Popuniti odmah! Jure Portada

Ime i prezime: **Broj indeksa:**

Datum: 08. 09. 2011 Vrijeme: od do

60

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

Broj ↓ bodova

1. Izračunati $\int \frac{x^2+2x+2}{x^2+x-2}\,dx$. ⑮
2. Izračunati $\int x^2\sin(x)\,dx$. ⑮
3. Nekom od metoda numeričke integracije (Simpsonova ili trapezna formula) približno odrediti vrijednost integrala:
$$\int_{\pi}^{2\pi} \frac{\arctan x}{x}\,dx$$ 15
4. Istražiti ekstreme funkcije $f(x,y) = y^3 - 3xy + x^2$. ~~⑳~~ 10
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~~ 0

~~$1)\ \int \frac{x^2+2x+2}{x^2+x-2}\,dx = \int \frac{x^2+x+x+2-2+2}{x^2+x-2}$~~

~~$\int \frac{x^2+x-2}{x^2+x-2}\,dx + \int \frac{x+4}{x^2+x-2}$~~

~~$\underbrace{\int dx}_{I} + \underbrace{\int \frac{x+4}{x^2+x-2}\,dx}_{II} \quad II = \int \frac{x+4}{x^2+x-2} =$~~

$(x^2+2x+2) : (x^2+x-2) = 1$
$\underline{-x^2+x-2}$
x

NA ZADNJOJ STRANICI!
11

$I = \int dx = x$

$II =$

$$2)\ x^2\sin(x)\,dx = \begin{cases} u = x^2 & du = 2x\,dx \\ dv = \sin(x)\,dx & v = -\cos x \end{cases}$$

$$-x^2\cos x + \int \cos x\, 2x\,dx = \begin{cases} u = 2x & du = 2\,dx \\ dv = \cos x & v = \sin x \end{cases}$$

$$-x^2\cos x + \left[2x\sin x - \int 2\sin x\,dx\right] = -x^2\cos x + \left[2x\sin x + 2\cos x + C\right]$$
$$= -x^2\cos x + 2x\sin x + 2\cos x + C \quad ✓$$

15

IME I PREZIME: JURE PORTADA **BROJ INDEKSA:**

4)

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

$z_x = -3y + 2x$ ✓

$z_y = -3x + 3y^2$ ✓

$2x - 3y = 0 \longrightarrow 2x = 3y$

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

$-3 \cdot \frac{3}{2}y + 3y^2 = 0$

$-\frac{9}{2}y + 3y^2 = 0 \quad / \cdot 2$

$-9y + 6y^2 = 0$

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

$3y_1 = 0 \qquad 2y - 3 = 0$

$y_1 = 0$ ✓ $\qquad 2y = -3$ ✗

$y = -\frac{3}{2}$ ✗

$x_1 = \frac{3}{2} \cdot 0$

$x_1 = 0$

$x_2 = \frac{3}{2} \cdot \left(-\frac{3}{2}\right)$

$x_2 = -\frac{9}{4}$

10

SEDLASTA TOČKA ✓

$T_1(0,0)$ ✓

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

$T(0,0)$

$z_{xx} = 2 = r_0 = 2 > 0$ min

$z_{xy} = -3 = s_0 = -3$

$z_{yy} = 6y \quad t_0 = 0$

$D = -9 \rightarrow$ nema Ex.

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

$z_{xx} = 2 \quad r_0 = 2$

$z_{xy} = -3 \quad s_0 = -3$

$z_{yy} = 6y \quad t_0 = \cancel{6}^{3} \cdot \left(-\frac{3}{\cancel{2}}\right) = -9$

$D = -18 - 9 = -27$

$D = r_0 \cdot t_0 - (s_0)^2 = -18 - 9 = -27 \rightarrow$ nema Ex

Ime i prezime: Jure Portada **Broj indeksa:**

5) $y' + xy + x = 0$

$y' + xy = -x$

$e^{-\int f(x)dx} = e^{-\int x\,dx}$

$= e^{-\frac{x^2}{2}}$ ✓

$e^{\int f(x)dx} = e^{\int x\,dx}$

$= e^{\frac{x^2}{2}}$ ✓

$e^{-\frac{x^2}{2}} \cdot \left[\int e^{\frac{x^2}{2}} \cdot (-x)\,dx\right]$

$e^{-\frac{x^2}{2}} \cdot \left[-\int x e^{\frac{x^2}{2}}\,dx\right] \Rightarrow \begin{cases} \frac{x^2}{2} = t \\ \frac{1}{2}x^2 = t \;/^{d} \\ \frac{1}{\cancel{2}}\cancel{2}x\,dx = dt \\ x\,dx = dt \end{cases}$

$e^{-\frac{x^2}{2}}\left[-\int e^{t} \cdot dt\right]$ ✓

$e^{-\frac{x^2}{2}}\left[-e^{\frac{x^2}{2}} + c\right] = -e^{-\frac{x^2}{2}+\frac{x^2}{2}} + ce^{-\frac{x^2}{2}}$

$= -e^{0} + Ce^{-\frac{x^2}{2}}$

$= -1 + Ce^{-\frac{x^2}{2}}$ ✓

20

IME I PREZIME: JURE PORTADA BROJ INDEKSA:

$$f_{(a)} + f'_{(a)}\frac{(x-a)}{1!} + f'''_{(a)}\frac{(x-a)^3}{3!} + f^{V}_{(a)}\frac{(x-a)^5}{5!} + f^{VII}_{(a)}\frac{(x-a)^7}{7!}$$

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

$f(0) = 2\cdot 0\cdot\cos 0 = 0$ ✓

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

$f'(0) = 2,$ ✓

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

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

$f'' = -2\sin x - 2\sin x - 2x\cos x = 0 \quad f''(0) = 0$

$f'' = -4\sin x - 2x\cos x$

$f''' = -4\cos x - (2\cos x + (-\sin x)\cdot 2x)$

$f''' = -4\cos x - 2\cos x + \sin x\, 2x = -4\cos x - 2\cos x + 2x\sin x$

$= -6\cos x + 2x\sin x$

$f'''_{(0)} = -6,$ ✓

$f^{IV} = 6\sin x + 2\sin x + 2x\cos x =$

$f^{IV}_{(0)} = 0$ ✓

BRAVO ZA DERIVIRANJE, ALI GREŠKA NA KRAJU NE DOPUŠTA NIJEDAN BOD

$f^{IV} = 8\sin x + 2x\cos x$

$f^{V} = +8\cos x + 2\cos x + 2x(-\sin x) = 8\cos x + 2\cos x - 2x\sin x$

$= 10\cos x - 2x\sin x$

$f^{V}_{(0)} = 10,$

$f^{VI} = -10\sin x - (2\sin x + 2x\cos x) = -10\sin x - 2\sin x - 2x\cos x$

$= -12\sin x - 2x\cos x$

$f^{VI}_{(0)} = 0$

$f^{VII} = -12\cos x - (2\cos x + 2x(-\sin x)) = -12\cos x - 2\cos x + 2x\sin x$

$f^{VII}_{(0)} = -14$

→

IME I PREZIME: JURE PORTADA **BROJ INDEKSA:**

$$f'_{(2)}\frac{(x-\overset{0}{2})}{1} + f'''_{(-6)}\frac{\overset{(x-0)^3}{(x+6)}}{3!} + f^{IV}_{(10)}\frac{\overset{(x-0)}{(x-10)^5}}{5!} + f^{VII}_{(-14)}\frac{\overset{(x-0)}{(x+14)^7}}{7!} \times$$

$$2(x-0)^1 - 6\frac{(x-0)^3}{3!} + \ldots = 2x - x^3$$

$$1)\ \int \frac{x^2+2x+2}{x^2+x-2} = \int \frac{x^2+x+x-2+4}{x^2+x-2} = \underbrace{\int \frac{x^2+x-2}{x^2+x-2}\,dx}_{I} + \underbrace{\int \frac{x+4}{x^2+x-2}\,dx}_{II} \quad ✓$$

$$I = \int dx = x \quad ✓$$

$$II\ \int \frac{x+4}{x^2+x-2}\cdot dx = \int \frac{x+4}{(x-1)(x+2)}\,dx = \int \frac{A}{(x-1)}\,dx + \int \frac{B}{(x+2)}\,dx \quad x^2+x-2 = \frac{-1\pm\sqrt{1+8}}{2} \quad /\cdot(x-1)(x+2) \quad ✓$$

[illegible]

$$x+4 = A(x+2) + B(x-1)$$

$$x+4 = Ax + 2A + Bx - B$$

$$x+4 = (A+B)x + (2A-B)$$

$$A+B=1 \quad /\cdot(-2)$$

$$2A-B=4$$

$$-2A-2B=-2$$

$$2A-B=4$$

$$-3B=2$$

$$B=-\frac{2}{3} \quad ✓$$

$$A-\frac{2}{3}=1$$

$$A=1+\frac{2}{3} \Rightarrow \frac{3+2}{3}=\frac{5}{3}$$

$$A=\frac{5}{3} \quad ✓$$

$$\int \frac{x+4}{x^2+x-2} = \int \frac{\frac{5}{3}}{(x-1)}\,dx + \int \frac{-\frac{2}{3}}{(x+2)}\,dx = \frac{5}{3}\ln(x-1) - \frac{2}{3}\ln(x+2) + C$$

$$\int \frac{x^2+2x+2}{x^2+x-2} = x + \frac{5}{3}\ln(x-1) - \frac{2}{3}\ln(x+2) + C \quad ✓$$

15

Popuniti odmah!

IME I PREZIME: LOVRE NIKITOVIC **BROJ INDEKSA:** 17-2-0035-2010 (55)

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 $\int \frac{x^2+2x+2}{x^2+x-2}\,\mathrm{d}x$. 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:
$$\int_{\pi}^{2\pi} \frac{\arctan x}{x}\,\mathrm{d}x$$
~~15~~ 0
4. Istražiti ekstreme funkcije $f(x,y) = y^3 - 3xy + x^2$. ~~20~~ 10
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~~ 10

Ime i prezime: Lovre Nikitović   Broj indeksa: 17-2-0035-2010

2. $\int x^2 \sin(x)\, dx = \left[\begin{array}{ll} u = x^2 & dv = \sin(x) dx \\ du = 2x dx & v = \int \sin(x) dx \\ & v = -\cos x \end{array}\right]$

$\int u dv = u \cdot v - \int v \cdot du$

$= x^2 \cdot (-\cos(x)) - \int -\cos(x) \cdot 2x dx$

$= -x^2 \cos(x) + 2 \int \cos(x)\, x\, dx = \left[\begin{array}{ll} u = x & dv = \cos(x) dx \\ du = dx & v = \int \cos(x) dx \\ & v = \sin x \end{array}\right]$

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

$= -x^2 \cos(x) + 2\left(x \sin(x) - (-\cos(x)) \right) + c$

$= -x^2 \cos(x) + 2\left(x \sin(x) + \cos(x) \right) + c$

$= \left(-x^2 \cos(x) + 2x \sin(x) + 2 \cos(x)\right) + C$ ✓

15

5. $y' + xy + x = 0$

$\frac{dy}{dx} = -xy - x$

$\frac{dy}{dx} = -x(y+1) \,/\, \cdot dx$

$dy = -x(y+1) dx \,/\, :(y+1)$

20

$\frac{dy}{y+1} = -x dx \,/\, \int$

$\int \frac{dy}{y+1} = \int -x dx$ $\int \frac{dy}{y+1} = \left| \begin{array}{l} y+1 = t \\ dy = dt \end{array} \right|$

$\underline{\ln|y+1| = -\frac{x^2}{2} + c}$ ✓ $\int \frac{dt}{t} = \ln|t| = \ln|y+1|$

IME I PREZIME: Lovre Nikitović **BROJ INDEKSA:** 17-2-0035-2010

6.

sin = cos
cos = - sin

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

$f(x_0) = f(0) = 2 \cdot 0 \cdot \cos 0 = 0 \cdot 1 = \textcircled{0}$ ✓

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

$= 2\cos x - 2x\sin(x)$

$f'(0) = 2\cos(0) - 2 \cdot 0 \cdot \sin(0) = 2 - 0 = \textcircled{2}$ ✓

$f''(x) = 2' \cdot \cos(x) + 2 \cdot \cos(x)' - \left(2x' \cdot \sin(x) + 2x \cdot \sin(x)'\right)$

$= 2 \cdot (-\sin(x)) - 2\sin(x) \underset{-}{+} 2x \cdot \cos(x)$

$= -2\sin(x) - 2\sin(x) \underset{-}{+} 2x\cos(x)$

$f''(0) = -2\sin(0) - 2\sin(0) + 2 \cdot 0 \cdot \cos(0)$

$= 0 - 0 + 0 = \textcircled{0}$ ✓

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

$f'''(x) = -2\cos(x) - 2\cos(x) \underset{-}{+} 2\cos(x) \underset{+}{-} 2x\sin(x)$

$f'''(x) = -2\cos(x) - 2x\sin(x)$ ✗

$f'(0) = -2\cos(0) - 2 \cdot 0 \cdot \sin(0) = -2 - 0 = \textcircled{-2}$

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

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

10

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

$f(x) = 2x\cos x = 2(x-0) - \frac{\cancel{2}(x-0)^3}{\cancel{6}_3} = 2(x-0) - \frac{(x-0)^3}{3} = \boxed{2x - \frac{(x-0)^3}{3}}$ ✗

IME I PREZIME: Lovre Nikitović **BROJ INDEKSA:** 17-2-0035-2010

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

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

$\partial xx f = 2$

$\partial xy f = -3$

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

$\partial yy f = 6y$

$\boxed{\begin{matrix}\partial x f = 0 \\ \partial y f = 0\end{matrix}}$

$\boxed{\partial xy f = \partial yx f}$

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

$3y^2 - 3x = 0$

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

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

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

$3 \cdot \frac{4}{9}x^2 - 3x = 0$

$\frac{12}{9}x^2 - 3x = 0$

$\frac{4}{3}x^2 - 3x = 0$

$x\left(\frac{4}{3}x - 3\right) = 0$

$\boxed{x_1 = 0}$

$\frac{4}{3}x - 3 = 0$

$\frac{4}{3}x = 3 \,/\left(\frac{4}{3}\right)$

$x = \frac{\frac{3}{1}}{\frac{4}{3}}$

$\boxed{y_1 = \frac{2}{3} \cdot 0 = 0}$

$y_2 = \frac{2}{3} \cdot \frac{9}{4} = \frac{18}{12} = \boxed{\frac{3}{2}}$

$\boxed{x_2 = \frac{9}{4}}$

$T_1(0,0)$

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

Za točku $T_1(0,0)$

$A = \partial xx f = 2$

$\Delta = \begin{vmatrix} \partial xx f & \partial xy f \\ \partial yx f & \partial yy f \end{vmatrix}$

$\Delta = \begin{vmatrix} 2 & -3 \\ -3 & 0 \end{vmatrix} = 0 - 9$

$= -9$

$\left.\begin{matrix} A = 2 > 0 \\ \Delta = -9 < 0 \end{matrix}\right\}$ lokalni minimum ✗

$f(x,y)_{min} = y^3 - 3xy + x^2 = 0^3 - 3 \cdot 0 \cdot 0 + 0^2$

$= 0$

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

$A = 2$

$\Delta = \begin{vmatrix} 2 & -3 \\ -3 & 9 \end{vmatrix} = 18 - (+9) = 18 - 9 = 9$

$\left.\begin{matrix} A = 2 > 0 \\ \Delta = 9 > 0 \end{matrix}\right\}$ lokalni minimum ✓

10

$f(x,y)_{min} = y^3 - 3xy + x^2 = \left(\frac{3}{2}\right)^3 - 3 \cdot \left(\frac{9}{4}\right) \cdot \left(\frac{3}{2}\right) \cdot$

$f(x,y)_{min} = \frac{27}{8} - 3 \cdot \frac{27}{8} + \frac{81}{16} = \frac{27}{8} - \frac{81}{8} + \frac{81}{16}$

$\frac{27}{8} - \frac{81}{8} + \frac{81}{16} = \frac{54 - 162 + 81}{16}$

$= -\frac{27}{16} = \boxed{-1.687}$

IME I PREZIME: Lovre Nikitović **BROJ INDEKSA:** 17-2-0035-2010

3. $$\int_{\pi}^{2\pi} \frac{\arctan x}{x}\, dx$$

$$\Delta x = \frac{b-a}{n} = \frac{2\pi - \pi}{4} = \frac{3.141}{4} = 0.785$$

$a = \pi$
$b = 2\pi$
$n = 4$

k	0	1	2	3	4
x_k	0	$\frac{1}{4}$	$\frac{2}{4}$	$\frac{3}{4}$	$\frac{4}{4}$
$\frac{\arctan}{x}$	0	0.979	0.927	0.858	0.785

K	0	1	2	3	4
x_k	π	$\frac{5\pi}{4}$	$\frac{3\pi}{2}$	$\frac{7\pi}{4}$	2π
$\frac{\arctan(x)}{x}$					

POGREŠNE TOČKE x_k !!!

$\cancel{0}$

$$y_0 = \frac{\arctan 0}{0} = 0$$

$$y_1 = \frac{\arctan(0.25)}{0.25} = 0.979$$

$$y_2 = \frac{\arctan(0.5)}{0.5} = 0.927$$

$$y_3 = \frac{\arctan(0.75)}{0.75} = 0.858$$

$$y_n = \frac{\arctan(1)}{1} = 0.785$$

$$I = \frac{\Delta x}{2}\left[y_0 + y_n + 2\cdot(y_1 + y_2 + y_3 + \dots)\right]$$

$$I = \frac{0.785}{2}\left[0 + 0.785 + 2\cdot(0.979 + 0.927 + 0.858)\right]$$

$$I = 0.3925\left[0.785 + 2\cdot(2.764)\right]$$

$$I = 0.3925\left[0.785 + 5.528\right]$$

$$I = 0.3925 \cdot 6.313 = \boxed{2.477}$$

45

~~50~~

Popuniti odmah!

IME I PREZIME: IVAN LONIĆ **BROJ INDEKSA:** 57104

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 $\int \frac{x^2+2x+2}{x^2+x-2}\,dx$.	15
2. Izračunati $\int x^2 \sin(x)\,dx$.	15
3. Nekom od metoda numeričke integracije (Simpsonova ili trapezna formula) približno odrediti vrijednost integrala: $\int\limits_{\pi}^{2\pi} \frac{\arctan x}{x}\,dx$	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~~ 10

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

$\partial_x f = -3y + 2x$ ✓

$\partial_{xx} f = 2$ ✓

$\partial_{xy} f = -3$ ✓

$\partial_y f = 3y^2 - 3x$ ✓

$\partial_{yy} f = 6y$ ✓

$\partial_{yx} f = -3$

$\partial_x f = 0$

$\partial_y f = 0$

$T_1(0,0)$ ✓

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

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

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

$-9y + 6x = 0$

$6y^2 - 6x = 0$

$-9y + 6y^2 = 0$

$y(-9 + 6y) = 0$

$y_1 = 0$

$-9 + 6y = 0$

$6y = 9$

$y = \frac{\cancel{9}^{3}}{\cancel{6}_{2}}$

$y_2 = \frac{3}{2}$

$-3 \cdot 0 + 2x = 0$

$2x = 0$

$x_1 = 0$

$-3 \cdot \frac{3}{2} + 2x = 0$

$-\frac{9}{2} + 2x = 0$

$2x = \frac{9}{2}$

$x = \frac{\frac{9}{2}}{\frac{2}{1}}$

$x_2 = \frac{9}{4}$

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

$A = |\partial_{xx} f| = 2 > 0$ FUNKCIJA IMA MINIMUM

$\Delta = \begin{vmatrix} \partial_{xx} f & \partial_{xy} f \\ \partial_{yx} f & \partial_{yy} f \end{vmatrix} = \begin{vmatrix} 2 & -3 \\ -3 & 6y \end{vmatrix} = 12y - 9$ ✓

$T_1(\overset{x}{0}, \overset{y}{0})$

$T_2(\overset{x}{\frac{9}{4}}, \overset{y}{\frac{3}{2}})$

$f(x,y) = y^3 - 3xy + x^2 = \left(\frac{3}{2}\right)^3 - 3 \cdot \frac{3}{2} \cdot \frac{9}{4} + \left(\frac{9}{4}\right)^2$

$= \frac{27}{8} - \frac{81}{8} + \frac{81}{16} = \frac{54 - 162 + 81}{16} = -1{,}68$

$12 \cdot 0 - 9 = -9$

$\cancel{12}^{6} \cdot \frac{3}{\cancel{2}} - 9 = 9$

U TOČKI T_1 NEMA EKSTREMA $\Delta < 0$. ✓

20

U TOČKI T_2 IMA MINIMUM $\left(\frac{9}{4}, \frac{3}{2}, -1{,}68\right)$ ✓

6) $f(x) = 2x\cos x \quad x_0 = 0$

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

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

$f'(x_0) = 2\cos(0) - \sin(0) 2 \cdot 0 = 2$ ✓

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

$= -4\sin x - \cos x 2x$

$f''(x_0) = -4\sin 0 - \cos 0 2 \cdot 0 = 0$

$f'''(x) = -4\cos x - (-\sin x 2x + 2\cos x) = -4\cos x + \sin x 2x - 2\cos x$

$= -6\cos x + \sin x 2x =$

$f'''(x_0) = -6\cos(0) + \sin(0) 2 \cdot 0 = -6$ ✓

$f^{IV}(x) = 6\sin x + (\cos x 2x + 2\sin x) = 6\sin x + \cos x 2x + 2\sin x$

$= 8\sin x + \cos x 2x$

$f^{IV}(x_0) = 8\sin(0) + \cos(0) 2 \cdot 0 = 0$

IME I PREZIME: IVAN LONIĆ **BROJ INDEKSA:** 57105

6) $f^{v}(x) = 8\cos x + (-\sin x 2x + 2\cos x) = 8\cos x - \sin x 2x + 2\cos x$

$= 10\cos x - \sin x 2x$

$f^{v}(x_0) = 10\cos(0) - \sin(0) 2 \cdot 0 = 10$

$f^{vi}(x) = -10\sin x - (\cos x 2x + 2\sin x) = -10\sin x - \cos x 2x - 2\sin x$

$= -12\sin x - \cos x 2x$

$f^{vi}(x_0) = -12\sin(0) - \cos(0) 2 \cdot 0 = 0$

$f^{vii}(x) = -12\cos x - (-\sin x 2x + 2\cos x) = -12\cos x + \sin x 2x - 2\cos x$

$= -14\cos x + \sin x 2x$

$f^{vii}(x_0) = -14\cos(0) + \sin(0) 2 \cdot 0 = -14$

$$f(x) = f(x_0) + \frac{(x-x_0)}{1!} \cdot f'(x_0) + \frac{(x-x_0)^2}{2!} \cdot f''(x_0) + \frac{(x-x_0)^3}{3!} \cdot f'''(x_0) + \frac{(x-x_0)^4}{4!} \cdot f^{IV}(x_0) + \frac{(x-x_0)^5}{5!} \cdot f^{v}(x_0) + \frac{(x-x_0)^6}{6!} \cdot f^{vi}(x_0) + \frac{(x-x_0)^7}{7!} \cdot f^{vii}(x_0)$$

$$f(x) = 0 + \frac{(x-0)}{1} \cdot 2 + \cancel{\frac{(x-0)^2}{2} \cdot 0} + \frac{(x-0)^3}{\cancel{6}} \cdot \cancel{(-6)} \, (-1) + \cancel{\frac{(x-0)^4}{24} \cdot 0} + \frac{(x-0)^5}{120_{12}} \cancel{10}$$

$$+ \cancel{\frac{(x-0)^6}{720} \cdot 0} + \frac{(x-0)^7}{\cancel{5040}_{60}} \cdot \cancel{(-14)}$$

$$= 2(x-0) \underset{-}{\textcircled{+}} (x-0)^3 + \frac{(x-0)^5}{12} + \frac{(x-0)^7}{60}$$

$$= 2x - x^3 + \ldots$$

~~15~~

10

IME I PREZIME: IVAN LONIĆ **BROJ INDEKSA:** 57/05

2) $\int x^2 \sin(x)\,dx = \left[\begin{matrix} u = x^2 & dv = \sin x\,dx \\ du = 2x\,dx & v = \int \sin x\,dx \\ & v = -\cos x \end{matrix}\right]$

$= x^2 \cdot (-\cos x) - \int -\cos x\, 2x\,dx = x^2(-\cos x) + \int \cos x\, 2x\,dx \left[\begin{matrix} 2x = u & dv = \cos x\,dx \\ 2dx = du & v = \int \cos x \\ & v = \sin x \end{matrix}\right.$

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

$= x^2(-\cos x) + 2x\sin x - 2\int \sin x$

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

$2\cos x + (-\sin x \cdot 2x) = 2\cos x$

Popuniti odmah!

IME I PREZIME: ANDREA SAVIĆ **BROJ INDEKSA:**

DATUM: VRIJEME: OD DO

45

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: $$\int_{\pi}^{2\pi} \frac{\arctan x}{x}\,\mathrm{d}x$$ 15
4. Istražiti ekstreme funkcije $f(x,y) = y^3 - 3xy + x^2$. ~~20~~ 0
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~~ 10

$$2.\ \int x^2 \sin(x)\,dx = \left\{\begin{matrix} u = x^2 & du = 2x\,dx \\ dv = \sin x & v = -\cos x \end{matrix}\right\} =$$

$$= x^2\cdot(-\cos x) - \int -\cos x \cdot 2x\,dx = -x^2\cos x + 2\int x\cos x\,dx =$$

$$= \left\{\begin{matrix} u = x & du = dx \\ dv = \cos x & v = \sin x \end{matrix}\right\} = -x^2\cos x + 2\left(x\sin x - \int \sin x\,dx\right)$$

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

15

IME I PREZIME: ANDREA SAVIĆ **BROJ INDEKSA:**

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

$dxf = -3y + 2x$

$dyf = 3y^2 - 3x$

$dxf = 0$

$dyf = 0$

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

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

$-9y + \cancel{6x} = 0$

$6y^2 - \cancel{6x} = 0$

$6y^2 - 9y = 0 \,/ : 3$

$2y^2 - 3y = 0$

$y(2y-3) = 0$

$y_1 = 0 \quad 2y - 3 = 0$

$\Downarrow \quad 2y = 3$

$x = 0 \quad y_2 = \frac{3}{2}$

$-3 \cdot \frac{3}{2} + 2x = 0$

$-\frac{9}{2} + 2x = 0$

$2x = \frac{9}{2}$

$x = 9 \times \boxed{\frac{9}{4}}$

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

A $dxxf = 2$

B $dxyf = \boxed{-3+2} = -1$ ×

C $dyyf = 6y$

$T(0,0) \quad \Delta = AC - B^2 = 2 \cdot 0 - 1 = -1 < 0$

Lokalni ekstrem ×

$A > 0 \Rightarrow$ lok. MINIMUM

$T(9, \frac{3}{2}) \quad \Delta = AC - B^2 = \cancel{2} \cdot 6 \cdot \frac{3}{\cancel{2}} - 1$

$\Delta = 18 - 1 = 17 > 0 \Rightarrow$ SEDLASTA TOČKA ×

PREVIŠE POGREŠAKA $\emptyset$

IME I PREZIME: ANDREA SAVIĆ **BROJ INDEKSA:**

5. $y' + xy + x = 0$

$y' = -xy - x$

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

$\frac{dy}{y+1} = -x\,dx \quad /\int$

$\int \frac{dy}{y+1} = \int (-x)\,dx$

20

$y+1=t$

$dy=d$

$\int \frac{dt}{t} = -\int x\,dx$

$\ln|t| = -\frac{x^2}{2}$

$\ln|y+1| = \frac{x^2}{2}$

$\boxed{\ln|y+1| = \frac{-x^2}{2} + C}$

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

$x_0 = 0$

$f(x) = 2x\cos x \quad f(0) = 0$ ✓

$f'(x) = 2x\cdot(-\sin x) + 2\cos x \quad f'(0) = 2$ ✓

$f''(x) = -2x\cos x + 2(-\sin x) + 2\cdot(-\sin x) \quad f''(0) = 0$ ✓

$= -2x\cos x - 2\sin x - 2\sin x$

$= -2x\cos x - 4\sin x$

$f'''(x) = -2\cos x + 2x\sin x - 4\cos x \quad f'''(0) = -2-4 = -6$

$2x\cos x \approx 0 + \frac{2}{1!}x + 0 + \frac{-6}{\underset{=6}{\boxed{2!}}}x^3 \approx 2x - \underset{\times}{\boxed{3x^3}}$

10

Popuniti odmah!

IME I PREZIME: DUJE KRALJEV **BROJ INDEKSA:** 17-2-0015-2010 40

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 $\int \frac{x^2+2x+2}{x^2+x-2}\,dx$. ~~15~~ 0
15
2. Izračunati $\int x^2 \sin(x)\,dx$. 15
3. Nekom od metoda numeričke integracije (Simpsonova ili trapezna formula) približno odrediti vrijednost integrala: $$\int_{\pi}^{2\pi} \frac{\arctan x}{x}\,dx$$ ~~15~~ 5
4. Istražiti ekstreme funkcije $f(x,y) = y^3 - 3xy + x^2$. ~~20~~ 10
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~~ 10

$$1)\ \int \frac{x^2+2x+2}{x^2+x-2}dx = \int 1 + \frac{x+4}{x^2+x-2}\,dx = \int dx + \underbrace{\int \frac{x+4}{x^2+x-2}dx}_{I_1} =$$ ✓ ?

0

$$(x^2+2x+2):(x^2+x-2) = 1$$
$$\frac{\begin{array}{l} x^2+x-2 \\ -\ \ -\ \ + \end{array}}{x+4}$$

$$I_1 = \int \frac{x+4}{x^2+x-2}dx = \begin{bmatrix} t = x^2+x-2 & x = \frac{1}{2}(2x+1) - \frac{1}{2} \\ dt = (2x+1)\,dx & x+4 = \frac{1}{2}(2x+1) - \frac{1}{2} + 4 \end{bmatrix}$$

$$\int \frac{\frac{1}{2}(2x+1) + \frac{7}{2}}{x^2+x-2}dx = \frac{1}{2}\int \frac{2x+1}{x^2+x-2}dx + \frac{7}{2}\int \frac{dx}{x^2+x-2} = \frac{1}{2}\int \frac{dt}{t} + \frac{7}{2}\int \frac{dx}{x^2+x-2} =$$ ✓ ✓

DALJE...

$$\int \frac{dx}{x^2+x-2} = \text{je TIP B} = \int \frac{dx}{(x+\frac{1}{2})^2 - \frac{1}{4} - 2} = \begin{Bmatrix} t = x+\frac{1}{2} \\ dt = dx \end{Bmatrix} = \int \frac{dt}{t^2 - \frac{9}{4}}$$

BOLJE ODMAH RASTAV NA PARC RAZL.

$$\frac{1}{x^2+x-2} = \frac{1}{(x+2)(x-1)} = \frac{A}{x+2} + \frac{B}{x-1},\ A = ?,\ B = ?$$

$$= \int \frac{dt}{(t+\frac{3}{2})(t-\frac{3}{2})}$$

RASTAV NA PARC RAZLOMKE.

Ime i prezime: DUSO KRAISOV **Broj indeksa:** 17-20015-2010

3)

$\Delta x = \frac{b-a}{n}$

$\Delta x = \frac{2\pi - \pi}{4}$

$\Delta x = \frac{2}{4} = \frac{1}{2}$

π

ℓ	0	1	2	3	4
$x\ell$	0	$\frac{1}{4}\pi+\pi$	$\frac{2}{4}\pi+\pi$	$\frac{3}{4}\pi+\pi$	$\frac{4}{4}\pi+\pi$
$y\ell$	0	13,75	11.70	8,97	7,58

$\Delta x = \frac{2\pi - \pi}{4} = \frac{\pi}{4}$

5

$y_0 = \frac{\text{arctg}\,0}{0} = 0$? DIJELJENJE S NULOM ?

$y_1 = 13,75$

$y_2 = 11.70$

$y_3 = 8,97$

$y_4 = 7,85$

$I \approx \frac{\Delta x}{2}\left[y_0 + y_4 + 2\cdot(y_1 + y_2 + y_3)\right]$

$I \approx \frac{\frac{1}{2}}{2}\left[0 + 7,85 + 2(13,75 + 11,70 + 8,97)\right]$

$I \approx \frac{1}{4}\left[7,85 + 68,84\right]$

$I \approx \frac{1}{4} \cdot 76,69$

$I \approx 19.1725$

IME I PREZIME: DUJT KRALJOV **BROJ INDEKSA:** 17-2-0015 2010

2) $\int x^2 \sin(x)\,dx = \begin{bmatrix} u=x^2 & dv=\sin x\,dx \\ du=2x\,dx & v=\int \sin x\,dx \\ & v=-\cos x \end{bmatrix} = x^2\cdot(-\cos x)-\int -\cos x\cdot 2x\,dx$

$= -x^2\cos x + 2\int \cos x\cdot x\,dx = \begin{bmatrix} u=x & dv=\cos x\,dx \\ du=dx & v=\int \cos x\,dx \\ & v=\sin x \end{bmatrix}$

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

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

15

6) $f(x)=2x\cos x \qquad x_0=0$

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

$f'(x)=2\cdot\cos x+2x(-\sin x)=2\cos x-2x\sin x,\ f'(x_0)=2\cdot 1-2\cdot 0\cdot 0=2$ ✓

$f''(x)=-2\sin x-\left(2\sin x+2x\cos x\right)\ f''(x_0)=0+0+0=0$ ✓

$f'''(x)=-2\cos x-2\cos x+2\cdot\cos x-2x\sin x;\ f'''(x_0)=-2-2+2-0=-2$ ✗

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

$f(x)=0+(x-0)\cdot 2+\frac{(x-0)^2}{2}\cdot 0+\frac{(x-0)^3}{6}\cdot(-2)+\dots$

$f(x)=0+(x-0)\cdot 2-\frac{(x-3)^3}{6}\cdot 2$ ✗

10

$= 2x - x^3$

IME I PREZIME: DUJO KRALJEV **BROJ INDEKSA:** IA-2-0015-2010

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

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

$\partial_{xx} f = 2$

$\partial_{xy} f = -3$

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

$\partial_{yy} f = 6y$

$\partial_{yx} f = -3$

$$\frac{\begin{array}{c}\partial_x f = 0 \\ \partial_y f = 0\end{array}}{\begin{array}{l}-3y + 2x = 0 \Rightarrow -3y = -2x \;/:(-3) \qquad y = \frac{2}{3}x \\ 3y^2 - 3x = 0\end{array}}$$

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

$\underbrace{2x^2 - 3x = 0}$ X

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{3 \pm \sqrt{9-0}}{4}$

$x = \frac{3 \pm 3}{4}$

$x_1 = \frac{6}{4} = \frac{3}{2}$

$x_2 = \frac{0}{4} = 0$

$y_1 = \frac{2}{3} \cdot \frac{3}{2}$

$y_1 = \frac{6}{6} = 1$

$y_2 = \frac{2}{3} \cdot 0$

$y_2 = 0$

$T_1\left(\frac{3}{2}, 1\right)$ X

$T_2(0, 0)$ ✓

$T_1\left(\frac{3}{2}, 1\right)$ $\partial_{yy} f = 6 \cdot y = 6 \cdot 1 = 6$

$A = \partial_{xx} f = 2$

$$\Delta = \begin{vmatrix} \partial_{xx} f & \partial_{xy} f \\ \partial_{yx} f & \partial_{yy} f \end{vmatrix} = \begin{vmatrix} 2 & -3 \\ -3 & 6 \end{vmatrix} = 12 - 9 = 3$$

$A > 0$
$\Delta > 0$ funkcija ima minimum u točki $T\left(\frac{3}{2}, 1\right)$

$f(min) = y^3 - 3xy + x^2 = 1^3 - 3 \cdot \frac{3}{2} \cdot 1 + \left(\frac{3}{2}\right)^2 = 1 - \frac{9}{2} + \frac{9}{4} = -\frac{5}{4}$

IME I PREZIME: DUJE KRALJEV BROJ INDEKSA: 17-2-0015-2010

$T_2(0,0)$ $\partial_{yy}f = 6y = 6\cdot 0 = 0$

$A = \partial_{xx}f = 2$

$$\Delta = \begin{vmatrix} \partial_{xx}f & \partial_{xy}f \\ \partial_{yx}f & \partial_{yy}f \end{vmatrix} = \begin{vmatrix} 2 & -3 \\ -3 & 0 \end{vmatrix} = 0 - 9 = -9$$

$A > 0$

$\Delta < 0$ sedlasta točka ✓

10

40
~~45~~

Popuniti odmah!
Ime i prezime: BEINARDO KOTLAR **Broj indeksa:**
Datum: Vrijeme: od 9:30 do 77:30

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~~ 0
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: $$\int_{\pi}^{2\pi} \frac{\arctan x}{x}\,\mathrm{d}x$$ ~~15~~ 0
4. Istražiti ekstreme funkcije $f(x,y) = y^3 - 3xy + x^2$. ~~20~~ ~~15~~ 10
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

2. $\int \underset{u}{x^2}\, \underset{v'}{\sin x}\,dx$ / $u = x^2$ $du = 2x\,dx$ $v' = \sin x$ $v = \int \sin x$ $v = -\cos x$

$u\cdot v - \int v\cdot du = -x^2 \sin x - \int -\cos x\, 2x\,dx$

$-x^2\cos x + 2\int \underset{v'}{\cos x}\, \underset{u}{x}\,dx$ / $u = x$ $du = dx$ $v' = \cos x$ $v = \sin x$

$-x^2\cos x + 2\cdot(x\cdot\sin x - \int \sin x\,dx$

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

IME I PREZIME: BERNARDO KOTLAR **BROJ INDEKSA:**

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

$f'(x,y)_x = -3y + 2x$

$f'(x,y) = 3y^2 - 3x$

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

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

$-9y + \cancel{6x} = 0$

$6y^2 - \cancel{6x} = 0$

$6y^2 - 9y = 0$

$\underline{y} \cdot (6y - 9) = 0 \Rightarrow$ DRUGO RJEŠENJE $\Rightarrow \underline{y = 0} \Rightarrow x = 0$

$6y = 9$

$y = \frac{9}{6} = \frac{3}{2}$ ✓

$-3y + 2x = 0$ 2 25

$2x = +3y$

$2x = +3 \cdot \frac{9}{6}$

$2y = +\frac{27}{6} \quad /:2$

$y = +\frac{27}{12} = \frac{9}{4}$ ✓

$A\left(+\frac{27}{12}, \frac{9}{6}\right)$ ✓

~~15~~

$\underline{10}$

minimum je

$H = \begin{vmatrix} 2 & -3 \\ -3 & 6 \end{vmatrix} = 72 + 9 = 27 > 0$ ✗ ✗

ima ekstrem

$f''(x,y)_{xx} = 2$ ✓

$f''(x,y)xy = -3$ ✓

$f''(x,y)yx = -3$ ✓

$f''(x,y)yy = 6y$ ✓

$\Delta = \begin{vmatrix} 2 & -3 \\ -3 & 6 \cdot \frac{3}{2} \end{vmatrix} = 2 \cdot 9 - (-3)^2 = 9$

$T_2(0,0)$?

IME I PREZIME: BERNARDO KOTLAR **BROJ INDEKSA:**

6. $f(x) = 2x\cos x \qquad x_0$

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

$f'(x) = 2x\cos x = 2x'\cdot\cos x + 2x\cdot\cos x'$

$= 2\cos x + 2x\cdot(-\sin x)$

$= 2\cos x - 2x\sin x$

$f'(0) = 2\cdot 1 - 0 = 2$

$f''(x) = \overset{\leftarrow 0}{\boxed{2'\cdot\cos x}} + 2\cdot\cos x' - \left(2x'\cdot\sin x + 2x\cdot\sin x'\right)$

$= -2\sin x - 2\sin x \overset{-}{+} 2x\cos x$

$f''(0) = 0 - 0 + 0 = 0$

$f'''(x) = \left(\overset{-0}{\boxed{-2'\cdot\sin x}} + (-2)\cdot\sin x'\right) - \left(\overset{\leftarrow 0}{\boxed{2'\cdot\sin x}} + 2\cdot\sin x'\right) \overset{-}{+} \left(2x'\cdot\cos x + 2x\cdot\cos x'\right.$

$= -2\cos x - 2\cos x + (2\cos x - 2x\sin x)$

$= -2\cos x - 2\cos x \underset{-}{+} 2\cos x \underset{+}{-} 2x\sin x$

$f''(0) = -2 \cancel{-2} \underset{-}{+2} - 0 = -2 \times -6$

$f(x) = 0 + \frac{2}{1!}(x-0) + \frac{0}{2!}(x-0)^2 + \frac{-2}{3!}\cdot(x-0)^3$

$= 0 + 2x + 0 - \frac{\overset{-6\ 1}{2}}{\cancel{6}_3}\cdot x^3 = 2x - \boxed{\frac{1}{3}}x^3$ ✓ 15

×

IME I PREZIME: BERNARDO KOTLAR **BROJ INDEKSA:**

1. $\int \frac{x^2+2x+2}{x^2+x-2}dx$

$\cancel{x^2}+2x+2 : (x^2+x-2) = 1+x$

$-\cancel{x^2} \pm x$

$x+2$

$\int \frac{A}{x+2} - \frac{B}{1+x}$

$\emptyset$

$x^2+2x+2 : x^2+x-2 = 1$

$-(x^2+x-2)$

$x+4$

$\Rightarrow I = \int\left(1+\frac{x+4}{x^2+x-2}\right)dx = \dots$

---

3. $\int_{\pi}^{2\pi} \frac{\arctan x}{x}dx = \int_{\pi}^{2\pi} \underset{u}{\underset{\downarrow}{\arctan x}} \cdot \underset{v}{\underset{|}{x^{-1}}} dx$

$u = \arctan x$

$du = \frac{1}{1+x^2}dx$

$v' = x^{-1}$

$v = \int x^{-1} = v = x^0$

$\arctan x - \int_{\pi}^{2\pi}$

NUMERIČKA INTEGRACIJA ?!