

Pismeni ispit iz Matematike I
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Zadatak 1 Odredite domenu funkcije f zadane formulom

$$f(x) = \ln \left(1 - \frac{1 - \ln 2x}{1 + \ln 2x} \right) - \sqrt{\frac{e^{\frac{1}{2-x}}}{(x^3 - 3x^2 + 3x - 1)}}.$$

Zadatak 2 U skupu kompleksnih brojeva riješite jednadžbu:

$$z^7 = \bar{z}.$$

Zadatak 3 Odredite parametar a tako da funkcija

$$f(x) = \begin{cases} 5e^{\frac{x^2}{5x^3-x}} & , x < 0 \\ e^{x^4} + 5a & , x \geq 0 \end{cases}$$

bude neprekidna.

Zadatak 4 Bez upotrebe L'Hospitalovog pravila odredite limes:

$$\lim_{x \rightarrow 1} \frac{[(\sin x + \cos x)^2 - \sin(2x)](x-1)}{x^3 - 1}.$$

Zadatak 5 Odredite intervale rasta i pada te lokalne ekstreme funkcije zadane formulom:

$$f(x) = xe^{x-x^2}.$$

	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π
	0°	30°	45°	60°	90°	180°	270°	360°
sin	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	0	-1	0
cos	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	-1	0	1
tg	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	$\pm\infty$	0	$\pm\infty$	0

TABLICA DERIVACIJA		
$(c)' = 0, c \in \mathbb{R}$	$(x)' = 1, x \in \mathbb{R}$	$(x^\alpha)' = \alpha x^{\alpha-1}, \alpha \in \mathbb{R}, x \in \mathbb{R}$
$(\sqrt{x})' = \frac{1}{2\sqrt{x}}, x > 0$	$(\log_a x)' = \frac{1}{x} \log_a e, x > 0$	$(\ln x)' = \frac{1}{x}, x > 0$
$(a^x)' = a^x \ln a, x \in \mathbb{R}$	$(e^x)' = e^x, x \in \mathbb{R}$	$(\sin x)' = \cos x, x \in \mathbb{R}$
$(\cos x)' = -\sin x, x \in \mathbb{R}$	$(\operatorname{tg} x)' = \frac{1}{\cos^2 x}, x \neq (2k-1)\frac{\pi}{2}, k \in \mathbb{Z}$	$(\operatorname{ctg} x)' = \frac{-1}{\sin^2 x}, x \neq k\pi, k \in \mathbb{Z}$