

Pismeni ispit iz Matematike I
Ak. god. 2014./2015.

Zadatak 1 Odredite domenu funkcije f zadane formulom

$$f(x) = \frac{\sin(x^2 - 1)}{\sqrt{x^2 - 5x + 6}}.$$

Zadatak 2 Dokažite da za svaki prirodan broj n vrijedi jednakost:

$$1^3 + 2^3 + \dots + n^3 = \frac{n^2(n+1)^2}{4}.$$

Zadatak 3 Skicirajte u Gaussovoj ravnini skup

$$\{z \in \mathbb{C} : \operatorname{Re}(z - 3 + 4i) + \operatorname{Im}(z + 2 - 3i) \leq 9\}.$$

Zadatak 4 Bez upotrebe L'Hospitalovog pravila izračunajte vrijednost sljedećeg limesa:

$$\lim_{x \rightarrow a} \frac{\sqrt[4]{x} - \sqrt[4]{a}}{x - a}.$$

Zadatak 5 Odredite intervale monotonosti funkcije zadane formulom:

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

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