Popuniti odmah!

IME I PREZIME: IVAN LONIĆ BROJ INDEKSA: 57104 36

DATUM: VRIJEME: OD DO

MATEMATIKA 2: Trajanje 120 minuta. Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata.

Broj ↓ bodova

1. Izračunati $\int_0^1 \sin^3 y \, dy$. ~~15~~ 5
2. Izračunati $\int e^{2x} x^2 \, dx$. 15
3. Grafički prikazati funkciju $f(x,y) = \dfrac{x^2}{y}$ pomoću razinskih krivulja. Koja je domena i kodomena ove funkcije? Strelicama označiti smjer rasta funkcije. Da li i zašto postoji limes $\lim\limits_{(x,y)\to(0,0)} f(x,y)$? 15
4. Istražiti domenu i ekstreme funkcije $f(x,y) = x^3 - 3xy + y^2$. ~~20~~ 16
5. Pronaći opće rješenje problema: $y' + xy^2 + x = 0$. 20
6. Odrediti početak (prva 4 člana) Taylorovog razvoju funkcije $f(x) = e^{x^2}$ oko točke $x_0 = 0$. ~~15~~

Ime i prezime: IVAN LONIĆ **Broj indeksa:** 57104

1.) $\int_0^1 \sin^3 y\,dy = \int_0^1 \sin^2 y \cdot \sin y\,dy = \int_0^1 (1-\cos^2 y)\cdot \sin y\,dy$ $= -t + \frac{t^3}{3}$

$\left[\begin{array}{l} \cos y = t \\ -\sin y\,dy = dt \\ \sin y\,dy = -dt \end{array}\right] = \int (1-t^2)\cdot -dt = -\int (1-t^2)\,dt = \int t^2\,dt = \frac{t^3}{3} = \frac{\cos^3 y}{3}$

$= \frac{\cos^3 y}{3}\Big|_0^1 = \frac{\cos^3(1)}{3} - \frac{\cos^3(0)}{3} = \frac{1}{3} - \frac{1}{3} = 0$

$\cos(1) = ?$

5

2.) $\int e^{2x} x^2\,dx$ $\left[\begin{array}{l} x^2 = u \\ 2x\,dx = du \end{array}\right.$ $\begin{array}{l} dv = e^{2x}dx \\ v = \int e^{2x}dx \\ v = \int e^t \frac{1}{2}dt \\ v = \frac{1}{2}\int e^t dt \\ v = \frac{1}{2}e^t \end{array}$ $\left.\begin{array}{l} 2x = t \\ 2dx = dt \\ dx = \frac{1}{2}dt \end{array}\right]$

$\int e^{2x}x^2dx = x^2\cdot\frac{1}{2}e^t - \int \frac{1}{2}e^t\,2x\,dx = x^2\cdot\frac{1}{2}e^{2x} - \int e^{2x}x\,dx$ $\left[\begin{array}{l} x = u \\ dx = du \end{array}\right.$ $\left.\begin{array}{l} dv = e^{2x}dx \\ v = \int e^{2x}dx \\ v = \frac{1}{2}e^t \end{array}\right]$

$= x^2\cdot\frac{1}{2}e^{2x} - \left(x\cdot\frac{1}{2}e^t - \int \frac{1}{2}e^t\cdot\frac{1}{2}dt\right)$

$= x^2\cdot\frac{1}{2}e^{2x} - \left(x\cdot\frac{1}{2}e^t - \frac{1}{4}\int e^t dt\right) = x^2\cdot\frac{1}{2}e^{2x} - \left(x\cdot\frac{1}{2}e^t - \frac{1}{4}e^t\right)$

$= x^2\cdot\frac{1}{2}e^{2x} - \left(x\cdot\frac{1}{2}e^{2x} - \frac{1}{4}e^{2x}\right) = \frac{1}{2}x^2e^{2x} - \frac{1}{2}xe^{2x} + \frac{1}{4}e^{2x}$

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

15

Ime i prezime: IVAN LONIĆ Broj indeksa: 57105

zd.6) $f(x)=e^{x^2}$ $x_0=0$

$f(x_0)=e^{0^2}=e^0=1$

$f'(x)=e^{x^2}\cdot 2x = 2xe^{x^2}$

$f'(x_0)=2\cdot 0\cdot e^{0^2}=0$

$f''(x)=2e^{x^2}-e^{x^2}2x\cdot 2x=2e^{x^2}-4x^2e^{x^2}$

$f''(x_0)=2e^0-4\cdot 0^2e^{0^2}=2e^0=2$

$f'''(x)=-2e^{x}-(8x\cdot e^{x^2}-e^{x^2}\cdot 2x\cdot 4x^2)=-2e^{x}-(8xe^{x^2}-8x^3e^{x^2})$

$=-2e^{x^2}-8xe^{x^2}+8x^3e^{x^2}$

$f'''(x_0)=-2\cdot e^{0^2}-8\cdot 0\cdot e^{0^2}+8\cdot 0^3e^{0^2}=-2$

$f^{IV}(x)=-2e^{x^2}-(8\cdot e^{x^2}-e^{x^2}\cdot 8)+(24x^2e^{x^2}-e^{x^2}2x\cdot 8x^3)$

$$f(x)=x_0+\frac{(x-x_0)}{1!}f'(x_0)+\frac{(x-x_0)^2}{2!}f''(x_0)+\frac{(x-x_0)^3}{3!}f'''(x)+\frac{(x-x_0)^4}{4!}f^{IV}(x)$$

$$e^{x^2}=0+\frac{(x-0)}{1}\cdot 0+\frac{(x-0)^2}{\cancel{4}\,2}\cdot\cancel{2}+\frac{(x-0)^3}{\cancel{6}\,3}\cdot(\cancel{-2})+\frac{(x-0)^4}{24}\cdot$$

$$e^{x^2}=\frac{(x-0)^2}{2}-\frac{(x-0)^3}{3}$$

Ø

VIDI RIKARDO PEROVIĆ

IME I PREZIME: IVAN LONIĆ

BROJ INDEKSA: 57105

zd. 4) $f(x,y)=x^3-3xy+y^2$

DOMENA?

$\partial_x f = 3x^2-3y$

$\partial_{xx} f = 6x$

$\partial_{xy} f = -3$

$\partial_y f = -3x+2y$

$\partial_{yy} f = 2$

16

$\partial_x f = 0$

$\partial_y f = 0$

$3x^2-3y=0 \quad /\cdot 2$

$-3x+2y=0 \quad /\cdot 3$

$6x^2-6y=0$

$-9x+6y=0$

$6x^2-9x=0$

$x(6x-9)=0$

$x_1=0$

$6x-9=0$

$6x=9$

$x_2=\frac{9^3}{6_2}=\frac{3}{2}$

$3\cdot 0^2-3y=0$

$-3y=0$

$y_1=0$

$3\cdot\left(\frac{3}{2}\right)^2-3y=0$

$3\cdot\frac{9}{4}-3y=0$

$\frac{27}{4}-3y=0$

$-3y=-\frac{27}{4}$

$-y=\frac{\frac{27}{4}}{\frac{-3}{1}}=\frac{9}{4}$

$T_1(0,0)$

$T_2\left(\frac{3}{2},\frac{9}{4}\right)$

$\Delta_1=|\partial_{xx} f| = 6\cdot 0 = 0$

$\Delta_2=\begin{vmatrix}\partial_{xx} f & \partial_{xy} f\\ \partial_{yx} f & \partial_{yy} f\end{vmatrix} = \begin{vmatrix}6x & -3\\ -3 & 2\end{vmatrix} = 12x-(-3\cdot(-3)) = 12x-9 = 12\cdot 0-9 = -9<0$

$f(x,y)=0^3-3\cdot 0\cdot 0+0^2=0$ U TOČKI T_1 NEMA EXTREMA

$\Delta_1=|\partial_{xx} f| = 6\cdot\frac{3}{2}=9$

DA LI JE (KAKAV) EKSTREM U T_2?

$\Delta_2=\begin{vmatrix}\partial_{xx} f & \partial_{xy} f\\ \partial_{yx} f & \partial_{yy} f\end{vmatrix} = \begin{vmatrix}6x & -3\\ -3 & 2\end{vmatrix} = 12x-9 = 12\cdot\frac{3}{2}-9 = 18-9 = 9>0$

$f(x,y)=\left(\frac{3}{2}\right)^3-3\cdot\frac{3}{2}\cdot\frac{9}{4}+\left(\frac{9}{4}\right)^2=\frac{27}{8}-\frac{9}{2}\cdot\frac{9}{4}+\frac{81}{16}=\frac{27}{8}-\frac{81}{8}+\frac{81}{16}=\frac{54-162+81}{16}=$

Popuniti odmah!

IME I PREZIME: GREGOR HAMARIĆ

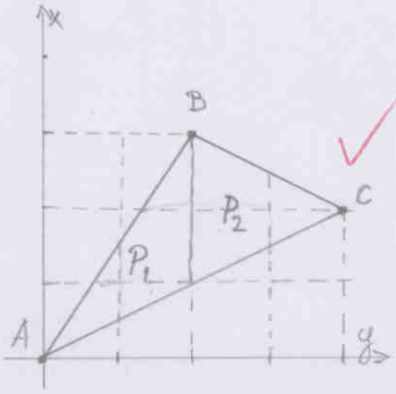
DATUM: VRIJEME: OD 08:30 DO **BROJ INDEKSA:** 57650

30

MATEMATIKA 2: Trajanje 120 minuta. Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata.

	Broj ↓ bodova
1. Integriranjem odrediti površinu trokuta koji je zadan točkama $A(0,0)$, $B(2,3)$ i $C(4,2)$.	15
2. Zadano je $f(x)=\frac{1}{\sqrt{x+1}}$. Odrediti $\int_{-1}^{1} f(x)\,dx$. Skicirati graf funkcije f i površinu koja je određena integralom $\int_{-1}^{1} f(x)\,dx$.	15
3. Grafički prikazati funkciju $f(x,y)=\frac{x^3}{y}$ pomoću razinskih krivulja. Koja je domena i kodomena ove funkcije? Strelicama označiti smjer rasta funkcije. Da li i zašto postoji limes $\lim_{(x,y)\to(0,0)} f(x,y)$?	15
4. Istražiti domenu i ekstreme funkcije $f(x,y)=x-y+\frac{1}{xy}$.	~~20~~
5. Riješiti diferencijalnu jednadžbu: $\sqrt[3]{x}\,y\,y'=1-x^2$	20
6. Pronaći partikularno rješenje koje zadovoljava sljedeće jednadžbe: $$y''+4y=0,\quad y(0)=0,\ y'(0)=2$$	15

1.



$x_1\,y_1$ $\quad x_2\,y_2$

$A(0,0)\quad B(2,3)$

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

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

$\underline{y=\frac{3}{2}x}$

$x_3\,y_3$

$B(2,3)\quad C(4,2)$

$y-3=\frac{2-3}{4-2}(x-2)$

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

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

$\underline{y=-\frac{1}{2}x+4}$

$A(0,0)\quad C(4,2)$

$y-0=\frac{2-0}{4-0}(x-0)$

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

$$P=\int_0^2\left(\frac{3}{2}x-\frac{1}{2}x\right)dx+\int_2^4\left(-\frac{1}{2}+4-\frac{1}{2}\right)=\int_0^2 x\,dx+\int_2^4-(x-4)\,dx=\int_0^2 x\,dx-\int_2^4(x-4)\,dx=$$

$$=x\Big|_0^2-\left(\frac{x^2}{2}-4x\right)\Big|_2^4=2-\left(\frac{4^2}{2}-4\cdot4\right)+\left(\frac{2^2}{2}-4\cdot2\right)=2+8-6=\underline{\underline{4}}$$

PROVJERA

$$P=\frac{1}{2}\left|x_1(y_2-y_3)+x_2(y_3-y_1)+x_3(y_1-y_2)\right|=\frac{1}{2}\left|0+2\cdot(2-0)+4\cdot(0-3)\right|=\frac{1}{2}\left|4-12\right|=$$

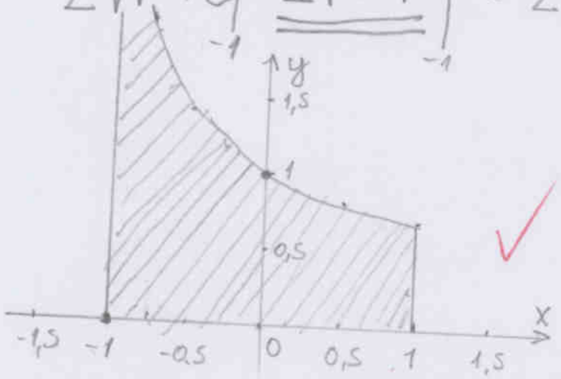
$$\frac{1}{2}\left|-8\right|=\underline{\underline{4}}$$

IME I PREZIME: GREGOR HAMARIĆ BROJ INDEKSA: 57650

2. $f(x) = \frac{1}{\sqrt{x+1}}$

$$\int_{-1}^{1}\left(\frac{1}{\sqrt{x+1}}\right)dx = \begin{bmatrix} x+1=t \\ dx = dt \end{bmatrix} = \int_{-1}^{1}\left(\frac{1}{\sqrt{t}}\right)dt = \int_{-1}^{1} t^{-\frac{1}{2}}dt = \frac{t^{\frac{1}{2}}}{\frac{1}{2}} + C \Big|_{-1}^{1} = 2t^{\frac{1}{2}} + C \Big|_{-1}^{1} =$$

$$= 2\sqrt{t} + C \Big|_{-1}^{1} = \underline{\underline{2\sqrt{x+1}}} \Big|_{-1}^{1} = 2\sqrt{2} - 2\sqrt{0} = \underline{\underline{2\sqrt{2}}}$$ ✓



✓

x	-1	-0,5	0	0,5	1
$f(x) = \frac{1}{\sqrt{x+1}}$	$+\infty$	1.41	1	0.82	0.71

15

4. $f(x,y) = x - y + \frac{1}{xy}$

$f'(x) = 1 + \frac{1}{y} = 1 + y^{-1}$ ✗ $\qquad 0 = 1 + \frac{1}{y} \qquad 0 = -1 + \frac{1}{x}$

$f'(y) = -1 + \frac{1}{x}$ ✗ $\qquad \frac{1}{y} = \frac{1}{-1} \qquad \frac{1}{x} = \frac{1}{1}$

$f'(xx) = 0 \quad A \qquad y = \underline{\underline{-1}} \qquad x = \underline{\underline{1}}$

$f'(yy) = 0 \quad B \qquad T(1,-1)$

$f'(xy) = \frac{y^{-2}}{2} = \frac{-1^{-2}}{2} =$

$\Delta = \underset{0}{A}C - \underset{0}{B} = 0 \cdot \frac{1}{2}^{-2} - 0 = \underline{\underline{0}}$

NEMA ODLUKE

$\cancel{0}$

~~$\partial_x f = 1 - \frac{1}{y}$~~

$\partial_x f = 1 - \frac{1}{y} \cdot \left(-\frac{1}{x^2}\right)$

$\partial_x f = 1 + \frac{1}{x^2 y} \overset{\partial_x f = 0}{\Rightarrow} x^2 y = -1$

$\partial_y f = -1 + \frac{1}{xy^2} \overset{\partial_y f = 0}{\Rightarrow} xy^2 = 1$

$\partial_{xx} f =$

$\partial_{yy} f = \ldots$

$\partial_{xy} f =$

$\Downarrow$

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

$x \cdot \left(-\frac{1}{x^2}\right)^2 = 1 \Rightarrow x = 1$

$\Downarrow$

$y = -1$

Popuniti odmah!

Ime i prezime: RIKARDO PEROVIĆ

Datum: 10.06.2011 Vrijeme: od do **Broj indeksa:** 57346

23

MATEMATIKA 2: Trajanje 120 minuta. Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata.

	Broj ↓ bodova
1. Izračunati $\int_0^1 \sin^3 y \, dy$.	15
2. Izračunati $\int e^{2x}x^2 \, dx$.	15
3. Grafički prikazati funkciju $f(x,y) = \frac{x^2}{y}$ pomoću razinskih krivulja. Koja je domena i kodomena ove funkcije? Strelicama označiti smjer rasta funkcije. Da li i zašto postoji limes $\lim_{(x,y)\to(0,0)} f(x,y)$?	15
4. Istražiti domenu i ekstreme funkcije $f(x,y) = x^3 - 3xy + y^2$.	~~20~~ 13
5. Pronaći opće rješenje problema: $y' + xy^2 + x = 0$.	20
6. Odrediti početak (prva 4 člana) Taylorovog razvoju funkcije $f(x) = e^{x^2}$ oko točke $x_0 = 0$.	~~15~~ 10

DOMENA?

4) $f(x,y) = x^3 - 3xy + y^2$

$f_x = 3x^2 - 3y$

$f_y = -3x + 2y$

13

$3x^2 - 3y = 0 \Rightarrow y = x^2$

$-3x + 2y = 0 \Rightarrow 2y = 3x \,/ :(2)$

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

$\frac{3}{2}x = x^2$

$x^2 - \frac{3}{2}x = 0$

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

$x_1 = 0 \quad x_2 = \frac{3}{2}$

$y_1 = 0 \quad y_2 = \frac{9}{4}$

$T_1(0,0), \; T_2(\frac{3}{2}, \frac{9}{4})$

T_1? SEDLASTA TOČKA

$f_{xx} = 6x \quad A = 9$

$f_{xy} = -3 \quad B = -3$

$f_{yy} = 2 \quad C = 2$

T2

$\Delta = 9 \cdot 2 - (-3^2)$

$\Delta = 27$ 9

$A > 0$ minimum

$\Delta > 0$ postoji ekstrem

$f_{2,min} = (\frac{3}{2})^3 - 3 \cdot (\frac{3}{2}) \cdot \frac{9}{4} + (\frac{9}{4})^2 = -1{,}69$

6.) $f(x) = e^{x^2} \quad x_0 = 0$

$f'(x) = e^{x^2} \cdot 2x = 2x \cdot e^{x^2}$

$f''(x) = 2 \cdot e^{x^2} + 2x \cdot e^{x^2} \cdot 2x = 2 \cdot e^{x^2} + 4x^2 \cdot e^{x^2}$

$f'''(x) = 8x \cdot e^{x^2} + 4x^2 \cdot e^{x^2} \cdot 2x \; {+4xe^{x^2}} = 8x \cdot e^{x^2} + 8x^3 \cdot e^{x^2} + 4xe^{x^2}$

$f(0) = e^{0^2} = 1$

$f'(0) = 2 \cdot 0 \cdot e^{0^2} = 1$

$f''(0) = 2 \cdot e^{0^2} + 4 \cdot 0^2 \cdot e^{0^2} = 2$

$f'''(0) = 8 \cdot 0 \cdot e^{0^2} + 8 \cdot 0^3 \cdot e^{0^2} = 0$

$f(x) = f(x_0) + (x - x_0) \cdot f'(x_0) + \frac{(x-x_0)^2}{2!} \cdot f''(x_0) + \frac{(x-x_0)^3}{3!} \cdot f'''(x_0) + \dots$

$e^{x^2} \approx 1 + (x-0) \cdot 1 + \frac{(x-0)^2}{2} \cdot 2 + \frac{(x-0)^3}{6} \cdot 0 + \dots$

$e^{x^2} = 1 + x + \underbrace{(x-0)^2}_{= x^2}$

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Popuniti odmah!

Ime i prezime: MATIJA JAKOBAC

Broj indeksa: 57321

Datum: Vrijeme: od do

15

MATEMATIKA 2: Trajanje 120 minuta. Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata.

	Broj ↓ bodova
1. Izračunati $\int \frac{x^2+2x+2}{x^2+x-2}\,\mathrm{d}x$.	~~15~~
2. Izračunati $\int x^2 \sin(x)\,\mathrm{d}x$.	15
3. Nekom od metoda numeričke integracije (Simpsonova ili trapezna formula) približno odrediti vrijednost integrala: $\int\limits_{\pi}^{2\pi} \frac{\arctan x}{x}\,\mathrm{d}x$	~~15~~
4. Istražiti ekstreme funkcije $f(x,y) = y^3 - 3xy + x^2$.	20
5. Pronaći opće rješenje problema: $y' + xy + x = 0$.	20
6. Odrediti početak (prva 4 člana) Taylorovog razvoju funkcije $f(x) = 2x\cos x$ oko točke $x_0 = 0$.	~~15~~

IME I PREZIME: MATIJA JAKOBAC BROJ INDEKSA: 57921

OVAKO SE NE MOGU "KRATITI" RAZLOMCI

1. $\int \frac{x^2+2x+2}{x^2+x-2}\,dx = \int \frac{\cancel{(x+1)^2+1}}{(x+1)^2-x-3}\,dx = \int \frac{dx}{-x-3}$ X

$= \int \frac{dx}{-(\sqrt{x})^2-(\sqrt{3})^2} = \frac{-1}{-2\sqrt{x}} \ln\left|\frac{-\sqrt{x}+\sqrt{3}}{\sqrt{x}-\sqrt{3}}\right| + C$

$= -\frac{1}{2\sqrt{x}} \ln\left|\frac{\sqrt{x}+\sqrt{3}}{\sqrt{x}-\sqrt{3}}\right| + C$ 0

2. $\int x^2 \sin x\,dx = \begin{bmatrix} x^2 = w & dv = \sin x\,dx \\ 2x\,dx = dw & v = -\cos x \end{bmatrix}$

$= x^2 \cdot (-\cos x) - \int -\cos x \cdot 2x\,dx$ ✓ $= -x^2\cos x + \int 2x\cos x\,dx \begin{bmatrix} 2x = w & dv = \cos x\,dx \\ 2\,dx = dw & v = \sin x \end{bmatrix}$

$= -x^2\cos x + \left(2x \cdot \sin x - 2\int \sin x\,dx\right)$ ✓

$= -x^2\cos x + 2\sin x + 2\cos x + C$ ✓ 15

IME I PREZIME: MATIJA JAKOBAC

BROJ INDEKSA: 57921

3.

$$\int_{\pi}^{2\pi} \frac{\operatorname{arctan} x}{x}\, dx =$$

k	0	1	2	3	4	5	6
X_k	0	$\frac{1}{6}$	$\frac{2}{6}$	$\frac{3}{6}$	$\frac{4}{6}$	$\frac{5}{6}$	1
Y_k	0	0.99	0.96	0.92	0.88	0.83	0.78

X

K	0	1	2	3	4	5	6
x_K	π	$\frac{7\pi}{6}$	$\frac{8\pi}{6}$	$\frac{9\pi}{6}$	$\frac{10\pi}{6}$	$\frac{11\pi}{6}$	2π
y_K							

$$P = \frac{\Delta X}{2} + Y_n (Y_1 + Y_2 + Y_3 + Y_4 \dots)$$

X

$\cancel{0}$

$$P = \frac{\frac{1}{6}}{2} + 0.78 + (0.99 + 0.96 + 0.92 + 0.88 + 0.83).$$

$$P = 0.86 + 4.58$$

$$P = 5.44$$

Ime i prezime: MATIJA JAKOBAC **Broj indeksa:** 57921

6.

$f(x) = 2x\cos x$

$x_0 = 0$

$f(x_0) = 2 \cdot 0 \cdot \cos 0 = 0$

$f'(x) = 2 \cdot (-\sin x) = -2\sin x$

$f'(x_0) = 0$

$f''(x) = -2\cos x$

$f''(x_0) = -2$

$f'''(x) = -2 \cdot -\sin x = 2\sin x$

$f'''(x_0) = 0$

$f^{IV}(x) = 2\cos x$

$f^{IV}(x_0) = 2$

0

$$f(x) = 2x\cos x = 0 + 0 + \frac{(x-0)^2}{2!} + \frac{(x+2)^3}{3!} \cdot (-2) + \frac{(x-0)}{4!} \cdot 0 + \frac{(x-2)}{5!} \cdot 2$$

$$f(x_0) = x_0 + \frac{(x-x_0)}{1!} f'(x) + \frac{(x-x_0)^2}{2!} \cdot f''(x_0) + \frac{(x-x_0)^3}{3!} \cdot f'''(x) \ldots$$

$$f(x) = 2x\cos x = 0 + (x-0) \cdot (-2\sin x) + \frac{(x-0)^2}{2!} \cdot (-2\cos x) + \frac{(x+2)^3}{3!} \cdot (2\sin x) + \frac{(x-0)^4}{4!} \cdot 2\cos x$$

$$= -2\sin x^2 - 2\cos \frac{x^2}{2!} - 2\sin x \frac{(x+2)^3}{3!} + 2\cos x \frac{x^4}{4!}$$

Popuniti odmah!

Ime i prezime: MATE IVIĆ

Broj indeksa: 17-2-0008-2010

Datum: 10.06.2011. Vrijeme: od do

(10)

MATEMATIKA 2: Trajanje 120 minuta. Ispit se održava sukladno objavljenim pravilima. Na snazi je Pravilnik o stegovnoj odgovornosti studenata.

	Broj ↓ bodova
1. Integriranjem odrediti površinu trokuta koji je zadan točkama $A(0,0)$, $B(2,3)$ i $C(4,2)$.	15
2. Zadano je $f(x) = \frac{1}{\sqrt{x+1}}$. Odrediti $\int_{-1}^{1} f(x)\,dx$. Skicirati graf funkcije f i površinu koja je određena integralom $\int_{-1}^{1} f(x)\,dx$.	~~15~~ 10
3. Grafički prikazati funkciju $f(x,y) = \frac{x^3}{y}$ pomoću razinskih krivulja. Koja je domena i kodomena ove funkcije? Strelicama označiti smjer rasta funkcije. Da li i zašto postoji limes $\lim_{(x,y)\to(0,0)} f(x,y)$?	15
4. Istražiti domenu i ekstreme funkcije $f(x,y) = x - y + \frac{1}{xy}$.	~~20~~
5. Riješiti diferencijalnu jednadžbu: $\sqrt[3]{x}\, y\, y' = 1 - x^2$	20
6. Pronaći partikularno rješenje koje zadovoljava sljedeće jednadžbe: $y'' + 4y = 0, \quad y(0) = 0,\ y'(0) = 2$	15

2. $f(x) = \frac{1}{\sqrt{x+1}}$ $\quad \int_{-1}^{1} \frac{1}{\sqrt{x+1}}\,dx$

$$\int \frac{1}{\sqrt{x+1}}\,dx = \begin{bmatrix} x+1 = t \\ dx = dt \end{bmatrix} = \int \frac{1}{\sqrt{t}}\,dt = \int t^{-\frac{1}{2}}\,dt = \frac{t^{-\frac{1}{2}+\frac{2}{2}}}{-\frac{1}{2}+\frac{2}{2}} = \frac{t^{\frac{1}{2}}}{\frac{1}{2}} = 2\sqrt{t} = 2\sqrt{x+1}$$

$$2\sqrt{x+1}\Big|_{-1}^{1} = 2\sqrt{1+1} - 2\sqrt{-1+1} = 2\sqrt{2} - 2\sqrt{0} = 2\sqrt{2} = 2.828$$

✓ 10

SKICA GRAFA ~~∅~~

VIDI HAMARIĆ

$f(x) = \frac{1}{\sqrt{x+1}}$

$y = \frac{1}{\sqrt{x+1}}$ $\quad y = 0$ $\quad a > 0$ min

T. $\frac{1}{\sqrt{x+1}} = 0 \quad |^2$

$\frac{1}{x+1} = 0$

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

$x^{-1} = -1$

$x = -1$

T. $(-1, 0)$

D.U. $y' = \frac{1}{\sqrt{x+1}} = \frac{(1)' \cdot (\sqrt{x+1}) - 1 \cdot (\sqrt{x+1})'}{(\sqrt{x+1})^2} = \frac{-1 \cdot (\sqrt{x+1} \cdot (x+1)')}{(\sqrt{x+1})^2} =$

$= \frac{-1 \cdot (\sqrt{x+1})}{(\sqrt{x+1})^2} = -\frac{\sqrt{x+1}}{(\sqrt{x+1})^2} = -\frac{1}{\sqrt{x+1}} = -\frac{1}{\sqrt{x}} = -1 \quad | \cdot (-1)$

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

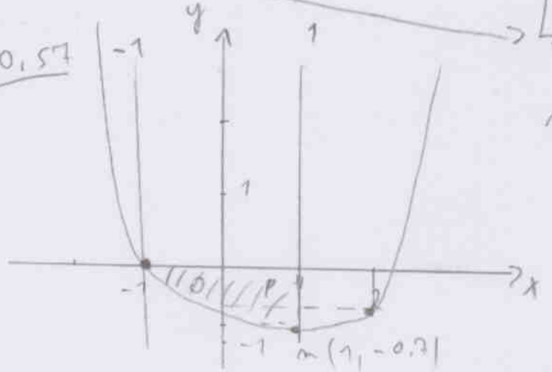
$x = 1$

$x = 2$

$y(2) = -\frac{1}{\sqrt{x+1}} = -\frac{1}{\sqrt{3}} = \underline{-0.57}$

$y(1) = -\frac{1}{\sqrt{1+1}} = -\frac{1}{\sqrt{2}} = -0.707$

min $(1, -0.7)$



$P = \int_{-1}^{1} f(x)\,dx$

$P = 2.828$

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4. EKSTREMI

$$f(x,y) = x - y + \frac{1}{xy}$$

$$\frac{\partial F}{\partial x} = 1 + \frac{1}{y}$$

$$\frac{\partial F}{\partial y} = -1 + \frac{1}{x}$$

$$A = \frac{\partial^2 F}{\partial^2 x} = 1$$

$$B = \frac{\partial^2 F}{\partial x y} = 1$$

$$B = \frac{\partial^2 F}{\partial y x} = 1$$

$$C = \frac{\partial^2 F}{\partial^2 y} = 1$$

$$\Delta = \begin{vmatrix} A & B \\ B & C \end{vmatrix} = \begin{vmatrix} 1 & 1 \\ 1 & 1 \end{vmatrix} = 1 \cdot 1 - 1 \cdot 1 = 1 - 1 = 0 = 0 \nexists$$

ekstrem

$A = 1 >$ min