME: Višnja Hrženjak - 0g2 BROJ INDEKSA:

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

$D_f = \mathbb{R} \setminus \{-2, 2\}$ $\quad x^2 - 4 = 0$

$x^2 = 4$

$x_1 = -2$

$x_2 = 2$

$x^2 - 1 = 0$

$x^2 = 1$

$x_1 = 1, \; x_2 = -1$

$h(x) = \frac{-x^2-1}{-x^2-4} = \frac{x^2-1}{x^2-4} \Rightarrow$

$\Rightarrow h(x)$ = parna funkcija ✓

$h(x) = -\frac{x^2-1}{x^2-4} \neq \frac{x^2-1}{x^2-4}$

$\Rightarrow$ nije NEPARNA

$h(x) = \frac{0^2-1}{0^2-4} = -\frac{1}{-4} = \frac{1}{4}$

$y = \frac{1}{4} = 0{,}25$

$h(x) = \frac{x^2-1}{x^2-4} = \frac{2x(x^2-4) - (x^2-1)(2x)}{(x^2-4)^2} = \frac{2x^3 - 4x - (2x^3 - 2x)}{(x^2-4)^2}$

$h'(x) = \frac{-2x}{(x^2-4)^2} =$ $\quad -2 \quad 0 \quad 2$

$\nearrow \quad \searrow$

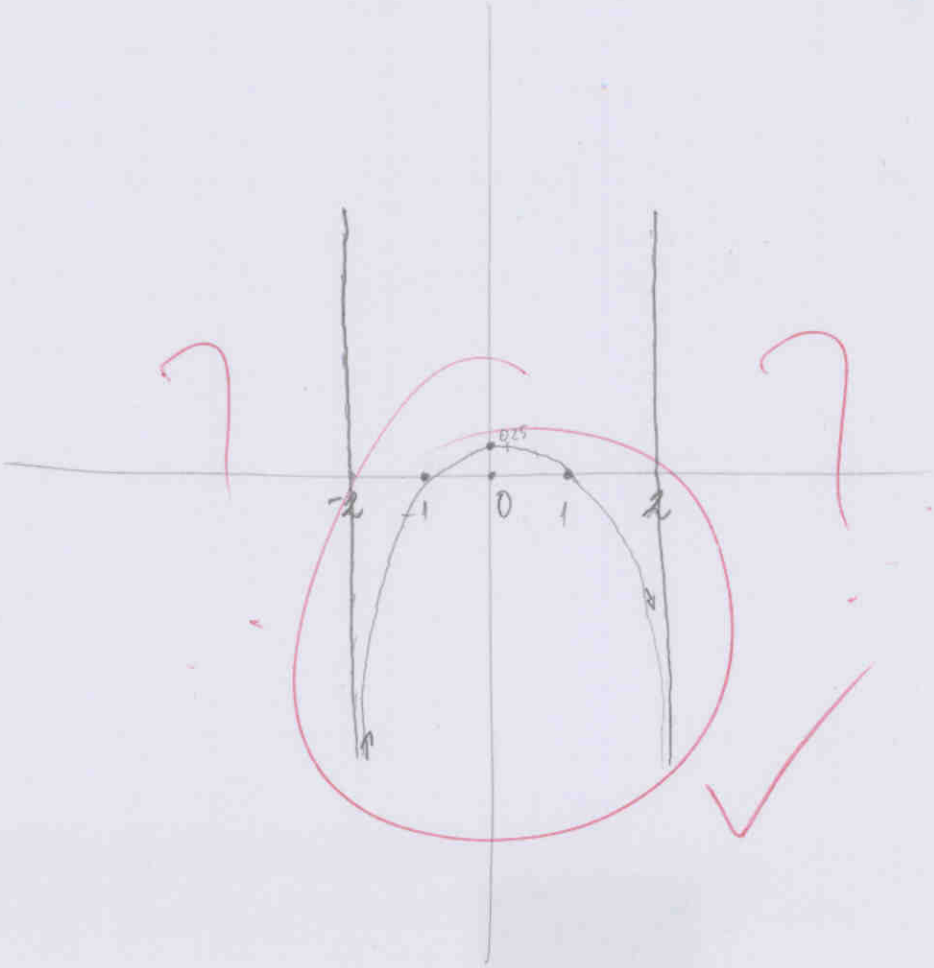
$\lim_{x \to (2,-2)} \frac{2^2-1}{2^2-4} = \frac{1}{0} = \infty$

-2 i 2 = Vertikalne asimptote

$x_1 = 2$

$x_2 = -2$

IME I PREZIME: Ninja Hrsoć - CS2 BROJ INDEKSA:



10

Popuniti odmah!

IME I PREZIME: STIPE DUŠEVIĆ **BROJ INDEKSA:** 17-2-0051-2010 (40)

DATUM: VRIJEME: OD DO

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

1. Gaussovom metodom riješiti matrični sustav:

$$\begin{bmatrix} 4 & -1 & 1 & 2 \\ 2 & 1 & 0 & -3 \\ 1 & -1 & 2 & 1 \\ 2 & 1 & 1 & -4 \end{bmatrix} \begin{bmatrix} a \\ b \\ c \\ d \end{bmatrix} = \begin{bmatrix} 14 \\ 2 \\ 3 \\ 0 \end{bmatrix}$$

10

2. Odrediti domenu, derivaciju i sve asimptote funkcije $f(x) = \ln\left(3 + 2x - x^2\right)$ 10

3. Istražiti konvergenciju reda: $\sum_{n=1}^{\infty} \left(\frac{3+2n}{3n+3}\right)^{n^2}$ 10

4. Odrediti (ako postoji) minimum funkcije $g(x) = \arctan\left(x^2\right)$. 10

5. Na temelju ispitivanja toka funkcije napraviti skicu grafa funkcije $h(x) = \frac{x^2-1}{x^2-4}$. 0

IME I PREZIME: STIPE DUŠEVIĆ BROJ INDEKSA: 17-2-0051-2011

11.

$$\left[\begin{array}{cccc|c} 4 & -1 & 1 & 2 & 14 \\ 2 & 1 & 0 & -3 & 2 \\ 1 & -1 & 2 & 1 & 3 \\ 2 & 1 & 1 & -4 & 0 \end{array}\right] \sim \left[\begin{array}{cccc|c} 1 & -1 & 2 & 1 & 3 \\ 2 & 1 & 0 & -3 & 2 \\ 4 & -1 & 4 & 2 & 14 \\ 2 & 1 & 1 & -4 & 0 \end{array}\right] \begin{array}{l} \cdot(-2)\ \cdot(-4)\ \cdot(-2) \\ \text{II} \\ \text{III} \\ \text{IV} \end{array}$$

$$\sim \left[\begin{array}{cccc|c} 1 & -1 & 2 & 1 & 3 \\ 0 & 3 & -4 & -5 & -4 \\ 0 & 3 & -7 & -2 & 2 \\ 0 & 3 & -3 & -6 & -6 \end{array}\right] \cdot\tfrac{1}{3} \sim \left[\begin{array}{cccc|c} 1 & -1 & 2 & 1 & 3 \\ 0 & 1 & -4/3 & -5/3 & -4/3 \\ 0 & 3 & -7 & -2 & 2 \\ 0 & 3 & -3 & -6 & -6 \end{array}\right] \begin{array}{l} \text{I} \\ \cdot 1\ \cdot(-3)\ \cdot(-3) \\ \text{III} \\ \text{IV} \end{array}$$

$$\sim \left[\begin{array}{cccc|c} 1 & 0 & 2/3 & -4/3 & 5/3 \\ 0 & 1 & -4/3 & -5/3 & -4/3 \\ 0 & 0 & -3 & 3 & 6 \\ 0 & 0 & 1 & -1 & -2 \end{array}\right] \cdot\left(-\tfrac{1}{3}\right) \sim \left[\begin{array}{cccc|c} 1 & 0 & 2/3 & -4/3 & 5/3 \\ 0 & 1 & -4/3 & -5/3 & -4/2 \\ 0 & 0 & 1 & -1 & -2 \\ 0 & 0 & 1 & -1 & -2 \end{array}\right] \begin{array}{l} \text{I} \\ \text{II} \\ \cdot\left(-\tfrac{2}{3}\right)\ \cdot\tfrac{4}{3}\ \cdot(-1) \\ \text{IV} \end{array}$$

$$\sim \left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & 9/3 \\ 0 & 1 & 0 & -3 & -12/3 \\ 0 & 0 & 1 & -1 & -2 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right] \sim \left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & 9/3 \\ 0 & 1 & 0 & -3 & -12/3 \\ 0 & 0 & 1 & -1 & -2 \end{array}\right]$$

KOJE JE RJEŠENJE? 10

$a = \frac{9}{3} = 3$

$b = -\frac{12}{3} + 3\lambda$

$c = -2 + \lambda$

$d = \lambda$

IME I PREZIME: STIPE DUŠEVIĆ BROJ INDEKSA: 17-2-0051-2011

② $f(x) = \ln(3-2x-x^2)$

$(3-2x-x^2) > 0$

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

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

$x_{1,2} = \frac{2 \pm \sqrt{4+12}}{-2}$

$x_{1,2} = \frac{2 \pm \sqrt{16}}{-2}$

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

$x_1 = \frac{2-4}{-2} = \frac{-2}{-2} = 1$

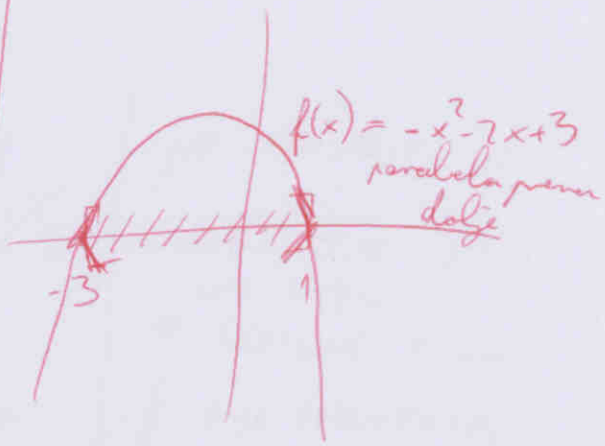
$x_2 = \frac{2+4}{-2} = \frac{6}{-2} = -3$

$x>1$

$x>-3$

$D_f \langle -\infty, -3 \rangle \cup \langle 1, +\infty \rangle$

PROVJERI $f(2)$ ✗



$D(f) = \langle -3, 1 \rangle$

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

$f'(x) = \frac{-2-2x}{3-2x-x^2}$ ✓

10

IME I PREZIME: STIPE DUŠEVIĆ BROJ INDEKSA: 17-2-0051-2010

③ $\sum_{n=1}^{\infty} \left(\frac{3+2n}{3n+3}\right)^{n}$ ②

$\sqrt[n]{a^n}$ ← POGREŠNO PREPISAN ZADATAK

10

$\lim_{n\to\infty} \sqrt[n]{\left(\frac{3+2n}{3n+3}\right)^n} = \lim_{n\to\infty} \frac{3+2n \,/:n}{3n+3 \,/:n} = \lim_{n\to\infty} \frac{\left(\frac{3}{n}\right)^{=0}+2}{3+\left(\frac{3}{n}\right)_{=0}} = \frac{2}{3}$ KONV.

④ $g(x) = \arctan(x^2)$

ZAŠTO STE ODABRALI TOČKU $x=0$?

$g''(0) > 0$ - MINIMUM

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

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

$g''(x) = \frac{2-2x^2+4x^2}{(1-x^2)^2} = \frac{2+2x^2}{(1-x^2)^2}$

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

$g''(0) > 0 \rightarrow$ MINIMUM

$g''(0) = 2$ ↗

10

IME I PREZIME: STIPE DUŠEVIĆ BROJ INDEKSA: 17-2-0051-2010

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

$D_f \; \mathbb{R} \setminus \{2, -2\}$

$$h'(x) = \frac{(x^2-1)' \cdot (x^2-4) - (x^2-1) \cdot (x^2-4)'}{(x^2-4)^2} = \frac{2x \cdot (x^2-4) - (x^2-1) \cdot 2x}{(x^2-4)^2} =$$

$$h'(x) = \frac{2x^3 - 8x - 2x^3 + 2x}{(x^2-4)^2} = \frac{-6x}{(x^2-4)^2}$$

GRAF ?

BODUJE SE SAMO GRAF

Popuniti odmah!

IME I PREZIME: LUKA BRONIĆ BROJ INDEKSA: 57826

DATUM: VRIJEME: OD 08:00 DO

10

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

xoxxx
Broj ↓ bodova

1. Gaussovom metodom riješiti matrični sustav:

$$\begin{bmatrix} 4 & -1 & 1 & 2 \\ 2 & 1 & 0 & -3 \\ 1 & -1 & 2 & 1 \\ 2 & 1 & 1 & -4 \end{bmatrix} \begin{bmatrix} a \\ b \\ c \\ d \end{bmatrix} = \begin{bmatrix} 14 \\ 2 \\ 3 \\ 0 \end{bmatrix}$$

2. Odrediti domenu, derivaciju i sve asimptote funkcije $f(x) = \ln(3 + 2x - x^2)$

10

3. Istražiti konvergenciju reda: $\sum_{n=1}^{\infty} \left(\frac{3+2n}{3n+3}\right)^{n^2}$

4. Odrediti (ako postoji) minimum funkcije $g(x) = \arctan(x^2)$.

5. Na temelju ispitivanja toka funkcije napraviti skicu grafa funkcije $h(x) = \frac{x^2-1}{x^2-4}$.

2. $f(x) = \ln(3 + 2x - x^2)$

$-x^2 + 2x + 3$

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

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

$x_{1,2} = \frac{-2 \pm \sqrt{4+12}}{-2}$

$x_{1,2} = \frac{-2 \pm \sqrt{16}}{-2}$

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

$x_1 = \frac{-2+4}{-2} = -1$

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

$D_f \langle -\infty, -1] \cup [-3, +\infty \rangle$ X

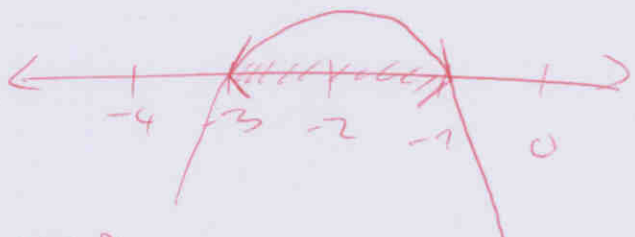
$f(x) = \ln(3 + 2x - x^2)$

$f'(x) = \frac{1}{(3+2x-x^2)} \cdot (2-2x)$ ✓ 10

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

PARABOLA GLEDA PREMA DOLJE

$-x^2 + 2x + 3$



$D(f) = \langle -3, -1 \rangle$

Popuniti odmah!

IME I PREZIME: IVAN RADOVIĆ BROJ INDEKSA: 57230

DATUM: VRIJEME: OD DO

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

xoxxx

Broj ↓ bodova

1. Gaussovom metodom riješiti matrični sustav:

$$\begin{bmatrix} 4 & -1 & 1 & 2 \\ 2 & 1 & 0 & -3 \\ 1 & -1 & 2 & 1 \\ 2 & 1 & 1 & -4 \end{bmatrix} \begin{bmatrix} a \\ b \\ c \\ d \end{bmatrix} = \begin{bmatrix} 14 \\ 2 \\ 3 \\ 0 \end{bmatrix}$$

2. Odrediti domenu, derivaciju i sve asimptote funkcije $f(x) = \ln\left(3 + 2x - x^2\right)$

3. Istražiti konvergenciju reda: $\sum_{n=1}^{\infty} \left(\frac{3+2n}{3n+3}\right)^{n^2}$

4. Odrediti (ako postoji) minimum funkcije $g(x) = \arctan\left(x^2\right)$.

5. Na temelju ispitivanja toka funkcije napraviti skicu grafa funkcije $h(x) = \frac{x^2-1}{x^2-4}$.

$h(x) = \frac{x^2-1}{x^2-4}$ $x^2-4 \neq 0$ $D \langle -\infty, 2 \rangle \cup \langle \sqrt{11}, \infty \rangle$ ×

$D(h) = \langle -\infty, -2 \rangle \cup \langle -2, 2 \rangle \cup \langle 2, +\infty \rangle$

Nul točke

$x^2-4=0$

$x^2=4$

$x=2$

$\frac{2^2-1}{2^2-4} = \frac{3}{0}$

$x(2,0)$ $y(0,3)$ ×

VIDI HRASTIĆ-CAR

ASIMPTOTE

$\lim_{x\to\infty} \frac{x^2-1}{x^2-4} \cdot \frac{1/x^2}{1/x^2} = \frac{1-\frac{1}{x^2}}{1-\frac{4}{x^2}} = 1$ H.A ✓

$\lim_{x\to-\infty} \frac{x^2-1}{x^2-4} = \begin{bmatrix} x=-t & t=-x \\ \infty=-\infty & -\infty=\infty \end{bmatrix} \lim_{x\to\infty} \frac{-t^2-1}{t^2-4} = -1$ V.A ×

IME I PREZIME: IVAN RADOVIĆ BROJ INDEKSA: 57220

$$h(x) = \frac{x^2-1}{x^2-4} = \frac{(x^2-1)(x^2-4)' - (x^2-4)(x^2-1)'}{(x^2-4)^2} = \frac{(x^2-1)2 - (x^2-4)2}{x^4-8x^2+16}$$

$$= \frac{2x^2-2-2x^2-8}{x^4-8x^2+16} = \frac{-10}{x^4-8x^2+16}$$ nema maximuma

$$\left(\frac{-10}{x^4-8x^2+16}\right)' =$$ nema minimuma