MATEMATIKA 2: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** xox

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Želim ustmeni kod (zaokružiti): prof. Uglešić asistent Kosor

POPUNJAVA NASTAVNIK
Broj ↓ bodova

1. Riješiti diferencijalnu jednadžbu: $y'' - y' = \mathrm{e}^x + 1$. 15
2. Odrediti lokalne ekstreme funkcije $f(x, y) = x^3 - 3xy - y^3$. 15
3. Pronaći ravninu koja dira graf funkcije $f(x, y) = y\sqrt{x} - y^2 - x + 6y$ povučenu u točki $(4, 1, z_0)$ tog grafa. 15
4. Numeričkom integracijom procijeniti vrijednost $\int_0^1 \frac{dx}{1+\sqrt{x}}$, a zatim isti integral riješiti egzaktno Newton Leibnitzovom formulom. 10+5
5. $\int_2^3 \frac{2x^2+x+2}{x^2-1}\mathrm{d}x =$ 20
6. $\int_0^2 \frac{x-1}{x^2+x-2}\mathrm{d}x = ?$ 20

Ukupno: 10

f	$\frac{\mathrm{d}f}{\mathrm{d}x}$
$x^\alpha\ (\alpha \neq 0)$	$\alpha x^{\alpha-1}$
$\ln x$	$\frac{1}{x}$
$\log_\alpha x\ (\alpha > 0)$	$\frac{1}{x \ln \alpha}$
e^x	e^x
$\alpha^x\ (\alpha > 0)$	$\alpha^x \ln \alpha$
$\sin x$	$\cos x$
$\cos x$	$-\sin x$
$\tan x$	$\frac{1}{\cos^2 x}$
$\cot x$	$\frac{-1}{\sin^2 x}$
$\arcsin x$	$\frac{1}{\sqrt{1-x^2}}$
$\arctan x$	$\frac{1}{1+x^2}$

Tablica nekih integrala

$\int \mathrm{d}x = x + C$	$\int \frac{\mathrm{d}x}{a^2+x^2} = \frac{1}{a}\arctan\frac{x}{a} + C$	$\int \frac{\mathrm{d}x}{a^2-x^2} = \frac{1}{2a}\ln\left\lvert\frac{a+x}{a-x}\right\rvert + C$
$\int x^\alpha \mathrm{d}x = \frac{x^{\alpha+1}}{\alpha+1},\ \alpha \neq -1$	$\int \tan x \mathrm{d}x = -\ln\lvert\cos x\rvert + C$	$\int \frac{\mathrm{d}x}{x^2-a^2} = \frac{1}{2a}\ln\left\lvert\frac{x-a}{x+a}\right\rvert + C$
$\int \frac{\mathrm{d}x}{x} = \ln\lvert x\rvert + C$	$\int \cot x \mathrm{d}x = \ln\lvert\sin x\rvert + C$	$\int \frac{\mathrm{d}x}{\sqrt{x^2 \pm a^2}} = \ln\left\lvert x + \sqrt{x^2 \pm a^2}\right\rvert + C$
$\int \mathrm{e}^x \mathrm{d}x = \mathrm{e}^x + C$	$\int \frac{\mathrm{d}x}{\cos^2 x} = \tan x + C$	$\int \frac{\mathrm{d}x}{\sqrt{a^2-x^2}} = \arcsin\frac{x}{a} + C$
$\int a^x \mathrm{d}x = \frac{a^x}{\ln a} + C$	$\int \frac{\mathrm{d}x}{\sin^2 x} = -\cot x + C$	$\int \frac{\mathrm{d}x}{\sqrt{2ax-x^2}} = \arccos\left(1-\frac{x}{a}\right) + C$
$\int \sin x \mathrm{d}x = -\cos x + C$	$\int \sqrt{x^2 \pm a^2}\,\mathrm{d}x = \frac{1}{2}\left[x\sqrt{x^2 \pm a^2} \pm a^2 \ln\left(x + \sqrt{x^2 \pm a^2}\right)\right] + C$	
$\int \cos x \mathrm{d}x = \sin x + C$	$\int \sqrt{a^2-x^2}\,\mathrm{d}x = \frac{1}{2}\left[x\sqrt{a^2-x^2} + a^2 \arcsin\left(\frac{x}{a}\right)\right] + C$	

ZUKA ZUKACIZ

④ $\int_0^1 \frac{dx}{1+\sqrt{x}} \Rightarrow y = \frac{1}{1+\sqrt{x}}$

$S = \frac{1}{6}(1 + 4 \cdot 0{,}5858 + 0{,}5)$

x	0	1	2
x_q	0	1/2	1
$f(x)$	1	0,5858	0,5

$S = 0{,}640$ ✓

$d = 1 - 0 = 1$

① $y'' - y' = e^x + 1$

$\lambda^2 - \lambda = e^x + 1$

$y = C \cdot e^{\lambda x}$ ✗

(5.) $\int_2^3 \frac{2x^2+x+2}{x^2-1}\,dx$

$= \int_2^3 \frac{2x^2}{x^2-1}\,dx + \int_2^3 \frac{x\,dx}{x^2-1} + \int_2^3 \frac{2\,dx}{x^2-1}$

$= 2\int_2^3 \frac{x^2}{x^2-1}\,dx + \int_2^3 \frac{x}{x^2-1}\,dx + 2\int_2^3 \frac{dx}{x^2-1}$

$= ? + \frac{1}{2}\left|\ln|x^2+1|\right|_2^3 + 2\left|\frac{1}{2}\ln\left|\frac{x-1}{x+1}\right|\right|_2^3$

$\not\in \emptyset$