

IME I PREZIME:

ŠIME MATANOVIĆ

BROJ INDEKSA:

DATUM:

VRIJEME: OD 13:30

DO

MATEMATIKA 1: Trajanje 100 minuta. Zabranjen je razgovor sa drugim studentima. Na klupama je dozvoljen samo pisaći pribor, kalkulator, indeks ili iksica i prazni papiri koji nose ime studenta. Sav ostali pribor, formule, uređaji, bilješke i nepotpisane prazne papire zabranjeno je koristiti i trebaju ostati u torbi ili pohranjeni kod nastavnika (elektronički uređaji trebaju biti isključeni) tokom cijelog trajanja ispita. Studenti koji primijete zabranjene predmete dužni su ih prijaviti nastavniku. Nije dozvoljeno međusobno posuđivanje pribora tijekom trajanja ispita. Povreda ovih pravila može za posljedicu imati udaljšavanje s ispita. ZADATKE RIJEŠAVATE JEDNOSTRANO NA PAPIRE KOJE DOBIJETE OD NASTAVNIKA.

ooxx

Broj ↓
bodova

1. Izračunaj determinantu:

$$\begin{vmatrix} 3 & 2 & -1 & 0 & 0 \\ 4 & 5 & 0 & 0 & 0 \\ -1 & 0 & -1 & 0 & -1 \\ 6 & 7 & 0 & 2 & 3 \\ 8 & 9 & -1 & 3 & 7 \end{vmatrix}$$

2. Odrediti sve asimptote funkcije $g(x) = \frac{9-x^2}{15+8x+x^2}$.

3. Ispitati domenu i prvu derivaciju funkcije: $h(x) = \arcsin(\ln x)$.

4. Na temelju ispitivanja toka funkcije napraviti skicu grafa funkcije $f(x) = x - \sqrt{x^2 - x}$.

5. Koji je kut između vektora (2, 3, 5) i (8, -1, 7)?

$$\begin{vmatrix} 2 & 3 & 5 \\ 8 & -1 & 7 \end{vmatrix}$$

$$= 3 \cdot 7 - 5 \cdot 1 + 2 \cdot 7 - 8 \cdot 5 + 2 \cdot 3 \cdot 4 - 8 \cdot 3 = 21 - 5 + 14 - 40 + 6 - 24 = -28$$

VIDI KURILJE

VIDI SEMINAR 7

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

$$x(x-1) \quad D(0)$$

$$(-\infty, -1] \cup [-1, +\infty)$$

funkcija je neparna

VIDI SEMINAR 13

$$P(P) = (-\infty, 0] \cup [1, +\infty)$$

ASIMPTOTE

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

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

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

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

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



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$$\begin{pmatrix} 3 & 2 & -1 & 0 & 0 & | & 1 & 0 & 0 & 0 & 0 \\ 4 & 5 & 0 & 0 & 0 & | & 0 & 1 & 0 & 0 & 0 \\ -1 & 0 & -1 & 0 & -1 & | & 0 & 0 & 1 & 0 & 0 \\ 6 & 7 & 0 & 2 & 3 & | & 0 & 0 & 0 & 1 & 0 \\ 8 & 9 & -1 & 3 & 7 & | & 0 & 0 & 0 & 0 & 1 \end{pmatrix} \begin{matrix} A \\ \\ \\ \\ \end{matrix}$$

$$\begin{pmatrix} +1 & 0 & -1 & 0 & +1 & | & 0 & 0 & -1 & 0 & 0 \\ 4 & 5 & 0 & 0 & 0 & | & 0 & 1 & 0 & 0 & 0 \\ 3 & 2 & -1 & 0 & 0 & | & 1 & 0 & 0 & 0 & 0 \\ 6 & 7 & 0 & 2 & 3 & | & 0 & 0 & 0 & 1 & 0 \\ 8 & 9 & -1 & 3 & 7 & | & 0 & 0 & 0 & 0 & 1 \end{pmatrix} \begin{matrix} (-4) \\ (-3) \\ (-6) \\ (-8) \\ \end{matrix}$$

$$\begin{pmatrix} 1 & 0 & -1 & 0 & 1 & | & 0 & 0 & -1 & 0 & 0 \\ 0 & 5 & 4 & 0 & 4 & | & 0 & 1 & 4 & 0 & 0 \\ 0 & 2 & 2 & 0 & -3 & | & 1 & 0 & 3 & 0 & 0 \\ 0 & 7 & 6 & 2 & -3 & | & 0 & 0 & 6 & 1 & 0 \\ 0 & 9 & 7 & 3 & -1 & | & 0 & 0 & 8 & 0 & 1 \end{pmatrix} \begin{matrix} \cdot \frac{1}{5} \\ \cdot \frac{1}{2} \\ - \\ - \\ \end{matrix}$$

$$\begin{pmatrix} 1 & 0 & -1 & 0 & 1 & | & 0 & 0 & -1 & 0 & 0 \\ 0 & 5 & 4 & 0 & 4 & | & 0 & 1 & 4 & 0 & 0 \\ 0 & 1 & 0 & \frac{3}{2} & \frac{1}{2} & | & 0 & \frac{3}{2} & 0 & 0 & 0 \\ 0 & 7 & 6 & 2 & -3 & | & 0 & 0 & 6 & 1 & 0 \\ 0 & 9 & 7 & 3 & -1 & | & 0 & 0 & 8 & 0 & 1 \end{pmatrix} \begin{matrix} -5 \\ 7 \\ -9 \\ \end{matrix}$$

$$\begin{pmatrix} 1 & 0 & -1 & 0 & 1 & | & 0 & 0 & -1 & 0 & 0 \\ 0 & 0 & 7 & 10 & 5 & | & 27 & 0 & 0 & 0 & 0 \\ 0 & 0 & 15 & 10 & 5 & | & 0 & 0 & 0 & 0 & 0 \end{pmatrix} \begin{matrix} \frac{7}{10} + \frac{4}{5} \\ \frac{27}{5} \\ \frac{15}{10} + \frac{13}{5} \end{matrix}$$

$$\begin{matrix} \frac{1}{10} - \frac{13}{5} = \frac{7}{5} - \frac{13}{5} = -\frac{6}{5} \\ \frac{-37}{10} = \frac{-7}{2} + 1 = \frac{-7+2}{2} = -\frac{5}{2} \\ \frac{14}{5} = \frac{4}{5} = \frac{2}{2} \end{matrix}$$

$$\begin{pmatrix} 1 & 0 & -1 & 0 & 1 & | & 0 & 0 & -1 & 0 & 0 \\ 0 & 4/5 & 0 & -4/5 & 0 & | & 1/5 & 4/5 & 0 & 0 & 0 \\ 0 & 2 & 2 & 0 & -3 & | & 1 & 0 & 3 & 0 & 0 \\ 0 & 7 & 6 & 2 & -3 & | & 0 & 0 & 6 & 1 & 0 \\ 0 & 9 & 7 & 3 & -1 & | & 0 & 0 & 8 & 0 & 1 \end{pmatrix} \begin{matrix} (-2) \\ (-3) \\ (-9) \end{matrix}$$

$$\begin{pmatrix} 1 & 0 & -1 & 0 & 1 & | & 0 & 0 & -1 & 0 & 0 \\ 0 & 1 & 4/5 & 0 & -4/5 & | & 1/5 & 4/5 & 0 & 0 & 0 \\ 0 & 0 & 2/5 & 0 & -7/5 & | & 2/5 & 7/5 & 0 & 0 & 0 \\ 0 & 0 & 2/5 & 2 & 13/5 & | & 0 & -7/5 & 2/5 & 1 & 0 \\ 0 & 0 & -1/5 & 3 & 31/5 & | & 0 & -9/5 & 4/5 & 0 & 1 \end{pmatrix} \cdot \frac{5}{2}$$

$$\begin{pmatrix} 1 & 0 & -1 & 0 & 1 & | & 0 & 0 & -1 & 0 & 0 \\ 0 & 1 & 4/5 & 0 & -4/5 & | & 1/5 & 4/5 & 0 & 0 & 0 \\ 0 & 0 & 0 & -7/2 & 5/2 & | & -1 & 7/2 & 0 & 0 & 0 \\ 0 & 0 & 2/5 & 2 & 13/5 & | & 0 & -7/5 & 2/5 & 1 & 0 \\ 0 & 0 & -1/5 & 3 & 31/5 & | & 0 & -9/5 & 4/5 & 0 & 1 \end{pmatrix} \begin{matrix} 1 \\ -4/5 \\ -2/5 \\ \frac{4}{5} \end{matrix}$$

$$\begin{pmatrix} 1 & 0 & 0 & 0 & -5/2 & | & 5/2 & -1 & 5/2 & 0 & 0 \\ 0 & 1 & 0 & 0 & 2 & | & -2 & 1 & -2 & 0 & 0 \\ 0 & 0 & 1 & 0 & -7/2 & | & 5/2 & -1 & 7/2 & 0 & 0 \\ 0 & 0 & 0 & 2 & -4 & | & -1 & -1 & 9/5 & 1 & 0 \\ 0 & 0 & 0 & 3 & 11/2 & | & 1/2 & -2 & 3/2 & 0 & 1 \end{pmatrix} \begin{matrix} \\ \\ \\ \frac{1}{2} \\ \end{matrix}$$

$$\begin{pmatrix} 1 & 0 & 0 & 0 & -5/2 & | & 5/2 & -1 & 5/2 & 0 & 0 \\ 0 & 1 & 0 & 0 & 2 & | & -2 & 1 & -2 & 0 & 0 \\ 0 & 0 & 1 & 0 & -7/2 & | & 5/2 & -1 & 7/2 & 0 & 0 \\ 0 & 0 & 0 & 1 & 2 & | & -1/2 & -1/2 & 9/10 & 1/2 & 0 \\ 0 & 0 & 0 & 3 & 11/2 & | & 1/2 & -2 & 3/2 & 0 & 1 \end{pmatrix} \begin{matrix} \\ \\ \\ \\ -3 \end{matrix}$$

$$\begin{pmatrix} 1 & 0 & 0 & 0 & -5/2 & | & 5/2 & -1 & 5/2 & 0 & 0 \\ 0 & 1 & 0 & 0 & 2 & | & -2 & 1 & -2 & 0 & 0 \\ 0 & 0 & 1 & 0 & -7/2 & | & 5/2 & -1 & 7/2 & 0 & 0 \\ 0 & 0 & 0 & 1 & 2 & | & -1/2 & -1/2 & 9/10 & 1/2 & 0 \\ 0 & 0 & 0 & 0 & -1/2 & | & 2 & -1/2 & -6/5 & 3/2 & 1 \end{pmatrix} \begin{matrix} \\ \\ \\ \\ (2) \end{matrix}$$

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$$\begin{array}{cccc|cccc} 1 & 0 & 0 & 0 & -5/2 & 5/2 & -1 & 5/2 & 0 & 0 \\ 0 & 1 & 0 & 0 & 2 & -2 & 1 & -2 & 0 & 0 \\ 0 & 0 & 1 & 0 & 7/2 & 5/2 & -1 & 7/2 & 0 & 0 \\ 0 & 0 & 0 & 1 & 2 & -1/2 & -1/2 & 9/2 & 1/2 & 0 \\ 0 & 0 & 0 & 0 & +1 & -4 & +1 & +1 & 15 & +3 & -2 \end{array} \left| \begin{array}{ccc} f(x) \\ g(x) \\ h(x) \end{array} \right. \sim \begin{array}{cccc} 1 & 0 & 0 & 0 \end{array}$$

VIDI BOTICA

$$2. \lim_{x \rightarrow \infty} \frac{9-x^2}{15+8x+x^2} = \lim_{x \rightarrow \infty} \frac{9-x^2}{\frac{15}{x^2} + \frac{8x}{x^2} + \frac{x^2}{x^2}} = -1 \quad \checkmark \quad \text{ZAKLJUČAK?}$$

$$\lim_{x \rightarrow \infty} \left(\frac{9-x^2}{15+8x+x^2} \cdot \frac{x}{x} \right) = \lim_{x \rightarrow \infty} \frac{9-x^2}{x(15+8x+x^2)} = \lim_{x \rightarrow \infty} \frac{9-x^2}{15x+8x^2+x^3} = \lim_{x \rightarrow \infty} \frac{\frac{9}{x^2} - \frac{x^2}{x^2}}{\frac{15x}{x^2} + \frac{8x^2}{x^2} + \frac{x^3}{x^2}} = \frac{0}{1} \quad \checkmark$$

4)

HORIZONTALNE } KOJE POSTOJE I GDJE?
KOSE
VERTIKALNE

VIDI SEMINAR (11) : (13)

VIDI KURILIĆ