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

IME I PREZIME: ALEN BURA **BROJ INDEKSA:** 17-2-0095-2011

POPUNJAVA NASTAVNIK
Broj ↓ bodova

1. Odredi partikularno rješenje koje zadovoljava navedenu ODJ i uvjete: $y''+2y'=1$, uz $y(0)=0$ i $y'(0)=0$. Na kraju provjeri rješenje. 15
2. Nađi koliko iznosi $f(5)$ ako f zadovoljava $dy = \left(1+x+\frac{y}{1-x^2}\right)dx$ i $y(0)=2$. 15
3. Za funkciju $f(x,y) = \ln\left(\frac{y}{x}\right)$ odrediti domenu, kodomenu, razinske krivulje i limes u ishodištu (ako postoji). ~~20~~ 8
4. $\int\limits_0^2 xe^x \,\mathrm{d}x = ?$ 15
5. Zadana je funkcija $f(x)=\sqrt{|x|}$. Traži se površina ispod grafa funkcije (do osi apcise) na segmentu $[-1,2]$. Podijeliti segment na nekoliko dijelova i preko trapezne formule procijeniti traženu površinu. Skicirati graf funkcije, površinu koja je dobivena procjenom i vizualno ocijeniti grešku numeričkog postupka. 20
6. Integriranjem izračunati površinu trokuta zadanog točkama $A(-2,1)$, $B(0,2)$, $C(1,-1)$. ~~15~~

Ukupno: 23

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

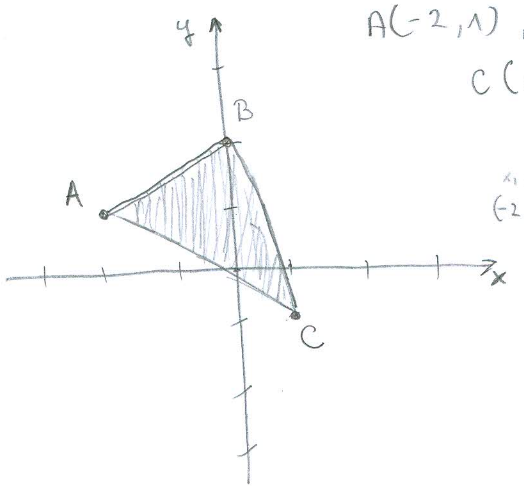
Tablica nekih integrala

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

4. $$\int\limits_0^2 xe^x\,dx = \begin{bmatrix} u=x & dv=e^x dx \\ du=dx & v=e^x \end{bmatrix} = x\cdot e^x - \int e^x dx = x\cdot e^x - e^x \Big|_0^2 = \left[(2\cdot e^2 - e^2) - (0\cdot e^0 - e^0)\right]$$

$= 8,389$ ✓

6.



A(-2,1), B(0,2)
C(1,-1)

$(y-y_1)(x_2-x_1)=(y_2-y_1)(x-x_1)$

$\overline{AB}$ $(-2,1)(0,2)$

$(y-1)\cdot(0+2)=(1-2)\cdot(x+2)$

$(y-1)2=-1\cdot(x+2)$

$2y-2=-x-2$

$2y=-x-\cancel{2}+\cancel{2}$

$2y=-x \;/:2$

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

$\overline{AC}$ $(-2,1)\cdot(1,-1)$

$(y-y_1)(x_2-x_1)=(y_2-y_1)(x-x_1)$

$(y-1)(1+2)=(-1-1)\cdot(x+2)$

$(y-1)\cdot 3=-2(x+2)$

$3y-3=-2x-4$

$3y=-2x-4+3$

$3y=-2x-1 \;/:3$

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

$\overline{BC}$ $(0,2)(1,-1)$

$(y-y_1)(x_2-x_1)=(y_2-y_1)(x-x_1)$

$(y-2)(1-0)=(-1-2)(x-0)$

$y-2=-3x$

$y=-3x+2$

$$\int_{-2}^{1}-\frac{1}{2}x+\frac{2}{3}x+\frac{1}{3}\,dx-\int_{-2}^{0}-\frac{1}{2}x+\frac{2}{3}x+\frac{1}{3}\,dx+\int_{0}^{1}-3x+2+\frac{2}{3}x+\frac{1}{3}\,dx=$$

$$=-\frac{1}{2}\left(\frac{x^2}{2}\right)\Big|_{-2}^{1}+\frac{2}{3}\cdot\left(\frac{x^2}{2}\right)\Big|_{-2}^{1}+\frac{1}{3}(x)\Big|_{-2}^{1}+\frac{1}{2}\left(\frac{x^2}{2}\right)\Big|_{-2}^{0}+\frac{2}{3}\left(\frac{x^2}{2}\right)\Big|_{-2}^{0}+\frac{1}{3}(x)\Big|_{-2}^{0}+3\left(\frac{x^2}{2}\right)\Big|_{0}^{1}+2\cdot(x)\Big|_{0}^{1}+\frac{2}{3}\left(\frac{x^2}{2}\right)\Big|_{0}^{1}$$

$$+\frac{1}{3}(x)\Big|_{0}^{1}=$$

$$=-\frac{1}{2}\cdot\left(\frac{5}{2}\right)+\frac{2}{3}\cdot\left(\frac{5}{2}\right)+\frac{1}{3}\cdot 3+\frac{1}{2}\cdot 1+\frac{2}{3}\cdot 1+\frac{1}{3}\cdot 2+3\cdot\frac{1}{2}+2\cdot 1+\frac{2}{3}\cdot\left(\frac{1}{2}\right)+\frac{1}{3}\cdot 1$$

$$=-\frac{5}{4}+\frac{5}{3}+1+\frac{1}{2}+\frac{2}{3}+\frac{2}{3}+\frac{3}{2}+2+\frac{1}{3}+\frac{1}{3}$$

$$=\frac{89}{12}$$

VIDI NOVOSEL

$y'' + 2y' = 1$ $\quad y(0) = 0 \quad y'(0) = 0$ ALEN BURA IT-2-0095-2011

$k^2 + 2k = 0$

$k(k+2) = 0$

$k_1 = 0 \quad k_2 = -2$

$\boxed{y_H = c_1 e^{-2x} + c_2}$

$y_p(x) = A$

$y_p'(x) = 0$

$y_p''(x) = 0$

$\boxed{y(x) = c_1 e^{-2x} + c_2 + A}$

$y'(0) = c_1 e^{-2x} \cdot -2 + c_2$

$\boxed{y'(0) = -2c_1 e^{-2x} + c_2}$

$0 = c_1 e^{-2 \cdot 0} + c_2$

$0 = c_1 + c_2$

$0 = -2c_1 + c_2$

$\left.\begin{array}{l} c_1 + c_2 = 1 \\ -2c_1 + c_2 = 0 \end{array}\right\} / \cdot (-1)$

$\left.\begin{array}{l} -c_1 - \cancel{c_2} = -1 \\ -2c_1 + \cancel{c_2} = 0 \end{array}\right\}$

$-3c_1 = -1 \quad / : (-3)$

$\boxed{c_1 = \frac{1}{3}}$

$\frac{1}{3} + c_2 = 1$

$c_2 = 1 - \frac{1}{3}$

$c_2 = \frac{2}{3}$

$\boxed{y(x) = \frac{1}{3} e^{-2x} + \frac{2}{3} + A}$

KOLIKI JE A?

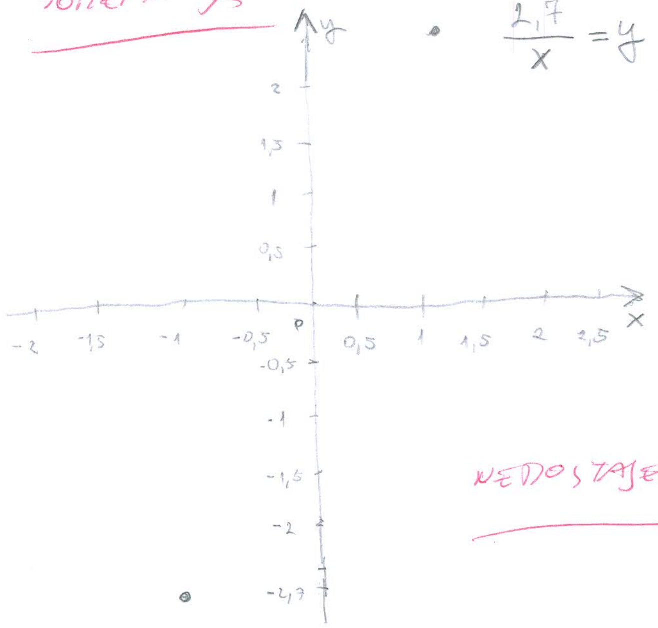
~~TREBA~~

BODUJE SE SAMO KONAČNO RJEŠENJE?

3. $f(x,y) = \ln\left(\frac{y}{x}\right)$

$\ln > \frac{y}{\cancel{x}}$; $x \neq 0$

DOMENA X



$c_1 = 1$

$1 = \ln\left(\frac{y}{x}\right) \Big/ ^{e}$

$e^1 = \frac{y}{x} \quad / : x$

$\frac{2,7}{x} = y$ ✓

$c_2 = 2$

$2 = \ln\left(\frac{y}{x}\right) \Big/ ^{e}$

$e^2 = \frac{y}{x}$ ✓

$7,3 = \frac{y}{x} \quad / : x$

$\frac{7,3}{x} = y$

$c_3 = -2$

$-2 = \ln\left(\frac{y}{x}\right) \Big/ ^{e}$

$e^{-2} = \frac{y}{x}$

$0,13 = \frac{y}{x} \quad / : x$

$\frac{0,13}{x} = y$ ✓

$c_4 = 0$

$0 = \ln\left(\frac{y}{x}\right) \Big/ ^{e}$

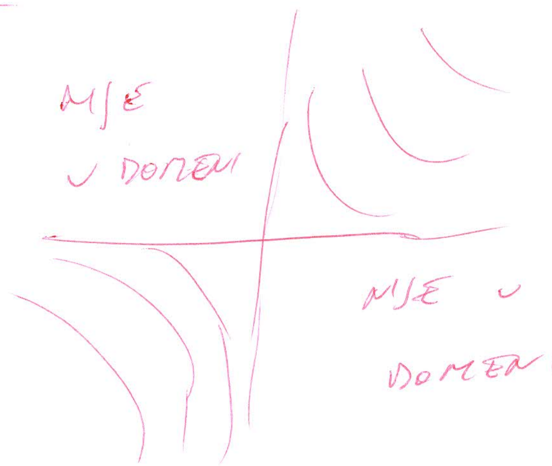
$1 = \frac{y}{x} \quad / : x$

$\frac{1}{x} = y$

RAZINSKE ✓

8

NEDOSTAJE SKICA



MATEMATIKA 2: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **Pišite dvostrano!** oox

Ime i prezime: DINO CVITAN **Broj indeksa:** 17-2-0068

Popunjava nastavnik
Broj ↓ bodova

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6. Integriranjem izračunati površinu trokuta zadanog točkama $A(-2, 1)$, $B(0, 2)$, $C(1, -1)$. 15

Ukupno: 6

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$x^\alpha \ (\alpha \neq 0)$	$\alpha x^{\alpha-1}$
$\ln x$	$\frac{1}{x}$
$\log_\alpha x \ (\alpha > 0)$	$\frac{1}{x \ln \alpha}$
e^x	e^x
$\alpha^x \ (\alpha > 0)$	$\alpha^x \ln \alpha$
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Tablica nekih integrala

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

$y - y_1 = \frac{y_2 - y_1}{x_2 - x_1}(x - x_1)$

6. $P_{AB} = y - 1 = \frac{2-1}{0+2}(x-1)$

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

$= y = \frac{1}{2}x - \frac{1}{2} + 1$

$= y = \frac{1}{2}x + \frac{1}{2}$

$P_{BC} = y - 2 = \frac{-1-2}{1-0}(x-0)$

$= y - 2 = -3x$

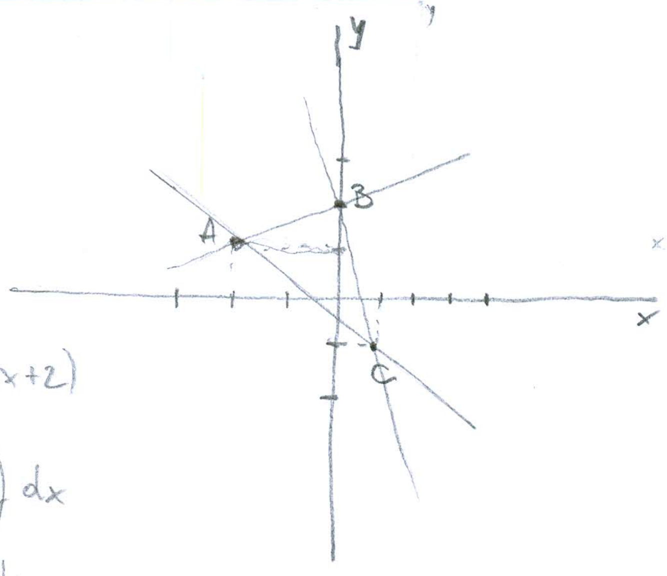
$= y = -3x + 2$

$P_{CA} = y + 1 = \frac{1+1}{-2-1}(x+2)$

$= y + 1 = -\frac{1}{3}x - \frac{2}{3}$

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

$y = -\frac{1}{3}x - \frac{5}{3}$



$P_1 = \int_{-2}^{0} \left(\frac{1}{2}x + \frac{1}{2}\right) - (-3x + 2)$

$I = \int \left(\frac{1}{2}x + \frac{1}{2} + 3x - 2\right) dx$

$= \int \left(\frac{1}{2}x + 3x - \frac{3}{2}\right) dx$

$\frac{1}{2}\int x \, dx + 3\int x \, dx - \frac{3}{2}x$

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

$= \frac{1}{4}x^2 + \frac{3}{2}x^2 - \frac{3}{2}x \Big|_{-2}^{0}$

$= \rightarrow$

$= \frac{1}{4}x^2 + \frac{3}{2}x^2 - \frac{3}{2}x$

$= 0 + 0 - 0 - 1 + 2 + 3$

$= 4$

$P_2 = \int_0^1 = (-3x+2) - (-\frac{1}{3}x - \frac{5}{3})$

$I = \int (-3x + 2 + \frac{1}{3}x + \frac{5}{3})$

$= \int (-3x + \frac{1}{3}x + \frac{11}{3}$

$= -3\int x\,dx + \frac{1}{3}\int x\,dx + \frac{1}{3}x$

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

$= -\frac{3}{2}x^2 + \frac{1}{6}x^2 + \frac{1}{3}x \Big|_0^1$

$= -\frac{3}{2} + \frac{1}{6} + \frac{1}{3} - 0$

$= -1$

$P = P_1 + P_2$

$P = 4 + (-1)$

$P = 4 - 1$

$P = 3$

VIDI NAVOSEL

4. $I = \int_0^2 xe^x\,dx = \begin{bmatrix} u = e^x & dv\int = \int x\,dx \\ du = e^x dx & v = x \end{bmatrix}$

$I_1 = xe^x - \int xe^x\,dx$

$I = xe^x - I$

$2I = xe^x \,/2$

$I = \frac{xe^x}{2}\Big|_0^2 = \frac{2e^2}{2} - \frac{0e^0}{2} = 7.389$

3. $f(x,y) = \ln\left(\frac{y}{x}\right)$

$\ln\left(\frac{y}{x}\right) > 0$

$x \neq 0$

$\varnothing$

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Ukupno: 30

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$x^\alpha\ (\alpha \neq 0)$	$\alpha x^{\alpha-1}$
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$\int x^\alpha \,\mathrm{d}x = \frac{x^{\alpha+1}}{\alpha+1},\ \alpha \neq -1$	$\int \tan x \,\mathrm{d}x = -\ln\lvert\cos x\rvert + C$	$\int \frac{\mathrm{d}x}{x^2-a^2} = \frac{1}{2a}\ln\left\lvert\frac{x-a}{x+a}\right\rvert + C$
$\int \frac{\mathrm{d}x}{x} = \ln\lvert x\rvert + C$	$\int \cot x \,\mathrm{d}x = \ln\lvert\sin x\rvert + C$	$\int \frac{\mathrm{d}x}{\sqrt{x^2 \pm a^2}} = \ln\left\lvert x + \sqrt{x^2 \pm a^2}\right\rvert + C$
$\int e^x \,\mathrm{d}x = e^x + C$	$\int \frac{\mathrm{d}x}{\cos^2 x} = \tan x + C$	$\int \frac{\mathrm{d}x}{\sqrt{a^2-x^2}} = \arcsin\frac{x}{a} + C$
$\int a^x \,\mathrm{d}x = \frac{a^x}{\ln a} + C$	$\int \frac{\mathrm{d}x}{\sin^2 x} = -\cot x + C$	$\int \frac{\mathrm{d}x}{\sqrt{2ax-x^2}} = \arccos\left(1-\frac{x}{a}\right) + C$
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$\int \cos x \,\mathrm{d}x = \sin x + C$	$\int \sqrt{a^2-x^2}\,\mathrm{d}x = \frac{1}{2}\left[x\sqrt{a^2-x^2} + a^2 \arcsin\left(\frac{x}{a}\right)\right] + C$	

(4) $\int\limits_0^2 x e^x dx = \left[\begin{matrix} u = x & dv = e^x dx \\ du = dx & v = e^x \end{matrix}\right] = x \cdot e^x - \int e^x dx$

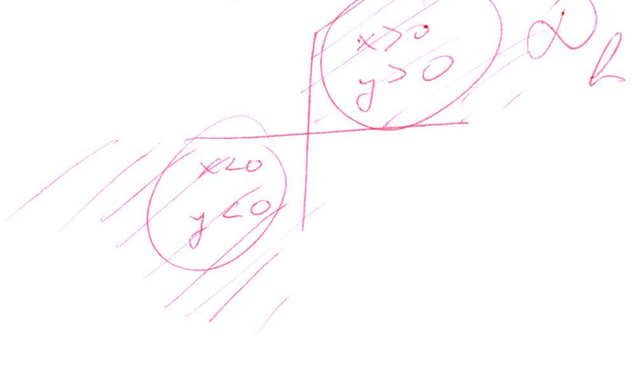
$= (x e^x - e^x)\Big|_0^2 = (2e^2 - e^2) - (0e^0 - e^0) = 8.39$

7.39

$\cancel{4}$

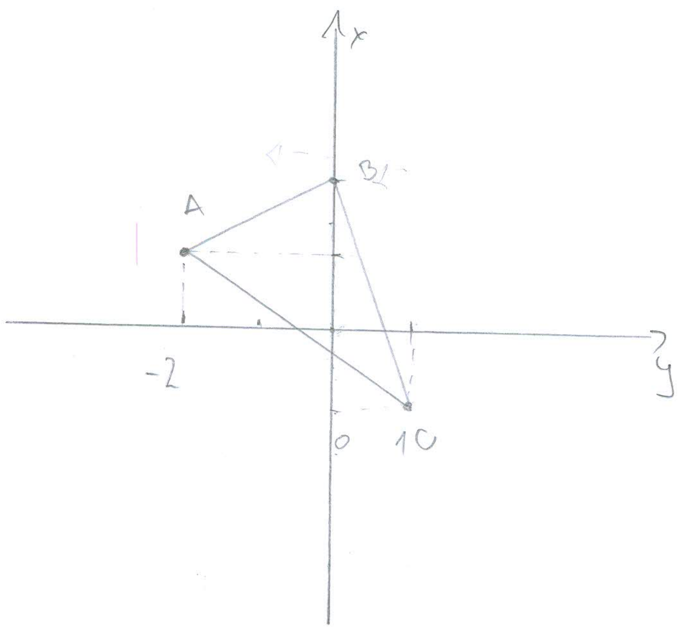
(3) $f(x,y) = \ln\left(\frac{y}{x}\right)$

$D(f) = \{(x,y) \in \mathbb{R} : x \neq 0\}$ ×



→D

⑥ $A(-2,1)$, $B(0,2)$, $C(1,-1)$



$A(\overset{x_1}{-2},\overset{y_1}{1})$ $B(\overset{x_2}{0},\overset{y_2}{2})$

$(x_2-x_1)(y-y_1)=(y_2-y_1)(x-x_1)$

$(0+2)(y-1)=(2-1)(x+2)$

$2(y-1)=1(x+2)$

$2y-2=x+2$

$2y=x+2+2$

$2y=x+4 /:2$

$\underline{y=\frac{1}{2}x+2}$

$B(\overset{x_1}{0},\overset{y_1}{2})$ $C(\overset{x_2}{1},\overset{y_2}{-1})$

$(x_2-x_1)(y-y_1)=(y_2-y_1)(x-x_1)$

$(1-0)(y-2)=(-1-2)(x-0)$

$1(y-2)=-3(x-0)$

$y-2=-3x+0$

$\underline{y=-3x+2}$

$A(\overset{x_1}{-2},\overset{y_1}{1})$ $C(\overset{x_2}{1},\overset{y_2}{-1})$

$(x_2-x_1)(y-y_1)=(y_2-y_1)(x-x_1)$

$(1+2)(y-1)=(-1-1)(x+2)$

$3(y-1)=-2(x+2)$

$3y-3=-2x-4$

$3y=-2x-4+3$

$3y=-2x-1 /:3$

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

$$P=\int_0^1\left[-3x+2-\left(-\frac{2}{3}x-\frac{1}{3}\right)\right]dx+\int_{-2}^{0}\left[\frac{1}{2}x+2-\left(-\frac{2}{3}x-\frac{1}{3}\right)\right]dx$$

$$=\int_0^1\left[-3x+2+\frac{2}{3}x+\frac{1}{3}\right]dx+\int_{-2}^{0}\left[\frac{1}{2}x+2+\frac{2}{3}x+\frac{1}{3}\right]dx$$

$$=\int_0^1\left[-\frac{7}{3}x+\frac{7}{3}\right]dx+\int_{-2}^{0}\left[\frac{7}{6}x+\frac{7}{3}\right]dx$$

$$=-\frac{7}{3}\cdot\frac{x^2}{2}+\frac{7}{3}x\Big|_0^1+\frac{7}{6}\frac{x^2}{2}+\frac{7}{3}x\Big|_{-2}^{0}=\frac{7}{6}+\frac{7}{3}=\frac{7}{2}//$$

$\frac{7}{6}$

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

IME I PREZIME: MAHADIĆ FRANE **BROJ INDEKSA:** 17-1-0077-2011

POPUNJAVA NASTAVNIK
Broj ↓ bodova

1. Odredi partikularno rješenje koje zadovoljava navedenu ODJ i uvjete: $y''+2y'=1$, uz $y(0)=0$ i $y'(0)=0$. Na kraju provjeri rješenje. 15
2. Nađi koliko iznosi $f(5)$ ako f zadovoljava $dy=\left(1+x+\frac{y}{1-x^2}\right)\mathrm{d}x$ i $y(0)=2$. 15
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4. $\int\limits_0^2 xe^x\,\mathrm{d}x=?$ 15
5. Zadana je funkcija $f(x)=\sqrt{|x|}$. Traži se površina ispod grafa funkcije (do osi apcise) na segmentu $[-1,2]$. Podijeliti segment na nekoliko dijelova i preko trapezne formule procijeniti traženu površinu. Skicirati graf funkcije, površinu koja je dobivena procjenom i vizualno ocijeniti grešku numeričkog postupka. 20
6. Integriranjem izračunati površinu trokuta zadanog točkama $A(-2,1)$, $B(0,2)$, $C(1,-1)$. ~~15~~

Ukupno: 15

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

4) $\int\limits_0^2 x\cdot e^x dx = \left| \begin{matrix} u=x & dv=e^x \ / \int \\ du=dx & v=e^x \end{matrix} \right|$

$u\cdot v-\int v\cdot du = x\cdot e^x-\int e^x dx$

$= x\cdot e^x\Big|_0^2 - e^x\Big|_0^2 = 2\cdot e^2-e^2(0-1)$

$=7.3890+1=8.3890$ ✓

$A(-2,1) \quad B(0,2) \quad C(1,-1)$

$\overset{x_1\ y_1}{A(-2,1)} \quad \overset{x_2\ y_2}{B(0,2)}$

$(y-y_1) = \frac{y_2-y_1}{x_2-x_1}(x-x_1)$

$(y-1) = \frac{2-1}{0+2}(x+2)$

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

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

$y-1 = \frac{1}{2}x+1$

$\underline{y = \frac{1}{2}x+2}$

$\underset{x_1\ y_1}{A(-2,1)} \quad \underset{x_2\ y_2}{C(1,-1)}$

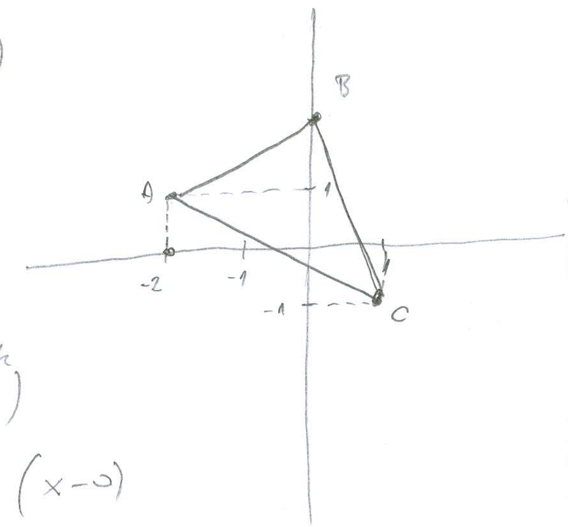
$(y-y_1) = \frac{y_2-y_1}{x_2-x_1}(x-x_1)$

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

$y-1 = \frac{0}{3}(x+2)$

$y-1 = 0(x+2)$

$\underline{y = 1}$



$\overset{x_1\ y_1}{B(0,2)}, \quad \overset{x_2\ y_2}{C(1,-1)}$

$(y-2) = \frac{-1+2}{1-0}(x-0)$

$y-2 = -\frac{3}{1}(x-0)$

$y-2 = -3(x-0)$

$y-2 = -3x$

$\underline{y = -3x+2}$

AB - BC

$$\int_{-2}^{1}\left(\frac{1}{2}x+2-(-3x+2)\right) = \frac{1}{2}\int_{-2}^{1} x+2dx = \int_{-2}^{1} 3x+2dx = \frac{1}{2}\cdot\frac{x^2}{2} - \frac{3x^2}{2}\Big|_{-1}^{2}$$

$P_1 = \frac{1}{2}\cdot\frac{2^2}{2} - \frac{3\cdot 2^2}{2} - \left(\frac{1}{2}\cdot\frac{(-1)^2}{2} - \frac{(-3)^2}{2}\right)$

$P_1 = \frac{1}{2}\cdot\frac{4}{2} - \frac{36}{2} - \left(\frac{1}{2}\cdot\frac{1}{2} - \frac{9}{2}\right)$

$P_1 = \frac{4}{4} - \frac{36}{2} - \left(\frac{1}{2}\cdot\frac{1}{2} - \frac{9}{2}\right)$

$P_1 = 1 - \frac{36}{2} - \left(\frac{1}{2} - \frac{9}{2}\right)$

$P_1 = 1 - 18 - 9$

$P_1 = -28$

AB - AC

$$\int_{-2}^{2}\left(\frac{1}{2}x+2\right)-1 = \frac{1}{2}\int_{-2}^{2} x+2\,dx - \int_{-2}^{2} 2 = \frac{1}{2}\cdot\frac{x^2}{2}\Big|_{-2}^{2} = \frac{1}{2}\cdot\frac{2^2}{2} - \left(\frac{1}{2}\cdot\frac{-2^2}{2}\right)$$

$P_2 = \frac{1}{2}\cdot\frac{4}{2} - \left(\frac{1}{2}\cdot\frac{4}{2}\right)$

$P_2 = 1 - 1$

$P_2 = 0$

$P = P_1 + P_2$

$= -28 + 0$

$\underline{P = -28}$

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

IME I PREZIME: MAURO MIŠLOV **BROJ INDEKSA:** 17-2-0170-2012

POPUNJAVA NASTAVNIK

Broj ↓ bodova

1. Odredi partikularno rješenje koje zadovoljava navedenu ODJ i uvjete: $\boxed{y''} + 2y' = 1$, uz $y(0) = 0$ i $y'(0) = 0$. Na kraju provjeri rješenje. 15
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6. Integriranjem izračunati površinu trokuta zadanog točkama $A(-2, 1)$, $B(0, 2)$, $C(1, -1)$. 15

Ukupno:

f	$\frac{df}{dx}$
$x^\alpha \ (\alpha \neq 0)$	$\alpha x^{\alpha-1}$
$\ln x$	$\frac{1}{x}$
$\log_\alpha x \ (\alpha > 0)$	$\frac{1}{x \ln \alpha}$
e^x	e^x
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Tablica nekih integrala		
$\int dx = x + C$	$\int \frac{dx}{a^2 + x^2} = \frac{1}{a} \arctan \frac{x}{a} + C$	$\int \frac{dx}{a^2 - x^2} = \frac{1}{2a} \ln \left\lvert \frac{a+x}{a-x} \right\rvert + C$
$\int x^\alpha dx = \frac{x^{\alpha+1}}{\alpha+1}, \ \alpha \neq -1$	$\int \tan x \, dx = -\ln \lvert \cos x \rvert + C$	$\int \frac{dx}{x^2 - a^2} = \frac{1}{2a} \ln \left\lvert \frac{x-a}{x+a} \right\rvert + C$
$\int \frac{dx}{x} = \ln \lvert x \rvert + C$	$\int \cot x \, dx = \ln \lvert \sin x \rvert + C$	$\int \frac{dx}{\sqrt{x^2 \pm a^2}} = \ln \left\lvert x + \sqrt{x^2 \pm a^2} \right\rvert + C$
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MATEMATIKA 2: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** oox **IME I PREZIME:** JURE DUNDOVIĆ **BROJ INDEKSA:**	POPUNJAVA NASTAVNIK Broj ↓ bodova

1. Odredi partikularno rješenje koje zadovoljava navedenu ODJ i uvjete: $y''+2y'=1$, uz $y(0)=0$ i $y'(0)=0$. Na kraju provjeri rješenje. 15

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$x^\alpha\ (\alpha \neq 0)$	$\alpha x^{\alpha-1}$
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Tablica nekih integrala

$\int \mathrm{d}x = x + C$	$\int \frac{\mathrm{d}x}{a^2+x^2} = \frac{1}{a}\arctan\frac{x}{a} + C$	$\int \frac{\mathrm{d}x}{a^2-x^2} = \frac{1}{2a}\ln\left\lvert\frac{a+x}{a-x}\right\rvert + C$
$\int x^\alpha \mathrm{d}x = \frac{x^{\alpha+1}}{\alpha+1},\ \alpha \neq -1$	$\int \tan x \,\mathrm{d}x = -\ln\lvert\cos x\rvert + C$	$\int \frac{\mathrm{d}x}{x^2-a^2} = \frac{1}{2a}\ln\left\lvert\frac{x-a}{x+a}\right\rvert + C$
$\int \frac{\mathrm{d}x}{x} = \ln\lvert x\rvert + C$	$\int \cot x \,\mathrm{d}x = \ln\lvert\sin x\rvert + C$	$\int \frac{\mathrm{d}x}{\sqrt{x^2 \pm a^2}} = \ln\left\lvert x + \sqrt{x^2 \pm a^2}\right\rvert + C$
$\int e^x \mathrm{d}x = e^x + C$	$\int \frac{\mathrm{d}x}{\cos^2 x} = \tan x + C$	$\int \frac{\mathrm{d}x}{\sqrt{a^2-x^2}} = \arcsin\frac{x}{a} + C$
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4) $\int\limits_0^2 xe^x dx$ $\quad \left| \begin{array}{ll} u = x & dv = e^x dx \\ du = dx & v = e^x \end{array} \right.$

$= \int\limits_0^2 \left(xe^x - \int\limits_0^2 e^x dx \right) = xe^x - \int e^x dx \Big|_0^2 = xe^x - e^x \Big|_0^2$

$= 2e^2 - e^2 - (0 - e^0) =$

$= e^2 + 1 \approx 8.389$ ✓

MATEMATIKA 2: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **Pišite dvostrano!** oox	Popunjava nastavnik
Ime i prezime: MATEA ČULINA **Broj indeksa:** 17-2-0206-2012	Broj ↓ bodova

1. Odredi partikularno rješenje koje zadovoljava navedenu ODJ i uvjete: $y''+2y'=1$, uz $y(0)=0$ i $y'(0)=0$. Na kraju provjeri rješenje. ~~15~~ 0

2. Nađi koliko iznosi $f(5)$ ako f zadovoljava $dy=\left(1+x+\frac{y}{1-x^2}\right)dx$ i $y(0)=2$. 15

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$\int\frac{dx}{x}=\ln\lvert x\rvert+C$	$\int\cot x\,dx=\ln\lvert\sin x\rvert+C$	$\int\frac{dx}{\sqrt{x^2\pm a^2}}=\ln\left\lvert x+\sqrt{x^2\pm a^2}\right\rvert+C$
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1. ODREDI PARTIKULARNO RJEŠENJE KOJE ZADOVOLJAVA NAVEDENU ODJ i UVJETE: $y''+2y'=1$, UZ $y(0)=0$ i $y'(0)=0$ NA KRAJU PROVJERI RJEŠENJE.

$y''+2y'=1 \quad y(0)=0 \quad y'(0)=0$

~~$y_F = (x\cdot A\cos 0$~~

$r^2+2r=0$

$r(r+2r)=0$

$r_1=0 \quad r_2=-2$

$y_h=C_1+C_2e^{-2x}$

$g(x)=1 \quad \alpha=0 \quad \beta=0 \to k=1$

$m=n=0 \to N=0$

1.

4.

$$\int_0^2 xe^x\,dx = \left|\begin{matrix} u = x & dv = e^x dx \\ du = dx & v = e^x \end{matrix}\right.$$

$$= \left(xe^x - \int e^x dx\right)\Big|_0^2 =$$

$$= (xe^x - e^x)\Big|_0^2 =$$

$$= 2e^2 - e^2 - (0 - e^0) =$$

$$= e^2 + 1$$

2.

$$dy = \left(1 + x + \frac{y}{1-x^2}\right) dx \qquad y(0) = 2 \qquad f(5)$$

$$f(5) = \left(1 + x + \frac{y}{1-x^2}\right) dx$$

$$f(5) = 1 + x + \frac{2}{1-x^2} \Big/ : 1+x^2$$

$$f(5) = \frac{1+x}{1+x^2} + 2$$

$$f(5) = \frac{1+x}{1+x^2} \cdot 1 - x^2 + 2$$

$$f(5) = 1 + x \cdot 1 - x^2 + 2$$

$$f(5) = 1 + x^2 + 2$$

17-2-0206-2012

Matea Culina

[redacted]

1. $y'' + 2y' = 1$

$r^2 + 2r = 0$

$r(r+2r) = 0$

$r_1 = 0 \quad r_2 = -2$

$y_h = C_1 + C_2$

$g(x) = 1$

$\alpha = 0 \quad \beta = 0 \rightarrow k = 1$

$m = n = 0 \rightarrow N = 0$

$y_F = (x \cdot A\cos 0 + B\sin 0 = Ax)$

$y'_F = A \quad y''_F = 0$

$2A = 1 \rightarrow A = \frac{1}{2}$

$y = C_1 + C_2 e^{-2x} + \frac{1}{2}x$

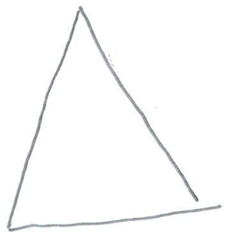
$y' = -2C_2 e^{-2x} + \frac{1}{2}$

NISTE UZELI U OBZIR RUBNE UVJETE.

$\emptyset$

... površina ispod grafa funkcije (do osi apcise) na segmentu $[-1, 2]$. Podijeliti segment na nekoliko dijelova i preko trapezne formule procijeniti traženu površinu. Skicirati graf funkcije, površinu koja je dobivena procjenom i vizualno ocjeniti grešku numeričkog postupka.

6. Integriranjem izračunati površinu trokuta zadanog točkama $A(-2,1)$, $B(0,2)$ $C(1,-1)$



MATEMATIKA 2: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!**	Popunjava nastavnik
ooX	Broj ↓ bodova
IME I PREZIME: TIHO BRAJKOVIĆ **BROJ INDEKSA:** 17-2-0100-2011	

1. Odredi partikularno rješenje koje zadovoljava navedenu ODJ i uvjete: $y''+2y'=1$, uz $y(0)=0$ i $y'(0)=0$. Na kraju provjeri rješenje. 15

2. Nađi koliko iznosi $f(5)$ ako f zadovoljava $dy=\left(1+x+\frac{y}{1-x^2}\right)dx$ i $y(0)=2$. 15

3. Za funkciju $f(x,y)=\ln\left(\frac{y}{x}\right)$ odrediti domenu, kodomenu, razinske krivulje i limes u ishodištu (ako postoji). 20

4. $\int_0^2 xe^x \, dx = ?$ 15

5. Zadana je funkcija $f(x)=\sqrt{|x|}$. Traži se površina ispod grafa funkcije (do osi apcise) na segmentu $[-1,2]$. Podijeliti segment na nekoliko dijelova i preko trapezne formule procijeniti traženu površinu. Skicirati graf funkcije, površinu koja je dobivena procjenom i vizualno ocijeniti grešku numeričkog postupka. 20

6. Integriranjem izračunati površinu trokuta zadanog točkama $A(-2,1)$, $B(0,2)$, $C(1,-1)$. 15

Ukupno: $\emptyset$

f	$\frac{df}{dx}$
$x^\alpha \ (\alpha \neq 0)$	$\alpha x^{\alpha-1}$
$\ln x$	$\frac{1}{x}$
$\log_\alpha x \ (\alpha > 0)$	$\frac{1}{x \ln \alpha}$
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

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

2. $f = 5$

$dy = \left(1 + x + \frac{y}{1-x^2}\right)dx$

$y(0) = 2$

$dy = \left(1 + x + \frac{2}{1-x^2}\right)dx$

$dy =$

4. $\int_0^2 x e^x dx =$

MATEMATIKA 2: Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata. **PIŠITE DVOSTRANO!** oox	POPUNJAVA NASTAVNIK
IME I PREZIME: TONI UGLEŠIĆ **BROJ INDEKSA:** 17-1-0065-2011	Broj ↓ bodova

1. Odredi partikularno rješenje koje zadovoljava navedenu ODJ i uvjete: $y''+2y'=1$, uz $y(0)=0$ i $y'(0)=0$. Na kraju provjeri rješenje. 15

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4. $\int\limits_0^2 xe^x\,\mathrm{d}x=?$ 15

5. Zadana je funkcija $f(x)=\sqrt{|x|}$. Traži se površina ispod grafa funkcije (do osi apcise) na segmentu $[-1,2]$. Podijeliti segment na nekoliko dijelova i preko trapezne formule procijeniti traženu površinu. Skicirati graf funkcije, površinu koja je dobivena procjenom i vizualno ocijeniti grešku numeričkog postupka. 20

6. Integriranjem izračunati površinu trokuta zadanog točkama $A(-2,1)$, $B(0,2)$, $C(1,-1)$. 15

Ukupno: ∅

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
$\alpha^x\ (\alpha>0)$	$\alpha^x\ln\alpha$
$\sin x$	$\cos x$
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Tablica nekih integrala

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