

MATEMATIKA I - KOLOKVIJ #1:

PRAVILA Studentima koji posjeduju mobitel treba biti ugašen. Studentima na ispitu nisu dopuštene nikakve formule. Nikakvo posuđivanje pribora nije dopušteno. U vrijeme trajanja ispita studenti ne mogu izlaziti van bez predaje ispita. Na snazi je Pravilnik o stegovnoj odgovornosti studenata.

TRAJANJE: 70 MINUTA. PIŠITE DVOSTRANO! Obavezno popuniti sva polja ispod. U pitanjima s višestrukim ponudnim odgovorima može biti više točnih.

IME I PREZIME: MARIN MATEK

BROJ INDEKSA:

VRIJEME POČETKA: 14:03

VRIJEME ZAVRŠETKA:

POPUNJAVA
NASTAVNIK
Broj ↓
bodova

Ukupno:

19

1. Diskutiraj postojanje inverza kvadratne funkcije.

Inverz kvadratne funkcije ne postoji iznad onih x u njegov domeni.

2. Kako glasi binomna formula?

Za svaku binomnu formulu vrijedi broj kombinacija

$$(x+y)^n = \sum_{k=0}^n \binom{n}{k} x^k y^{n-k}$$

3. Grafički riješiti jednadžbu: $e^x - 2 = \ln(x+2)$

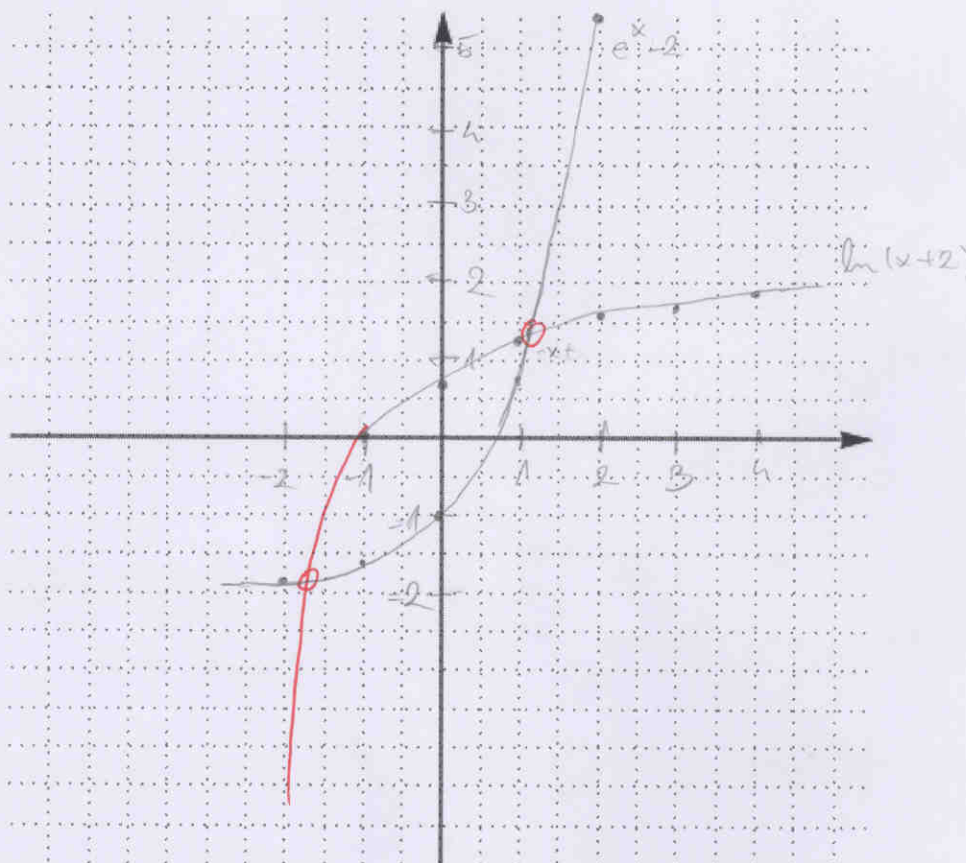
x	-2	-1	0	1	2
$e^x - 2$	-1.8	-1.63	-1	0.71	6.38

x	-2	-1	0	1	2	3	4
$\ln(x+2)$	NP	0	0.69	1.09	1.38	1.60	1.79

PROV.

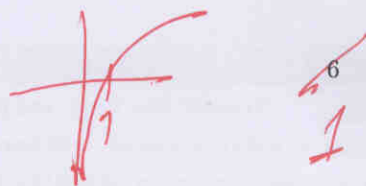
$$e^{1.1} - 2 = \ln(1.1 + 2)$$

$$1.004 \approx 1.13$$



4. Odrediti nultočke funkcije $f(x) = \frac{\arcsin x}{\ln x}$ $\stackrel{?}{=} 0$

$\ln x > 0$ $\xrightarrow{\text{arcsin } x = 0}$ $x \neq 0$
 $x \neq 1$



Nema realnih nultočaka za ovu jednadžbu. ✓

5. Riješiti jednadžbu u kompleksnim brojevima: $z^3 = \frac{7+2i}{3-7i}$ 8

$$z^3 = \frac{7+2i}{3-7i} \cdot \frac{3+7i}{3+7i}$$

$$\frac{7+2i}{3-7i} \cdot \frac{3+7i}{3+7i} = \frac{(7+2i)(3+7i)}{9+49} = \frac{21+49i+6i-14}{58} = \frac{7}{58} + \frac{55i}{58}$$

$$\operatorname{Re} \frac{7}{58}$$

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

$$\operatorname{tg} \varphi = \frac{x}{y}$$

$$\operatorname{Im} \frac{55}{58}i$$

$$= \sqrt{\left(\frac{7}{58}\right)^2 + \left(\frac{55}{58}\right)^2} = 0,95$$

$$\operatorname{tg} \varphi = \frac{406}{310}$$

$$k = 0, 1, 2$$

$$\varphi = 0, 12$$

$$k_2 = 0$$

$$z_1 = \sqrt[3]{0,95} \left(\cos \frac{0,12}{3} + i \sin \frac{0,12}{3} \right)$$

$$= \sqrt[3]{0,95} (0,99 + 0,03i)$$

$$= 0,97 + 0,029i$$

$$k = 1$$

$$z_2 = \sqrt[3]{0,95} \left(\cos \frac{2\pi + 0,12}{3} + i \sin \frac{2\pi + 0,12}{3} \right)$$

$$= \sqrt[3]{0,95} (-0,53 + 0,84i)$$

$$= -0,52 + 0,82i$$



Gaussovom metodom riješi sustav linearnih jednačbi:

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$$\begin{aligned} x + 2y - z + u &= 7 \\ 2x + 5y - z + 2u &= 3 \\ 3x - y - 2z + u &= 7 \\ x - y + 3z - 5u &= 3 \end{aligned}$$

$$\left[\begin{array}{cccc|c} 1 & 2 & -1 & 1 & 7 \\ 2 & 5 & -1 & 2 & 3 \\ 3 & -1 & -2 & 1 & 7 \\ 1 & -1 & 3 & -5 & 3 \end{array} \right] \begin{array}{l} \\ \text{II} - 2\text{I} \\ \text{III} - 3\text{I} \\ \text{IV} - \text{I} \end{array} \sim \left[\begin{array}{cccc|c} 1 & 2 & -1 & 1 & 7 \\ 0 & 1 & 1 & 0 & -11 \\ 0 & -7 & 1 & -2 & -14 \\ 0 & -3 & 4 & -6 & -4 \end{array} \right] \begin{array}{l} \\ \\ \text{III} + 7\text{II} \\ \text{IV} + 3\text{II} \end{array}$$

$$\left[\begin{array}{cccc|c} 1 & 0 & -3 & 1 & 29 \\ 0 & 1 & 1 & 0 & -11 \\ 0 & 0 & 2 & -2 & -91 \\ 0 & 0 & 7 & -6 & -37 \end{array} \right]$$

$$\left[\begin{array}{cccc|c} 1 & 0 & -3 & 1 & 29 \\ 0 & 1 & 1 & 0 & -11 \\ 0 & 0 & 1 & -4 & -54 \\ 0 & 0 & 7 & -6 & -37 \end{array} \right] \begin{array}{l} \\ \\ \text{III} - \text{IV} \\ \text{IV} - 7\text{III} \end{array}$$

$$\left[\begin{array}{cccc|c} 1 & 0 & -3 & 1 & 29 \\ 0 & 1 & 1 & 0 & -11 \\ 0 & 0 & 1 & -4 & -54 \\ 0 & 0 & 0 & -34 & 341 \end{array} \right]$$

$$\left[\begin{array}{cccc|c} 1 & 0 & -3 & 1 & 29 \\ 0 & 1 & 1 & 0 & -11 \\ 0 & 0 & 1 & -4 & -54 \\ 0 & 0 & 0 & 1 & \frac{341}{34} \end{array} \right] \begin{array}{l} \text{I} - \text{IV} \\ \\ \text{III} - 4\text{IV} \\ \text{:}(-34) \end{array}$$

$$\left[\begin{array}{cccc|c} 1 & 0 & -3 & 0 & \frac{1327}{34} \\ 0 & 1 & 1 & 0 & -11 \\ 0 & 0 & 1 & 0 & \frac{236}{17} \\ 0 & 0 & 0 & 1 & \frac{341}{34} \end{array} \right]$$

$$\left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & -\frac{89}{34} \\ 0 & 1 & 0 & 0 & \frac{49}{17} \\ 0 & 0 & 1 & 0 & -\frac{236}{17} \\ 0 & 0 & 0 & 1 & \frac{341}{34} \end{array} \right] \begin{array}{l} \text{I} + 3\text{III} \\ \text{II} - \text{III} \\ \\ \end{array}$$

PROVJERA

$$-\frac{89}{34} + 2 \cdot \frac{49}{17} + \frac{236}{17} - \frac{341}{34} = 7$$

$$7 = 7 //$$

$$3 \cdot \left(-\frac{89}{34}\right) - \frac{49}{17} + \frac{236}{17} - \frac{341}{34} = 7$$

$$7 = 7 //$$

$$2 \cdot \left(-\frac{89}{34}\right) + 5 \cdot \left(\frac{49}{17}\right) + \frac{236}{17} - 2 \cdot \frac{341}{34} = 3$$

$$3 = 3 //$$

$$-\frac{89}{34} - \frac{49}{17} - 3 \cdot \left(\frac{236}{17}\right) + 5 \cdot \left(\frac{341}{34}\right) = 3$$

$$3 = 3 //$$

Ako vam nedostaje mjesta za neki zadatak slobodno nastavite pisati ovdje (samo istaknite broj zadatka)...

$$Q = 2$$

$$z_3 = \sqrt[3]{0,95} \left(\cos \frac{4\pi + 0,12}{3} + i \sin \frac{4\pi + 0,12}{3} \right)$$

$$= \sqrt[3]{0,95} (-0,45 - 0,88i)$$

$$= -0,45 - 0,86i$$

