Popuniti odmah!

IME I PREZIME: Toma Medić BROJ INDEKSA: 17-2-0052 (62)

DATUM: 28.04.2019 VRIJEME: OD 13:35 DO .

MATEMATIKA 1: Trajanje 100 minuta. Zabranjen je razgovor sa drugim studentima. ZADATKE RIJEŠAVATE JEDNOSTRANO NA PAPIRE KOJE DOBIJETE OD NASTAVNIKA. xoxo

Broj ↓ bodova

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

2. Odrediti domenu i sve asimptote funkcije $f(x) = x + \sqrt{x^2 + x + 1}$ 0

3. Ispitati konvergenciju reda $\sum \left(\frac{n^2 + 4n + 4}{2n + 2n^2} \right)^{2n}$ 20

4. Ispitati domenu, periodičnost, parnost i prvu derivaciju funkcije $g(x) = \ln(\sin(3x))$. 7

5. Na temelju ispitivanja toka funkcije napraviti skicu grafa funkcije $h(x) = \frac{x^2 + 2}{x^2 + 1}$. 15

3.) $\sum_{n=1}^{\infty} \left(\frac{n^2+4n+4}{2n+2n^2} \right)^{2n}$ CAUCHY $L = \lim_{n\to\infty} \sqrt[n]{a_n}$

$L = \lim_{n\to\infty} \sqrt[n]{\left(\frac{n^2+4n+4}{2n+2n^2}\right)^{2n}} = \lim_{n\to\infty} \frac{(n^2+4n+4)^{2}}{(2n+2n^2)^{2}} = \lim_{n\to\infty} \frac{\left(1+\frac{4}{n}+\frac{4}{n^2}\right)^{2}}{\left(\frac{2}{n}+2\right)^{2}} = \frac{(1)^2}{(2)^2} = \frac{1}{4}$

$L < 1$ RED KONVERGIRA ✓ 20

$\frac{1}{4} < 1$

4.) $y(x) = \ln(\sin(3x))$

3° DERIVACIJA

$f'(x) = \frac{1}{\sin(3x)} \cdot \cos 3x \cdot 3$ ✓

1° DOMENA $D(f) = \langle 0, \infty \rangle$

$\sin(3x) > 0$

$3x > 0$

$x > 0$ ✗

$f'(x) = \frac{\cos 3x}{\sin 3x} \cdot 3$

$f'(x) = 3 \cot 3x$ 7

2° PARNOST

$g(x) = \ln(\sin(3x))$

$g(-x) = \ln(\sin(-3x))$ ✗

$g(-x) = -\ln(\sin(3x))$

$f(x) = -f(x)$

NEPARNA

1° PERIODIČNOST

NIJE PERIODIČNA

VIDI SKIĆ

IME I PREZIME: Toma Medić BROJ INDEKSA: 17-2-0032

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

$x^2+x+1 \geq 0$ $\quad \mathcal{D}(f) = \mathbb{R}$ VIDI ŠIKIĆ

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

$x_{1,2} = \frac{-1 \pm \sqrt{-3}}{2}$

NIJE ZADOVOLJEN UVJET DOMENE

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

$= 1\left[1\begin{bmatrix} 1 & 2 & 0 \\ 1 & 1 & 2 \\ 0 & 1 & 1 \end{bmatrix} - 2\begin{bmatrix} 1 & 2 & 0 \\ 0 & 1 & 2 \\ 0 & 1 & 1 \end{bmatrix}\right] - 2\left[1\begin{bmatrix} 1 & 2 & 0 \\ 1 & 1 & 2 \\ 0 & 1 & 1 \end{bmatrix}\right] =$

$= 1\left[1\left[1\begin{pmatrix} 1 & 2 \\ 1 & 1 \end{pmatrix} - 2\begin{pmatrix} 1 & 2 \\ 0 & 1 \end{pmatrix}\right] - 2\left[1\begin{pmatrix} 1 & 2 \\ 1 & 1 \end{pmatrix}\right]\right] - 2\left[1\left[1\begin{pmatrix} 1 & 2 \\ 1 & 1 \end{pmatrix} - 2\begin{pmatrix} 1 & 2 \\ 0 & 1 \end{pmatrix}\right]\right] =$

$= 1\left[1\left[1(-1) - 2(1)\right] - 2\left[1(-1)\right]\right] - 2\left[1\left[1(-1) - 2(1)\right]\right] =$

$= 1\left[1[-3] - 2[-1]\right] - 2\left[1[-3]\right]$

$= 1[-3+2] - 2[-3] = -1+6 = 5$

20

IME I PREZIME: Toma Medić BROJ INDEKSA: 17-2-0052

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

1° DOMENA $D(f)=\mathbb{R}$

2° PARNOST

$h(x)=\frac{6x^2+2}{x^2+1}$

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

3° PERIODIČNOST
NIJE PERIODIČNA

4° NULTOČKE NEMA NULTOČAKA

$f(x)=0$

$x^2+2=0$

$x^2=-2$

$x=\sqrt{-2}$

$x=2i$

5° ASIMPTOTE

a) VERTIKALNIH ASIMPTOTA NEMA JER JE DOMENA FUNKCIJE $\mathbb{R}$

b) HORIZONTALNE ASIMPTOTE

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

$\frac{\sim}{\sim}=1$

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

c) KOSIH ASIMPTOTA NEMA JER IMAMO HORIZONTALNU

IME I PREZIME: Toma Mudić BROJ INDEKSA: 17-2-0052

6° EKSTREMI

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

$6x=0$

$x=0$

POTENCIJALNI EKSTREM

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

$$f''(x)=\frac{6(x^2+1)-24x^2}{(x^2+1)^3}$$

$$f''(x)=\frac{6x^2+6-24x^2}{(x^2+1)^3}$$

$$f''(x)=\frac{-18x^2+6}{(x^2+1)^3}$$

$$f''(0)=\frac{6}{1}=6$$

7° INTERVALI MONOTONOSTI

x	$-\infty$		0		∞
$f'(x)$		$+$	0	$-$	
$f(x)$		$\nearrow$	L.max	$\searrow$	

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

$M(0,2)$

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

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

8° INTERVALI ZAKRIVLJENOSTI

x	$-\infty$		0		∞
$f''(x)$		$+$	0	$-$	
$f(x)$		$\cup$		$\cap$	

$$f''(-1)=\frac{-18+6}{(1+1)^3}=\frac{-12}{8}=-\frac{3}{2}$$

$$f''(1)=\frac{-18+6}{(1+1)^3}=\frac{-12}{8}=-\frac{3}{2}$$

NEMA TOČAKA ZAKRIVLJENOSTI

$f''(x)$ IMA POZITIVAN NAZIVNIK

PREDZNAK $f'(x)$ OVISI O BROJNIKU

GDJE JE $-2+8x^2\gtrless 0$?

GDJE JE $-2+8x^2=0$

$\Rightarrow x=\pm\frac{1}{2}$

x	$-\infty$		$-\frac{1}{2}$		$\frac{1}{2}$		$+\infty$
$f'(x)$		$+$	0	$+$	0	$+$	
$f(x)$		$\nearrow$		$\searrow$		$\nearrow$	

$f''(x)=0$

$-2+8x^2=0$

$8x^2=2$

$x^2=\frac{1}{4}$

$x=\pm\frac{1}{2}$

IME I PREZIME: Toma Mioković

BROJ INDEKSA: 17-2-0032

5° Glat

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

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

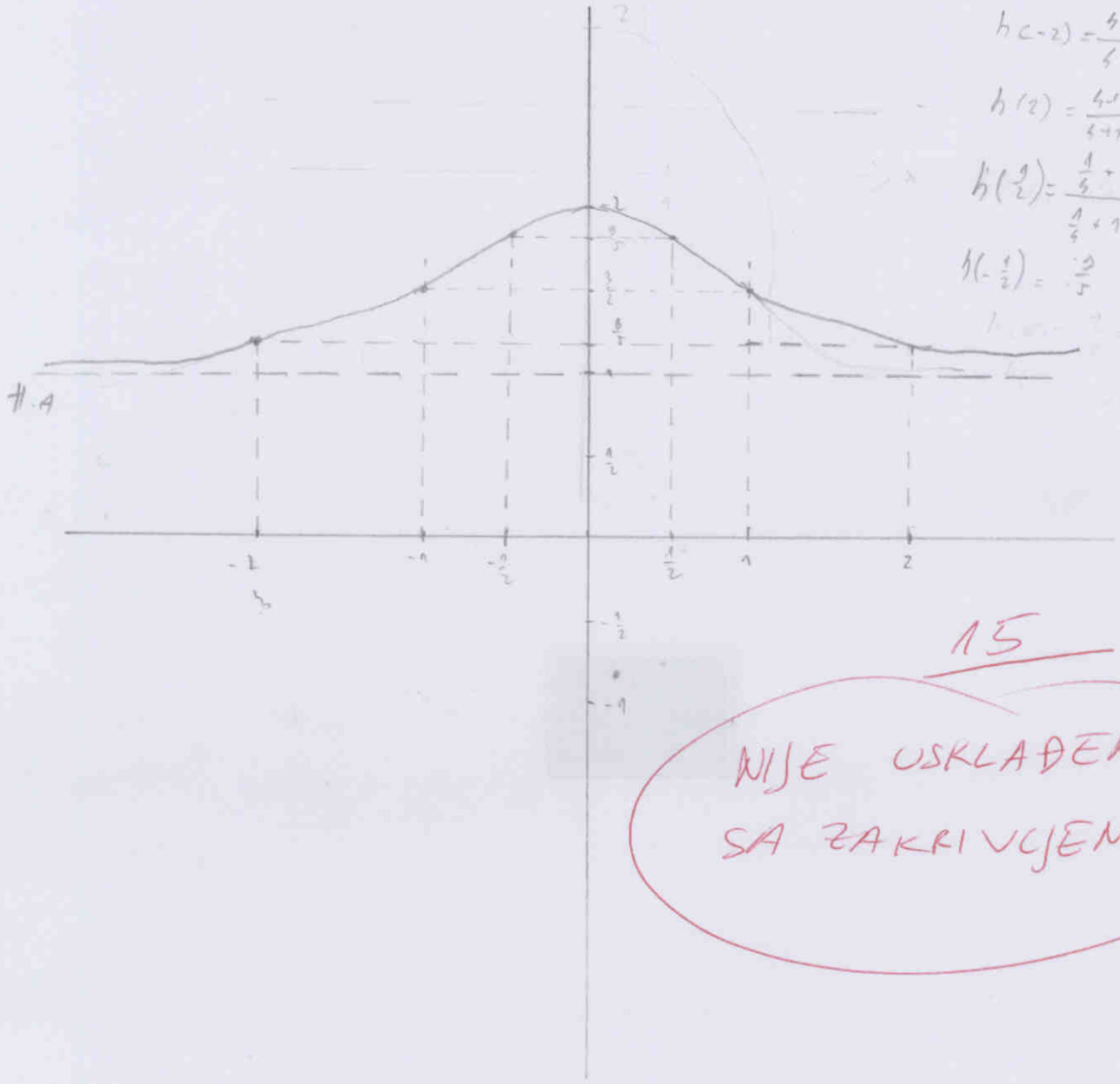
$h(-1) = \frac{1+2}{1+1} = \frac{3}{2}$

$h(-2) = \frac{4+2}{4+1} = \frac{6}{5}$

$h(2) = \frac{4+2}{4+1} = \frac{6}{5}$

$h\left(\frac{1}{2}\right) = \frac{\frac{1}{4}+2}{\frac{1}{4}+1} = \frac{\frac{9}{4}}{\frac{5}{4}} = \frac{9}{5}$

$h\left(-\frac{1}{2}\right) = \frac{9}{5}$



15

NIJE USKLAĐENO SA ZAKRIVLJENOSTI

Popuniti odmah!

IME I PREZIME: IVAN ŠKIĆ

BROJ INDEKSA: 17-1-0014-2010 (57)

DATUM: 28.4.2011 VRIJEME: OD 13 55 DO 16 20

MATEMATIKA 1: Trajanje 100 minuta. Zabranjen je razgovor sa drugim studentima. ZADATKE RIJEŠAVATE JEDNOSTRANO NA PAPIRE KOJE DOBIJETE OD NASTAVNIKA.

xoxo

Broj ↓ bodova

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

2. Odrediti domenu i sve asimptote funkcije $f(x) = x + \sqrt{x^2 + x + 1}$ 20 ∅

3. Ispitati konvergenciju reda $\sum \left(\frac{n^2 + 4n + 4}{2n + 2n^2} \right)^{2n}$

4. Ispitati domenu, periodičnost, parnost i prvu derivaciju funkcije $g(x) = \ln(\sin(3x))$. 7

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

1. $A = \begin{bmatrix} 1 & 2 & 0 & 0 & 0 \\ 1 & 1 & 2 & 0 & 0 \\ 0 & 1 & 1 & 2 & 0 \\ 0 & 0 & 1 & 1 & 2 \\ 0 & 0 & 0 & 1 & 1 \end{bmatrix}$ 1.R. 1.S.

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

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

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

$-1 - 2$ (−3) (+2) (+6)

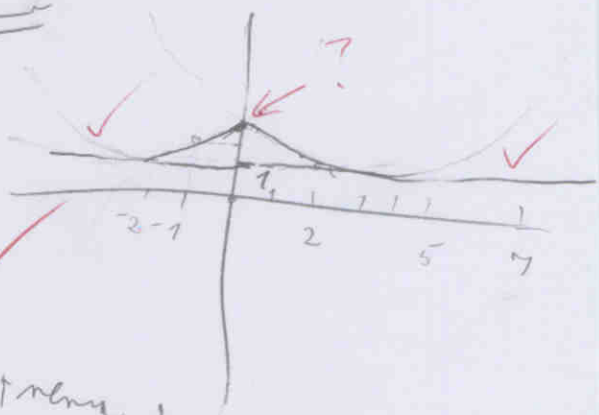
$-1(0 - 0) \Big| = 1 \cdot (-1) + 6 = 5$ ✓ 20

28.4.2010.

IME I PREZIME: IVAN ŠIKIĆ

BROJ INDEKSA: 17-1-0014-2010

5. $f(x)=\frac{x^2+2}{x^2+1}$, $D_f=\mathbb{R}$ ✓ $\quad x^2+1>0$



f-ija nije periodična, ne sadrži trig. f-ije, nije neparna, parna je. ✓

Rastuća funkcija, nema prekida, nema V. A. ✓

$$\lim_{x\to 0}\frac{x^2+2}{x^2+1}=\frac{2}{1}=2$$

D.H.A. $\lim_{x\to+\infty}\frac{x^2+2}{x^2+1}=\frac{\infty}{\infty}=\frac{x^2+2\,/:x^2}{x^2+1\,/:x^2}=\frac{1}{1}=1$ ✓

L.H.A. $\lim_{x\to-\infty}\frac{(-x)^2+2}{(-x)^2+1}=\frac{\infty}{\infty}=1$ ✓

10

VIDI

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

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

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

$$=\frac{8x^4+8x^2-2x^4-4x^2-2}{(x^2+1)^4}=\frac{6x^4+4x^2-2}{(x^2+1)^4}$$

28.4.2011.

IME I PREZIME: IVAN ŠIKIĆ BROJ INDEKSA: 17-1-0014-2010

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

$D(f) = \mathbb{R}$ ✓

1. D.H.A.

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

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

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

NEMA D.H.A., MOŽDA IMA DESNU KOSU. ✓

28.4.2011.

IME I PREZIME: IVAN ŠIKIĆ BROJ INDEKSA: 17-1-0014-2010

NASTAVAK.

2. L.H.D.

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

$$= \lim_{\substack{x\to-\infty \\ +\infty}} \frac{x^2-x^2+x+1}{-x-\sqrt{x^2-x+1}} = \lim_{\substack{x\to-\infty \\ +\infty}} \frac{+x-1 \;/:x}{-x-\sqrt{x^2-x+1}\;/:x} = \lim_{\substack{x\to-\infty \\ +\infty}} \frac{1+\frac{1}{x}}{-1-\sqrt{1-\frac{1}{x}+\frac{1}{x^2}}} =$$

$$= \lim_{\substack{x\to-\infty \\ +\infty}} \frac{-1}{-2} = -\frac{-1}{2} \text{ je L.H.A.} \checkmark$$

D.K.A.

$$\lim_{x\to\infty}\left(\frac{f(x)}{x}\right) \Rightarrow \lim_{x\to\infty} \frac{x+\sqrt{x^2+x+1}}{x} \Rightarrow \lim_{x\to\infty}\left(1+\frac{\sqrt{x^2+x+1}}{x}\right)$$

$$= 1+\lim_{x\to\infty} \frac{\sqrt{x^2+x+1}\;/^2}{x\;/^2} = 1+\lim_{x\to\infty} \frac{x^2+x+1\;/:x^2}{x^2\;/:x^2} =$$

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

$$\underline{k=2} \checkmark$$

$$\boxed{y=kx+l}$$

$$\lim_{x\to\infty}\left(\underbrace{f(x)-kx}_{l}\right) = \lim_{x\to\infty}\left(x+\sqrt{x^2+x+1}-2x\right) =$$

$$\lim_{x\to\infty}\left(-x+\sqrt{x^2+x+1}\right) = \lim_{x\to\infty} -x+\sqrt{x^2+x+1} \cdot \frac{-x-\sqrt{x^2+x+1}}{-x-\sqrt{x^2+x+1}}$$

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

$$= \lim_{x\to\infty} \frac{-1}{-2} = \boxed{\frac{1}{2}}$$

$$\boxed{y=2x+\frac{1}{2}} \Rightarrow \text{DESNA KOSA ASIMPT} \checkmark$$

20

28.4.2011.

IME I PREZIME: IVAN ŠIKIĆ BROJ INDEKSA: 17-1-0014-2010

2. V.A.

$x^2+x+1=0$

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

$x_{1,2} = \frac{-1 \pm \sqrt{-3}}{2}$, ali ijo nema rešenja u R, nema V.A. ✓

3. $\sum \left(\frac{n^2+4n+4}{2n+2n^2} \right)^{2n} =$

$\left(1+\frac{1}{n}\right)^n$

$n^2+4n+4 \Rightarrow (n+2)^2$

$2n+2n^2 \Rightarrow (n+1)2n$

$\lim_{n\to\infty} \frac{(n+2)^2}{(n+1)2n}$

$(n+1)(n+1)$

n^2+2n+1

?

28.4. 2011.

IME I PREZIME: IVAN ĆIKIĆ BROJ INDEKSA: 17-1-0014-2010

4. $g(x) = \ln(\sin 3x)$

$\sin x \Rightarrow$ NEPARNA F-ija ?

$D_f(\sin x) = \mathbb{R}$, $R_f = \left[-\frac{\pi}{2}+k\pi, \frac{\pi}{2}+k\pi\right]$

$D_f(\ln x) = \langle 0, +\infty \rangle$

$D_f(\ln(\sin 3x)) = \left[-\frac{3\pi}{2}+3k\pi, +\infty\right\rangle$ ✗ $k \in \mathbb{Z}$

$\sin 3x > 0$ | $\sin\frac{3\pi}{2} > 0$

Funkcija je periodična, sadrži trig. f-iju u slici.

NIJE PARNA, NITI NEPARNA

PERIOD?

$g(x) = \ln(\sin(3x))$

$f(x) = \sin 3x$

$f'(x) = \cos 3x \cdot 3$

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

7

$g'(x) = \frac{1}{\sin 3x} \cdot \cos 3x \cdot 3 = \frac{3\cos 3x}{\sin 3x}$ ✓

$= 3 \operatorname{ctan} 3x$

NEPARNOST: DA LI JE $f(x) = -f(-x)$

ILI $-f(x) = f(-x)$

NPR ZA $x=1$: $-f(1) = f(-1)$?

PERIOD: $\sin x = \sin(x+2\pi)$

$\sin 3x = \sin(3x+2\pi) = \sin\left(3\left(x+\frac{2\pi}{3}\right)\right)$

$\Rightarrow f(x) = f\left(x+\frac{2\pi}{3}\right) \Rightarrow P = \frac{2\pi}{3}$

28. 9. 2010

IME I PREZIME: IVAN ŠIKIĆ

BROJ INDEKSA: 17.1-0014-2010

Popuniti odmah!

IME I PREZIME: Hatega Ććarić BROJ INDEKSA: 17-0032-2010 (53)

DATUM: 28.04.2011. VRIJEME: OD 13:45 DO

MATEMATIKA 1: Trajanje 100 minuta. Zabranjen je razgovor sa drugim studentima. ZADATKE RIJEŠAVATE JEDNOSTRANO NA PAPIRE KOJE DOBIJETE OD NASTAVNIKA.

xoxo

Broj ↓ bodova

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

2. Odrediti domenu i sve asimptote funkcije $f(x) = x + \sqrt{x^2 + x + 1}$ 7

3. Ispitati konvergenciju reda $\sum \left(\frac{n^2 + 4n + 4}{2n + 2n^2} \right)^{2n}$ 5

4. Ispitati domenu, periodičnost, parnost i prvu derivaciju funkcije $g(x) = \ln(\sin(3x))$. 11

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

1

$$A = \begin{bmatrix} +1 & 2 & 0 & 0 & 0 \\ -1 & 1 & 2 & 0 & 0 \\ 0 & 1 & 1 & 2 & 0 \\ 0 & 0 & 1 & 1 & 2 \\ 0 & 0 & 0 & 1 & 1 \end{bmatrix} = 1 \begin{bmatrix} +1 & 2 & 0 & 0 \\ -1 & 1 & 2 & 0 \\ +0 & 1 & 1 & 2 \\ -0 & 0 & 1 & 1 \end{bmatrix} - 1 \begin{bmatrix} +2 & 0 & 0 & 0 \\ -1 & 1 & 2 & 0 \\ +0 & 1 & 1 & 2 \\ -0 & 0 & 1 & 1 \end{bmatrix} = -1+6 = 5 \checkmark$$

20

$$\begin{bmatrix} +1 & 2 & 0 & 0 \\ -1 & 1 & 2 & 0 \\ +0 & 1 & 1 & 2 \\ -0 & 0 & 1 & 1 \end{bmatrix} = 1 \begin{bmatrix} 1 & 2 & 0 \\ 1 & 1 & 2 \\ 0 & 1 & 1 \end{bmatrix} - 1 \begin{bmatrix} 2 & 0 & 0 \\ 1 & 1 & 2 \\ 0 & 1 & 1 \end{bmatrix} = 2(-1) - 1(-2) = -3 - 1(-2) = -3 + 2 = -1$$

$$\begin{bmatrix} 1 & 2 & 0 \\ 1 & 1 & 2 \\ 0 & 1 & 1 \end{bmatrix} = 1 \underbrace{\begin{vmatrix} 1 & 2 \\ 1 & 1 \end{vmatrix}}_{-1} - 1 \underbrace{\begin{vmatrix} 2 & 0 \\ 1 & 1 \end{vmatrix}}_{-2} = 1 \underbrace{\left((1 \cdot 1) - (2 \cdot 1) \right)}_{-1} - 1 \underbrace{\left((2 \cdot 1) - (0 \cdot 1) \right)}_{-2} = (1-2) - 1(2) = -1 - 2 = -3$$

$$\begin{bmatrix} 2 & 0 & 0 \\ 1 & 1 & 2 \\ 0 & 1 & 1 \end{bmatrix} = 2 \underbrace{\begin{vmatrix} 1 & 2 \\ 1 & 1 \end{vmatrix}}_{-1} - 1 \begin{vmatrix} 0 & 0 \\ 1 & 1 \end{vmatrix} = 2 \left((1 \cdot 1) - (2 \cdot 1) \right) - 1 \left((0 \cdot 1) - (0 \cdot 1) \right) = 2(1-2) = 2 \cdot (-1) = -2$$

IME I PREZIME: Matija Pečarić BROJ INDEKSA: 17-0032-2010

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

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

-1, 2, -1, -2, -6

$$= 2\underbrace{\Big(\underbrace{(1\cdot 1)-(2\cdot 1)}_{-1}\underbrace{-1\big((2\cdot 1)-(0\cdot 1)\big)}_{-2}\Big)}_{-3} = -6$$

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

$D(f) = \mathbb{R}$ ✓

$$\lim_{x\to+\infty} x+\sqrt{x^2+x+1}\cdot\frac{x-\sqrt{x^2+x+1}}{x-\sqrt{x^2+x+1}} = \frac{x^2-x^2+x+1}{x-\sqrt{x^2+x+1}} = \frac{x+1}{x-\sqrt{x^2+x+1}} \;/:x$$

$+\infty + \infty = +\infty$

$$= \frac{\frac{x}{x}+\frac{1}{x}}{\frac{x}{x}-\sqrt{\frac{x^2}{x^2}+\frac{x}{x^2}+\frac{1}{x^2}}} = \frac{1}{0} = +\infty$$ ✓

$$\lim_{x\to-\infty} x+\sqrt{x^2+x+1}\cdot\frac{x-\sqrt{x^2+x+1}}{x-\sqrt{x^2+x+1}} = -\infty$$ ✗ VIDI ŠIKIĆ

$$\lim \frac{x+\sqrt{x^2+x+1}}{x} \Big/ :x = \lim \frac{\frac{x}{x}+\sqrt{\frac{x^2}{x^2}+\frac{x}{x^2}+\frac{1}{x^2}}}{\frac{x}{x}} = \frac{1+1}{1} = 2 \quad k=2 \checkmark$$

$l = ?$ VIDI SLIKU

$$\lim x+\sqrt{x^2+x+1} \cdot \frac{x-\sqrt{x^2+x+1}}{x-\sqrt{x^2+x+1}} = \frac{x+1}{x-\sqrt{x^2+x+1}} + 2x = \frac{3x+1}{x-\sqrt{x^2+x+1}} \Big/ :x$$

NITI JEDNA ASIMPTOTA NIJE SASVIM ISPRAVNA

$$= \frac{\frac{3x}{x}+\frac{1}{x}}{\frac{x}{x}-\sqrt{\frac{x^2}{x^2}+\frac{x}{x^2}+\frac{1}{x^2}}}$$

$= 3 \quad y = 3$

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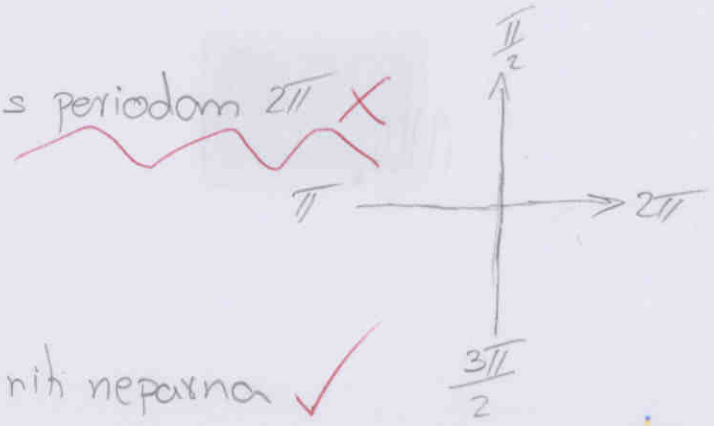
4. $f(x) = \ln(\sin(3x))$

- funkcija je periodična s periodom 2π ✗



- $f(x) = f(-x)$
  $f(x) = -f(x)$
- funkcija nije niti parna niti neparna ✓

$$f'(x) = \ln(\sin(3x))$$

$$= \frac{1}{\sin(3x)} \cdot \sin'(3x) \cdot (3x)'$$

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$$= \frac{1}{\sin(3x)} \cdot \cos 3x \cdot 3 = \frac{3\cos 3x}{\sin(3x)} \checkmark$$

$D(f) = ?$

Mateja Pečarić

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3. $\sum \left(\frac{n^2+4n+4}{2n+2n^2} \right)^{2n}$

$\lim \frac{n^2+4n+4}{2n+2n^2} = \lim \frac{n^2+4n+4}{2n^2+2n} \Big/ :n^2 = \lim \frac{\frac{n^2}{n^2} + \frac{4n}{n^2} + \frac{4}{n^2}}{\frac{2n^2}{n^2} + \frac{2n}{n^2}} \to \left(\frac{1}{2}\right)^{2n} ?$

ZAŠTO?

-konvergira

5

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

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

$f(0)=\frac{x^2+2}{x^2+1}=\frac{1}{2}$ //

$T\left(0,\frac{1}{2}\right)$

$0=\frac{x^2+2}{x^2+1}$

$x^2+2=0$

$x^2=2$

$x=\sqrt{2}$

$T(1{,}41,0)$

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

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

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

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

$=\frac{-2x}{(x^2+1)^2}$ ⇒ Amhajja pada. ?

$\frac{-2x}{(x^2+1)^2}=0 \;/\cdot(x^2+1)^2$

$-2x=0$

$x=0$ ✓

$T(0,0)$

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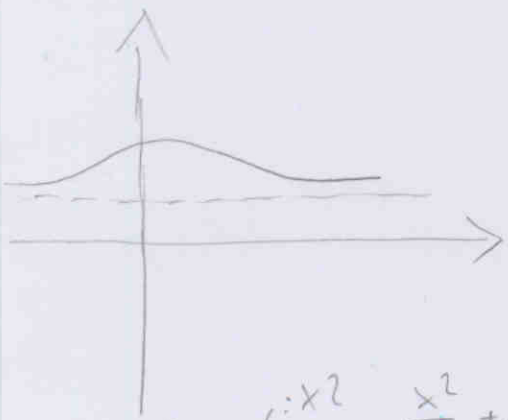
VIDI ŠIKIĆ MEDIĆ



$\lim_{x\to\infty}\frac{x^2+2}{x^2+1}\;/:x^2=\frac{\frac{x^2}{x^2}+\frac{2}{x^2}}{\frac{x^2}{x^2}+\frac{1}{x^2}}=\frac{1}{1}=1$ ✓

$\lim\frac{x^2+2}{x^2+1}=\frac{x^2+2}{x^3+x}\;/:x^3\to\lim\frac{\frac{x^2}{x^3}+\frac{2}{x^3}}{\frac{x^3}{x^3}+\frac{x}{x^3}}=\frac{0}{1}=0$?

≥ 1