MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod⇓⇓ S5

IME I PREZIME: MARINO ŽUBČIĆ **BROJ INDEKSA:** 17-2-0216-2012

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

POPUNJAVA NASTAVNIK Broj ↓ bodova

40

1. Izračunaj sve kompleksne brojeve z takve da $\left|\frac{z}{2}\right|^2 = z + 5i$. *Prikaži ih u kompleksnoj ravnini!* 10+5

2. Riješi sustav Gaussovom metodom i obavezno provjeri rješenje: 10+5

$$\begin{array}{rcrcrcr} 2x_1 & - & x_2 & + & x_3 & - & x_4 = -1 \\ 2x_1 & - & x_2 & & & - & 3x_4 = 1 \\ 3x_1 & & & - & x_3 & + & x_4 = -1 \\ 2x_1 & + & 2x_2 & - & 2x_3 & + & 5x_4 = -1 \end{array}$$

3. Odrediti kada je $\frac{x+1}{\sqrt{x^2-x}} + 1 > 0$ i obavezno provjeriti rješenje. 13+2

4. Za funkciju: $f(x) = \sqrt{x^2+7x+7}$ treba:
   (a) pronaći drugu derivaciju 10
   (b) na temelju ispitivanja toka funkcije skicirati graf 20(graf)

5. Odrediti i provjeriti rješenje $\lim_{x\to+\infty} \frac{x^2}{e^{2x}} =$ 8+2

6. Riješiti jednadžbu $e^x = \arccos x$ grafičkom metodom. *Provjeriti uvrštavanjem!* 10+5

Ukupno:

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(2)

$$\left[\begin{array}{cccc|c} 2 & -1 & 1 & -1 & -1 \\ 2 & -1 & 0 & -3 & 1 \\ 3 & 0 & -1 & 1 & -1 \\ 2 & 2 & -2 & 5 & -1 \end{array}\right] \sim \left[\begin{array}{cccc|c} -1 & -1 & 2 & -2 & 0 \\ 2 & -1 & 0 & -3 & 1 \\ 3 & 0 & -1 & 1 & -1 \\ 2 & 2 & -2 & 5 & -1 \end{array}\right] \sim \left[\begin{array}{cccc|c} 1 & 1 & -2 & 2 & 0 \\ 2 & -1 & 0 & -3 & 1 \\ 3 & 0 & -1 & 1 & -1 \\ 2 & 2 & -2 & 5 & -1 \end{array}\right]$$

1R - 3R; 1R · (-1); 1R · (-2) + 2R; 1R · (-3) + 3R; 1R · (-2) + 4R

$$\sim \left[\begin{array}{cccc|c} 1 & 1 & -2 & 2 & 0 \\ 0 & -3 & 4 & -7 & 1 \\ 0 & -3 & 5 & -5 & -1 \\ 0 & 0 & 2 & 1 & -1 \end{array}\right] 1:(-3) \sim \left[\begin{array}{cccc|c} 1 & 1 & -2 & 2 & 0 \\ 0 & 1 & -4/3 & 7/3 & -1/3 \\ 0 & -3 & 5 & -5 & -1 \\ 0 & 0 & 2 & 1 & -1 \end{array}\right] 2R \cdot 3 + 3R \sim \left[\begin{array}{cccc|c} 1 & 1 & -2 & 2 & 0 \\ 0 & 1 & -4/3 & 7/3 & -1/3 \\ 0 & 0 & 1 & 2 & -2 \\ 0 & 0 & 2 & 1 & -1 \end{array}\right] 3R \cdot (-2) + 4R$$

$$\sim \left[\begin{array}{cccc|c} 1 & 1 & -2 & 2 & 0 \\ 0 & 1 & -4/3 & 7/3 & -1/3 \\ 0 & 0 & 1 & 2 & -2 \\ 0 & 0 & 0 & -3 & 3 \end{array}\right] 1:(-3) \sim \left[\begin{array}{cccc|c} 1 & 1 & -2 & 2 & 0 \\ 0 & 1 & -4/3 & 7/3 & -1/3 \\ 0 & 0 & 1 & 2 & -2 \\ 0 & 0 & 0 & 1 & -1 \end{array}\right] \sim \left[\begin{array}{cccc|c} 1 & 1 & -2 & 0 & 2 \\ 0 & 1 & -4/3 & 0 & 2 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & -1 \end{array}\right]$$

4R · (-2) + 3R; 4R · (-7/3) + 2R; 4R · (-2) + 1R; 3R · 4/3 + 2R; 3R · (-2) + 1R

$$\sim \left[\begin{array}{cccc|c} 1 & 1 & 0 & 0 & 2 \\ 0 & 1 & 0 & 0 & 2 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & -1 \end{array}\right] \sim \left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 2 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & -1 \end{array}\right] \qquad \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} 0 \\ 2 \\ 0 \\ -1 \end{bmatrix}$$

2R · (-1) + 1R

✓

PROVJERA:

① $2x_1 - x_2 + x_3 - x_4 = -1$

$2\cdot 0 - 2 + 0 + 1 = -1$

$0 - 2 + 0 + 1 = -1$

$-1 = -1$ ✓

② $2x_1 - x_2 - 3x_4 = 1$

$2\cdot 0 - 2 - 3\cdot(-1) = 1$

$0 - 2 + 3 = 1$

$1 = 1$ ✓

③ $3x_1 - x_3 + x_4 = -1$

$3\cdot 0 - 0 + (-1) = -1$

$-1 = -1$ ✓

④ $2x_1 + 2x_2 - 2x_3 + 5x_4 = -1$

$2\cdot 0 + 2\cdot 2 - 2\cdot 0 + 5\cdot(-1) = -1$

$4 - 5 = -1$

$-1 = -1$ ✓

⑥ $e^x = \arccos x$

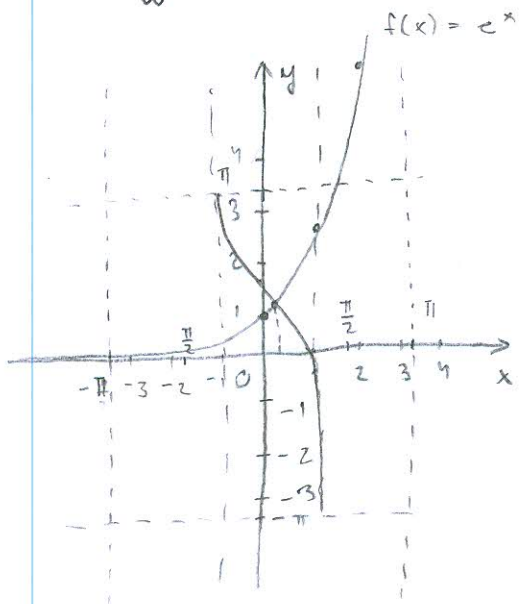
$f(x) = e^x$ $\quad g(x) = \arccos x$

$f(0) = 1$ $\quad g(-1) = \pi$

$f(1) = 2.71$ $\quad g(0) = \frac{\pi}{2}$

$f(2) = 7.39$ $\quad g(1) = 0$

$f(3) = 20.09$



PROVJERA

$x \approx 0.27$

$e^{0.27} = \arccos 0.27$

$1.30 = 1.30$ ✓

⑤ $\lim_{x\to\infty} \frac{x^2}{e^{2x}} = \left[\frac{\infty}{\infty}\right]^{L'H} = \frac{2x}{e^{2x}\cdot(2x)'} = \frac{2x}{e^{2x}\cdot 2} = \frac{2x}{2e^{2x}} = \frac{x}{e^{2x}}$ 2

③ $\frac{x+1}{\sqrt{x^2-x}} + 1 > 0$

$D_f = +R \setminus [0, 1]$

$x^2 - x \geq 0$

$x(x-1) \geq 0$

$x_1 = 0$

$x_2 - 1 > 0$

$x_2 > 1$

PROVJERA: $x = 2$

$\frac{2+1}{\sqrt{2^2-2}} + 1 > 0$

$\frac{3}{\sqrt{2}} + 1 > 0$

$3.12 > 0$

$x = 3$

$\frac{3+1}{\sqrt{3^2-3}} + 1 > 0$

$\frac{4}{\sqrt{6}} + 1 > 0$

$1.63 > 0$

④ $f(x) = \sqrt{x^2+7x+7}$

a)

$f'(x) = \frac{1}{2\sqrt{x^2+7x+7}} \cdot (x^2+7x+7)'$

$f'(x) = \frac{1}{2\sqrt{x^2+7x+7}} \cdot (2x+7)$

$f'(x) = \frac{2x+7}{2\sqrt{x^2+7x+7}}$

$f''(x) = \frac{(2x+7)'\cdot(2\sqrt{x^2+7x+7}) - (2x+7)(2\sqrt{x^2+7x+7})'}{(2\sqrt{x^2+7x+7})^2}$

$f''(x) = \frac{2(2\sqrt{x^2+7x+7}) - (2x+7)\left(2\cdot\frac{1}{2\sqrt{x^2+7x+7}}\cdot(x^2+7x+7)'\right)}{(2\sqrt{x^2+7x+7})^2}$

$f''(x) = \frac{2(2\sqrt{x^2+7x+7}) - (2x+7)\cdot\frac{2x+7}{2\sqrt{x^2+7x+7}}}{(2\sqrt{x^2+7x+7})^2}$

$f''(x) = \frac{2(2\sqrt{x^2+7x+7}) - \frac{(2x+7)^2}{2\sqrt{x^2+7x+7}}}{(2\sqrt{x^2+7x+7})^2}$ ✓

① $\left|\frac{z}{2i}\right|^2 = z + 5i$

$\frac{z^2}{4} = z + 5i \quad / \cdot 4$

$z^2 = 4z + 5i$

$z^2 - 4z = 5i$

$z(z-4) = 5i$

$z \cdot 5i = 5i$

$z = 1$

④ b) $f(x) = \sqrt{x^2+7x+7}$ Df:

$x^2 + 7x + 7 \geq 0$

$x^2 + 7x \geq -7$

$x(x+7) \geq -7$

$x_1 = -7$

$x + 7 > -7$

$x \geq -7 - 7$

$x \geq -14$

♣10

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod⇓⇓ S5

IME I PREZIME: Ante Pedišić **BROJ INDEKSA:** 0265066715

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

POPUNJAVA NASTAVNIK Broj ↓ bodova

0

1. Izračunaj sve kompleksne brojeve z takve da $\left|\frac{z}{2}\right|^2 = z + 5i$. *Prikaži ih u kompleksnoj ravnini!* 10+5

2. Riješi sustav Gaussovom metodom i obavezno provjeri rješenje: 10+5

$$\begin{array}{rcrcrcrcl} 2x_1 & - & x_2 & + & x_3 & - & x_4 & = & -1 \\ 2x_1 & - & x_2 & & & - & 3x_4 & = & 1 \\ 3x_1 & & & - & x_3 & + & x_4 & = & -1 \\ 2x_1 & + & 2x_2 & - & 2x_3 & + & 5x_4 & = & -1 \end{array}$$

3. Odrediti kada je $\frac{x+1}{\sqrt{x^2-x}} + 1 > 0$ i obavezno provjeriti rješenje. 13+2

4. Za funkciju: $f(x) = \sqrt{x^2+7x+7}$ treba:

   (a) pronaći drugu derivaciju 10

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6. Riješiti jednadžbu $e^x = \arccos x$ grafičkom metodom. *Provjeriti uvrštavanjem!* 10+5

Ukupno:

(2)

$$\begin{aligned} 2x_1 - x_2 + x_3 - x_4 &= -1 \\ 2x_1 - x_2 \quad\quad - 3x_4 &= 1 \\ 3x_1 \quad\quad - x_3 + x_4 &= -1 \\ 2x_1 + 2x_2 - 2x_3 + 5x_4 &= -1 \end{aligned}$$

$$\left[\begin{array}{cccc|c} 2 & -1 & 1 & -1 & -1 \\ 2 & -1 & 0 & -3 & 1 \\ 3 & 0 & -1 & 1 & -1 \\ 2 & 2 & -2 & 5 & -1 \end{array}\right] /:2 \sim \left[\begin{array}{cccc|c} 1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 2 & -1 & 0 & -3 & 1 \\ 3 & 0 & -1 & 1 & -1 \\ 2 & 2 & -2 & 5 & -1 \end{array}\right] /\cdot(-2) /\cdot(-3) /\cdot(-2)$$

$$\left[\begin{array}{cccc|c} 1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 2 & -1 & 0 & -3 & 1 \\ 3 & 0 & -1 & 1 & -1 \\ 0 & 3 & -3 & 6 & -2 \end{array}\right] \sim \left[\begin{array}{cccc|c} 1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 3 & -3 & 6 & -2 \\ 3 & 0 & -1 & 4 & -1 \\ 2 & -1 & 0 & -3 & 1 \end{array}\right] /:(-3) /:(-2) \sim$$

$$\sim \left[\begin{array}{cccc|c} 1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 3 & -3 & 6 & -2 \\ 0 & \frac{3}{2} & -\frac{5}{2} & \frac{5}{2} & \frac{1}{2} \\ 0 & 0 & -1 & -1 & 3 \end{array}\right] \begin{array}{l} \\ \\ \cdot\frac{1}{2} \\ \\ \end{array} \sim \left[\begin{array}{cccc|c} 1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 3 & -3 & 6 & -2 \\ 0 & 0 & 1 & \frac{1}{2} & -\frac{3}{2} \\ 0 & 0 & -1 & -1 & 3 \end{array}\right] \begin{array}{l} \\ \\ :3 \\ \sim \\ \end{array}$$

$$\sim \left[\begin{array}{cccc|c} 1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 1 & -1 & 2 & -\frac{2}{3} \\ 0 & 0 & 1 & \frac{1}{2} & -\frac{3}{2} \\ 0 & 0 & -1 & -1 & 3 \end{array}\right] \begin{array}{l} \\ \\ \\ \cdot(-1) \end{array} + \left[\begin{array}{cccc|c} 1 & 0 & 0 & \frac{1}{2} & -\frac{5}{6} \\ 0 & 1 & -1 & 2 & -\frac{2}{3} \\ 0 & 0 & 1 & \frac{1}{2} & -\frac{3}{2} \\ 0 & 0 & -1 & -1 & 3 \end{array}\right] \begin{array}{l} \\ \\ \\ \cdot(-1) \end{array} + \sim$$

$$\sim \left[\begin{array}{cccc|c} 1 & 0 & 0 & \frac{1}{2} & -\frac{5}{6} \\ 0 & 1 & 0 & 3 & \frac{1}{3} \\ 0 & 0 & 1 & 1 & -\frac{2}{3} \\ 0 & 0 & -1 & -1 & -1 \end{array}\right] \begin{array}{l} \\ \\ \\ \cdot(1) \end{array} + \left[\begin{array}{cccc|c} 1 & 0 & 0 & \frac{1}{2} & -\frac{5}{6} \\ 0 & 1 & 0 & 3 & \frac{1}{3} \\ 0 & 0 & 1 & 1 & -\frac{2}{3} \\ 0 & 0 & 0 & -\frac{1}{2} & -\frac{5}{3} \end{array}\right] \begin{array}{l} \cdot(-6) \\ + \\ \\ \end{array} \begin{array}{l} \cdot(-\frac{1}{2}) \\ \\ + \\ \sim \end{array}$$

$$\sim \left[\begin{array}{cccc|c} 1 & 0 & 0 & \frac{1}{2} & -\frac{5}{6} \\ 0 & 1 & 0 & 0 & -\frac{8}{3} \\ 0 & 0 & 1 & 0 & -\frac{5}{12} \\ 0 & 0 & 0 & -\frac{1}{2} & -\frac{5}{3} \end{array}\right] \begin{array}{l} \\ \\ \\ \cdot(-1) \end{array} + \sim \left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & -\frac{5}{2} \\ 0 & 1 & 0 & 0 & -\frac{8}{3} \\ 0 & 0 & 1 & 0 & -\frac{5}{12} \\ 0 & 0 & 0 & -\frac{1}{2} & -\frac{5}{3} \end{array}\right] \begin{array}{l} \\ \\ \\ :(-\frac{1}{2}) \end{array} \sim$$

$$\left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & -\frac{5}{2} \\ 0 & 1 & 0 & 0 & -\frac{8}{3} \\ 0 & 0 & 1 & 0 & -\frac{5}{12} \\ 0 & 0 & 0 & 1 & \frac{10}{3} \end{array}\right]$$

rješenje $\Rightarrow$ $\left[\begin{array}{c} -\frac{5}{2} \\ -\frac{8}{3} \\ -\frac{5}{12} \\ \frac{10}{3} \end{array}\right]$

Ante Podišić

1. $\left|\frac{z}{2}\right|^2 = 2 + 5i$

$\frac{z^2}{4} = 2 + 5i \;/ : 4$

$z^2 = \frac{2 + 5i}{4}$

$z^2 = \frac{2}{4} + \frac{5i}{4}$

$z^2 - \frac{2}{4} = \frac{5i}{4}$

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod⇓⇓ S5

IME I PREZIME: TONI STOŠIĆ **BROJ INDEKSA:** 57817-2009

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

POPUNJAVA NASTAVNIK Broj ↓ bodova

1. Izračunaj sve kompleksne brojeve z takve da $\left|\frac{z}{2}\right|^2 = z + 5i$. *Prikaži ih u kompleksnoj ravnini!* 10+5

2. Riješi sustav Gaussovom metodom i obavezno provjeri rješenje: 10+5

$$\begin{array}{rcrcrcr} 2x_1 & - & x_2 & + & x_3 & - & x_4 = -1 \\ 2x_1 & - & x_2 & & & - & 3x_4 = 1 \\ 3x_1 & & & - & x_3 & + & x_4 = -1 \\ 2x_1 & + & 2x_2 & - & 2x_3 & + & 5x_4 = -1 \end{array}$$

3. Odrediti kada je $\frac{x+1}{\sqrt{x^2-x}} + 1 > 0$ i obavezno provjeriti rješenje. 13+2

4. Za funkciju: $f(x) = \sqrt{x^2+7x+7}$ treba:

   (a) pronaći drugu derivaciju 10

   (b) na temelju ispitivanja toka funkcije skicirati graf 20(graf)

5. Odrediti i provjeriti rješenje $\lim_{x\to+\infty} \frac{x^2}{e^{2x}} =$ 8+2

6. Riješiti jednadžbu $e^x = \arccos x$ grafičkom metodom. *Provjeriti uvrštavanjem!* 10+5

Ukupno:

(2.)

$$\left[\begin{array}{cccc|c} 2 & -1 & 1 & -1 & -1 \\ 2 & -1 & 0 & -3 & 1 \\ 3 & 0 & -1 & 1 & -1 \\ 2 & 2 & -2 & 5 & -1 \end{array}\right] \sim \left[\begin{array}{cccc|c} 1 & 1 & -2 & 2 & 0 \\ 2 & -1 & 0 & -3 & 1 \\ 3 & 0 & -1 & 1 & -1 \\ 2 & 2 & -2 & 5 & -1 \end{array}\right] \sim \left[\begin{array}{cccc|c} 1 & 1 & -2 & 2 & 0 \\ 0 & -3 & 4 & -7 & 1 \\ 0 & -3 & 5 & 5 & -1 \\ 0 & 0 & 2 & 1 & -1 \end{array}\right] \sim$$

3R - 1R

1R · (-2) + 2R
1R · (-3) + 3R
1R · (-2) + 4R

2R : (-3)

$$\left[\begin{array}{cccc|c} 1 & 1 & -2 & 2 & 0 \\ 0 & 1 & -\frac{4}{3} & \frac{7}{3} & -\frac{1}{3} \\ 0 & -3 & 5 & 5 & -1 \\ 0 & 0 & 2 & 1 & -1 \end{array}\right] \sim \left[\begin{array}{cccc|c} 1 & 1 & -2 & 2 & 0 \\ 0 & 1 & -\frac{4}{3} & \frac{7}{3} & -\frac{1}{3} \\ 0 & 0 & 1 & 12 & -2 \\ 0 & 0 & 2 & 1 & -1 \end{array}\right] \sim \left[\begin{array}{cccc|c} 1 & 1 & -2 & 2 & 0 \\ 0 & 1 & -\frac{4}{3} & \frac{7}{3} & -\frac{1}{3} \\ 0 & 0 & 1 & 12 & -2 \\ 0 & 0 & 0 & -23 & 3 \end{array}\right] \sim \left[\begin{array}{cccc|c} 1 & 1 & -2 & 2 & 0 \\ 0 & 1 & -\frac{4}{3} & \frac{7}{3} & -\frac{1}{3} \\ 0 & 0 & 1 & 12 & -2 \\ 0 & 0 & 0 & 1 & -\frac{3}{23} \end{array}\right] \sim$$

2R · 3 + 3R

3R · (-2) + 4R

4R : (-23)

4R · (-12) + 3R
4R · $\left(\frac{7}{3}\right)$ + 2R
4R · (-2) + 1R

$$\sim \left[\begin{array}{cccc|c} 1 & 1 & -2 & 0 & \frac{5}{23} \\ 0 & 1 & -\frac{4}{3} & 0 & -\frac{2}{69} \\ 0 & 0 & 1 & 0 & \frac{240}{23} \\ 0 & 0 & 0 & 1 & -\frac{3}{23} \end{array}\right] \sim \left[\begin{array}{cccc|c} 1 & 1 & 0 & 0 & \frac{493}{46} \\ 0 & 1 & 0 & 0 & \frac{958}{69} \\ 0 & 0 & 1 & 0 & \frac{240}{23} \\ 0 & 0 & 0 & 1 & -\frac{3}{23} \end{array}\right] \sim \left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & \frac{11}{46} \\ 0 & 1 & 0 & 0 & \frac{958}{69} \\ 0 & 0 & 1 & 0 & \frac{240}{23} \\ 0 & 0 & 0 & 1 & -\frac{3}{23} \end{array}\right]$$

3R · $\left(\frac{4}{3}\right)$ + 2R
3R · 2 + 1R

2R · (-1) + 1R

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod↓↓ S5

IME I PREZIME: SANDRO GRGOVIĆ **BROJ INDEKSA:** 0269071192

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

POPUNJAVA NASTAVNIK
Broj ↓ bodova

1. Izračunaj sve kompleksne brojeve z takve da $\left|\frac{z}{2}\right|^2 = z + 5i$. *Prikaži ih u kompleksnoj ravnini!* 10+5

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3. Odrediti kada je $\frac{x+1}{\sqrt{x^2-x}} + 1 > 0$ i obavezno provjeriti rješenje. 13+2

4. Za funkciju: $f(x) = \sqrt{x^2+7x+7}$ treba:

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5. Odrediti i provjeriti rješenje $\lim_{x\to+\infty} \frac{x^2}{e^{2x}} =$ 8+2

6. Riješiti jednadžbu $e^x = \arccos x$ grafičkom metodom. *Provjeriti uvrštavanjem!* 10+5

Ukupno:

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod⇊ S5

IME I PREZIME: Luka Žilić **BROJ INDEKSA:** 5956

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

POPUNJAVA NASTAVNIK
Broj ↓ bodova

1. Izračunaj sve kompleksne brojeve z takve da $\left|\frac{z}{2}\right|^2 = z + 5i$. *Prikaži ih u kompleksnoj ravnini!* 10+5

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$$\begin{array}{rcrcrcr} 2x_1 & - & x_2 & + & x_3 & - & x_4 = -1 \\ 2x_1 & - & x_2 & & & - & 3x_4 = 1 \\ 3x_1 & & & - & x_3 & + & x_4 = -1 \\ 2x_1 & + & 2x_2 & - & 2x_3 & + & 5x_4 = -1 \end{array}$$

3. Odrediti kada je $\frac{x+1}{\sqrt{x^2-x}} + 1 > 0$ i obavezno provjeriti rješenje. 13+2

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Ukupno:

1. $\left|\frac{z}{2}\right|^2 = z + 5i$

$|z| = \sqrt{x^2+y^2}$

$z = x + yi$

$\frac{|z|^2}{|2|^2} = z + 5i$

$x_{1,2} = \frac{4 \pm \sqrt{(-4)^2 - 100}}{2}$

$\frac{|z|^2}{4} = z + 5i \,/\cdot 4$

$x_{1,2} = \frac{4 \pm \sqrt{-84}}{2}$

$x \in \mathbb{R}$?

$|z|^2 = 4z + 20i$

$\left(\sqrt{x^2+y^2}\right)^2 = 4x + 4yi + 20i$

$x^2 + y^2 = 4x + 4yi + 20i$

Re: $x^2 + y^2 = 4x$

Im: $0 = 4y + 20$

$4y = 20 \,/:4$

$y = 5$

$x^2 + 5^2 = 4x$

$x^2 + 25 = 4x$

$x^2 - 4x + 25 = 0$

$a = 1 \quad b = -4 \quad c = 25$

2.

$$\begin{array}{c} x_1 \quad x_2 \quad x_3 \quad x_4 \\ \left[\begin{array}{cccc|c} 2 & -1 & 1 & -1 & -1 \\ 1 & -1 & 0 & -3 & 1 \\ 3 & 0 & -1 & 1 & -1 \\ 2 & 2 & -2 & 5 & -1 \end{array}\right] \end{array} \quad 1:2$$

$$\sim \left[\begin{array}{cccc|c} 1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 2 & -1 & 0 & -3 & 1 \\ 3 & 0 & -1 & 1 & -1 \\ 2 & 2 & -2 & 5 & -1 \end{array}\right] \begin{array}{l} \cdot(-2) \\ + \\ \cdot(-3) \\ + \\ \cdot(-2) \\ + \end{array}$$

$$\sim \left[\begin{array}{cccc|c} 1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 0 & -1 & -2 & 2 \\ 0 & \frac{3}{2} & -\frac{5}{2} & \frac{5}{2} & \frac{1}{2} \\ 0 & 3 & -3 & 6 & 0 \end{array}\right] \sim \left[\begin{array}{cccc|c} 1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & \frac{3}{2} & -\frac{5}{2} & \frac{5}{2} & \frac{1}{2} \\ 0 & 0 & -1 & -2 & 2 \\ 0 & 3 & -3 & 6 & 0 \end{array}\right] \cdot\frac{2}{3}$$

$$\sim \left[\begin{array}{cccc|c} 1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 1 & -\frac{5}{3} & \frac{5}{3} & \frac{1}{3} \\ 0 & 0 & -1 & -2 & 2 \\ 0 & 3 & -3 & 6 & 0 \end{array}\right] \begin{array}{l} \\ \\ \cdot(-3) \\ + \end{array} \sim \left[\begin{array}{cccc|c} 1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 1 & -\frac{5}{3} & \frac{5}{3} & \frac{1}{3} \\ 0 & 0 & -1 & -2 & 2 \\ 0 & 0 & 2 & 1 & -1 \end{array}\right] \cdot(-1)$$

$$\sim \left[\begin{array}{cccc|c} 1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 1 & -\frac{5}{3} & \frac{5}{3} & \frac{1}{3} \\ 0 & 0 & 1 & 2 & -2 \\ 0 & 0 & 2 & 1 & -1 \end{array}\right] \begin{array}{l} \\ \\ \\ \cdot(-2) \\ + \end{array} \sim \left[\begin{array}{cccc|c} 1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 1 & -\frac{5}{3} & \frac{5}{3} & \frac{1}{3} \\ 0 & 0 & 1 & 2 & -2 \\ 0 & 0 & 0 & -3 & -5 \end{array}\right] \cdot(-\frac{1}{3})$$

$$\sim \left[\begin{array}{cccc|c} 1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 1 & -\frac{5}{3} & \frac{5}{3} & \frac{1}{3} \\ 0 & 0 & 1 & 2 & -2 \\ 0 & 0 & 0 & 1 & \frac{5}{3} \end{array}\right] \begin{array}{l} \\ \\ \\ \cdot(-2) \\ + \end{array}$$

$$x = \begin{bmatrix} -\frac{8}{3} \\ -\frac{34}{3} \\ -\frac{16}{3} \\ \frac{5}{3} \end{bmatrix}$$

4R: $x_4 = \frac{5}{3}$

3R: $x_3 + 2x_4 = -2$

$x_3 + \frac{10}{3} = -2$

$x_3 = -2 - \frac{10}{3}$

$x_3 = -\frac{16}{3}$

2R: $x_2 - \frac{5}{3}x_3 + \frac{5}{3}x_4 = \frac{1}{3}$

$x_2 + \frac{80}{9} + \frac{25}{9} = \frac{1}{3}$

$x_2 = \frac{1}{3} - \frac{25}{9} - \frac{80}{9}$

$x_2 = -\frac{34}{3}$

1R: $x_1 - \frac{1}{2}x_2 + \frac{1}{2}x_3 - \frac{1}{2}x_4 = -\frac{1}{2}$

$x_1 + \frac{17}{3} - \frac{8}{3} - \frac{5}{6} = -\frac{1}{2}$

$x_1 = -\frac{1}{2} - \frac{17}{3} + \frac{8}{3} + \frac{5}{6}$

$x_1 = -\frac{8}{3}$

→ PROVJERA RJEŠENJA:

4R: $\frac{5}{3} = \frac{5}{3}$

3R: $x_3 + 2x_4 = -2$

$-\frac{16}{3} + 2 \cdot \frac{5}{3} = -2$

$-2 = -2$

2R: $x_2 - \frac{5}{3}x_3 + \frac{5}{3}x_4 = \frac{1}{3}$

$-\frac{34}{3} - \frac{5}{3} \cdot \left(-\frac{16}{3}\right) + \frac{5}{3} \cdot \frac{5}{3} = \frac{1}{3}$

$-\frac{22}{9} + \frac{25}{9} = \frac{1}{3}$

$\frac{1}{3} = \frac{1}{3}$

1R: $x_1 - \frac{1}{2}x_2 + \frac{1}{2}x_3 - \frac{1}{2}x_4 = -\frac{1}{2}$

$-\frac{8}{3} + \frac{17}{3} - \frac{8}{3} - \frac{5}{6} = -\frac{1}{2}$

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

4. b) $f(x) = \sqrt{x^2 + 7x + 7}$

1.) DOMENA:

$x^2 + 7x + 7 \geq 0 \quad a=1 \quad b=7 \quad c=7$

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

$x_{1,2} = \frac{-7 \pm \sqrt{7^2 - 4 \cdot 1 \cdot 7}}{2 \cdot 1}$

$x_{1,2} = \frac{-7 \pm \sqrt{21}}{2}$

$x_1 = \frac{-7 + \sqrt{21}}{2} = -1,21 \qquad x_2 = \frac{-7 - \sqrt{21}}{2} = -5,79$

	$-\infty$		$-5,79$		$-1,21$		$+\infty$
x^2+7x+7		$\oplus$	0	$-$	0	$\oplus$	

2) SJECIŠTA S x ; y OSI:

$f(x) = 0$

$\sqrt{x^2 + 7x + 7} = 0$

$8x + 7 = 0$

$8x = -7 \,/\cdot \frac{1}{8}$

$x = -\frac{7}{8}$

SJEČE SE S x-OSI: $\begin{matrix} x & y \\ -\frac{7}{8} & 0 \end{matrix}$

$f(0) = \sqrt{x^2 + 7x + 7}$

$f(0) = \sqrt{7}$

SJEČE SE S y-OSI: $\begin{matrix} x & y \\ 0 & \sqrt{7} \end{matrix}$

3.) ASIMPTOTE;

VA: $\lim_{x \to -5,79^-} \sqrt{x^2+7x+7} = \sqrt{\frac{59}{10\,000}}$ NEMA LVA

$\lim_{x \to -1,21^+} \sqrt{x^2+7x+7} = \sqrt{\frac{59}{10\,000}}$ NEMA DVA

LHA: $\lim_{x \to -\infty} \sqrt{x^2+7x+7} / :x = [\infty] = -\sqrt{\frac{x^2+7x+7}{x^2}} = -\sqrt{1+\frac{7}{x}+\frac{7}{x^2}} = -\sqrt{1} = -1$

LHA ... $y = -1$

NEMA LKA

DHA: $\lim_{x \to +\infty} \sqrt{x^2+7x+7} / :x = [\infty] = -\sqrt{\frac{x^2+7x+7}{x^2}} = -\sqrt{1+\frac{7}{x}+\frac{7}{x^2}} = -\sqrt{1} = -1$

DHA ... $y = -1$

NEMA DKA

4.) MONOTONOST I EKSTREMI;

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod⇊ S5

IME I PREZIME: Filip Štrlek **BROJ INDEKSA:** 17-2-0230-2012

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

POPUNJAVA NASTAVNIK Broj ↓ bodova

0

1. Izračunaj sve kompleksne brojeve z takve da $\left|\frac{z}{2}\right|^2 = z + 5i$. *Prikaži ih u kompleksnoj ravnini!* 10+5

2. Riješi sustav Gaussovom metodom i obavezno provjeri rješenje: 10+5

$$\begin{array}{rcrcrcrcl} 2x_1 & - & x_2 & + & x_3 & - & x_4 & = & -1 \\ 2x_1 & - & x_2 & & & - & 3x_4 & = & 1 \\ 3x_1 & & & - & x_3 & + & x_4 & = & -1 \\ 2x_1 & + & 2x_2 & - & 2x_3 & + & 5x_4 & = & -1 \end{array}$$

3. Odrediti kada je $\frac{x+1}{\sqrt{x^2-x}} + 1 > 0$ i obavezno provjeriti rješenje. 13+2

4. Za funkciju: $f(x) = \sqrt{x^2+7x+7}$ treba:

   (a) pronaći drugu derivaciju 10

   (b) na temelju ispitivanja toka funkcije skicirati graf 20(graf)

5. Odrediti i provjeriti rješenje $\lim_{x\to+\infty} \frac{x^2}{e^{2x}} =$ 8+2

6. Riješiti jednadžbu $e^x = \arccos x$ grafičkom metodom. *Provjeriti uvrštavanjem!* 10+5

Ukupno:

(2.)

$$\left[\begin{array}{cccc|c} 2 & -1 & 1 & -1 & -1 \\ 2 & -1 & 0 & -3 & 1 \\ 3 & 0 & -1 & 1 & -1 \\ 2 & 2 & -2 & 5 & -1 \end{array}\right] \approx \left[\begin{array}{cccc|c} 2 & -1 & 1 & -1 & -1 \\ 0 & 0 & -1 & -2 & 2 \\ 1 & 1 & -2 & 2 & 0 \\ 0 & 3 & -3 & 6 & 0 \end{array}\right] \cdot(-1) \quad /:3$$

$$\left[\begin{array}{cccc|c} 0 & -3 & 5 & -5 & -1 \\ 0 & 0 & 1 & 2 & -2 \\ 1 & 1 & -2 & 2 & 0 \\ 0 & 1 & -1 & 2 & 0 \end{array}\right] \overset{1\leftrightarrow3}{\approx} \left[\begin{array}{cccc|c} 0 & 0 & 2 & -11 & -1 \\ 0 & 0 & 1 & 2 & -2 \\ 1 & 1 & -2 & 2 & 0 \\ 0 & 1 & -1 & 2 & 0 \end{array}\right] \approx \left[\begin{array}{cccc|c} 0 & 0 & 2 & -11 & -1 \\ 0 & 0 & 1 & 2 & -2 \\ 1 & 1 & -3 & 0 & +2 \\ 0 & 1 & -2 & 0 & -2 \end{array}\right] \approx$$

$$\left[\begin{array}{cccc|c} 0 & 0 & 2 & -11 & -1 \\ 0 & 0 & 1 & 2 & -2 \\ 1 & 0 & -1 & 0 & 0 \\ 0 & 1 & -2 & 0 & 2 \end{array}\right] \approx \left[\begin{array}{cccc|c} 1 & 0 & -1 & 0 & 0 \\ 0 & 1 & -2 & 0 & 2 \\ 0 & 0 & 1 & 2 & -2 \\ 0 & 0 & 2 & -11 & -1 \end{array}\right] \approx \left[\begin{array}{l} x_3 + 2x_4 = -2 \\ 2x_3 - 11x_4 = -1 \\ 2x_3 = -1 + 11x_4 \\ x_3 = \frac{-1+11x_4}{2} \end{array}\right.$$

$$x_1 + \frac{8}{5} = 0 \qquad x_2 - 2x_3 = 2 \qquad x_3 = -2 - 2\cdot x_4 \qquad -\frac{1+11x_4}{2} + 2x_4 = -2 \,/\cdot 2$$

$$x_1 = -\frac{8}{5} \qquad x_2 = 2 + 2x_3 \qquad x_3 = -2 + \frac{2}{5} \qquad -1 + 11x_4 + 4x_4 = -4$$

$$x_2 = 2 - \frac{16}{5} \qquad x_3 = -\frac{8}{5} \qquad 15x_4 = -3 \,/:15$$

$$x_2 = \frac{10-16}{5} = -\frac{6}{5} \qquad x_4 = -\frac{1}{5}$$

4. $f(x) = \sqrt{x^2 + 7x + 7}$

$-\frac{1}{2} - 1 = -\frac{1}{2} - \frac{2}{2} = -\frac{3}{2}$

a) $f'(x) = (x^2 + 7x + 7)^{1/2}$

$f'(x) = \frac{1}{2} \cdot (2x + 7)^{-\frac{1}{2}}$

$f'(x) = 2^{-1} \cdot (2x + 7)^{-\frac{1}{2}}$

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

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

$f''(x) = \frac{1}{8} \cdot \frac{1}{2\sqrt{2}}$

$$\boxed{f''(x) = \frac{1}{16\sqrt{2}}}$$

b) a) DOMENA

$x^2 + 7x + 7 \geq 0$

$x(x + 7) + 7 \geq 0$

$x_1 = 0$

$x_2 \geq -14$

$D(f) \langle -\infty, -14], \cup [-14, \infty +\rangle$

b) PRESJEK

$x = 0 \quad y = 0$

$y = 7 \quad x = \text{NEMA}$ tj. imaginaran broj

c) ASIMPTOTE

V. A. ~~NEMA~~ = 1

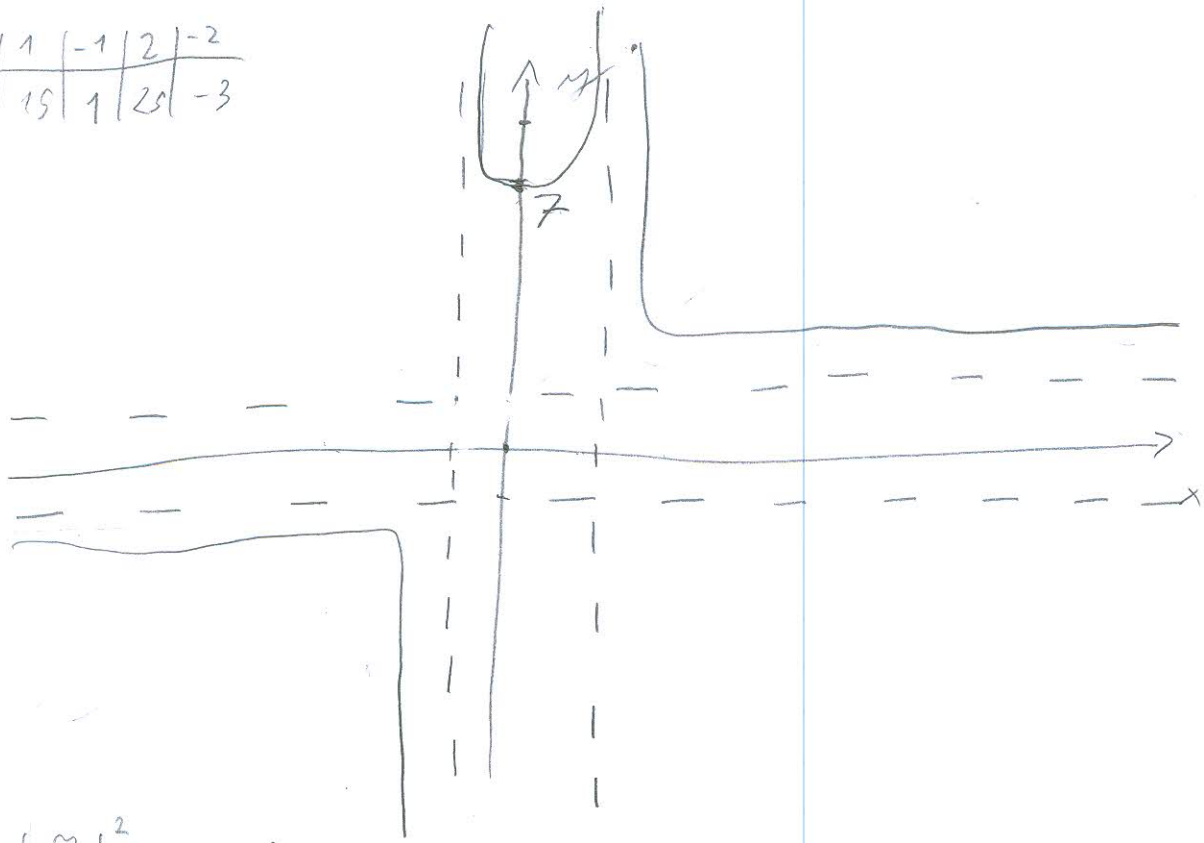
H. A. $\lim_{x \to \infty} \sqrt{x^2 + 7x + 7} : x = \sqrt{\frac{x^2}{x^2} + \frac{7x}{x^2} + \frac{7}{x^2}} = 1$

H. A. $= \pm 1$

K. A.

$k = \frac{f}{x} = \frac{x^2 + 7x + 7}{x} = \frac{x(x + 7) + 7}{x} = \text{NEMA}$

x	0	1	-1	2	-2
y	7	15	1	25	-3



(7.) $\left|\frac{z}{2}\right|^2 = z + 5i$

$\frac{z^2}{4} = z + 5i \quad / \cdot 4$

$z^2 = 4z + 20i$

$z^2 - 4z - 20i = 0$

$z(z-4) - 20i = 0$

$z_1 = 0$

$z_2 = 4 + 20i$

$R_1 = 4$

$Im = 20$ //

$-\frac{2}{15}$

$-2 + \frac{2}{15}$

$-30 + 2$

$\frac{28}{15}$

$-2 + \frac{56}{15}$

$-\frac{30+56}{2}$

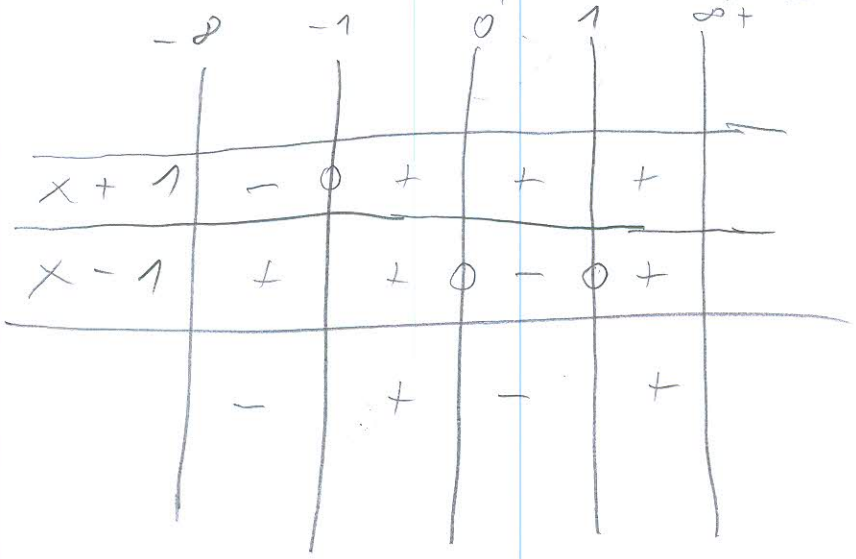
$= \frac{26}{15}$

3.) $\frac{x+1}{\sqrt{x^2-x}} + 1 > 0$

$x + 1 > 0 \qquad x^2 - x \geq 0$

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

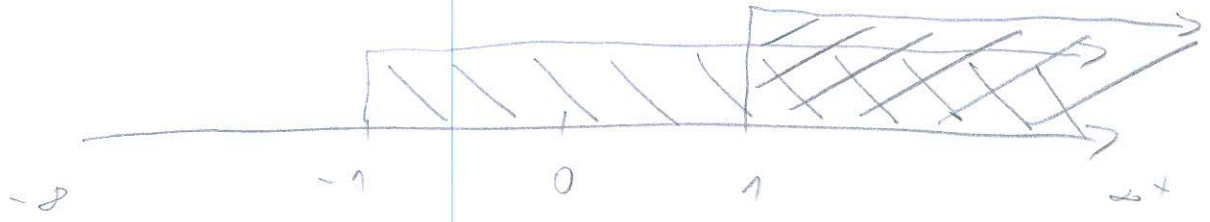
$x_1 = 0 \qquad x_2 \geq +1$



$x = -1$

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

ONDA KADA JE $x < 1$ //



(5)

$$\left[\begin{array}{cccc|c} 1 & 0 & -1 & 0 & 0 \\ 0 & 1 & -2 & 0 & 2 \\ 0 & 0 & 1 & 2 & -2 \\ 0 & 0 & 2 & -11 & -1 \end{array}\right] \approx \left[\begin{array}{cccc|c} 1 & 0 & -1 & 0 & 0 \\ 0 & 1 & -2 & 0 & 2 \\ 0 & 0 & 1 & 2 & -2 \\ 0 & 0 & 0 & 1 & -\frac{1}{15} \end{array}\right]$$

$$\left[\begin{array}{cccc|c} 1 & 0 & -1 & 0 & 0 \\ 0 & 1 & -2 & 0 & 2 \\ 0 & 0 & 1 & 0 & -\frac{28}{15} \\ 0 & 0 & 0 & 1 & -\frac{1}{15} \end{array}\right] \approx \left[\begin{array}{cccc|c} 1 & 0 & -1 & 0 & 0 \\ 0 & 1 & 0 & 0 & \frac{26}{15} \\ 0 & 0 & 1 & 0 & -\frac{28}{15} \\ 0 & 0 & 0 & 1 & -\frac{1}{15} \end{array}\right]$$

$$\left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & \frac{28}{15} \\ 0 & 1 & 0 & 0 & \frac{26}{15} \\ 0 & 0 & 1 & 0 & -\frac{28}{15} \\ 0 & 0 & 0 & 1 & -\frac{1}{15} \end{array}\right]$$

$x_1 = \frac{28}{15}$

$x_2 = \frac{26}{15}$

$x_3 = -\frac{28}{15}$

$x_4 = -\frac{1}{15}$

$3x_1 - x_3 + x_4 = -1$

3. $\frac{28}{15} + \frac{28}{15} - \frac{1}{15} = -1$,

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod ⇊ S5

IME I PREZIME: MATEA ČULINA, 21.2.2013 **BROJ INDEKSA:** [redacted] 17-2-0206-2012

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

POPUNJAVA NASTAVNIK
Broj ↓ bodova

1. Izračunaj sve kompleksne brojeve z takve da $\left|\frac{z}{2}\right|^2 = z + 5i$. *Prikaži ih u kompleksnoj ravnini!* 10+5

2. Riješi sustav Gaussovom metodom i obavezno provjeri rješenje: 10+5

$$\begin{array}{rcrcrcrcl} 2x_1 & - & x_2 & + & x_3 & - & x_4 & = & -1 \\ 2x_1 & - & x_2 & & & - & 3x_4 & = & 1 \\ 3x_1 & & & - & x_3 & + & x_4 & = & -1 \\ 2x_1 & + & 2x_2 & - & 2x_3 & + & 5x_4 & = & -1 \end{array}$$

3. Odrediti kada je $\frac{x+1}{\sqrt{x^2-x}} + 1 > 0$ i obavezno provjeriti rješenje. 13+2

4. Za funkciju: $f(x) = \sqrt{x^2+7x+7}$ treba: 10

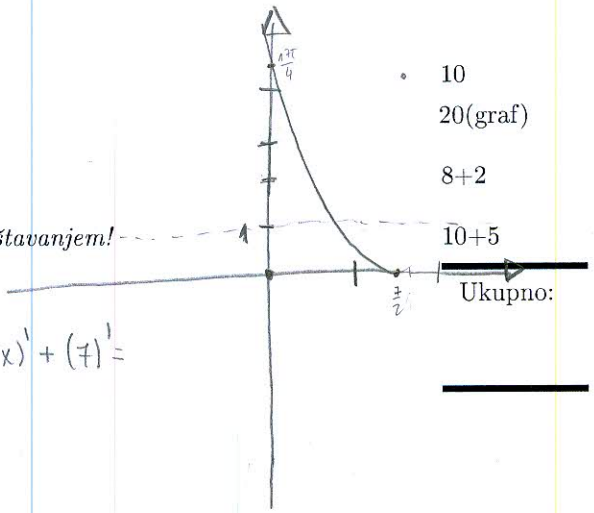
   (a) pronaći drugu derivaciju

   (b) na temelju ispitivanja toka funkcije skicirati graf 20(graf)

5. Odrediti i provjeriti rješenje $\lim_{x\to+\infty} \frac{x^2}{e^{2x}} =$ 8+2

6. Riješiti jednadžbu $e^x = \arccos x$ grafičkom metodom. *Provjeriti uvrštavanjem!* 10+5

Ukupno:



4.) $f(x) = \sqrt{x^2+7x+7}$

a) $f'(x) = \left(\sqrt{x^2+7x+7}\right)' = (x^2)' + (7x)' + (7)' =$

$= 2x - 7$

$f''(x) = (2x-7)'$

$= (2x)' \cdot (7) - (2x) \cdot (7)'$

$= 2 \cdot (7) - (2x)$

$= 14 - 2x$

1.) Domena

$\sqrt{x^2+7x+7} \geq 0$

$x^2+7x+7 \geq 0$

$x^2+7x+7 = 0$

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

$x_{1/2} = \frac{-7 \pm \sqrt{7^2-4\cdot 7}}{2}$

$x_{1/2} = \frac{-7 \pm \sqrt{49-28}}{2}$

$x_{1/2} = \frac{-7 \pm \sqrt{21}}{2}$

$x_1 = \frac{-7+\sqrt{21}}{2}$

$x_2 = \frac{-7-\sqrt{21}}{2}$

$D_f: \left[-\infty, -7\right\rangle \cup \left\langle -7, 7\right\rangle \left\langle 7, +\infty\right]$

II. ASIMPTOTE

H.A. $\lim_{x\to\pm\infty} \frac{x^2+7x+7}{x^2} : x^2$

$\lim_{x\to\pm\infty} 1 + \frac{7}{x} + \frac{7}{x^2} = 1$

kose asimptote nema!

V.A.: $\lim_{x\to 7^+} \sqrt{7^2+7\cdot 7+7} = \sqrt{49+49+7} = \sqrt{105}$

$\lim_{x\to 7^-} \sqrt{7^2-7\cdot 7-7} = \sqrt{49-49-7} = \sqrt{7}$

KRIT. TOČKE

$2x-7=0$

$2x=7$

$x=\frac{7}{2}$

$f(x) = x^2+7x+7$

$f(x) = \left(\frac{7}{2}\right)^2 + 7\cdot\left(\frac{7}{2}\right) + 7$

$= \frac{49}{4} + \frac{49}{2} + 7$

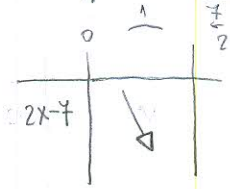
$= \frac{49+98+28}{4} = \frac{175}{4}$

MONOTONOST

$2x-7>0$

$2x>7$

$x>\frac{7}{2}$

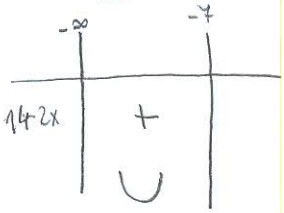


KONVEKSNOST i KONKAVNOST

$14-2x=0$

$-2x=14 \mid :(-2)$

$x=-7$



2.) $2x_1 - x_2 + x_3 - x_4 = -1$

$2x_1 - x_2 \quad 0 \quad -3x_4 = 1$

$3x_1 \quad 0 \quad -x_3 + x_4 = -1$

$2x_1 + 2x_2 - 2x_3 + 5x_4 = -1$

2	-1	1	-1	= -1
2	-1	0	-3	= 1
3	0	-1	1	= -1
2	2	-2	5	= -1

II. - I.

1	-2	-1	-4	= 2
2	-1	0	-3	= 1
3	0	-1	1	= -1
2	2	-2	5	= -1

III. - II.

1	-2	-1	-4	= 2
0	3	-2	8	= -2
3	0	-1	1	= -1
2	2	-2	5	= -1

IV. - II.

1	-2	-1	-4	= 2
0	3	-2	8	= -2
3	0	-1	1	= -1
2	-1	0	-3	= 2

I·(-3)

1	-2	-1	-4	= 2
0	3	-2	8	= -2
3	0	-1	1	= -1
-6	3	0	9	= 6

IV. - III.

1	-2	-1	-4	= 2
0	3	-2	8	= -2
3	0	-1	1	= -1
-6	0	2	1	= 8

I·(-2)

1	-2	-1	-4	= 2
0	3	-2	8	= -2
-6	0	2	-2	= 2
-6	0	2	1	= 8

1	-2	-1	-4	= 2
0	3	-2	8	= -2
-6	0	2	-2	= 2
0	0	0	-3	≠ 8

III + I

1	-2	-1	-4	= 2
0	3	-2	8	= -2
-1	0	3	-3	= 2
0	0	0	-3	= 8

1	-2	-1	-4	= 2
0	3	-2	8	= -2
0	-2	-4	-1	= 0
0	0	0	-3	= 8

III. - I.

1	-2	-1	-4	= 2
0	3	-2	8	= -2
0	0	-3	3	= -2
0	0	0	-3	= 8

II : 3

III : (-3)

IV : (-3)

1	-2	-1	-4	= 2
0	1	$-\frac{2}{3}$	$\frac{8}{3}$	$= -\frac{2}{3}$
0	0	1	-1	$= -\frac{2}{3}$
0	0	0	1	$= -\frac{8}{3}$

$x - 2y - z - 4u = 2$

$y - \frac{2}{3}z + \frac{8}{3}u = -\frac{2}{3}$

$z - u = -\frac{2}{3}$

$u = -\frac{8}{3}$

$z - \frac{8}{3} = -\frac{2}{3}$

$z = -\frac{2}{3} + \frac{8}{3}$

$z = \frac{-2+8}{3}$

$z = \frac{6}{3}$

$z = 2$

$y - \frac{2}{3} \cdot 2 + \frac{8}{3} \cdot \left(-\frac{8}{3}\right) = -\frac{2}{3}$

$y - \frac{4}{3} + \frac{64}{9} = -\frac{2}{3}$

$y = -\frac{2}{3} + \frac{4}{3} - \frac{64}{9}$

$y = \frac{-6+12-64}{9}$

$y = \frac{-58}{9}$

$x - 2 \cdot \left(-\frac{58}{9}\right) - 2 - 4 \cdot \left(-\frac{8}{3}\right) = 2$

$x + \frac{116}{9} - 2 + \frac{32}{3} = 2$

$x = \frac{18 - 116 - 18 + 96}{9}$

$x = \frac{-20}{9}$

1.) $\left|\frac{z}{2}\right|^2 = z+5i$

$\left|\frac{x+yi}{2}\right|^2 = x+yi+5i$

$\frac{x+yi}{2} = x+yi+5i \;/:2$

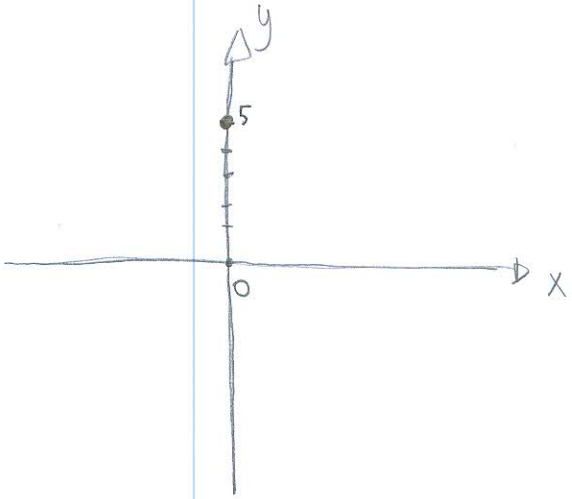
$x+yi = \frac{x+5i}{2}$

$x+yi = \frac{x}{2} + \frac{5}{2}yi$

$x\ \frac{x}{2} = 0 \;/\cdot 2 \rightarrow 2x-x=0$

$x=0$

$y+\frac{5}{2}y=0 \;/\cdot 2 \rightarrow y=5$



5.) $\lim_{x\to+\infty} \frac{x^2}{e^{2x}} \overset{/:x^2}{\underset{/:x^2}{=}} \frac{1}{\frac{e^{2x}}{x^2}} = \frac{x^2}{e^{2x}}$

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod⇊ S5

IME I PREZIME: JOSIP JANKOVIĆ **BROJ INDEKSA:** 17-2-0099-2011

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

POPUNJAVA NASTAVNIK Broj ↓ bodova

1. Izračunaj sve kompleksne brojeve z takve da $\left|\frac{z}{2}\right|^2 = z + 5i$. *Prikaži ih u kompleksnoj ravnini!* 10+5

2. Riješi sustav Gaussovom metodom i obavezno provjeri rješenje: 10+5

$$\begin{array}{rcrcrcrcl} & x & & y & & z & & v & \\ 2x_1 & - & x_2 & + & x_3 & - & x_4 & = & -1 \\ 2x_1 & - & x_2 & & & - & 3x_4 & = & 1 \\ 3x_1 & & & - & x_3 & + & x_4 & = & -1 \\ 2x_1 & + & 2x_2 & - & 2x_3 & + & 5x_4 & = & -1 \end{array}$$

3. Odrediti kada je $\frac{x+1}{\sqrt{x^2-x}} + 1 > 0$ i obavezno provjeriti rješenje. 13+2

4. Za funkciju: $f(x) = \sqrt{x^2+7x+7}$ treba:

   (a) pronaći drugu derivaciju 10

   (b) na temelju ispitivanja toka funkcije skicirati graf 20(graf)

5. Odrediti i provjeriti rješenje $\lim_{x\to+\infty} \frac{x^2}{e^{2x}} =$ 8+2

6. Riješiti jednadžbu $e^x = \arccos x$ grafičkom metodom. *Provjeriti uvrštavanjem!* 10+5

Ukupno:

4. $f(x) = \sqrt{x^2+7x+7}$

$x^2+7x+7 \geq 0$

$x_{1,2} = \frac{-b \pm \sqrt{b^2-4ac}}{2a} = \frac{-7 \pm \sqrt{7^2-4\cdot7}}{2} = \frac{-7 \pm \sqrt{49-28}}{2} = \frac{-7 \pm \sqrt{21}}{2}$ / $\frac{-7+\sqrt{21}}{2} = -1,2$ / $\frac{-7-\sqrt{21}}{2} = -5,8$

$D_f(x) = \langle -\infty, \frac{-7-\sqrt{21}}{2} \rangle \cup \langle \frac{-7+\sqrt{21}}{2}, +\infty \rangle$

1. NULTOČKE

$f(x)\sqrt{x^2+7x+7} = 0 \,/\, 2$

$x^2+7x+7 = 0$

$x_{1,2} = \frac{-b \pm \sqrt{b^2-4ac}}{2a} = \frac{-7 \pm \sqrt{7^2-4\cdot7}}{2} = \frac{-7 \pm \sqrt{21}}{2}$ / $\frac{-7+\sqrt{21}}{2}$ / $\frac{-7-\sqrt{21}}{2}$

NULTOČKE NISU U DOMENI

$f(0) = 0 = \sqrt{x^2+7x+7}$

$y(0) = \sqrt{x^2+7x+7}$

$f(0) = \sqrt{0^2+7\cdot0+7}$

$f(0) = \sqrt{7}$

$S(0, \sqrt{7})$

2. EKSTREMI

$f'(x) = \sqrt{x^2+7x+7} = \frac{(x^2+7x+7)'}{2\cdot\sqrt{x^2+7x+7}}$

$f'(x) = \frac{2x+7}{2\sqrt{x^2+7x+7}}$

$\frac{2x+7}{2\sqrt{x^2+7x+7}} = 0 \,/\, 2\sqrt{x^2+7x+7}$

$2x+7 = 0$

$2x = -7$

$x = \frac{-7}{2}$

$-\infty$		$-5,8$		$-3,5$		$-1,2$		0
	-6		-4		-2			
	$-$		$+$		$-$		$-$	
	↘		↗		↘		↘	

MAX $\left(-\frac{7}{2}, \frac{\sqrt{21}}{2}\right)$

VA.... NEMA

HA... NEMA

KA.... $k = \lim_{x\to\infty} \frac{f(x)}{x} = \frac{\sqrt{x^2+7x+7}\ /:x}{x:x} = \sqrt{\frac{\frac{1}{x}\cdot\frac{1+7}{x}+7+\frac{7}{x}}{1}} = \frac{7}{1} = 7$

$l = f(x) - k\cdot x$

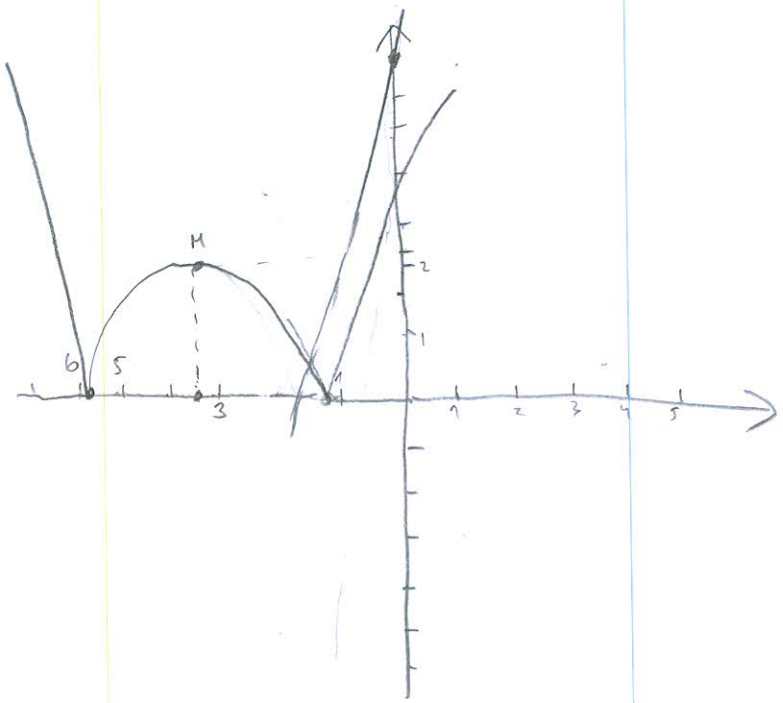
$= \sqrt{x^2+7x+7} - 7x = [\infty-\infty] = \sqrt{x^2+7x+7-7x}\cdot\frac{\sqrt{x^2+7x+7}+7x}{\sqrt{x^2+7x+7}+7x} =$

$= \frac{\sqrt{x^2+7x+7-7(8\cdot7)x-7x\ /:x}}{\sqrt{x^2+7x+7}+7x\ /:x}$

$y = kx+l$

$y = \frac{1}{2}(2x+7)$

x	0	-2
	$\frac{7}{2}$	$\frac{3}{2}$
	1	
	1,5	



$2^\circ\ \sqrt{x^2+7x+7}$

$= \frac{x^2+7x+7'}{2\sqrt{x^2+7x+7}} = \frac{2x+7}{2\sqrt{x^2+7x+7}}$

$= \frac{1}{2}(2x+7)\left(\frac{1}{\sqrt{x^2+7x+7}}\right) + \frac{2x+7}{\sqrt{x^2+7x+7}}$

$= \frac{1}{2}\left(\frac{7+2}{\sqrt{x^2+7x+7}} + (2x+7)\left(\frac{1}{\sqrt{x^2+7x+7}}\right)\right.$

$= \frac{1}{2}\left(\frac{2x+7}{\sqrt{x^2+7x+7}} - \frac{(2x+7)(x^2+7x+7)}{2(x^2+7x+7)^{\frac{5}{2}}}\right.$

$= \frac{1}{2}\left(\frac{2+0}{\sqrt{x^2+7x+7}} - \frac{(2x+7)(x^2+7x+7)}{2(x^2+7x+7)^{\frac{5}{2}}}\right.$

$= \frac{1}{2}\left(\frac{2}{\sqrt{x^2+7x+7}} - \frac{(2x+7)(2x+7)}{2(x^2+7x+7)^{\frac{5}{2}}}\right.$

$= \frac{1}{2}\left(\frac{2}{\sqrt{x^2+7x+7}} - \frac{(2x+7)^2}{2(x^2+7x+7)^{\frac{5}{2}}}\right.$

$= -\frac{2\cdot1}{4(x^2+7x+7)^{\frac{3}{2}}}$

Josip Janković

$$\left[\begin{array}{cccc|c} 2 & -1 & +1 & -4 & -1 \\ 2 & -1 & 0 & -3 & 1 \\ 3 & 0 & -1 & 0 & -1 \\ 2 & 2 & 2 & 1 & -1 \end{array}\right] \begin{matrix} - \\ \\ \\ - \end{matrix}$$

$$\left[\begin{array}{cccc|c} 2 & -1 & +1 & -4 & -1 \\ 0 & -2 & -1 & -7 & 0 \\ 3 & 0 & -1 & 0 & -1 \\ 0 & -1 & 1 & -9 & -2 \end{array}\right] \cdot(-1) \sim \left[\begin{array}{cccc|c} 2 & -1 & +1 & -4 & -1 \\ 0 & -2 & -1 & -7 & 0 \\ -3 & 0 & -1 & 0 & -1 \\ 0 & 1 & -1 & -9 & +2 \end{array}\right] +$$

$$\sim \left[\begin{array}{cccc|c} 2 & -1 & +1 & -4 & -1 \\ 0 & -2 & -1 & -7 & 0 \\ -3 & 0 & -1 & 0 & -1 \\ 0 & -0 & 0 & -13 & -3 \end{array}\right] \begin{matrix} (+1) \\ \\ \\ \\ \end{matrix} \sim \left[\begin{array}{cccc|c} x_1 & x_2 & x_3 & x_4 & \\ 2 & -1 & +1 & -4 & 1 \\ 0 & -2 & -1 & -7 & 0 \\ 0 & 0 & 1 & -5 & 0 \\ 0 & 0 & 0 & -13 & -3 \end{array}\right]$$

$$-13x_4 = -3 \,/ : -13$$

$$x_4 = \frac{3}{13}$$

$$1x_3 - 5 \cdot \left(\frac{3}{13}\right) = 0$$

$$x_3 - \frac{15}{13} = 0$$

$$x_3 = \frac{15}{13}$$

$$-2x_2 - \left(\frac{15}{13}\right) - 7 \cdot \left(\frac{3}{13}\right) =$$

$$-2x_2 - \left(\frac{15}{13}\right) - \frac{21}{13} =$$

$$-2x_2 + \frac{6}{13} = 0$$

$$-2x_2 = -\frac{6}{13}$$

$$x_2 = \frac{3}{13}$$

$$2x_1 - \left(\frac{3}{13}\right) + \left(\frac{15}{13}\right) - 4 \cdot \left(\frac{3}{13}\right) = 0$$

$$2x_1 - 0 = 0$$

$$2x_1 = 0 \,/ 2$$

$$x_1 = 0$$

$e^x = \arccos x$ $\quad e^x = \arccos x$

$e^x = \cos^{-1}(x)$ $\quad e^x + \sin^{-1}(x) = \frac{\pi}{2}$

1. $\left|\frac{z}{2}\right|^2 = z + 5i$

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod⇓⇓ S5

IME I PREZIME: Petra Ugrinić **BROJ INDEKSA:** 17-1-0123-2012

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

POPUNJAVA NASTAVNIK Broj ↓ bodova

0

1. Izračunaj sve kompleksne brojeve z takve da $\left|\frac{z}{2}\right|^2 = z + 5i$. *Prikaži ih u kompleksnoj ravnini!* 10+5

2. Riješi sustav Gaussovom metodom i obavezno provjeri rješenje: 10+5

$$\begin{array}{rcrcrcrcl} 2x_1 & - & x_2 & + & x_3 & - & x_4 & = & -1 \\ 2x_1 & - & x_2 & & & - & 3x_4 & = & 1 \\ 3x_1 & & & - & x_3 & + & x_4 & = & -1 \\ 2x_1 & + & 2x_2 & - & 2x_3 & + & 5x_4 & = & -1 \end{array}$$

3. Odrediti kada je $\frac{x+1}{\sqrt{x^2-x}} + 1 > 0$ i obavezno provjeriti rješenje. 13+2

4. Za funkciju: $f(x) = \sqrt{x^2+7x+7}$ treba:

   (a) pronaći drugu derivaciju 10

   (b) na temelju ispitivanja toka funkcije skicirati graf 20(graf)

5. Odrediti i provjeriti rješenje $\lim_{x\to+\infty} \frac{x^2}{e^{2x}} =$ 8+2

6. Riješiti jednadžbu $e^x = \arccos x$ grafičkom metodom. *Provjeriti uvrštavanjem!* 10+5

Ukupno:

2)

$$\left[\begin{array}{cccc|c} 2 & -1 & 1 & -1 & -1 \\ 2 & -1 & 0 & -3 & 1 \\ 3 & 0 & -1 & 1 & -1 \\ 2 & 2 & -2 & 5 & -1 \end{array}\right] \begin{array}{l} /:2 \\ R_2-R_4 \\ \\ \\ \end{array} \left[\begin{array}{cccc|c} 1 & -2 & 2 & -2 & -2 \\ 0 & 1 & -2 & -8 & 2 \\ 3 & 0 & -1 & 1 & -1 \\ 2 & 2 & -2 & 5 & -1 \end{array}\right] \begin{array}{l} \\ \\ R3-R1 \\ R4-R1 \end{array} \sim \left[\begin{array}{cccc|c} 1 & -2 & 2 & -2 & -2 \\ 0 & 1 & -2 & -8 & 2 \\ 2 & -2 & 1 & -1 & 3 \\ 1 & 0 & 0 & 3 & -3 \end{array}\right] R4-R1$$

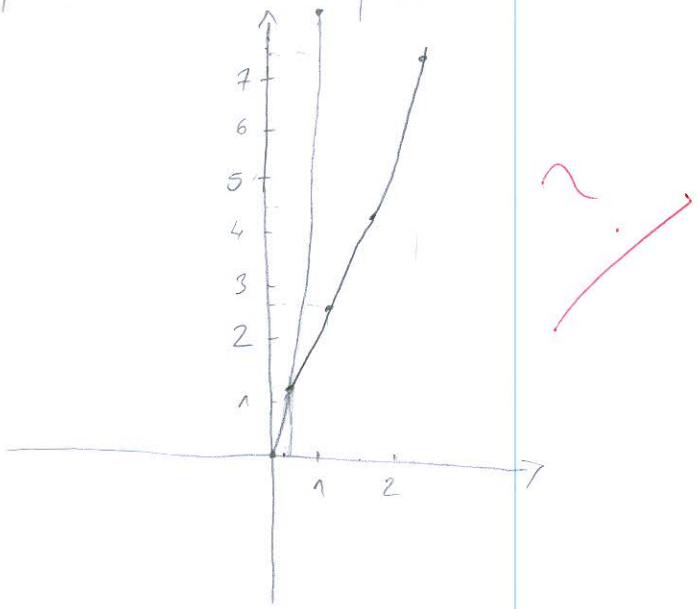
$$\left[\begin{array}{cccc|c} 1 & -2 & 2 & -2 & -2 \\ 0 & 1 & -2 & -8 & 2 \\ 2 & -2 & 1 & -1 & -3 \\ 0 & -2 & -2 & 1 & -5 \end{array}\right] R1+R4 \sim \left[\begin{array}{cccc|c} 1 & -4 & 0 & -1 & -7 \\ 0 & 1 & -2 & -8 & 2 \\ 2 & -2 & 1 & -1 & -3 \\ 0 & -2 & -2 & 1 & -5 \end{array}\right]$$

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

6) $e^x = \arccos x$

e^x	
0,25	1,28
1	2,7
1,5	4,48
2	7,38

$\arccos x$	
0,25	75,5
1	0
1,5	N/D
2	N/D



MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod⇓⇓ S5

IME I PREZIME: TINO BRAJKOVIĆ **BROJ INDEKSA:** 17-2-0100-2011

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

POPUNJAVA NASTAVNIK Broj ↓ bodova

0

1. Izračunaj sve kompleksne brojeve z takve da $\left|\frac{z}{2}\right|^2 = z + 5i$. *Prikaži ih u kompleksnoj ravnini!* 10+5

2. Riješi sustav Gaussovom metodom i obavezno provjeri rješenje: 10+5

$$\begin{array}{rcrcrcrcl} 2x_1 & - & x_2 & + & x_3 & - & x_4 & = & -1 \\ 2x_1 & - & x_2 & & & - & 3x_4 & = & 1 \\ 3x_1 & & & - & x_3 & + & x_4 & = & -1 \\ 2x_1 & + & 2x_2 & - & 2x_3 & + & 5x_4 & = & -1 \end{array}$$

3. Odrediti kada je $\frac{x+1}{\sqrt{x^2-x}} + 1 > 0$ i obavezno provjeriti rješenje. 13+2

4. Za funkciju: $f(x) = \sqrt{x^2+7x+7}$ treba: 5/2

   (a) pronaći drugu derivaciju 10

   (b) na temelju ispitivanja toka funkcije skicirati graf 20(graf)

5. Odrediti i provjeriti rješenje $\lim_{x\to+\infty} \frac{x^2}{e^{2x}} =$ 8+2

6. Riješiti jednadžbu $e^x = \arccos x$ grafičkom metodom. *Provjeriti uvrštavanjem!* 10+5

Ukupno:

4 $f(x) = \sqrt{x^2+7x+7}$

$f'(x) = \frac{1}{2\sqrt{x^2+7x+7}} \cdot (x^2+7x+7)'$

$f'(x) = \frac{2x+7}{2\sqrt{x^2+7x+7}}$

$f''(x) = \frac{(2x+7)' \cdot 2\sqrt{x^2+7x+7} - (2x+7)\cdot(2\sqrt{x^2+7x+7})'}{(2\sqrt{x^2+7x+7})^2}$

$f''(x) = \frac{4\sqrt{x^2+7x+7} - (2x+7)\cdot\frac{1}{x^2+7x+7}\cdot 2x+7}{(2\sqrt{x^2+7x+7})^2}$

$f''(x) = \frac{4\sqrt{x^2+7x+7} - \frac{2x+7}{x^2+7x+7}\cdot 7x+7}{(2\sqrt{x^2+7x+7})^2} = \frac{4\sqrt{x^2+7x+7} - \frac{14x^2+49}{x^2+7x+7}}{(2\sqrt{x^2+7x+7})^2}$

V.A., H.A. Nema

N.T. $x_{1,2} = \frac{-7 \pm \sqrt{49-28}}{2}$

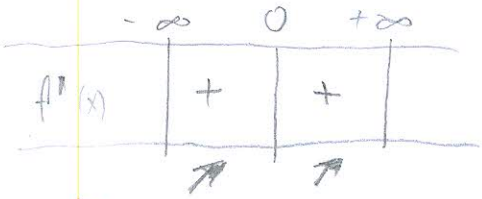
$x_{1,2} = \frac{-7 \pm \sqrt{21}}{2}$

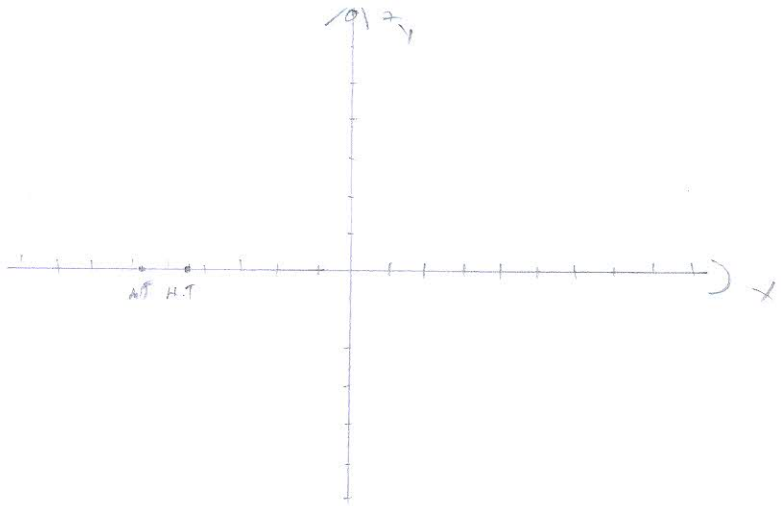
$x_1 = -4.792$ N.T. $(-4.92, 0)$

$x_2 = -5.79$ N.T $(-5.79, 0)$

$f(0) = 7$ $(0, 7)$

$D_f = \mathbb{R}$


- ∞
0
+ ∞
f'(x)
+
+


y
x
A
H.T

MATEMATIKA 1: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** Obavezno popuniti sva polja ispod↓↓ S5

IME I PREZIME: KREŠIMIR KALCINA **BROJ INDEKSA:** 57181/2009

ZAOKRUŽITI AKO ŽELITE: ustmeni kod prof. Uglešića

POPUNJAVA NASTAVNIK
Broj ↓ bodova

1. Izračunaj sve kompleksne brojeve z takve da $\left|\frac{z}{2}\right|^2 = z + 5i$. *Prikaži ih u kompleksnoj ravnini!* 10+5

2. Riješi sustav Gaussovom metodom i obavezno provjeri rješenje: 10+5

$$\begin{array}{rcrcrcrcl} 2x_1 & - & x_2 & + & x_3 & - & x_4 & = & -1 \\ 2x_1 & - & x_2 & & & - & 3x_4 & = & 1 \\ 3x_1 & & & - & x_3 & + & x_4 & = & -1 \\ 2x_1 & + & 2x_2 & - & 2x_3 & + & 5x_4 & = & -1 \end{array}$$

3. Odrediti kada je $\frac{x+1}{\sqrt{x^2-x}} + 1 > 0$ i obavezno provjeriti rješenje. 13+2

4. Za funkciju: $f(x) = \sqrt{x^2+7x+7}$ treba:

   (a) pronaći drugu derivaciju 10

   (b) na temelju ispitivanja toka funkcije skicirati graf 20(graf)

5. Odrediti i provjeriti rješenje $\lim_{x\to+\infty} \frac{x^2}{e^{2x}} =$ 8+2

6. Riješiti jednadžbu $e^x = \arccos x$ grafičkom metodom. *Provjeriti uvrštavanjem!* 10+5

Ukupno:

(4) Derivacija

$f'(x) = \sqrt{x^2+7x+7} = (x^2+7x+7)^{\frac{1}{2}} = \frac{1}{2}(x^2+7x+7)^{-\frac{1}{2}} \cdot (2x+7) =$

$f(x) =$

(3) $\frac{x+1}{\sqrt{x^2-x}} + 1 \geq 0$

(6) $e^x = \arccos x$

x	e^x
1	
2	
3	

x	$\arccos$