

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj

odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod!!

49

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BROJ INDEKSA: *17-2-0208-2012*

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

POPUNJAVA
NASTAVNIK
Broj ↓
bodova

1. Izračunati i obavezno provjeriti $\lim_{x \rightarrow 3} \left(\frac{\sqrt{6+x} - 3}{x-3} \right)$.

6+2

2. Ispitati konvergenciju reda $\sum n(\sqrt{n+1} - \sqrt{n-1})$.

7

3. Na osnovi ispitivanja tijeka funkcije skicirati graf: $f(x) = \frac{x+4}{x^2-2x-3}$.

20 (graf)

4. Zapisati treću parcijalnu sumu razvoja funkcije $g(x) = e^{8x}$ u Taylorov red po potencijama od x . Taylorov red oko točke $x_0 = 0$ naziva se još i Maclaurinov red.

15

5. Odrediti domenu i asimptote funkcije $h(x) = \frac{2x+3}{x+\sqrt{x^2-x}}$.

~~6+14~~ 5

6. Posebno izračunati rang, a posebno determinantu matrice $A = \begin{bmatrix} 0 & 8 & 0 & 0 \\ 2 & 0 & 1 & 0 \\ -8 & 0 & 0 & 1 \\ 0 & 8 & 0 & 18 \end{bmatrix}$.

8+7

7. Na sljedećem primjeru pokazati kako se nejednadžba može riješiti grafički, a kako analitički: $x-4 \leq \sqrt{x}$.
Provjeravaj gdje god možeš uvrštavanjem!

~~6+6+3~~

Ukupno:

11

6.

$$\det A = \begin{vmatrix} 0 & 8 & 0 & 0 \\ 2 & 0 & 1 & 0 \\ -8 & 0 & 0 & 1 \\ 0 & 8 & 0 & 18 \end{vmatrix} \stackrel{!}{=} \begin{vmatrix} 0 & 8 & 0 & 0 \\ 2 & 0 & 1 & 0 \\ -8 & 0 & 0 & 1 \\ 0 & 8 & 0 & 9 \end{vmatrix} = 1 \cdot (-1)^{2+3} \begin{vmatrix} 0 & 8 & 0 \\ -8 & 0 & 1 \\ 0 & 4 & 9 \end{vmatrix} \cdot (-1)$$

$$= -1 \cdot \begin{vmatrix} 0 & 8 & 0 \\ -8 & 0 & 1 \\ -72 & 4 & 9 \end{vmatrix} \stackrel{!}{=} -1 \cdot 4 \begin{vmatrix} 0 & 8 & 0 \\ 8 & 0 & 1 \\ 8 & 1 & 0 \end{vmatrix} = 1 \cdot (-1) \cdot (-1)^{2+3} \begin{vmatrix} 0 & 8 \\ 8 & 1 \end{vmatrix} = 1 \cdot (0 - 64) = -64$$

$\det A = -64$ X

$r(A) = 4$

RANG MATRICE JE 4.

KAKO IZRAČUNATI RANG?

$|W| = \sqrt{3^2 + y^2}$

$|W| = \sqrt{3^2 + 1^2} = 2$

$|W| = 60 + 1 = 61$

$|W| = \frac{1 \pm \sqrt{1 - 4 \cdot 1 \cdot 1}}{2}$

$|W| = 1$

$|W| = 1$

$$5. \quad h(x) = \frac{2x+3}{x+\sqrt{x^2-x}}$$

DOMENA:

$$x + \sqrt{x^2-x} \neq 0 \quad x^2 - x \geq 0$$

$$x \neq 0 \quad a=1 \quad b=-1 \quad c=0$$

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

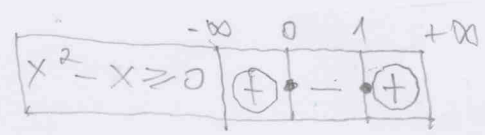
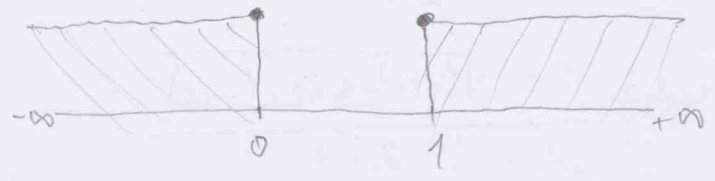
$$x_{1,2} = \frac{1 \pm \sqrt{(-1)^2 - 4 \cdot 1 \cdot 0}}{2 \cdot 1}$$

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

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

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

$$x_2 = \frac{1-1}{2} = \frac{0}{2} = 0$$



$$D(f) = \langle -\infty, 0 \rangle \cup [1, +\infty) \quad \checkmark \quad \underline{6}$$

ASIMPTOTE

VERTIKALNE:

$$\lim_{x \rightarrow 0^-} \frac{2x+3}{x+\sqrt{x^2-x}} = \frac{2 \cdot 0 + 3}{0 + \sqrt{0^2 - 0}} = \frac{3}{0} = -\infty \quad \text{IMA V.A. ZA } x \rightarrow 0 \quad \checkmark$$

~~V.A. ... x=0~~

$$\lim_{x \rightarrow 1^+} \frac{2x+3}{x+\sqrt{x^2-x}} = \frac{2 \cdot 1 + 3}{1 + \sqrt{1^2 - 1}} = \frac{5}{1} = 5 \quad \text{NEMA V.A. ZA } x \rightarrow 1$$

5

HORIZONTALNE:

LHA:

$$\lim_{x \rightarrow -\infty} \frac{2x+3}{x+\sqrt{x^2-x}} = \left[\frac{-\infty}{-\infty + \infty} \right] = \frac{2x+3}{x+\sqrt{x^2-x}} \cdot \frac{1/x}{1/x} = \frac{2 + \frac{3}{x}}{1 + \frac{\sqrt{x^2-x}}{x}} = \frac{2 + \frac{3^0}{x}}{1 + \sqrt{1 - \frac{1}{x}}}$$

TREBALO JE

$x \rightarrow -x$
 $-x \rightarrow +\infty$

D.H.A.

IMA LHA ZA $x \rightarrow -\infty$

~~LHA ... y=1~~

$$7. x-4 \leq \sqrt{x} \quad |^2$$

$$x^2 - 4^2 \leq (\sqrt{x})^2$$

$$x^2 - 16 \leq x$$

$$x^2 - x - 16 \leq 0$$

$$a=1 \quad b=-1 \quad c=-16$$

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

$$x_{1,2} = \frac{1 \pm \sqrt{(-1)^2 - 4 \cdot 1 \cdot (-16)}}{2 \cdot 1}$$

$$x_{1,2} = \frac{1 \pm \sqrt{1 + 64}}{2}$$

$$x_{1,2} = \frac{1 \pm \sqrt{65}}{2}$$

$$x_1 = \frac{1 + \sqrt{65}}{2} = 4.53$$

$$x_2 = \frac{1 - \sqrt{65}}{2} = -3.53$$

POGREŠNO!

BILO BI PAMETNO
DA PROVERAVATE!!!

BODUJE SE SAMO GRAF.

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

DOMENA:

$$x^2 - 2x - 3 \neq 0$$

$$a=1 \quad b=-2 \quad c=-3$$

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

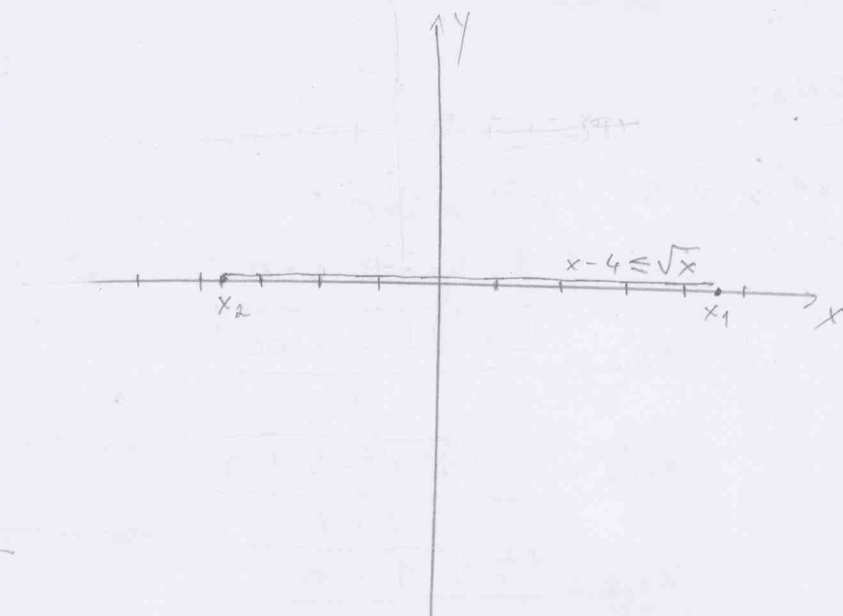
$$x_{1,2} = \frac{2 \pm \sqrt{(-2)^2 - 4 \cdot 1 \cdot (-3)}}{2 \cdot 1}$$

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

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

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

$$x_1 = \frac{2+4}{2} = \frac{6}{2} = 3 \quad x_2 = \frac{2-4}{2} = \frac{-2}{2} = -1$$



GRAFIČKI?