

Popunite odmah!

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DATUM: 21.2.2012. VRIJEME: OD 13:05 DO 13:55

BROJ INDEKSA: 17-2-0025-2010

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

2
Broj ↓
bodova

20

6+7+7

20

6+4+10

20

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

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

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

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

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

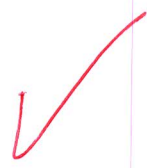
1.

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

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

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

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



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

Domena

$$x^2 + 1 > 0$$

$$x^2 > -1$$

$$x^2 > \pm 1$$



P/N

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

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

funzione PARIA

$$D(g) \setminus \{-1, 1\}$$

$$D(g) \langle -\infty, -1 \rangle \cup \langle 1, +\infty \rangle$$

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

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

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

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

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

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

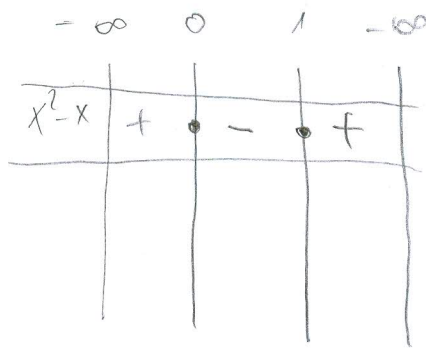
2.

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

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

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

$$x = 0 \quad x = 1$$



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

V.A.

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

$x \rightarrow 0$

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

$x \rightarrow 1$

H.A.

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

$x \rightarrow -\infty$

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

$x \rightarrow \infty$

