Popuniti odmah!

Ime i prezime: ANTONIO SEKUCA **Broj indeksa:** 17-2-0025-2010

Datum: 21.2.2012. Vrijeme: od 13:05 do 13:55 .

MATEMATIKA 1: Trajanje 120 minuta. Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. 2 Broj ↓ bodova

60

1. Odrediti determinantu matrice $A = \begin{bmatrix} 1 & 2 & 0 & 0 & 0 \\ 2 & 1 & 0 & 2 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 2 & 0 & 1 & 2 \\ 0 & 0 & 0 & 2 & 1 \end{bmatrix}$ 20

2. Odrediti domenu i sve asimptote funkcije $f(x) = x - \sqrt{x^2 - x}$ 6+7+7

3. Ispitati konvergenciju reda $\sum \left(\frac{3n+3}{\frac{1}{n} + 2n} \right)^n$ 20

4. Ispitati domenu, (ne)parnost i drugu derivaciju funkcije $g(x) = \ln\left(x^2+1\right)$. 6+4+10

5. Na temelju ispitivanja toka funkcije napraviti skicu grafa funkcije $f(x) = \dfrac{x^2+1}{x+1}$. 20

1.

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

$$1 \cdot \left(1 \cdot \left| \begin{matrix} 1 & 2 & 0 \\ 2 & 1 & 2 \\ 0 & 2 & 1 \end{matrix} \right| \begin{matrix} 1 & 2 \\ 2 & 1 \\ 0 & 2 \end{matrix} \right) - 2 \cdot \left(2 \cdot \left| \begin{matrix} 1 & 0 & 0 \\ 0 & 1 & 2 \\ 0 & 2 & 1 \end{matrix} \right| \begin{matrix} 1 & 0 \\ 0 & 1 \\ 0 & 2 \end{matrix} \right) =$$

$$1 \cdot \left(1 \cdot (1+0+0-0-4-4) \right) - 2 \cdot \left(2 \cdot (1+0+0-4-0) \right) =$$

$$1 \cdot (-7) - 2 \cdot (-6) = -7 + 12 = 5$$

4. $g(x) = \ln(x^2+1)$

Domena

$x^2+1>0$

$x^2>-1$

$x^2>\pm 1$

P/N

$g(-x) = \ln((-x)^2+1)$

$g(-x) = \ln(x^2+1)$

funkcja PARNA

$D(g) \setminus \{-1, 1\}$ $\quad D(g) \; \langle -\infty, -1 \rangle \cup \langle 1, +\infty \rangle$

$g(x) = \ln(x^2+1)$

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

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

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

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

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

2. $f(x) = x - \sqrt{x^2-x}$

$x^2-x \geq 0$

$x(x-1) \geq 0$

$X=0 \quad x=1$

	$-\infty$	0	1	$-\infty$
x^2-x	+	-	+	

$D(f) \; \langle -\infty, 0] \cup [1, +\infty \rangle$

V.A.

$\lim_{x \to 0} x - \sqrt{x^2-x} = 0$

$\lim_{x \to 1} x - \sqrt{x^2-x} = 1 - \sqrt{1^2-1} = 1-0 = 1$

H.A.

$\lim_{x \to -\infty} x - \sqrt{x^2-x} = -\infty$

$\lim_{x \to +\infty} x - \sqrt{x^2-x} = \infty$

Popuniti odmah!

Ime i prezime: Andrija Ribić **Broj indeksa:** 57688 - 2009

Datum: 21.2.2012. Vrijeme: od 13^{05} do 14^{30}.

MATEMATIKA 1: Trajanje 120 minuta. Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata.

2 Broj ↓ bodova

60

1. Odrediti determinantu matrice $A = \begin{bmatrix} 1 & 2 & 0 & 0 & 0 \\ 2 & 1 & 0 & 2 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 2 & 0 & 1 & 2 \\ 0 & 0 & 0 & 2 & 1 \end{bmatrix}$ 20

2. Odrediti domenu i sve asimptote funkcije $f(x) = x - \sqrt{x^2 - x}$ 6+7+7

3. Ispitati konvergenciju reda $\sum \left(\frac{3n+3}{\frac{1}{n}+2n}\right)^n$ 20

4. Ispitati domenu, (ne)parnost i drugu derivaciju funkcije $g(x) = \ln(x^2+1)$. 6+4+10

5. Na temelju ispitivanja toka funkcije napraviti skicu grafa funkcije $f(x) = \frac{x^2+1}{x+1}$. 20

(1)

$$A = \begin{bmatrix} 1 & 2 & 0 & 0 & 0 \\ 2 & 1 & 0 & 2 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 2 & 0 & 1 & 2 \\ 0 & 0 & 0 & 2 & 1 \end{bmatrix} = \det A \begin{vmatrix} 1 & 2 & 0 & 0 & 0 \\ 2 & 1 & 0 & 2 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 2 & 0 & 1 & 2 \\ 0 & 0 & 0 & 2 & 1 \end{vmatrix} = \begin{vmatrix} 1 & 2 & 0 & 0 & 0 \\ 0 & -3 & 0 & 2 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 2 & 0 & 1 & 2 \\ 0 & 0 & 0 & 2 & 1 \end{vmatrix}$$

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

Razvijamo po el prvog stupca

$$= (-1)^{1+1} \cdot 1 \begin{vmatrix} -3 & 0 & 2 & 0 \\ 0 & 1 & 0 & 0 \\ 2 & 0 & 1 & 2 \\ 0 & 0 & 2 & 1 \end{vmatrix} = \begin{vmatrix} -3 & 0 & 2 & 0 \\ 0 & 1 & 0 & 0 \\ 2 & 0 & -3 & 0 \\ 0 & 0 & 2 & 1 \end{vmatrix} = (-1)^{4+4} \cdot 1 \begin{vmatrix} -3 & 0 & 2 \\ 0 & 1 & 0 \\ 2 & 0 & -3 \end{vmatrix}$$

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

Razvijamo po el 4. stupca

Razvijamo po el. 2 stupca

$$= (-1)^{2+2} \cdot 1 \begin{vmatrix} -3 & 2 \\ 2 & -3 \end{vmatrix} = (-3)\cdot(-3) - 2 \cdot 2 = 9 - 4 = 5$$

(3) $\sum \left(\frac{3n+3}{\frac{1}{n}+2n}\right)^n$ CAUSHY-JEW

$\frac{1}{n} + \frac{2}{1} = \frac{1+2n}{n} = \frac{3n}{n}$

$L = \lim \sqrt[n]{a_n}$

$L < 1$ kon

$L > 1$ div

$L = 1$?

$$L = \lim \sqrt[n]{\left(\frac{3n+3}{\frac{1}{n}+2n}\right)^n} = \lim \frac{3n+3 /:n}{\frac{1}{n}+2n /:n} = \frac{3 \frac{3}{n}}{\frac{1}{n^2}+2} = \frac{3}{2} > 1$$

Red divergira

② Odredi domenu i sve asimptote funkcije

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

Domena

$x^2 - x \geq 0$

$x^2 \geq x$

$D(f) = \mathbb{R} \setminus \{0, 1\}$

1) Vertikalna

$\lim\limits_{x \to 1} x - \sqrt{x^2 - x} = \lim\limits_{x \to 1} x - \sqrt{x^2 - x} \cdot \frac{x + \sqrt{x^2 - x}}{x + \sqrt{x^2 - x}}$

$\lim\limits_{x \to 1} \frac{x^2 - (\sqrt{x^2 - x})^2}{x + \sqrt{x^2 - x}} = \lim\limits_{x \to 1} \frac{\cancel{x^2} - \cancel{x^2} + x}{x + \sqrt{x^2 - x}} = \frac{1}{1} = 1$

$\boxed{\text{Nema V.A}}$

2) $\lim\limits_{x \to 0} \frac{\cancel{x^2} - \cancel{x^2} + x}{x + \sqrt{x^2 - x}} = \frac{x}{x + \sqrt{x^2 - x}} = \frac{0}{0} = +\infty$ Rezultat mora biti $\pm\infty$

$\lim\limits_{x \to 1} \frac{x}{x + \sqrt{x^2 - 1}} = \frac{1}{1} = \boxed{1 \text{ H.A}}$

3) kose $y = kx + l$

$k = \lim\limits_{x \to \pm\infty} \frac{f(x)}{x} = \lim\limits_{x \to \pm\infty} \frac{x - \sqrt{x^2 - x}}{x} \Big/ \frac{:x}{:x}$

$\lim\limits_{x \to \pm\infty} \frac{1 - \sqrt{1 - \frac{1}{x}}}{1} = \frac{0}{1}$

$l =$ Nema kose asimptote jer je $k = 0$ a mora biti $k \neq 0$ $k \neq \infty$

4) $g(x) = \ln(x^2 + 1)$

$x^2 + 1 > 0$

$x^2 = > -1$

$x > \pm\sqrt{-1}$

$D(g x) = \mathbb{R}$

Parnost

$g(x) = \ln(x^2 + 1)$

$g(-x) = \ln((-x)^2 + 1)$

$g(-x) = \ln(x^2 + 1)$

$g(x) = g(-x) \neq -g(x)$

Funkcija je parna tako da nije neparna

Derivacija:

$g(x) = \ln(x^2 + 1)$

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

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

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

II. Derivacija

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

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

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

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

5) $f(x) = \frac{x^2+1}{x+1}$

Domena

$x+1 \neq 0$

$x \neq -1$

$D(f) = \mathbb{R} \setminus \{1\}$

Popuniti odmah!

Ime i prezime: GORAN BASIOLI **Broj indeksa:** 17-1-0031-2010

Datum: 21.2.2012. **Vrijeme:** od do .

MATEMATIKA 1: Trajanje 120 minuta. Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata.

2 Broj ↓ bodova 20

1. Odrediti determinantu matrice $A = \begin{bmatrix} 1 & 2 & 0 & 0 & 0 \\ 2 & 1 & 0 & 2 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 2 & 0 & 1 & 2 \\ 0 & 0 & 0 & 2 & 1 \end{bmatrix}$ — 20 (20)

2. Odrediti domenu i sve asimptote funkcije $f(x) = x - \sqrt{x^2 - x}$ — 6+7+7

3. Ispitati konvergenciju reda $\sum \left(\frac{3n+3}{\frac{1}{n} + 2n} \right)^n$ — 20

4. Ispitati domenu, (ne)parnost i drugu derivaciju funkcije $g(x) = \ln(x^2 + 1)$. — 6+4+10

5. Na temelju ispitivanja toka funkcije napraviti skicu grafa funkcije $f(x) = \dfrac{x^2+1}{x+1}$. — 20

1)

$$A = \begin{array}{c} \begin{matrix} + & - & + & - & + \end{matrix} \\ \begin{bmatrix} 1 & 2 & 0 & 0 & 0 \\ 2 & 1 & 0 & 2 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 2 & 0 & 1 & 2 \\ 0 & 0 & 0 & 2 & 1 \end{bmatrix} \end{array} \Rightarrow \det_A = (-7) - (-12) + 0 - 0 + 0 = 5$$

$$\underline{\underline{\det_A = 5}}$$

$$1 \cdot \begin{array}{c} \begin{matrix} + & - & + & - \end{matrix} \\ \begin{bmatrix} 1 & 0 & 2 & 0 \\ 0 & 1 & 0 & 0 \\ 2 & 0 & 1 & 2 \\ 0 & 0 & 2 & 1 \end{bmatrix} \end{array} = 1 \cdot \begin{vmatrix} 1 & 0 & 0 \\ 0 & 1 & 2 \\ 0 & 2 & 1 \end{vmatrix} - \overset{\text{množimo nulom}}{0 \cdot |X|} + 2 \cdot \begin{vmatrix} 0 & 1 & 0 \\ 2 & 0 & 2 \\ 0 & 0 & 1 \end{vmatrix} - \overset{\text{množimo nulom}}{0 \cdot |X|} =$$

$$= 1 \cdot \left\{ \left[1 \cdot \left| \begin{matrix} 1 & 0 & 0 \\ 0 & 1 & 2 \\ 0 & 2 & 1 \end{matrix} \right| \begin{matrix} 1 & 0 \\ 0 & 1 \\ 0 & 2 \end{matrix} \right] + \left[2 \cdot \left| \begin{matrix} 0 & 1 & 0 \\ 2 & 0 & 2 \\ 0 & 0 & 1 \end{matrix} \right| \begin{matrix} 0 & 1 \\ 2 & 0 \\ 0 & 0 \end{matrix} \right] \right\} =$$

$$= 1 \cdot \{ [1 \cdot (1 + 0 + 0 - 1 - 4 - 0)] + [2 \cdot (0 + 0 + 0 - 2 - 0 - 0)] \}$$

$$1 \cdot \{ [1 \cdot (-3)] + [2 \cdot (-2)] \} = 1 \cdot [(-3) + (-4)] = -7$$

$$2 \cdot \begin{array}{c} \begin{matrix} + & - & + & - \end{matrix} \\ \begin{bmatrix} 2 & 0 & 2 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 2 \\ 0 & 0 & 2 & 1 \end{bmatrix} \end{array} = 2 \cdot \left\{ \left[2 \cdot \begin{vmatrix} 1 & 0 & 0 \\ 0 & 1 & 2 \\ 0 & 2 & 1 \end{vmatrix} \right] - \overset{\text{množenje sa nulom}}{\left[0 \cdot \begin{vmatrix} 0 & 0 & 0 \\ 0 & 1 & 2 \\ 0 & 2 & 1 \end{vmatrix} \right]} + \left[2 \cdot \begin{vmatrix} 0 & 1 & 0 \\ 0 & 0 & 2 \\ 0 & 0 & 1 \end{vmatrix} \right] \right\} - \overset{\text{množimo nulom}}{0 \cdot |X|}$$

$$= 2 \cdot \left\{ \left[2 \cdot \left| \begin{matrix} 1 & 0 & 0 \\ 0 & 1 & 2 \\ 0 & 2 & 1 \end{matrix} \right| \begin{matrix} 1 & 0 \\ 0 & 1 \\ 0 & 2 \end{matrix} \right] + \left[2 \cdot \left| \begin{matrix} 0 & 1 & 0 \\ 0 & 0 & 2 \\ 0 & 0 & 1 \end{matrix} \right| \begin{matrix} 0 & 1 \\ 0 & 0 \\ 0 & 0 \end{matrix} \right] \right\} =$$

$$= 2 \cdot \{ [2 \cdot (1 + 0 + 0 - 0 - 4 - 0)] + [2 \cdot (0 + 0 + 0 + 0 + 0 + 0)] \}$$

$$= 2 \cdot \{ [2 \cdot (-3)] + [2 \cdot 0] \} = 2 \cdot \{ -6 + 0 \} = -12$$

OSTALI ELEMENTI PRVOG REDKA SU NULA I UKUPNO DAJU NULA

Popuniti odmah! Ivan Colić

IME I PREZIME: Ivan Colić **BROJ INDEKSA:** 3709

DATUM: 21.2.2012. VRIJEME: OD DO

MATEMATIKA 1: Trajanje 120 minuta. Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata.

2 Broj ↓ bodova

1. Odrediti determinantu matrice $A = \begin{bmatrix} 1 & 2 & 0 & 0 & 0 \\ 2 & 1 & 0 & 2 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 2 & 0 & 1 & 2 \\ 0 & 0 & 0 & 2 & 1 \end{bmatrix}$ ~~20~~

2. Odrediti domenu i sve asimptote funkcije $f(x) = x - \sqrt{x^2 - x}$ ~~6+7+7~~

3. Ispitati konvergenciju reda $\sum \left(\frac{3n+3}{\frac{1}{n} + 2n} \right)^n$ 20

4. Ispitati domenu, (ne)parnost i drugu derivaciju funkcije $g(x) = \ln(x^2+1)$. 6+4+10

5. Na temelju ispitivanja toka funkcije napraviti skicu grafa funkcije $f(x) = \frac{x^2+1}{x+1}$. ~~20~~

1.

$$\begin{bmatrix} 1 & 2 & 0 & 0 & 0 \\ 2 & 1 & 0 & 2 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 2 & 0 & 1 & 2 \\ 0 & 0 & 0 & 2 & 1 \end{bmatrix} = 1 \cdot \begin{bmatrix} 2 & 1 & 0 & 0 \\ 2 & 1 & 2 & 0 \\ 0 & 2 & 1 & 2 \\ 0 & 0 & 2 & 1 \end{bmatrix} = 1 + \left(2 \cdot \begin{bmatrix} 1 & 2 & 0 \\ 2 & 1 & 2 \\ 0 & 2 & 1 \end{bmatrix} + 2 \cdot \begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 2 \\ 0 & 2 & 1 \end{bmatrix} \right)$$

$$= 1 + (2 \cdot 4 + 2 \cdot (4)) = 1 + [8 - 8] = 1$$

$$\begin{bmatrix} 1 & 2 & 0 \\ 2 & 1 & 2 \\ 0 & 2 & 1 \end{bmatrix} \begin{matrix} 1 & 2 \\ 2 & 1 \\ 0 & 2 \end{matrix} = 1 + 4 + 0 - 0 - 0 - 1$$

$$= \cancel{1} + 4 - \cancel{1}$$

$$= 4$$

$$\begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 2 \\ 0 & 2 & 1 \end{bmatrix} \begin{matrix} 1 & 0 \\ 2 & 1 \\ 0 & 2 \end{matrix} \cancel{= 1 + 0 + 0 - 0 - 0 - 1}$$

$$= 0$$

$$R = 1$$

$$1 \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix} = 1 \cdot (-3) = -4$$

(2)

$f(x) = x - \sqrt{x^2 - x}$ $D(f) = \cancel{[0,+\infty)}\ (-\infty, 0] \cup [1, +\infty)$

$\geq 0 \Rightarrow x^2 - x \geq 0$

$f(1) = 1 - \sqrt{1-1}$

$f(1) = 1 - 0 = 1$

$f(-1) = -1 - \sqrt{(1)-(-1)}$

$= -1 - \sqrt{2}$

$= -2.41$

$f(0) = 0 - \sqrt{0-0}$

$f(0) = 0$

$f(3) = 3 - \sqrt{3^2 - 3}$

$= 3 - \sqrt{9-3}$

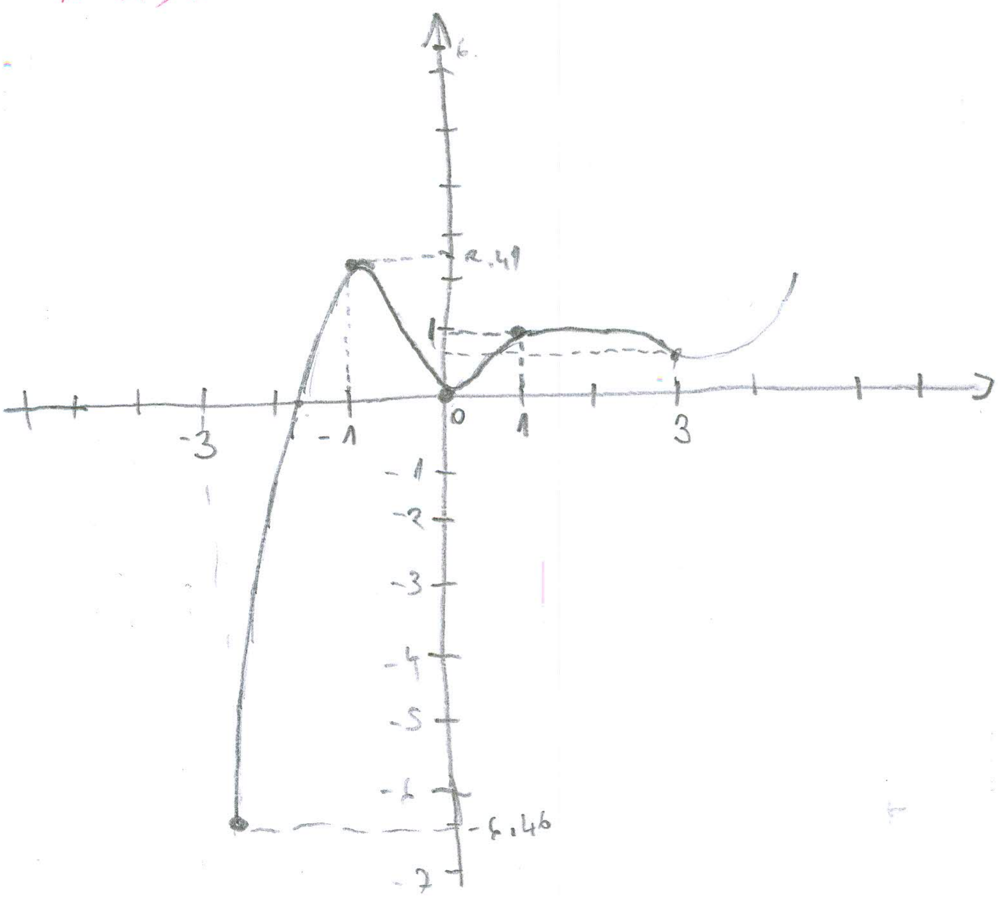
$= 3 - \sqrt{6}$

$= 0.55$

$f(-3) = -3 - \sqrt{9+3}$

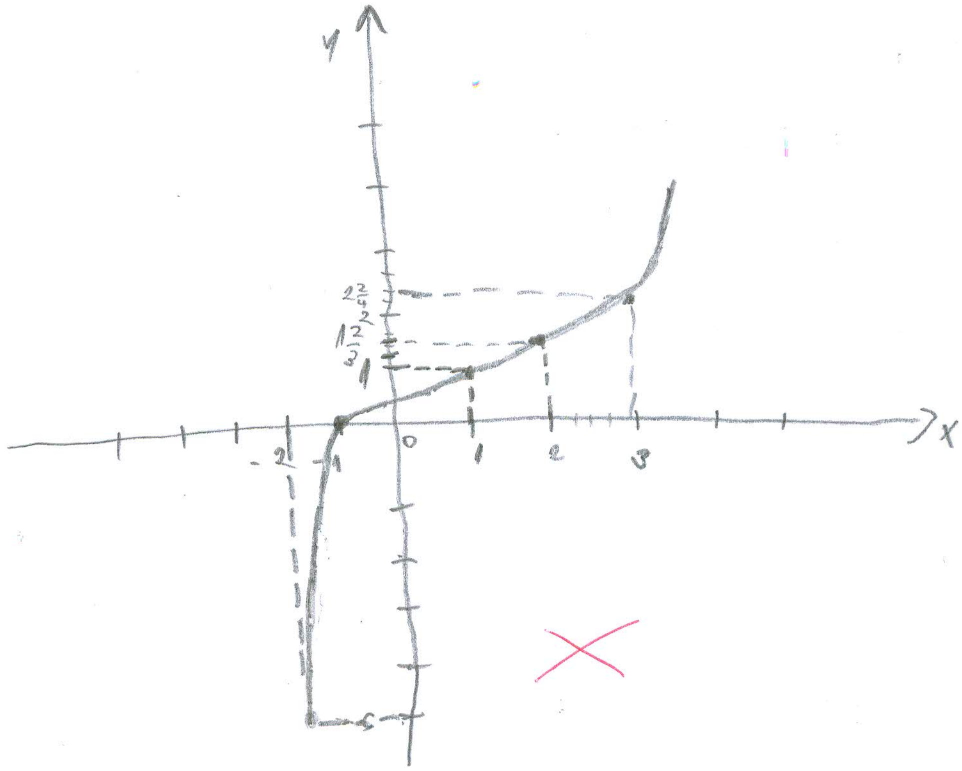
$= -3 - \sqrt{12}$

$= -6.46$



$D = \langle -\infty, -1.7 \rangle \cup \langle -1.7, 0 \rangle \cup \langle 0, +\infty \rangle$

⑤ $f(x)=\frac{x^2+1}{x+1}$



$f(1)=\frac{1^2+1}{1+1}$

$f(1)=1$

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

$f(2)=\frac{5}{3}=1\frac{2}{3}$

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

$f(-1)=0$

$f(-2)=-\frac{5}{1}$

$f(-2)=-5$

$f(0)=\frac{0+1}{0+1}$

$f(0)=1$

$f(3)=\frac{10}{4}$

$f(3)=2\frac{2}{4}$

Popuniti odmah!
Ime i prezime: DENIS ČOVIĆ **Broj indeksa:** 17-2-0030-10
Datum: 21.2.2012. **Vrijeme:** od do .
MATEMATIKA 1: Trajanje 120 minuta. Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata.

0

	Broj ↓ bodova
1. Odrediti determinantu matrice $A = \begin{bmatrix} 1 & 2 & 0 & 0 & 0 \\ 2 & 1 & 0 & 2 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 2 & 0 & 1 & 2 \\ 0 & 0 & 0 & 2 & 1 \end{bmatrix}$	20
2. Odrediti domenu i sve asimptote funkcije $f(x) = x - \sqrt{x^2 - x}$	6+7+7
3. Ispitati konvergenciju reda $\sum \left(\frac{3n+3}{\frac{1}{n} + 2n} \right)^n$	20
4. Ispitati domenu, (ne)parnost i drugu derivaciju funkcije $g(x) = \ln\left(x^2 + 1\right)$.	6+4+10
5. Na temelju ispitivanja toka funkcije napraviti skicu grafa funkcije $f(x) = \frac{x^2+1}{x+1}$.	20

1.
$$\begin{bmatrix} 1 & 2 & 0 & 0 & 0 \\ 2 & 1 & 0 & 2 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 2 & 0 & 1 & 2 \\ 0 & 0 & 0 & 2 & 1 \end{bmatrix}$$

17-2-0062-2010

Popuniti odmah!

Ime i prezime: IVAN STOJANOV **Broj indeksa:** 0269031670

Datum: 21.2.2012. Vrijeme: od 13:05 do .

MATEMATIKA 1: Trajanje 120 minuta. Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata.

2 Broj ↓ bodova 1

1. Odrediti determinantu matrice $A = \begin{bmatrix} 1 & 2 & 0 & 0 & 0 \\ 2 & 1 & 0 & 2 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 2 & 0 & 1 & 2 \\ 0 & 0 & 0 & 2 & 1 \end{bmatrix}$ 20
2. Odrediti domenu i sve asimptote funkcije $f(x) = x - \sqrt{x^2 - x}$ 6+7+7
3. Ispitati konvergenciju reda $\sum \left(\frac{3n+3}{\frac{1}{n}+2n}\right)^n$ 20
4. Ispitati domenu, (ne)parnost i drugu derivaciju funkcije $g(x) = \ln(x^2+1)$. 6+4+10
5. Na temelju ispitivanja toka funkcije napraviti skicu grafa funkcije $f(x) = \frac{x^2+1}{x+1}$. 20

(2.) $f(x) = x - \sqrt{x^2 - x}$

$\cancel{f(2) = 2 - \sqrt{2^2 - 2}}$

$\cancel{f(2) = 2 - \sqrt{4-2}}$

$\cancel{f(2) = 2 - \sqrt{2}}$

$x^2 - x \neq 0$ 2

$x \neq 1$

$D_f: \mathbb{R} \setminus \{1\}$

$\lim_{x\to 0^+} f(x) = x - \sqrt{x^2 - x} = 0 = x - \sqrt{x^2 - x} \,/ : x^2 = \frac{1}{x} - \sqrt{1 - \frac{1}{x}} = -\sqrt{1}$

$\lim_{x\to 0^-} f(x) = x - \sqrt{x^2 - x} = 0 = x - \sqrt{x^2 - x} \,/ : x^2 = \frac{1}{x} - \sqrt{1 - \frac{1}{x}} = -(-\sqrt{1}) = \sqrt{1}$

$\lim_{x\to \infty^+} f(x) = x - \sqrt{x^2 - x} = [+\infty - \infty] = 0$

$\lim_{x\to \infty^-} f(x) = x - \sqrt{x^2 - x} = [-\infty] = -\infty$

(3.) $\sum\left(\frac{3n+3}{\frac{1}{n}+2n}\right)^n = \lim \sum\left(\frac{3n+3}{\frac{1}{n}+2n}\right)^n = \lim\left(\frac{3n+3}{2n}\right)^n = \lim\left(\frac{3n+3/:n}{2n/:n}\right)^n$

$\lim\left(\frac{\frac{3n}{n}+\frac{3}{n}}{\frac{2n}{n}}\right)^n = \left(\frac{3}{2}\right)^n \Rightarrow 0$, red divergira

(4.) $g(x) = \ln(x^2+1)$

$g'(x) = \ln' \cdot (x^2+1) + \ln \cdot (x^2+1)'$

$g'(x) = \log a \cdot (x^2+1) + \ln \cdot 2x$

$g''(x) = \log a(x^2+1) + \ln 2x$

$g''(x) = (\log a(x^2+1))' + (\ln 2x)'$

$g''(x) = \ln 2x + \log a$

5.

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

$x+1\neq 0$

$x\neq -1$

$Df: \mathbb{R}\setminus\{-1\}$

$f(1)=\frac{1^2+1}{1+1}=\frac{2}{2}=1$

$\cancel{f(-1)=(-1)^2+1}$

$\cancel{f(-2)=\frac{(-2)^2+2}{-2+1}=\frac{6}{-1}}=-6$

$\cancel{Kf: \langle\quad\rangle \cup \langle 1}$

$Kf: [-\infty, 1\rangle \cup \langle -1, +\infty\rangle$

$\cancel{\lim_{x\to 0^+}(x)=\frac{1}{1}=1=+\infty}$

$\cancel{\lim_{x\to 0^-}(x)=-1}$

$\lim_{x\to -\infty}(x)=\frac{x^2+1\ /:x^2}{x+1\ /:x^2}$

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

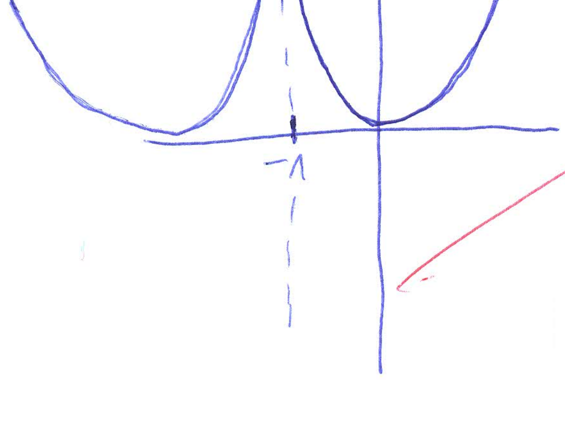
$\lim_{x\to 2^+}(x)=+\infty$

$\lim_{x\to 2^-}(x)=-\infty$

$\lim_{x\to +\infty}(x)=+\infty$

$\lim_{x\to -\infty}(x)=\frac{+\infty}{-\infty}=$ neodređen oblik

$\lim_{x\to -\infty}(x)=-\infty$



1.

$$A = \begin{bmatrix} 1 & 2 & 0 & 0 & 0 \\ 2 & 1 & 0 & 2 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 2 & 0 & 1 & 2 \\ 0 & 0 & 0 & 2 & 1 \end{bmatrix} \sim (-1) \cdot \frac{\cancel{}}{\det A} \sim \begin{vmatrix} 1 & 2 & 0 & 0 & 0 \\ 2 & 1 & 0 & 2 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 2 & 0 & 1 & 2 \\ 0 & 0 & 0 & 2 & 1 \end{vmatrix}$$

$$(-1) \cdot \frac{1}{\det A} \quad \left| 1 \cdot \begin{vmatrix} 1 & 0 & 2 & 0 \\ 0 & 1 & 0 & 0 \\ 2 & 0 & 1 & 2 \\ 0 & 0 & 2 & 1 \end{vmatrix} - 2 \cdot \begin{vmatrix} 2 & 0 & 2 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 2 \\ 0 & 0 & 2 & 1 \end{vmatrix} \right| = \left| 1 \cdot \right| 1 \cdot \begin{vmatrix} 1 & 0 & 0 \\ 0 & 1 & 2 \\ 0 & 2 & 1 \end{vmatrix} +$$

$$2 \cdot \begin{vmatrix} 0 & 1 & 0 \\ 2 & 0 & 2 \\ 0 & 0 & 1 \end{vmatrix} \Big| - 2 \cdot \left| 2 \cdot \begin{vmatrix} 1 & 0 & 0 \\ 0 & 1 & 2 \\ 0 & 2 & 1 \end{vmatrix} + 2 \cdot \begin{vmatrix} 0 & 1 & 0 \\ 0 & 0 & 2 \\ 0 & 0 & 1 \end{vmatrix} \right| \Big| = \Big| 1 \cdot \Big| 1 \cdot \Big| 1 \cdot \begin{vmatrix} 1 & 2 \\ 2 & 1 \end{vmatrix}$$

$$+ 2 \cdot \Big| -1 \cdot \begin{vmatrix} 2 & 2 \\ 0 & 1 \end{vmatrix} \Big| - 2 \Big| 2 \cdot \Big| 1 \begin{vmatrix} 1 & 2 \\ 2 & 1 \end{vmatrix} + 2 \cdot \Big| -1 \cdot \begin{vmatrix} 0 & 2 \\ 0 & 1 \end{vmatrix} \Big| \Big| \Big| =$$

$$\Big| 1 \cdot \Big| 1 \cdot \Big| 1 \cdot \Big| (1 \cdot 1) - (2 \cdot 2) \Big| + 2 \cdot \Big| -1 \cdot \Big| (2 \cdot 1) - (2 \cdot 0) \Big| - 2 \cdot \Big| 2 \cdot \Big| 1 \cdot \Big| (1 \cdot 1) -$$

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

$$\Big| 1 \cdot \Big| 1 \cdot \Big| 1 \cdot (-3) \Big| + 2 \cdot \Big| -1 \cdot 2 \Big| - 2 \cdot \Big| 2 \cdot \Big| 1 \cdot (-3) \Big| - 2 \Big| 2 \Big| 1 \cdot$$

$$(-3) \Big| \cancel{+ 2 \cdot \Big| -1 \cdot 0 \Big|} \Big| = \Big| -3 + (-4) \Big| - 2 \cdot \Big| 2 \cdot (-3) \Big| - 2 \cdot \Big| 2 \cdot (-3) \Big|$$

$$= \Big| -7 \Big| - 2 \cdot (-6) \Big| - 2 \cdot (-6) \Big| \Big| = \Big| -7 \cdot (-18) \Big| \cdot (-18) \Big| = \cancel{-2268}$$

$$\cancel{(-1) \cdot \Big| (- \tfrac{1}{}} \qquad (-1) \cdot (-2268) = 2268$$

Popuniti odmah!

Ime i prezime: ANDRIJA PAVIN **Broj indeksa:** 17-2-0128-204

Datum: 21.2.2012. Vrijeme: od 13:00 do .

MATEMATIKA 1: Trajanje 120 minuta. Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. 2

0

Broj ↓ bodova

1. Odrediti determinantu matrice $A = \begin{bmatrix} 1 & 2 & 0 & 0 & 0 \\ 2 & 1 & 0 & 2 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 2 & 0 & 1 & 2 \\ 0 & 0 & 0 & 2 & 1 \end{bmatrix}$ 20
2. Odrediti domenu i sve asimptote funkcije $f(x) = x - \sqrt{x^2 - x}$ 6+7+7
3. Ispitati konvergenciju reda $\sum \left(\frac{3n+3}{\frac{1}{n} + 2n} \right)^n$ 20
4. Ispitati domenu, (ne)parnost i drugu derivaciju funkcije $g(x) = \ln(x^2 + 1)$. 6+4+10
5. Na temelju ispitivanja toka funkcije napraviti skicu grafa funkcije $f(x) = \dfrac{x^2+1}{x+1}$. 20

1.

$\det A = (1\cdot1\cdot1\cdot1\cdot1) + (2\cdot0\cdot0\cdot2\cdot0) + (0\cdot2\cdot0\cdot0\cdot0) + (0\cdot0\cdot0\cdot2\cdot0) +$

$+ (0\cdot2\cdot0\cdot0\cdot2) - (0\cdot2\cdot1\cdot2\cdot0) - (0\cdot0\cdot0\cdot0\cdot1) - (0\cdot1\cdot0\cdot2\cdot2) -$

$(2\cdot2\cdot0\cdot1\cdot0) - (1\cdot0\cdot0\cdot0\cdot0) = 1$

2. $f(x) = x - \sqrt{x^2 - x}$

$x \neq 0$

$D f \mathbb{R} \{0\}$

5. $f(x) = \dfrac{x^2+1}{x+1}$

1. DOMENA $x+1=0$

$x \neq -1$

2. NULTOČKE $x^2+1=0$

$x^2 = 1$

$x_{1,2} = \pm 1$

3. ASIMPTOTE

V. A. $x_1 \neq 0 \quad x_2 \neq -1$

H. A. $\lim\limits_{x \to \infty} \frac{x^2+1 /: x^2}{x+1 /: x^2} = \frac{1 + \frac{1}{x^2}}{\frac{1}{x} + \frac{1}{x^2}} = \frac{1}{0} = \infty$

K. A. $\lim\limits_{x \to \infty} \left(\frac{\frac{x^2+1}{x+1}}{\frac{x}{1}} \right) = \frac{x^2+1 /: x^2}{x^2+x /: x^2} = \frac{1 + \frac{1}{x^2}}{1 + \frac{1}{x}} = \frac{1}{1} = 1$