$$Seznam := 2$$

$$line :=$$

$line :=$ "PMMAT2|105005|Adamová, Marie |zk|ESF B-HPS FP [sem 2]

zadani pro, "Adamová, Marie ", 105005

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`1.200000000`)*exp(`.1000000000`)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\ln(1.200000000)\,\mathrm{e}^{.1000000000}$$

Reseni:

volime bod, $[1, 0]$, *funkci*, $(x, y) \to \ln(x)\,\mathrm{e}^{y}$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to x - 1 + (x-1)\,y - \frac{1}{2}(x-1)^2$$

Jeho hodnota v bode, $[1.200000000, 0.1000000000]$, *je*, 0.2000000000

```
metodou per partes vypoctete integral
 Int(x*2^x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int x\,2^x\,dx = \frac{2^x\,x}{\ln(2)} - \int \frac{2^x}{\ln(2)}\,dx, \text{"="}, \frac{(-1 + x\ln(2))\,2^x}{\ln(2)^2}\right]$$

```
Najdete lokalni extremy a sedlove body funkce 9-10*x^2+5*x*y+3*x^3+9*x^2*y-
6*x*y^2
```

funkce, $9 - 10x^2 + 5xy + 3x^3 + 9x^2y - 6xy^2$, *má gradient*,

$$\begin{bmatrix} -20x + 5y + 9x^2 + 18xy - 6y^2 \\ 5x + 9x^2 - 12xy \end{bmatrix}, \textit{ten je nulový v bodech},$$

$$\left[[x = 0, y = 0], \left[x = 0, y = \frac{5}{6}\right], \left[x = \frac{5}{51}, y = \frac{25}{51}\right], \left[x = \frac{5}{9}, y = \frac{5}{6}\right]\right]$$

v bode, $[x = 0, y = 0]$, *je druhy diferencial*,

$$(u, v) \to -20u^2 + 10vu = -20\left(u - \frac{1}{4}v\right)^2 + \frac{5}{4}v^2$$

v bode, $\left[x = 0, y = \frac{5}{6}\right]$, *je druhy diferencial*,

$$(u, v) \to -5u^2 - 10vu = -5(u + v)^2 + 5v^2$$

$$v\ bode, \left[x=\frac{5}{51}, y=\frac{25}{51}\right], je\ druhy\ diferencial,$$

$$(u,v) \to -\frac{160}{17}u^2 + \frac{30}{17}v\,u - \frac{20}{17}v^2 = -\frac{160}{17}\left(u-\frac{3}{32}v\right)^2 - \frac{35}{32}v^2$$

$$v\ bode, \left[x=\frac{5}{9}, y=\frac{5}{6}\right], je\ druhy\ diferencial,$$

$$(u,v) \to 5\,u^2 + 10\,v\,u - \frac{20}{3}v^2 = 5\,(u+v)^2 - \frac{35}{3}v^2$$

$$LocalMin = [\ ], LocalMax = \left[\left[\frac{5}{51}, \frac{25}{51}\right]\right], Saddle = \left[[0,0], \left[0, \frac{5}{6}\right], \left[\frac{5}{9}, \frac{5}{6}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+3-3*cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

line := "PMMAT2| 99521|Albrechtová, Kristýna|zk|ESF B-HPS NH [sem 6]

zadani pro, "Albrechtová, Kristýna", 99521

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`1.200000000`)*exp(`.1000000000`)
```

*Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\
zvolenem bode priblizne vypocitejte:*

$$\ln(1.200000000)\,e^{.1000000000}$$

Reseni:

volime bod, $[1, 0]$, *funkci*, $(x,y) \to \ln(x)\,e^y$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom

$$(x,y) \to x - 1 + (x-1)\,y - \frac{1}{2}(x-1)^2$$

Jeho hodnota v bode, [1.200000000, 0.1000000000], *je*, 0.2000000000

```
metodou per partes vypoctete integral
 Int(ln(x),x)
,x na konci zadani ctete jako dx
```

$$[\int \ln(x)\,dx = \ln(x)\,x - \int 1\,dx, "=", \ln(x)\,x - x]$$

```
Najdete lokalni extremy a sedlove body funkce -9+3*x^2+2*y^2+x^3+15*y^3
```

$$\textit{funkce}, -9+3x^2+2y^2+x^3+15y^3, \textit{má gradient}, \begin{bmatrix} 6x+3x^2 \\ 4y+45y^2 \end{bmatrix},$$

ten je nulový v bodech,

$$\left[[x=0, y=0], [x=-2, y=0], \left[x=0, y=\frac{-4}{45}\right], \left[x=-2, y=\frac{-4}{45}\right]\right]$$

$$\textit{v bode}, [x=0, y=0], \textit{je druhy diferencial},$$

$$(u, v) \to 6u^2+4v^2 = 6u^2+4v^2$$

$$\textit{v bode}, [x=-2, y=0], \textit{je druhy diferencial},$$

$$(u, v) \to -6u^2+4v^2 = -6u^2+4v^2$$

$$\textit{v bode}, \left[x=0, y=\frac{-4}{45}\right], \textit{je druhy diferencial},$$

$$(u, v) \to 6u^2-4v^2 = 6u^2-4v^2$$

$$\textit{v bode}, \left[x=-2, y=\frac{-4}{45}\right], \textit{je druhy diferencial},$$

$$(u, v) \to -6u^2-4v^2 = -6u^2-4v^2$$

$$\mathit{LocalMin} = [[0, 0]], \mathit{LocalMax} = \left[\left[-2, \frac{-4}{45}\right]\right], \mathit{Saddle} = \left[[-2, 0], \left[0, \frac{-4}{45}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+3-3*cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

line := "PMMAT2|100108|Babák, Jan |zk|ESF M-HPS RRS [sem 6]

zadani pro, "Babák, Jan ", 100108

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`-.1000000000`)*`8.950000000`^(1/2)
```

*Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\
zvolenem bode priblizne vypocitejte:*

$$\cos(-.1000000000)\sqrt{8.950000000}$$

Reseni:

$$\textit{volime bod}, [0, 9], \textit{funkci}, (x, y) \to \cos(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to \frac{3}{2} + \frac{1}{6}y - \frac{1}{216}(y-9)^2 - \frac{3}{2}x^2$$

$$\textit{Jeho hodnota v bode}, [-0.1000000000, 8.950000000], \textit{ je}, 2.976655093$$

```
metodou per partes vypoctete integral
 Int(x*cos(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int x\cos(x)\,dx = \sin(x)\,x - \int \sin(x)\,dx, \text{"="}, \cos(x)+\sin(x)\,x\right]$$

```
Najdete lokalni extremy a sedlove body funkce -5*x^2+9*y^2+12*x^3-3*x^2*y-
9*y^3
```

$$\textit{funkce}, -5\,x^2+9\,y^2+12\,x^3-3\,x^2\,y-9\,y^3, \textit{má gradient},$$

$$\begin{bmatrix} -10\,x+36\,x^2-6\,x\,y \\ 18\,y-3\,x^2-27\,y^2 \end{bmatrix}, \textit{ten je nulový v bodech},$$

$$\left[[x=0, y=0], \left[x=0, y=\frac{2}{3}\right], \left[x=\frac{7}{25}, y=\frac{1}{75}\right], \left[x=\frac{5}{13}, y=\frac{25}{39}\right]\right]$$

$$\textit{v bode}, [x=0, y=0], \textit{je druhy diferencial},$$

$$(u, v) \rightarrow -10\,u^2+18\,v^2 = -10\,u^2+18\,v^2$$

$$\textit{v bode}, \left[x=0, y=\frac{2}{3}\right], \textit{je druhy diferencial},$$

$$(u, v) \rightarrow -14\,u^2-18\,v^2 = -14\,u^2-18\,v^2$$

$$\textit{v bode}, \left[x=\frac{7}{25}, y=\frac{1}{75}\right], \textit{je druhy diferencial},$$

$$(u, v) \rightarrow \frac{252}{25}\,u^2-\frac{84}{25}\,v\,u+\frac{432}{25}\,v^2 = \frac{252}{25}\left(u-\frac{1}{6}\,v\right)^2+17\,v^2$$

$$\textit{v bode}, \left[x=\frac{5}{13}, y=\frac{25}{39}\right], \textit{je druhy diferencial},$$

$$(u, v) \rightarrow \frac{180}{13}\,u^2-\frac{60}{13}\,v\,u-\frac{216}{13}\,v^2 = \frac{180}{13}\left(u-\frac{1}{6}\,v\right)^2-17\,v^2$$

$$\textit{LocalMin} = \left[\left[\frac{7}{25}, \frac{1}{75}\right]\right], \textit{LocalMax} = \left[\left[0, \frac{2}{3}\right]\right], \textit{Saddle} = \left[[0, 0], \left[\frac{5}{13}, \frac{25}{39}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(cos(x)^3+3-3*cos(x)^2)/(sin(x)*cos(x)^2)
```

$$\int \frac{\cos(x)^3+3-3\cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{3}{\cos(x)}$$

line :=

"PMMAT2|174666|Bednáø, Martin |zk|ESF M-HPS HOSP [sem 2]

zadani pro, "Bednáø, Martin ", 174666

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`.9000000000`)*`.9500000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\ln(.9000000000)\sqrt{.9500000000}$$

Reseni:

$$\textit{volime bod}, [1, 1], \textit{funkci}, (x, y) \to \ln(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to x - 1 + \frac{1}{2}(x-1)(y-1) - \frac{1}{2}(x-1)^2$$

$$\textit{Jeho hodnota v bode}, [0.9000000000, 0.9500000000], \ \textit{je}, -0.1025000000$$

```
metodou per partes vypoctete integral
 Int(x*cos(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int x\cos(x)\,dx = \sin(x)\,x - \int \sin(x)\,dx, \text{"="}, \cos(x) + \sin(x)\,x\right]$$

```
Najdete lokalni extremy a sedlove body funkce 5*x+4*x^2-10*y^2-7*x^3+9*y^3
```

$$\textit{funkce}, 5x + 4x^2 - 10y^2 - 7x^3 + 9y^3, \textit{má gradient}, \begin{bmatrix} 5 + 8x - 21x^2 \\ -20y + 27y^2 \end{bmatrix},$$

ten je nulový v bodech,

$$\left[\left[x = \frac{-1}{3}, y = 0\right], \left[x = \frac{5}{7}, y = 0\right], \left[x = \frac{-1}{3}, y = \frac{20}{27}\right], \left[x = \frac{5}{7}, y = \frac{20}{27}\right]\right]$$

$$\textit{v bode}, \left[x = \frac{-1}{3}, y = 0\right], \textit{je druhy diferencial},$$

$$(u, v) \to 22u^2 - 20v^2 = 22u^2 - 20v^2$$

$$\textit{v bode}, \left[x = \frac{5}{7}, y = 0\right], \textit{je druhy diferencial},$$

$$(u, v) \to -22u^2 - 20v^2 = -22u^2 - 20v^2$$

$$\textit{v bode}, \left[x = \frac{-1}{3}, y = \frac{20}{27}\right], \textit{je druhy diferencial},$$

$$(u, v) \to 22u^2 + 20v^2 = 22u^2 + 20v^2$$

$$\textit{v bode}, \left[x = \frac{5}{7}, y = \frac{20}{27}\right], \textit{je druhy diferencial},$$

$$(u, v) \to -22u^2 + 20v^2 = -22u^2 + 20v^2$$

$$\textit{LocalMin} = \left[\left[\frac{-1}{3}, \frac{20}{27}\right]\right], \textit{LocalMax} = \left[\left[\frac{5}{7}, 0\right]\right], \textit{Saddle} = \left[\left[\frac{-1}{3}, 0\right], \left[\frac{5}{7}, \frac{20}{27}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(cos(x)^3+1-cos(x)^2)/(sin(x)*cos(x)^2)
```

$$\int \frac{\cos(x)^3 + 1 - \cos(x)^2}{\sin(x)\cos(x)^2}\, dx = \ln(\sin(x)) + \frac{1}{\cos(x)}$$

line :=

"PMMAT2|174933|Benda, Vladislav |zk|ESF M-EKT EKON [sem 2]

zadani pro, "Benda, Vladislav ", 174933

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte exp(`.2000000000`)*`1.100000000`^(1/2)
```

*Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\
zvolenem bode priblizne vypocitejte:*

$$e^{.2000000000}\sqrt{1.100000000}$$

Reseni:

volime bod, $[0, 1]$, *funkci*, $(x, y) \to e^x \sqrt{y}$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to \frac{1}{2} + \frac{1}{2} y + x - \frac{1}{8}(y-1)^2 + \frac{1}{2} x^2 + \frac{1}{2} x (y-1)$$

Jeho hodnota v bode, $[0.2000000000, 1.100000000]$, *je*, 1.278750000

```
metodou per partes vypoctete integral
 Int(ln(x)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \ln(x)\, x\, dx = \frac{1}{2} x^2 \ln(x) - \int \frac{x}{2}\, dx, "=", \frac{1}{2} x^2 \ln(x) - \frac{x^2}{4}\right]$$

```
Najdete lokalni extremy a sedlove body funkce -9+3*x^2+2*y^2+x^3+15*y^3
```

funkce, $-9 + 3x^2 + 2y^2 + x^3 + 15y^3$, *má gradient*, $\begin{bmatrix} 6x + 3x^2 \\ 4y + 45y^2 \end{bmatrix}$,

ten je nulový v bodech,

$$\left[[x = 0, y = 0], [x = -2, y = 0], \left[x = 0, y = \frac{-4}{45}\right], \left[x = -2, y = \frac{-4}{45}\right]\right]$$

v bode, $[x = 0, y = 0]$, *je druhy diferencial*,

$$(u, v) \to 6u^2 + 4v^2 = 6u^2 + 4v^2$$

v bode, $[x = -2, y = 0]$, *je druhy diferencial*,

$$(u, v) \to -6u^2 + 4v^2 = -6u^2 + 4v^2$$

$$v\ bode, \left[x = 0, y = \frac{-4}{45}\right], je\ druhy\ diferencial,$$

$$(u, v) \to 6\,u^2 - 4\,v^2 = 6\,u^2 - 4\,v^2$$

$$v\ bode, \left[x = -2, y = \frac{-4}{45}\right], je\ druhy\ diferencial,$$

$$(u, v) \to -6\,u^2 - 4\,v^2 = -6\,u^2 - 4\,v^2$$

$$LocalMin = [[0, 0]], LocalMax = \left[\left[-2, \frac{-4}{45}\right]\right], Saddle = \left[[-2, 0], \left[0, \frac{-4}{45}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3-3*cos(x)^2+3)/(4*sin(x)*cos(x)^2)
```

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

line := "PMMAT2|172164|Beníèková, Petra |zk|ESF B-HPS FP [sem 2]

zadani pro, "Beníèková, Petra   ", 172164

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`-.1000000000`)*ln(`.9500000000`)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne
zvolenem bode priblizne vypocitejte:

$$\cos(-.1000000000)\ln(.9500000000)$$

Reseni:

$$volime\ bod, [0, 1], funkci, (x, y) \to \cos(x)\ln(y)$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to y - 1 - \frac{1}{2}(y - 1)^2$$

Jeho hodnota v bode, [-0.1000000000, 0.9500000000], *je*, -0.05125000000

```
metodou per partes vypoctete integral
 Int(arctan(x^2)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arctan(x^2)\,x\,dx = \frac{1}{2}x^2\arctan(x^2) - \int \frac{x^3}{x^4+1}\,dx, \text{"="}, \quad \frac{1}{2}x^2\arctan(x^2) - \frac{1}{4}\ln(x^4+1)\right]$$

```
Najdete lokalni extremy a sedlove body funkce 5+15*x+8*x*y-11*x^3-x^2*y-
9*x^3*y
```

$funkce, 5+15x+8xy-11x^3-x^2y-9x^3y, má\ gradient,$

$$\begin{bmatrix} 15+8y-33x^2-2xy-27x^2y \\ 8x-x^2-9x^3 \end{bmatrix}, ten\ je\ nulový\ v\ bodech,$$

$$\left[\left[x=0, y=\frac{-15}{8}\right], \left[x=-1, y=\frac{-18}{17}\right], \left[x=\frac{8}{9}, y=\frac{-299}{408}\right]\right]$$

$$v\ bode, \left[x=0, y=\frac{-15}{8}\right], je\ druhy\ diferencial,$$

$$(u,v)\to\frac{15}{4}u^2+16vu=\frac{15}{4}\left(u+\frac{32}{15}v\right)^2-\frac{256}{15}v^2$$

$$v\ bode, \left[x=-1, y=\frac{-18}{17}\right], je\ druhy\ diferencial,$$

$$(u,v)\to\frac{186}{17}u^2-34vu=\frac{186}{17}\left(u-\frac{289}{186}v\right)^2-\frac{4913}{186}v^2$$

$$v\ bode, \left[x=\frac{8}{9}, y=\frac{-299}{408}\right], je\ druhy\ diferencial,$$

$$(u,v)\to-\frac{4493}{204}u^2-\frac{272}{9}vu=-\frac{4493}{204}\left(u+\frac{9248}{13479}v\right)^2+\frac{1257728}{121311}v^2$$

$$LocalMin=[\ ], LocalMax=[\ ], Saddle=\left[\left[0, \frac{-15}{8}\right], \left[-1, \frac{-18}{17}\right], \left[\frac{8}{9}, \frac{-299}{408}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+3-3*cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

line := "PMMAT2|174769|Blaha, Robert |zk|ESF M-HPS FP [sem 2]

zadani pro, "Blaha, Robert ", 174769

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`.2000000000`)*exp(`.1000000000`)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne

zvolenem bode priblizne vypocitejte:

$$\cos(.2000000000)\,\mathbf{e}^{.1000000000}$$

Reseni:

$$volime\ bod, [0,0], funkci, (x,y)\to\cos(x)\,\mathbf{e}^y$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to 1 + y + \frac{1}{2} y^2 - \frac{1}{2} x^2$$

Jeho hodnota v bode, [0.2000000000, 0.1000000000], *je*, 1.085000000

```
metodou per partes vypoctete integral
 Int(x*arctan(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int x \arctan(x)\, dx = \frac{1}{2} \arctan(x)\, x^2 - \int \frac{x^2}{2\,(x^2+1)}\, dx, \text{"="}, \quad \frac{1}{2} \arctan(x)\, x^2 - \frac{x}{2} + \frac{1}{2} \arctan(x) \right]$$

```
Najdete lokalni extremy a sedlove body funkce -6+5*x^2-8*y^2+11*x^3-3*y^3
```

funkce, $-6 + 5\,x^2 - 8\,y^2 + 11\,x^3 - 3\,y^3$, *má gradient*, $\begin{bmatrix} 10\,x + 33\,x^2 \\ -16\,y - 9\,y^2 \end{bmatrix}$,

ten je nulový v bodech,

$$\left[[x = 0, y = 0], \left[x = 0, y = \frac{-16}{9} \right], \left[x = \frac{-10}{33}, y = 0 \right], \left[x = \frac{-10}{33}, y = \frac{-16}{9} \right] \right]$$

v bode, $[x = 0, y = 0]$, *je druhy diferencial*,

$$(u, v) \to 10\,u^2 - 16\,v^2 = 10\,u^2 - 16\,v^2$$

v bode, $\left[x = 0, y = \frac{-16}{9} \right]$, *je druhy diferencial*,

$$(u, v) \to 10\,u^2 + 16\,v^2 = 10\,u^2 + 16\,v^2$$

v bode, $\left[x = \frac{-10}{33}, y = 0 \right]$, *je druhy diferencial*,

$$(u, v) \to -10\,u^2 - 16\,v^2 = -10\,u^2 - 16\,v^2$$

v bode, $\left[x = \frac{-10}{33}, y = \frac{-16}{9} \right]$, *je druhy diferencial*,

$$(u, v) \to -10\,u^2 + 16\,v^2 = -10\,u^2 + 16\,v^2$$

$$LocalMin = \left[\left[0, \frac{-16}{9} \right] \right], LocalMax = \left[\left[\frac{-10}{33}, 0 \right] \right],$$

$$Saddle = \left[[0, 0], \left[\frac{-10}{33}, \frac{-16}{9} \right] \right]$$

```
Vyjdrete jako elementarni funkci integral z
(cos(x)^3+1-cos(x)^2)/(sin(x)*cos(x)^2)
```

$$\int \frac{\cos(x)^3 + 1 - \cos(x)^2}{\sin(x)\cos(x)^2}\, dx = \ln(\sin(x)) + \frac{1}{\cos(x)}$$

line := "PMMAT2|151092|Cífka, Michal |zk|ESF B-EKM POH [sem 2] *zadani pro*, "Cífka, Michal ", 151092

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`-.1000000000`)*ln(`.9500000000`)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\cos(-.1000000000)\ln(.9500000000)$$

Reseni:

volime bod, $[0, 1]$, *funkci*, $(x, y) \to \cos(x)\ln(y)$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to y - 1 - \frac{1}{2}(y-1)^2$$

Jeho hodnota v bode, $[-0.1000000000, 0.9500000000]$, *je*, -0.05125000000

```
metodou per partes vypoctete integral
 Int(arctan(x^2),x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arctan(x^2)\,dx = \arctan(x^2)\,x - \int \frac{2x^2}{x^4+1}\,dx, \text{"="}, \arctan(x^2)\,x \quad -\frac{1}{2}\sqrt{2}\arctan(x\sqrt{2}-1) - \frac{1}{4}\sqrt{2}\ln\left(\frac{x^2 - x\sqrt{2}+1}{x^2+x\sqrt{2}+1}\right) - \frac{1}{2}\sqrt{2}\arctan(x\sqrt{2}+1)\right]$$

```
Najdete lokalni extremy a sedlove body funkce 3*x-11*x^2+16*x*y+13*x*y^2
```

funkce, $3x - 11x^2 + 16xy + 13xy^2$, *má gradient*, $\begin{bmatrix} 3 - 22x + 16y + 13y^2 \\ 16x + 26xy \end{bmatrix}$,

ten je nulový v bodech,

$$\left[\left[x = \frac{-25}{286}, y = \frac{-8}{13}\right], [x = 0, y = -1], \left[x = 0, y = \frac{-3}{13}\right]\right]$$

v bode, $\left[x = \frac{-25}{286}, y = \frac{-8}{13}\right]$, *je druhy diferencial*,

$$(u, v) \to -22u^2 - \frac{25}{11}v^2 = -22u^2 - \frac{25}{11}v^2$$

v bode, $[x = 0, y = -1]$, *je druhy diferencial*,

$$(u, v) \to -22u^2 - 20vu = -22\left(u + \frac{5}{11}v\right)^2 + \frac{50}{11}v^2$$

$$v\ bode, \left[x=0,\ y=\frac{-3}{13}\right], je\ druhy\ diferencial,$$

$$(u, v) \to -22\,u^2 + 20\,v\,u = -22\left(u - \frac{5}{11}\,v\right)^2 + \frac{50}{11}\,v^2$$

$$LocalMin = [\ ], LocalMax = \left[\left[\frac{-25}{286}, \frac{-8}{13}\right]\right], Saddle = \left[[0, -1], \left[0, \frac{-3}{13}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(cos(x)^3+1-cos(x)^2)/(sin(x)*cos(x)^2)
```

$$\int \frac{\cos(x)^3 + 1 - \cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{1}{\cos(x)}$$

line := "PMMAT2|171784|Diani¹ka, Róbert |zk|ESF B-HPS FP [sem 2]

zadani pro, "Diani¹ka, Róbert ", 171784

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`-.1000000000`)*`8.950000000`^(1/2)
```

*Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\
zvolenem bode priblizne vypocitejte:*

$$\cos(-.1000000000)\sqrt{8.950000000}$$

Reseni:

$$volime\ bod, [0, 9], funkci, (x, y) \to \cos(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to \frac{3}{2} + \frac{1}{6}\,y - \frac{1}{216}\,(y-9)^2 - \frac{3}{2}\,x^2$$

Jeho hodnota v bode, [-0.1000000000, 8.950000000], *je*, 2.976655093

```
metodou per partes vypoctete integral
 Int(x*cos(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int x\cos(x)\,dx = \sin(x)\,x - \int \sin(x)\,dx, "=", \cos(x) + \sin(x)\,x\right]$$

```
Najdete lokalni extremy a sedlove body funkce -3*x+3*x^2-7*y^2+15*x^3+7*y^3
```

$$funkce, -3\,x + 3\,x^2 - 7\,y^2 + 15\,x^3 + 7\,y^3, m\acute{a}\ gradient, \begin{bmatrix} -3 + 6\,x + 45\,x^2 \\ -14\,y + 21\,y^2 \end{bmatrix},$$

ten je nulový v bodech,

$$\left[\left[x = \frac{-1}{3}, y = 0\right], \left[x = \frac{1}{5}, y = 0\right], \left[x = \frac{-1}{3}, y = \frac{2}{3}\right], \left[x = \frac{1}{5}, y = \frac{2}{3}\right]\right]$$

$$v\ bode, \left[x = \frac{-1}{3}, y = 0\right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow -24\,u^2 - 14\,v^2 = -24\,u^2 - 14\,v^2$$

$$v\ bode, \left[x = \frac{1}{5}, y = 0\right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow 24\,u^2 - 14\,v^2 = 24\,u^2 - 14\,v^2$$

$$v\ bode, \left[x = \frac{-1}{3}, y = \frac{2}{3}\right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow -24\,u^2 + 14\,v^2 = -24\,u^2 + 14\,v^2$$

$$v\ bode, \left[x = \frac{1}{5}, y = \frac{2}{3}\right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow 24\,u^2 + 14\,v^2 = 24\,u^2 + 14\,v^2$$

$$LocalMin = \left[\left[\frac{1}{5}, \frac{2}{3}\right]\right], LocalMax = \left[\left[\frac{-1}{3}, 0\right]\right], Saddle = \left[\left[\frac{1}{5}, 0\right], \left[\frac{-1}{3}, \frac{2}{3}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(2*cos(x)^3+3-3*cos(x)^2)/(2*sin(x)*cos(x)^2)
```

$$\int \frac{1}{2} \frac{2\cos(x)^3 + 3 - 3\cos(x)^2}{\sin(x)\cos(x)^2}\, dx = \ln(\sin(x)) + \frac{3}{2} \frac{1}{\cos(x)}$$

line := "PMMAT2|136915|Dole¾el, Tomá¹ |zk|ESF B-HPS NH [sem 4]

zadani pro, "Dole¾el, Tomá¹ ", 136915

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`1.200000000`)*`4.100000000`^(1/2)
```

*Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\
zvolenem bode priblizne vypocitejte:*

$$\ln(1.200000000)\sqrt{4.100000000}$$

Reseni:

$$volime\ bod, [1, 4], funkci, (x, y) \rightarrow \ln(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \rightarrow 2\,x - 2 + \frac{1}{4}(x-1)(y-4) - (x-1)^2$$

Jeho hodnota v bode, [1.200000000, 4.100000000], *je*, 0.3650000000

```
metodou per partes vypoctete integral
 Int(sin(x)*x,x)
```

```
,x na konci zadani ctete jako dx
```

$$[\int \sin(x)\, x\, dx = -x\cos(x) - \int -\cos(x)\, dx, "=", \sin(x) - x\cos(x)]$$

```
Najdete lokalni extremy a sedlove body funkce 16+4*x-8*x^2+10*x*y+6*x*y^2
```

funkce, $16 + 4x - 8x^2 + 10xy + 6xy^2$, *má gradient*,

$\begin{bmatrix} 4 - 16x + 10y + 6y^2 \\ 10x + 12xy \end{bmatrix}$, *ten je nulový v bodech*,

$$\left[\left[x = \frac{-1}{96}, y = \frac{-5}{6}\right], [x = 0, y = -1], \left[x = 0, y = \frac{-2}{3}\right]\right]$$

v bode, $\left[x = \frac{-1}{96}, y = \frac{-5}{6}\right]$, *je druhy diferencial*,

$$(u, v) \to -16u^2 - \frac{1}{8}v^2 = -16u^2 - \frac{1}{8}v^2$$

v bode, $[x = 0, y = -1]$, *je druhy diferencial*,

$$(u, v) \to -16u^2 - 4vu = -16\left(u + \frac{1}{8}v\right)^2 + \frac{1}{4}v^2$$

v bode, $\left[x = 0, y = \frac{-2}{3}\right]$, *je druhy diferencial*,

$$(u, v) \to -16u^2 + 4vu = -16\left(u - \frac{1}{8}v\right)^2 + \frac{1}{4}v^2$$

$$LocalMin = [\ ], LocalMax = \left[\left[\frac{-1}{96}, \frac{-5}{6}\right]\right], Saddle = \left[[0, -1], \left[0, \frac{-2}{3}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+3-3*cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

line := "PMMAT2|171845|Fajtová, Veronika |zk|ESF B-HPS FP [sem 2]

zadani pro, "Fajtová, Veronika   ", 171845

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`1.200000000`)*exp(`.1000000000`)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne
zvolenem bode priblizne vypocitejte:

$$\ln(1.200000000)\, e^{.1000000000}$$

Reseni:

$$\textit{volime bod}, [1, 0], \textit{funkci}, (x, y) \to \ln(x)\, \mathrm{e}^y$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to x - 1 + (x - 1)\, y - \frac{1}{2}(x - 1)^2$$

$$\textit{Jeho hodnota v bode}, [1.200000000, 0.1000000000], \ \textit{je}, 0.2000000000$$

```
metodou per partes vypoctete integral
 Int(arctan(x^2)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arctan(x^2)\, x\, dx = \frac{1}{2} x^2 \arctan(x^2) - \int \frac{x^3}{x^4 + 1}\, dx, \text{"="}, \quad \frac{1}{2} x^2 \arctan(x^2) - \frac{1}{4} \ln(x^4 + 1)\right]$$

```
Najdete lokalni extremy a sedlove body funkce -6+5*x^2-8*y^2+11*x^3-3*y^3
```

$$\textit{funkce}, -6 + 5\, x^2 - 8\, y^2 + 11\, x^3 - 3\, y^3, \textit{má gradient}, \begin{bmatrix} 10\, x + 33\, x^2 \\ -16\, y - 9\, y^2 \end{bmatrix},$$

ten je nulový v bodech,

$$\left[[x = 0, y = 0], \left[x = 0, y = \frac{-16}{9}\right], \left[x = \frac{-10}{33}, y = 0\right], \left[x = \frac{-10}{33}, y = \frac{-16}{9}\right]\right]$$

$$\textit{v bode}, [x = 0, y = 0], \textit{je druhy diferencial},$$

$$(u, v) \to 10\, u^2 - 16\, v^2 = 10\, u^2 - 16\, v^2$$

$$\textit{v bode}, \left[x = 0, y = \frac{-16}{9}\right], \textit{je druhy diferencial},$$

$$(u, v) \to 10\, u^2 + 16\, v^2 = 10\, u^2 + 16\, v^2$$

$$\textit{v bode}, \left[x = \frac{-10}{33}, y = 0\right], \textit{je druhy diferencial},$$

$$(u, v) \to -10\, u^2 - 16\, v^2 = -10\, u^2 - 16\, v^2$$

$$\textit{v bode}, \left[x = \frac{-10}{33}, y = \frac{-16}{9}\right], \textit{je druhy diferencial},$$

$$(u, v) \to -10\, u^2 + 16\, v^2 = -10\, u^2 + 16\, v^2$$

$$\textit{LocalMin} = \left[\left[0, \frac{-16}{9}\right]\right], \textit{LocalMax} = \left[\left[\frac{-10}{33}, 0\right]\right],$$

$$\textit{Saddle} = \left[[0, 0], \left[\frac{-10}{33}, \frac{-16}{9}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
 (2*cos(x)^3+3-3*cos(x)^2)/(2*sin(x)*cos(x)^2)
```

$$\int \frac{1}{2} \frac{2\cos(x)^3 + 3 - 3\cos(x)^2}{\sin(x)\cos(x)^2}\, dx = \ln(\sin(x)) + \frac{3}{2} \frac{1}{\cos(x)}$$

$line$:= "PMMAT2|172168|Ferèák, Ondrej |zk|ESF B-HPS NH [sem 2]

zadani pro, "Ferèák, Ondrej   ", 172168

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`-.1000000000`)*`8.950000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\cos(-.1000000000)\sqrt{8.950000000}$$

Reseni:

volime bod, $[0, 9]$, *funkci*, $(x, y) \to \cos(x)\sqrt{y}$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to \frac{3}{2} + \frac{1}{6}y - \frac{1}{216}(y-9)^2 - \frac{3}{2}x^2$$

Jeho hodnota v bode, [-0.1000000000, 8.950000000], *je*, 2.976655093

```
metodou per partes vypoctete integral
 Int(arctan(x^2),x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arctan(x^2)\,dx = \arctan(x^2)\,x - \int \frac{2x^2}{x^4+1}\,dx, \text{"="}, \arctan(x^2)\,x - \frac{1}{2}\sqrt{2}\arctan(x\sqrt{2}-1) - \frac{1}{4}\sqrt{2}\ln\left(\frac{x^2 - x\sqrt{2}+1}{x^2+x\sqrt{2}+1}\right) - \frac{1}{2}\sqrt{2}\arctan(x\sqrt{2}+1)\right]$$

```
Najdete lokalni extremy a sedlove body funkce -10-9*y-9*x^2+11*y^2-9*x^3-x^4
```

funkce, $-10 - 9y - 9x^2 + 11y^2 - 9x^3 - x^4$, *má gradient*,

$$\begin{bmatrix} -18x - 27x^2 - 4x^3 \\ -9 + 22y \end{bmatrix}$$, *ten je nulový v bodech*,

$$\left[\left[x = 0, y = \frac{9}{22}\right], \left[x = -6, y = \frac{9}{22}\right], \left[x = \frac{-3}{4}, y = \frac{9}{22}\right]\right]$$

v bode, $\left[x = 0, y = \frac{9}{22}\right]$, *je druhy diferencial*,

$$(u, v) \to -18u^2 + 22v^2 = -18u^2 + 22v^2$$

v bode, $\left[x = -6, y = \frac{9}{22}\right]$, *je druhy diferencial*,

$$(u, v) \to -126u^2 + 22v^2 = -126u^2 + 22v^2$$

$$v\ bode, \left[x = \frac{-3}{4}, y = \frac{9}{22}\right], je\ druhy\ diferencial,$$

$$(u, v) \to \frac{63}{4} u^2 + 22 v^2 = \frac{63}{4} u^2 + 22 v^2$$

$$LocalMin = \left[\left[\frac{-3}{4}, \frac{9}{22}\right]\right], LocalMax = [\ ], Saddle = \left[\left[0, \frac{9}{22}\right], \left[-6, \frac{9}{22}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(cos(x)^3+1-cos(x)^2)/(sin(x)*cos(x)^2)
```

$$\int \frac{\cos(x)^3 + 1 - \cos(x)^2}{\sin(x)\cos(x)^2}\, dx = \ln(\sin(x)) + \frac{1}{\cos(x)}$$

line := "PMMAT2|172186|Florová, Zuzana |zk|ESF B-HPS RRS [sem 2]

zadani pro, "Florová, Zuzana ", 172186

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte exp(`-.1000000000`)*`3.950000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$e^{-.1000000000}\sqrt{3.950000000}$$

Reseni:

$$volime\ bod, [0, 4], funkci, (x, y) \to e^x \sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to 1 + \frac{1}{4} y + 2x - \frac{1}{64}(y-4)^2 + x^2 + \frac{1}{4} x (y - 4)$$

Jeho hodnota v bode, [-0.1000000000, 3.950000000], *je*, 1.798710938

```
metodou per partes vypoctete integral
 Int(arctan(x^2)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arctan(x^2)\, x\, dx = \frac{1}{2} x^2 \arctan(x^2) - \int \frac{x^3}{x^4+1}\, dx, "=", \quad \frac{1}{2} x^2 \arctan(x^2) - \frac{1}{4}\ln(x^4+1)\right]$$

```
Najdete lokalni extremy a sedlove body funkce -4+16*y-9*x^2+13*y^2-7*x^3+y^3
```

$$funkce, -4+16y-9x^2+13y^2-7x^3+y^3, má\ gradient, \begin{bmatrix} -18x-21x^2 \\ 16+26y+3y^2 \end{bmatrix},$$

ten je nulový v bodech,

$$\left[[x=0, y=-8], \left[x=0, y=\frac{-2}{3}\right], \left[x=\frac{-6}{7}, y=-8\right], \left[x=\frac{-6}{7}, y=\frac{-2}{3}\right]\right]$$

$$v\ bode, [x=0, y=-8], je\ druhy\ diferencial,$$

$$(u, v) \to -18u^2-22v^2 = -18u^2-22v^2$$

$$v\ bode, \left[x=0, y=\frac{-2}{3}\right], je\ druhy\ diferencial,$$

$$(u, v) \to -18u^2+22v^2 = -18u^2+22v^2$$

$$v\ bode, \left[x=\frac{-6}{7}, y=-8\right], je\ druhy\ diferencial,$$

$$(u, v) \to 18u^2-22v^2 = 18u^2-22v^2$$

$$v\ bode, \left[x=\frac{-6}{7}, y=\frac{-2}{3}\right], je\ druhy\ diferencial,$$

$$(u, v) \to 18u^2+22v^2 = 18u^2+22v^2$$

$$LocalMin = \left[\left[\frac{-6}{7}, \frac{-2}{3}\right]\right], LocalMax = [[0, -8]], Saddle = \left[\left[0, \frac{-2}{3}\right], \left[\frac{-6}{7}, -8\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(2*cos(x)^3+3-3*cos(x)^2)/(2*sin(x)*cos(x)^2)
```

$$\int \frac{1}{2}\,\frac{2\cos(x)^3+3-3\cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{3}{2}\,\frac{1}{\cos(x)}$$

line := "PMMAT2|135083|Havli¹ta, Luká¹ |zk|ESF B-HPS NH [sem 2]

zadani pro, "Havli¹ta, Luká¹ ", 135083

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte exp(`.2000000000`)*`9.100000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$e^{.2000000000}\sqrt{9.100000000}$$

Reseni:

$$volime\ bod, [0, 9], funkci, (x, y) \to e^x\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to \frac{3}{2} + \frac{1}{6} y + 3 x - \frac{1}{216} (y - 9)^2 + \frac{3}{2} x^2 + \frac{1}{6} x (y - 9)$$

Jeho hodnota v bode, [0.2000000000, 9.100000000], *je*, 3.679953704

```
metodou per partes vypoctete integral
 Int(arctan(x^2)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arctan(x^2)\, x\, dx = \frac{1}{2} x^2 \arctan(x^2) - \int \frac{x^3}{x^4 + 1}\, dx, \text{"="}, \quad \frac{1}{2} x^2 \arctan(x^2) - \frac{1}{4} \ln(x^4 + 1) \right]$$

```
Najdete lokalni extremy a sedlove body funkce 4+3*x+11*y^2-9*x^3+12*y^3
```

funkce, $4 + 3x + 11 y^2 - 9 x^3 + 12 y^3$, *má gradient*, $\begin{bmatrix} 3 - 27 x^2 \\ 22 y + 36 y^2 \end{bmatrix}$,

ten je nulový v bodech,

$$\left[\left[x = \frac{1}{3}, y = 0 \right], \left[x = \frac{-1}{3}, y = 0 \right], \left[x = \frac{1}{3}, y = \frac{-11}{18} \right], \left[x = \frac{-1}{3}, y = \frac{-11}{18} \right] \right]$$

v bode, $\left[x = \frac{1}{3}, y = 0 \right]$, *je druhy diferencial*,

$$(u, v) \to -18 u^2 + 22 v^2 = -18 u^2 + 22 v^2$$

v bode, $\left[x = \frac{-1}{3}, y = 0 \right]$, *je druhy diferencial*,

$$(u, v) \to 18 u^2 + 22 v^2 = 18 u^2 + 22 v^2$$

v bode, $\left[x = \frac{1}{3}, y = \frac{-11}{18} \right]$, *je druhy diferencial*,

$$(u, v) \to -18 u^2 - 22 v^2 = -18 u^2 - 22 v^2$$

v bode, $\left[x = \frac{-1}{3}, y = \frac{-11}{18} \right]$, *je druhy diferencial*,

$$(u, v) \to 18 u^2 - 22 v^2 = 18 u^2 - 22 v^2$$

$$LocalMin = \left[\left[\frac{-1}{3}, 0 \right] \right], LocalMax = \left[\left[\frac{1}{3}, \frac{-11}{18} \right] \right],$$

$$Saddle = \left[\left[\frac{1}{3}, 0 \right], \left[\frac{-1}{3}, \frac{-11}{18} \right] \right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+3-3*cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

line := "PMMAT2|171776|Holasová, Pavla |zk|ESF B-HPS FP [sem 2] *zadani pro*, "Holasová, Pavla ", 171776

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`.9000000000`)*`8.950000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\ln(.9000000000)\sqrt{8.950000000}$$

Reseni:

volime bod, $[1, 9]$, *funkci*, $(x, y) \to \ln(x)\sqrt{y}$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to 3x - 3 + \frac{1}{6}(x-1)(y-9) - \frac{3}{2}(x-1)^2$$

Jeho hodnota v bode, [0.9000000000, 8.950000000], *je*, -0.3141666667

```
metodou per partes vypoctete integral
 Int(ln(x)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \ln(x)\, x\, dx = \frac{1}{2}x^2\ln(x) - \int \frac{x}{2}\, dx, \text{"="}, \frac{1}{2}x^2\ln(x) - \frac{x^2}{4}\right]$$

```
Najdete lokalni extremy a sedlove body funkce 5*x+4*x^2-10*y^2-7*x^3+9*y^3
```

funkce, $5x + 4x^2 - 10y^2 - 7x^3 + 9y^3$, *má gradient*, $\begin{bmatrix} 5 + 8x - 21x^2 \\ -20y + 27y^2 \end{bmatrix}$,

ten je nulový v bodech,

$$\left[\left[x = \frac{-1}{3}, y = 0\right], \left[x = \frac{5}{7}, y = 0\right], \left[x = \frac{-1}{3}, y = \frac{20}{27}\right], \left[x = \frac{5}{7}, y = \frac{20}{27}\right]\right]$$

v bode, $\left[x = \frac{-1}{3}, y = 0\right]$, *je druhy diferencial*,

$$(u, v) \to 22u^2 - 20v^2 = 22u^2 - 20v^2$$

v bode, $\left[x = \frac{5}{7}, y = 0\right]$, *je druhy diferencial*,

$$(u, v) \to -22u^2 - 20v^2 = -22u^2 - 20v^2$$

v bode, $\left[x = \frac{-1}{3}, y = \frac{20}{27}\right]$, *je druhy diferencial*,

$$(u, v) \to 22u^2 + 20v^2 = 22u^2 + 20v^2$$

$$v\ bode, \left[x=\frac{5}{7}, y=\frac{20}{27}\right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow -22\,u^2 + 20\,v^2 = -22\,u^2 + 20\,v^2$$

$$LocalMin = \left[\left[\frac{-1}{3}, \frac{20}{27}\right]\right], LocalMax = \left[\left[\frac{5}{7}, 0\right]\right], Saddle = \left[\left[\frac{-1}{3}, 0\right], \left[\frac{5}{7}, \frac{20}{27}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(cos(x)^3+3-3*cos(x)^2)/(sin(x)*cos(x)^2)
```

$$\int \frac{\cos(x)^3 + 3 - 3\cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{3}{\cos(x)}$$

line := "PMMAT2|171762|Hurníková, Tereza |zk|ESF B-HPS FP [sem 2]

zadani pro, "Hurníková, Tereza ", 171762

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`.9000000000`)*`.9500000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\ln(.9000000000)\sqrt{.9500000000}$$

Reseni:

$$volime\ bod, [1, 1], funkci, (x, y) \rightarrow \ln(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \rightarrow x - 1 + \frac{1}{2}(x-1)(y-1) - \frac{1}{2}(x-1)^2$$

Jeho hodnota v bode, [0.9000000000, 0.9500000000], *je*, -0.1025000000

```
metodou per partes vypoctete integral
 Int(x*cos(x),x)
,x na konci zadani ctete jako dx
```

$$[\int x\cos(x)\,dx = \sin(x)\,x - \int \sin(x)\,dx, "=", \cos(x) + \sin(x)\,x]$$

```
Najdete lokalni extremy a sedlove body funkce
5+10*x^2+10*x*y+12*y^2+4*x^3+6*x^2*y
```

$$funkce, 5 + 10\,x^2 + 10\,x\,y + 12\,y^2 + 4\,x^3 + 6\,x^2\,y, má\ gradient,$$

$$\begin{bmatrix} 20\,x + 10\,y + 12\,x^2 + 12\,x\,y \\ 10\,x + 24\,y + 6\,x^2 \end{bmatrix}, ten\ je\ nulový\ v\ bodech,$$

$$\left[[x=0, y=0], \left[x=\frac{-5}{3}, y=0\right], \left[x=\frac{19}{6}, y=\frac{-551}{144}\right]\right]$$

$$v\ bode, [x=0, y=0], je\ druhy\ diferencial,$$

$$(u, v) \to 20\,u^2 + 20\,v\,u + 24\,v^2 = 20\left(u + \frac{1}{2}v\right)^2 + 19\,v^2$$

$$v\ bode, \left[x = \frac{-5}{3}, y = 0\right], je\ druhy\ diferencial,$$

$$(u, v) \to -20\,u^2 - 20\,v\,u + 24\,v^2 = -20\left(u + \frac{1}{2}v\right)^2 + 29\,v^2$$

$$v\ bode, \left[x = \frac{19}{6}, y = \frac{-551}{144}\right], je\ druhy\ diferencial,$$

$$(u, v) \to \frac{601}{12}u^2 + 96\,v\,u + 24\,v^2 = \frac{601}{12}\left(u + \frac{576}{601}v\right)^2 - \frac{13224}{601}v^2$$

$$LocalMin = [[0, 0]], LocalMax = [\ ], Saddle = \left[\left[\frac{-5}{3}, 0\right], \left[\frac{19}{6}, \frac{-551}{144}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(3*cos(x)^3+1-cos(x)^2)/(3*sin(x)*cos(x)^2)
```

$$\int \frac{1}{3}\frac{3\cos(x)^3 + 1 - \cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{1}{3}\frac{1}{\cos(x)}$$

line := "PMMAT2| 99517|Charvát, Ondøej |zk|ESF B-HPS RRS [sem 2]'

zadani pro, "Charvát, Ondøej   ", 99517

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`.2000000000`)*exp(`.1000000000`)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\cos(.2000000000)\,e^{.1000000000}$$

Reseni:

$$volime\ bod, [0, 0], funkci, (x, y) \to \cos(x)\,e^y$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to 1 + y + \frac{1}{2}y^2 - \frac{1}{2}x^2$$

$$Jeho\ hodnota\ v\ bode, [0.2000000000, 0.1000000000],\ je, 1.085000000$$

```
metodou per partes vypoctete integral
 Int(ln(x)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \ln(x)\, x\, dx = \frac{1}{2} x^2 \ln(x) - \int \frac{x}{2}\, dx, "=", \frac{1}{2} x^2 \ln(x) - \frac{x^2}{4}\right]$$

```
Najdete lokalni extremy a sedlove body funkce -8*y+6*y^2+12*x^2*y-10*x^4
```

$$\mathit{funkce}, -8\,y + 6\,y^2 + 12\,x^2\,y - 10\,x^4, \mathit{m\acute{a}\ gradient}, \begin{bmatrix} 24\,x\,y - 40\,x^3 \\ -8 + 12\,y + 12\,x^2 \end{bmatrix},$$

ten je nulový v bodech,

$$\left[\left[x = 0, y = \frac{2}{3}\right], \left[x = \frac{1}{2}, y = \frac{5}{12}\right], \left[x = \frac{-1}{2}, y = \frac{5}{12}\right]\right]$$

$$\mathit{v\ bode}, \left[x = 0, y = \frac{2}{3}\right], \mathit{je\ druhy\ diferencial},$$

$$(u, v) \to 16\,u^2 + 12\,v^2 = 16\,u^2 + 12\,v^2$$

$$\mathit{v\ bode}, \left[x = \frac{1}{2}, y = \frac{5}{12}\right], \mathit{je\ druhy\ diferencial},$$

$$(u, v) \to -20\,u^2 + 24\,v\,u + 12\,v^2 = -20\left(u - \frac{3}{5}v\right)^2 + \frac{96}{5}v^2$$

$$\mathit{v\ bode}, \left[x = \frac{-1}{2}, y = \frac{5}{12}\right], \mathit{je\ druhy\ diferencial},$$

$$(u, v) \to -20\,u^2 - 24\,v\,u + 12\,v^2 = -20\left(u + \frac{3}{5}v\right)^2 + \frac{96}{5}v^2$$

$$\mathit{LocalMin} = \left[\left[0, \frac{2}{3}\right]\right], \mathit{LocalMax} = [\ ], \mathit{Saddle} = \left[\left[\frac{1}{2}, \frac{5}{12}\right], \left[\frac{-1}{2}, \frac{5}{12}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(cos(x)^3+1-cos(x)^2)/(sin(x)*cos(x)^2)
```

$$\int \frac{\cos(x)^3 + 1 - \cos(x)^2}{\sin(x)\cos(x)^2}\, dx = \ln(\sin(x)) + \frac{1}{\cos(x)}$$

line := "PMMAT2|174783|Jakubcová, Simona |zk|ESF M-HPS HOSP\
sem 2]"

zadani pro, "Jakubcová, Simona ", 174783

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`.2000000000`)*`4.100000000`^(1/2)
```

*Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\
zvolenem bode priblizne vypocitejte:*

$$\cos(.2000000000)\sqrt{4.100000000}$$

Reseni:

$$volime\ bod,\ [0,4],\ funkci,\ (x,y) \to \cos(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x,y) \to 1 + \frac{1}{4}y - \frac{1}{64}(y-4)^2 - x^2$$

$$Jeho\ hodnota\ v\ bode,\ [0.2000000000, 4.100000000],\ je,\ 1.984843750$$

```
metodou per partes vypoctete integral
 Int(ln(x),x)
,x na konci zadani ctete jako dx
```

$$[\int \ln(x)\,dx = \ln(x)\,x - \int 1\,dx, "=", \ln(x)\,x - x]$$

```
Najdete lokalni extremy a sedlove body funkce 8-3*x-9*x^2+x*y+4*x*y^2
```

$$funkce,\ 8 - 3x - 9x^2 + x\,y + 4x\,y^2,\ má\ gradient,\ \begin{bmatrix} -3 - 18x + y + 4y^2 \\ x + 8x\,y \end{bmatrix},$$

ten je nulový v bodech,

$$\left[\left[x = \frac{-49}{288}, y = \frac{-1}{8}\right], [x = 0, y = -1], \left[x = 0, y = \frac{3}{4}\right]\right]$$

$$v\ bode,\ \left[x = \frac{-49}{288}, y = \frac{-1}{8}\right],\ je\ druhy\ diferencial,$$

$$(u,v) \to -18u^2 - \frac{49}{36}v^2 = -18u^2 - \frac{49}{36}v^2$$

$$v\ bode,\ [x = 0, y = -1],\ je\ druhy\ diferencial,$$

$$(u,v) \to -18u^2 - 14v\,u = -18\left(u + \frac{7}{18}v\right)^2 + \frac{49}{18}v^2$$

$$v\ bode,\ \left[x = 0, y = \frac{3}{4}\right],\ je\ druhy\ diferencial,$$

$$(u,v) \to -18u^2 + 14v\,u = -18\left(u - \frac{7}{18}v\right)^2 + \frac{49}{18}v^2$$

$$LocalMin = [\ ],\ LocalMax = \left[\left[\frac{-49}{288}, \frac{-1}{8}\right]\right],\ Saddle = \left[[0,-1], \left[0, \frac{3}{4}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+3-3*cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

line := "PMMAT2| 73899|Jurèek, Daniel |zk|ESF B-HPS VEK [sem 6]

zadani pro, "Jurèek, Daniel ", 73899

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`.2000000000`)*`4.100000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\cos(.2000000000)\sqrt{4.100000000}$$

Reseni:

$$\textit{volime bod},\ [0, 4],\ \textit{funkci},\ (x, y) \to \cos(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to 1 + \frac{1}{4}y - \frac{1}{64}(y-4)^2 - x^2$$

$$\textit{Jeho hodnota v bode},\ [0.2000000000, 4.100000000],\ \textit{je},\ 1.984843750$$

```
metodou per partes vypoctete integral
 Int(x*arctan(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int x\arctan(x)\,dx = \frac{1}{2}\arctan(x)\,x^2 - \int \frac{x^2}{2(x^2+1)}\,dx,\ "=",\qquad \frac{1}{2}\arctan(x)\,x^2 - \frac{x}{2} + \frac{1}{2}\arctan(x)\right]$$

```
Najdete lokalni extremy a sedlove body funkce 17-6*y+4*x^2-11*y^2-10*x^3-4*y^3
```

$$\textit{funkce},\ 17 - 6y + 4x^2 - 11y^2 - 10x^3 - 4y^3,\ \textit{má gradient},$$

$$\begin{bmatrix} 8x - 30x^2 \\ -6 - 22y - 12y^2 \end{bmatrix},\ \textit{ten je nulový v bodech},$$

$$\left[\left[x = 0, y = \frac{-3}{2}\right], \left[x = 0, y = \frac{-1}{3}\right], \left[x = \frac{4}{15}, y = \frac{-3}{2}\right], \left[x = \frac{4}{15}, y = \frac{-1}{3}\right]\right]$$

$$\textit{v bode},\ \left[x = 0, y = \frac{-3}{2}\right],\ \textit{je druhy diferencial},$$

$$(u, v) \to 8u^2 + 14v^2 = 8u^2 + 14v^2$$

$$\textit{v bode},\ \left[x = 0, y = \frac{-1}{3}\right],\ \textit{je druhy diferencial},$$

$$(u, v) \to 8u^2 - 14v^2 = 8u^2 - 14v^2$$

$$\textit{v bode},\ \left[x = \frac{4}{15}, y = \frac{-3}{2}\right],\ \textit{je druhy diferencial},$$

$$(u, v) \to -8u^2 + 14v^2 = -8u^2 + 14v^2$$

$$\textit{v bode},\ \left[x = \frac{4}{15}, y = \frac{-1}{3}\right],\ \textit{je druhy diferencial},$$

$$(u, v) \to -8u^2 - 14v^2 = -8u^2 - 14v^2$$

$$LocalMin = \left[\left[0, \frac{-3}{2}\right]\right], LocalMax = \left[\left[\frac{4}{15}, \frac{-1}{3}\right]\right],$$
$$Saddle = \left[\left[0, \frac{-1}{3}\right], \left[\frac{4}{15}, \frac{-3}{2}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+1-cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

line := "PMMAT2|171933|Kamenská, Katarína |zk|ESF B-HPS FP [sem 2]"

zadani pro, "Kamenská, Katarína ", 171933

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte exp(`.2000000000`)*`1.100000000`^(1/2)
```

*Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\
zvolenem bode priblizne vypocitejte:*

$$e^{.2000000000}\sqrt{1.100000000}$$

Reseni:

volime bod, $[0, 1]$, *funkci*, $(x, y) \rightarrow e^x \sqrt{y}$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \rightarrow \frac{1}{2} + \frac{1}{2} y + x - \frac{1}{8}(y-1)^2 + \frac{1}{2}x^2 + \frac{1}{2}x(y-1)$$

Jeho hodnota v bode, [0.2000000000, 1.100000000], *je*, 1.278750000

```
metodou per partes vypoctete integral
 Int(arctan(x^2)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arctan(x^2)\, x\, dx = \frac{1}{2}x^2 \arctan(x^2) - \int \frac{x^3}{x^4+1}\, dx, \text{"="}, \quad \frac{1}{2}x^2\arctan(x^2) - \frac{1}{4}\ln(x^4+1)\right]$$

```
Najdete lokalni extremy a sedlove body funkce 5-2*x^2-x*y-5*x*y^2+y^3
```

funkce, $5 - 2x^2 - xy - 5xy^2 + y^3$, *má gradient*, $\begin{bmatrix} -4x - y - 5y^2 \\ -x - 10xy + 3y^2 \end{bmatrix}$,

ten je nulový v bodech,

$$\left[[x=0, y=0], \left[x = \frac{-3}{16}, y = \frac{-1}{2}\right], \left[x = \frac{1}{125}, y = \frac{-1}{25}\right]\right]$$

$$v\ bode, [x=0, y=0], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow -4\,u^2 - 2\,v\,u = -4\left(u + \frac{1}{4}\,v\right)^2 + \frac{1}{4}\,v^2$$

$$v\ bode, \left[x = \frac{-3}{16}, y = \frac{-1}{2}\right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow -4\,u^2 + 8\,v\,u - \frac{9}{8}\,v^2 = -4\,(u-v)^2 + \frac{23}{8}\,v^2$$

$$v\ bode, \left[x = \frac{1}{125}, y = \frac{-1}{25}\right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow -4\,u^2 - \frac{6}{5}\,v\,u - \frac{8}{25}\,v^2 = -4\left(u + \frac{3}{20}\,v\right)^2 - \frac{23}{100}\,v^2$$

$$LocalMin = [\ ], LocalMax = \left[\left[\frac{1}{125}, \frac{-1}{25}\right]\right], Saddle = \left[[0, 0], \left[\frac{-3}{16}, \frac{-1}{2}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(2*cos(x)^3+1-cos(x)^2)/(2*sin(x)*cos(x)^2)
```

$$\int \frac{1}{2}\,\frac{2\cos(x)^3 + 1 - \cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{1}{2}\,\frac{1}{\cos(x)}$$

line := "PMMAT2|170527|Kantor, Ondøej |zk|ESF B-HPS FP [sem 2]'

zadani pro, "Kantor, Ondøej ", 170527

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`1.200000000`)*`4.100000000`^(1/2)
```

*Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\
zvolenem bode priblizne vypocitejte:*

$$\ln(1.200000000)\sqrt{4.100000000}$$

Reseni:

$$volime\ bod, [1, 4], funkci, (x, y) \rightarrow \ln(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \rightarrow 2\,x - 2 + \frac{1}{4}\,(x-1)\,(y-4) - (x-1)^2$$

Jeho hodnota v bode, [1.200000000, 4.100000000], *je*, 0.3650000000

```
metodou per partes vypoctete integral
 Int(arctan(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arctan(x)\,dx = x\arctan(x) - \int \frac{x}{x^2+1}\,dx, "=", x\arctan(x) - \frac{1}{2}\ln(x^2+1)\right]$$

```
Najdete lokalni extremy a sedlove body funkce 17-6*y+4*x^2-11*y^2-10*x^3-4*y^3
```

funkce, $17-6\,y+4\,x^2-11\,y^2-10\,x^3-4\,y^3$, *má gradient*,

$$\begin{bmatrix} 8\,x-30\,x^2 \\ -6-22\,y-12\,y^2 \end{bmatrix}, \textit{ten je nulový v bodech},$$

$$\left[\left[x=0, y=\frac{-3}{2}\right], \left[x=0, y=\frac{-1}{3}\right], \left[x=\frac{4}{15}, y=\frac{-3}{2}\right], \left[x=\frac{4}{15}, y=\frac{-1}{3}\right]\right]$$

$$\textit{v bode}, \left[x=0, y=\frac{-3}{2}\right], \textit{je druhy diferencial},$$

$$(u, v) \to 8\,u^2+14\,v^2 = 8\,u^2+14\,v^2$$

$$\textit{v bode}, \left[x=0, y=\frac{-1}{3}\right], \textit{je druhy diferencial},$$

$$(u, v) \to 8\,u^2-14\,v^2 = 8\,u^2-14\,v^2$$

$$\textit{v bode}, \left[x=\frac{4}{15}, y=\frac{-3}{2}\right], \textit{je druhy diferencial},$$

$$(u, v) \to -8\,u^2+14\,v^2 = -8\,u^2+14\,v^2$$

$$\textit{v bode}, \left[x=\frac{4}{15}, y=\frac{-1}{3}\right], \textit{je druhy diferencial},$$

$$(u, v) \to -8\,u^2-14\,v^2 = -8\,u^2-14\,v^2$$

$$\mathit{LocalMin} = \left[\left[0, \frac{-3}{2}\right]\right], \mathit{LocalMax} = \left[\left[\frac{4}{15}, \frac{-1}{3}\right]\right],$$

$$\mathit{Saddle} = \left[\left[0, \frac{-1}{3}\right], \left[\frac{4}{15}, \frac{-3}{2}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+3-3*cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

line :=

"PMMAT2|174836|Kapoun, Vítìzslav |zk|ESF M-HPS VEK [sem 2]

zadani pro, "Kapoun, Vítìzslav ", 174836

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`.9000000000`)*`8.950000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\ln(.9000000000)\sqrt{8.950000000}$$

Reseni:

volime bod, $[1, 9]$, *funkci*, $(x, y) \to \ln(x)\sqrt{y}$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to 3x - 3 + \frac{1}{6}(x-1)(y-9) - \frac{3}{2}(x-1)^2$$

Jeho hodnota v bode, $[0.9000000000, 8.950000000]$, *je*, -0.3141666667

```
metodou per partes vypoctete integral
 Int(arcsin(x)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arcsin(x)\,x\,dx = \frac{1}{2}x^2\arcsin(x) - \int \frac{x^2}{2\sqrt{-x^2+1}}\,dx, \text{"="}, \frac{1}{2}x^2\arcsin(x) + \frac{x\sqrt{-x^2+1}}{4} - \frac{1}{4}\arcsin(x)\right]$$

```
Najdete lokalni extremy a sedlove body funkce 5*x+4*x^2-10*y^2-7*x^3+9*y^3
```

funkce, $5x + 4x^2 - 10y^2 - 7x^3 + 9y^3$, *má gradient*, $\begin{bmatrix} 5 + 8x - 21x^2 \\ -20y + 27y^2 \end{bmatrix}$,

ten je nulový v bodech,

$$\left[\left[x = \frac{-1}{3}, y = 0\right], \left[x = \frac{5}{7}, y = 0\right], \left[x = \frac{-1}{3}, y = \frac{20}{27}\right], \left[x = \frac{5}{7}, y = \frac{20}{27}\right]\right]$$

v bode, $\left[x = \frac{-1}{3}, y = 0\right]$, *je druhy diferencial*,

$$(u, v) \to 22u^2 - 20v^2 = 22u^2 - 20v^2$$

v bode, $\left[x = \frac{5}{7}, y = 0\right]$, *je druhy diferencial*,

$$(u, v) \to -22u^2 - 20v^2 = -22u^2 - 20v^2$$

v bode, $\left[x = \frac{-1}{3}, y = \frac{20}{27}\right]$, *je druhy diferencial*,

$$(u, v) \to 22u^2 + 20v^2 = 22u^2 + 20v^2$$

v bode, $\left[x = \frac{5}{7}, y = \frac{20}{27}\right]$, *je druhy diferencial*,

$$(u, v) \to -22u^2 + 20v^2 = -22u^2 + 20v^2$$

$$LocalMin = \left[\left[\frac{-1}{3}, \frac{20}{27}\right]\right], LocalMax = \left[\left[\frac{5}{7}, 0\right]\right], Saddle = \left[\left[\frac{-1}{3}, 0\right], \left[\frac{5}{7}, \frac{20}{27}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(cos(x)^3+3-3*cos(x)^2)/(sin(x)*cos(x)^2)
```

$$\int \frac{\cos(x)^3 + 3 - 3\cos(x)^2}{\sin(x)\cos(x)^2}\, dx = \ln(\sin(x)) + \frac{3}{\cos(x)}$$

line :=

"PMMAT2|174675|Kedroò, Milan |zk|ESF M-HPS HOSP [sem 2]

zadani pro, "Kedroò, Milan ", 174675

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`.2000000000`)*`4.100000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\cos(.2000000000)\sqrt{4.100000000}$$

Reseni:

$$volime\ bod, [0, 4], funkci, (x, y) \to \cos(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to 1 + \frac{1}{4}y - \frac{1}{64}(y-4)^2 - x^2$$

Jeho hodnota v bode, [0.2000000000, 4.100000000], *je*, 1.984843750

```
metodou per partes vypoctete integral
 Int(arcsin(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arcsin(x)\, dx = \arcsin(x)\, x - \int \frac{x}{\sqrt{-x^2+1}}\, dx, "=", \arcsin(x)\, x + \sqrt{-x^2+1}\right]$$

```
Najdete lokalni extremy a sedlove body funkce 17-6*y+4*x^2-11*y^2-10*x^3-4*y^3
```

funkce, $17 - 6y + 4x^2 - 11y^2 - 10x^3 - 4y^3$, *má gradient*,

$$\begin{bmatrix} 8x - 30x^2 \\ -6 - 22y - 12y^2 \end{bmatrix}, \text{ten je nulový v bodech},$$

$$\left[\left[x = 0, y = \frac{-3}{2}\right], \left[x = 0, y = \frac{-1}{3}\right], \left[x = \frac{4}{15}, y = \frac{-3}{2}\right], \left[x = \frac{4}{15}, y = \frac{-1}{3}\right]\right]$$

$$v\ bode, \left[x = 0, y = \frac{-3}{2} \right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow 8\, u^2 + 14\, v^2 = 8\, u^2 + 14\, v^2$$

$$v\ bode, \left[x = 0, y = \frac{-1}{3} \right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow 8\, u^2 - 14\, v^2 = 8\, u^2 - 14\, v^2$$

$$v\ bode, \left[x = \frac{4}{15}, y = \frac{-3}{2} \right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow -8\, u^2 + 14\, v^2 = -8\, u^2 + 14\, v^2$$

$$v\ bode, \left[x = \frac{4}{15}, y = \frac{-1}{3} \right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow -8\, u^2 - 14\, v^2 = -8\, u^2 - 14\, v^2$$

$$LocalMin = \left[\left[0, \frac{-3}{2} \right] \right], LocalMax = \left[\left[\frac{4}{15}, \frac{-1}{3} \right] \right],$$

$$Saddle = \left[\left[0, \frac{-1}{3} \right], \left[\frac{4}{15}, \frac{-3}{2} \right] \right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+1-cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

line := "PMMAT2|191617|Klimková, Jana |zk|ESF B-HPS FP [sem 2]

zadani pro, "Klimková, Jana ", 191617

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`.2000000000`)*exp(`.1000000000`)
```

*Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\
zvolenem bode priblizne vypocitejte:*

$$\cos(.2000000000)\, \mathbf{e}^{.1000000000}$$

Reseni:

$$volime\ bod, [0, 0], funkci, (x, y) \rightarrow \cos(x)\, \mathbf{e}^y$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \rightarrow 1 + y + \frac{1}{2} y^2 - \frac{1}{2} x^2$$

Jeho hodnota v bode, [0.2000000000, 0.1000000000], *je*, 1.085000000

metodou per partes vypoctete integral
 Int(x*cos(x),x)
,x na konci zadani ctete jako dx

$$[\int x\cos(x)\,dx = \sin(x)\,x - \int \sin(x)\,dx, "=", \cos(x)+\sin(x)\,x]$$

Najdete lokalni extremy a sedlove body funkce 13*x^2+9*x*y+9*x^3+13*x^4-x^3*y

funkce, $13x^2+9xy+9x^3+13x^4-x^3y$, *má gradient*,

$$\begin{bmatrix} 26x+9y+27x^2+52x^3-3x^2y \\ 9x-x^3 \end{bmatrix}, \textit{ten je nulový v bodech,}$$

$$\left[[x=0, y=0], \left[x=3, y=\frac{575}{6}\right], \left[x=-3, y=\frac{-413}{6}\right]\right]$$

$$\textit{v bode}, [x=0, y=0], \textit{je druhy diferencial},$$

$$(u,v) \to 26u^2+18vu = 26\left(u+\frac{9}{26}v\right)^2 - \frac{81}{26}v^2$$

$$\textit{v bode}, \left[x=3, y=\frac{575}{6}\right], \textit{je druhy diferencial},$$

$$(u,v) \to -133u^2-36vu = -133\left(u+\frac{18}{133}v\right)^2 + \frac{324}{133}v^2$$

$$\textit{v bode}, \left[x=-3, y=\frac{-413}{6}\right], \textit{je druhy diferencial},$$

$$(u,v) \to 29u^2-36vu = 29\left(u-\frac{18}{29}v\right)^2 - \frac{324}{29}v^2$$

$$LocalMin = [\ ], LocalMax = [\ ], Saddle = \left[[0,0], \left[3, \frac{575}{6}\right], \left[-3, \frac{-413}{6}\right]\right]$$

Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+3-3*cos(x)^2)/(4*sin(x)*cos(x)^2)

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

line :=

"PMMAT2|174818|Kopr, Eduard |zk|ESF M-HPS HOSP [sem 2]

zadani pro, "Kopr, Eduard ", 174818

aaa

Priklad:

Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem bode priblizne vypocitejte cos(`-.1000000000`)*`.9500000000`^(1/2)

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\cos(-.1000000000)\sqrt{.9500000000}$$

Reseni:

volime bod, $[0, 1]$, *funkci*, $(x, y) \to \cos(x)\sqrt{y}$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to \frac{1}{2} + \frac{1}{2}y - \frac{1}{8}(y-1)^2 - \frac{1}{2}x^2$$

Jeho hodnota v bode, $[-0.1000000000, 0.9500000000]$, *je*, 0.9696875000

```
metodou per partes vypoctete integral
 Int(arcsin(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arcsin(x)\,dx = \arcsin(x)\,x - \int \frac{x}{\sqrt{-x^2+1}}\,dx, \text{"="}, \arcsin(x)\,x + \sqrt{-x^2+1}\right]$$

```
Najdete lokalni extremy a sedlove body funkce 14+17*x^2+16*y^2-10*x^3+8*x^2*y
```

funkce, $14 + 17x^2 + 16y^2 - 10x^3 + 8x^2y$, *má gradient*,

$$\begin{bmatrix} 34x - 30x^2 + 16xy \\ 32y + 8x^2 \end{bmatrix}, \textit{ten je nulový v bodech},$$

$$\left[[x=0, y=0], \left[x = \frac{-17}{2}, y = \frac{-289}{16}\right], \left[x = 1, y = \frac{-1}{4}\right]\right]$$

v bode, $[x=0, y=0]$, *je druhy diferencial*,

$$(u, v) \to 34u^2 + 32v^2 = 34u^2 + 32v^2$$

v bode, $\left[x = \frac{-17}{2}, y = \frac{-289}{16}\right]$, *je druhy diferencial*,

$$(u, v) \to 255u^2 - 272vu + 32v^2 = 255\left(u - \frac{8}{15}v\right)^2 - \frac{608}{15}v^2$$

v bode, $\left[x = 1, y = \frac{-1}{4}\right]$, *je druhy diferencial*,

$$(u, v) \to -30u^2 + 32vu + 32v^2 = -30\left(u - \frac{8}{15}v\right)^2 + \frac{608}{15}v^2$$

$$\mathit{LocalMin} = [[0, 0]], \mathit{LocalMax} = [\ ], \mathit{Saddle} = \left[\left[\frac{-17}{2}, \frac{-289}{16}\right], \left[1, \frac{-1}{4}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(cos(x)^3-cos(x)^2+1)/(sin(x)*cos(x)^2)
```

$$\int \frac{\cos(x)^3 - \cos(x)^2 + 1}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{1}{\cos(x)}$$

line :=

"PMMAT2|174678|Ko¹íèková, Irena |zk|ESF M-EKM POH [sem 2]

zadani pro, "Ko¹íèková, Irena ", 174678

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`.9000000000`)*`.9500000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\ln(.9000000000)\sqrt{.9500000000}$$

Reseni:

volime bod, $[1, 1]$, *funkci*, $(x, y) \to \ln(x)\sqrt{y}$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to x - 1 + \frac{1}{2}(x-1)(y-1) - \frac{1}{2}(x-1)^2$$

Jeho hodnota v bode, $[0.9000000000, 0.9500000000]$, *je*, -0.1025000000

```
metodou per partes vypoctete integral
 Int(sin(x)*x,x)
,x na konci zadani ctete jako dx
```

$$[\int \sin(x)\, x\, dx = -x\cos(x) - \int -\cos(x)\, dx, "=", \sin(x) - x\cos(x)]$$

```
Najdete lokalni extremy a sedlove body funkce 11+16*x+2*x*y-7*x^3-11*x^2*y-
6*x^3*y
```

funkce, $11 + 16x + 2xy - 7x^3 - 11x^2y - 6x^3y$, *má gradient*,

$$\begin{bmatrix} 16 + 2y - 21x^2 - 22xy - 18x^2y \\ 2x - 11x^2 - 6x^3 \end{bmatrix}, \textit{ten je nulový v bodech},$$

$$\left[[x = 0, y = -8], \left[x = -2, y = \frac{-34}{13}\right], \left[x = \frac{1}{6}, y = \frac{185}{26}\right]\right]$$

v bode, $[x = 0, y = -8]$, *je druhy diferencial*,

$$(u, v) \to 176u^2 + 4vu = 176\left(u + \frac{1}{88}v\right)^2 - \frac{1}{44}v^2$$

v bode, $\left[x = -2, y = \frac{-34}{13}\right]$, *je druhy diferencial*,

$$(u, v) \to -\frac{608}{13}u^2 - 52vu = -\frac{608}{13}\left(u + \frac{169}{304}v\right)^2 + \frac{2197}{152}v^2$$

$$v\ bode,\left[x=\frac{1}{6}, y=\frac{185}{26}\right], je\ druhy\ diferencial,$$

$$(u, v) \to -\frac{2681}{13}u^2 - \frac{13}{3}v\,u = -\frac{2681}{13}\left(u + \frac{169}{16086}v\right)^2 + \frac{2197}{96516}v^2$$

$$LocalMin = [\ ], LocalMax = [\ ], Saddle = \left[[0, -8], \left[-2, \frac{-34}{13}\right], \left[\frac{1}{6}, \frac{185}{26}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(3*cos(x)^3+1-cos(x)^2)/(3*sin(x)*cos(x)^2)
```

$$\int \frac{1}{3}\frac{3\cos(x)^3 + 1 - \cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{1}{3}\frac{1}{\cos(x)}$$

line :=

"PMMAT2|174797|Kozáèková, Barbora |zk|ESF M-HPS RRS [sem 2]

zadani pro, "Kozáèková, Barbora ", 174797

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`1.200000000`)*exp(`.1000000000`)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\ln(1.200000000)\,\mathrm{e}^{.1000000000}$$

Reseni:

$$volime\ bod, [1, 0], funkci, (x, y) \to \ln(x)\,\mathrm{e}^y$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to x - 1 + (x-1)\,y - \frac{1}{2}(x-1)^2$$

Jeho hodnota v bode, [1.200000000, 0.1000000000], *je*, 0.2000000000

```
metodou per partes vypoctete integral
 Int(arctan(x^2),x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arctan(x^2)\,dx = \arctan(x^2)\,x - \int \frac{2x^2}{x^4+1}\,dx, "=", \arctan(x^2)\,x \quad - \frac{1}{2}\sqrt{2}\arctan(x\sqrt{2} - 1)\right.$$

$$\left. - \frac{1}{4}\sqrt{2}\ln\left(\frac{x^2 - x\sqrt{2} + 1}{x^2 + x\sqrt{2} + 1}\right) - \frac{1}{2}\sqrt{2}\arctan(x\sqrt{2} + 1)\right]$$

```
Najdete lokalni extremy a sedlove body funkce -9+3*x^2+2*y^2+x^3+15*y^3
```

$$funkce, -9+3x^2+2y^2+x^3+15y^3, má\ gradient, \begin{bmatrix} 6x+3x^2 \\ 4y+45y^2 \end{bmatrix},$$

$$ten\ je\ nulový\ v\ bodech,$$

$$\left[[x=0, y=0], [x=-2, y=0], \left[x=0, y=\frac{-4}{45}\right], \left[x=-2, y=\frac{-4}{45}\right] \right]$$

$$v\ bode, [x=0, y=0], je\ druhy\ diferencial,$$

$$(u, v) \to 6u^2+4v^2 = 6u^2+4v^2$$

$$v\ bode, [x=-2, y=0], je\ druhy\ diferencial,$$

$$(u, v) \to -6u^2+4v^2 = -6u^2+4v^2$$

$$v\ bode, \left[x=0, y=\frac{-4}{45}\right], je\ druhy\ diferencial,$$

$$(u, v) \to 6u^2-4v^2 = 6u^2-4v^2$$

$$v\ bode, \left[x=-2, y=\frac{-4}{45}\right], je\ druhy\ diferencial,$$

$$(u, v) \to -6u^2-4v^2 = -6u^2-4v^2$$

$$LocalMin = [[0, 0]], LocalMax = \left[\left[-2, \frac{-4}{45}\right]\right], Saddle = \left[[-2, 0], \left[0, \frac{-4}{45}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+3-3*cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

line := "PMMAT2| 78782|Kozel, Petr |zk|ESF B-HPS RRS [sem 4]

zadani pro, "Kozel, Petr ", 78782

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`-.1000000000`)*`.9500000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne

zvolenem bode priblizne vypocitejte:

$$\cos(-.1000000000)\sqrt{.9500000000}$$

Reseni:

$$volime\ bod, [0, 1], funkci, (x, y) \to \cos(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to \frac{1}{2}+\frac{1}{2}y-\frac{1}{8}(y-1)^2-\frac{1}{2}x^2$$

$$\textit{Jeho hodnota v bode}, [-0.1000000000, 0.9500000000], \ \textit{je}, 0.9696875000$$

```
metodou per partes vypoctete integral
 Int(ln(x)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \ln(x)\, x\, dx = \frac{1}{2} x^2 \ln(x) - \int \frac{x}{2}\, dx, \text{"="}, \frac{1}{2} x^2 \ln(x) - \frac{x^2}{4} \right]$$

```
Najdete lokalni extremy a sedlove body funkce 4-11*x^2+12*y^2+16*x^3+5*y^3
```

$$\textit{funkce}, 4 - 11 x^2 + 12 y^2 + 16 x^3 + 5 y^3, \textit{má gradient}, \begin{bmatrix} -22 x + 48 x^2 \\ 24 y + 15 y^2 \end{bmatrix},$$

ten je nulový v bodech,

$$\left[[x = 0, y = 0], \left[x = 0, y = \frac{-8}{5} \right], \left[x = \frac{11}{24}, y = 0 \right], \left[x = \frac{11}{24}, y = \frac{-8}{5} \right] \right]$$

$$\textit{v bode}, [x = 0, y = 0], \textit{je druhy diferencial},$$

$$(u, v) \to -22 u^2 + 24 v^2 = -22 u^2 + 24 v^2$$

$$\textit{v bode}, \left[x = 0, y = \frac{-8}{5} \right], \textit{je druhy diferencial},$$

$$(u, v) \to -22 u^2 - 24 v^2 = -22 u^2 - 24 v^2$$

$$\textit{v bode}, \left[x = \frac{11}{24}, y = 0 \right], \textit{je druhy diferencial},$$

$$(u, v) \to 22 u^2 + 24 v^2 = 22 u^2 + 24 v^2$$

$$\textit{v bode}, \left[x = \frac{11}{24}, y = \frac{-8}{5} \right], \textit{je druhy diferencial},$$

$$(u, v) \to 22 u^2 - 24 v^2 = 22 u^2 - 24 v^2$$

$$\textit{LocalMin} = \left[\left[\frac{11}{24}, 0 \right] \right], \textit{LocalMax} = \left[\left[0, \frac{-8}{5} \right] \right], \textit{Saddle} = \left[[0, 0], \left[\frac{11}{24}, \frac{-8}{5} \right] \right]$$

```
Vyjdrete jako elementarni funkci integral z
(2*cos(x)^3+3-3*cos(x)^2)/(2*sin(x)*cos(x)^2)
```

$$\int \frac{1}{2} \frac{2 \cos(x)^3 + 3 - 3 \cos(x)^2}{\sin(x) \cos(x)^2}\, dx = \ln(\sin(x)) + \frac{3}{2} \frac{1}{\cos(x)}$$

line := "PMMAT2| 99730|Kr¹ková, Marie |zk|ESF B-HPS NH [sem 2]

zadani pro, "Kr¹ková, Marie ", 99730

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte exp(`-.1000000000`)*`3.950000000`^(1/2)
```

*Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\
zvolenem bode priblizne vypocitejte:*

$$e^{-.1000000000}\sqrt{3.950000000}$$

Reseni:

$$\textit{volime bod}, [0, 4], \textit{funkci}, (x, y) \to e^x \sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to 1 + \frac{1}{4} y + 2x - \frac{1}{64}(y-4)^2 + x^2 + \frac{1}{4} x (y-4)$$

$$\textit{Jeho hodnota v bode}, [-0.1000000000, 3.950000000], \textit{je}, 1.798710938$$

```
metodou per partes vypoctete integral
 Int(ln(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int \ln(x)\, dx = \ln(x)\, x - \int 1\, dx, "=", \ln(x)\, x - x\right]$$

```
Najdete lokalni extremy a sedlove body funkce 5*x+4*x^2-10*y^2-7*x^3+9*y^3
```

$$\textit{funkce}, 5x + 4x^2 - 10y^2 - 7x^3 + 9y^3, \textit{má gradient}, \begin{bmatrix} 5 + 8x - 21x^2 \\ -20y + 27y^2 \end{bmatrix},$$

$$\textit{ten je nulový v bodech},$$

$$\left[\left[x = \frac{-1}{3}, y = 0\right], \left[x = \frac{5}{7}, y = 0\right], \left[x = \frac{-1}{3}, y = \frac{20}{27}\right], \left[x = \frac{5}{7}, y = \frac{20}{27}\right]\right]$$

$$\textit{v bode}, \left[x = \frac{-1}{3}, y = 0\right], \textit{je druhy diferencial},$$

$$(u, v) \to 22u^2 - 20v^2 = 22u^2 - 20v^2$$

$$\textit{v bode}, \left[x = \frac{5}{7}, y = 0\right], \textit{je druhy diferencial},$$

$$(u, v) \to -22u^2 - 20v^2 = -22u^2 - 20v^2$$

$$\textit{v bode}, \left[x = \frac{-1}{3}, y = \frac{20}{27}\right], \textit{je druhy diferencial},$$

$$(u, v) \to 22u^2 + 20v^2 = 22u^2 + 20v^2$$

$$\textit{v bode}, \left[x = \frac{5}{7}, y = \frac{20}{27}\right], \textit{je druhy diferencial},$$

$$(u, v) \to -22u^2 + 20v^2 = -22u^2 + 20v^2$$

$$\textit{LocalMin} = \left[\left[\frac{-1}{3}, \frac{20}{27}\right]\right], \textit{LocalMax} = \left[\left[\frac{5}{7}, 0\right]\right], \textit{Saddle} = \left[\left[\frac{-1}{3}, 0\right], \left[\frac{5}{7}, \frac{20}{27}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+1-cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

line := "PMMAT2|173143|Kuèerová, Petra |zk|ESF M-HPS FP [sem 2]

zadani pro, "Kuèerová, Petra ", 173143

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`1.200000000`)*`4.100000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\ln(1.200000000)\sqrt{4.100000000}$$

Reseni:

volime bod, $[1, 4]$, *funkci*, $(x, y) \to \ln(x)\sqrt{y}$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to 2x - 2 + \frac{1}{4}(x-1)(y-4) - (x-1)^2$$

Jeho hodnota v bode, $[1.200000000, 4.100000000]$, *je*, 0.3650000000

```
metodou per partes vypoctete integral
 Int(arctan(x^2)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arctan(x^2)\,x\,dx = \frac{1}{2}x^2\arctan(x^2) - \int \frac{x^3}{x^4+1}\,dx, \text{"="}, \quad \frac{1}{2}x^2\arctan(x^2) - \frac{1}{4}\ln(x^4+1)\right]$$

```
Najdete lokalni extremy a sedlove body funkce 1-9*x^2-8*x*y+15*x^3+2*x*y^2
```

funkce, $1 - 9x^2 - 8xy + 15x^3 + 2xy^2$, *má gradient*,

$$\begin{bmatrix} -18x - 8y + 45x^2 + 2y^2 \\ -8x + 4xy \end{bmatrix}, \textit{ ten je nulový v bodech},$$

$$\left[[x=0, y=0], [x=0, y=4], \left[x = \frac{-4}{15}, y = 2\right], \left[x = \frac{2}{3}, y = 2\right]\right]$$

v bode, $[x=0, y=0]$, *je druhy diferencial*,

$$(u, v) \to -18u^2 - 16vu = -18\left(u + \frac{4}{9}v\right)^2 + \frac{32}{9}v^2$$

v bode, $[x=0, y=4]$, *je druhy diferencial*,

$$(u, v) \to -18u^2 + 16vu = -18\left(u - \frac{4}{9}v\right)^2 + \frac{32}{9}v^2$$

$$v\ bode, \left[x=\frac{-4}{15}, y=2\right], je\ druhy\ diferencial,$$

$$(u, v) \to -42\,u^2 - \frac{16}{15}v^2 = -42\,u^2 - \frac{16}{15}v^2$$

$$v\ bode, \left[x=\frac{2}{3}, y=2\right], je\ druhy\ diferencial,$$

$$(u, v) \to 42\,u^2 + \frac{8}{3}v^2 = 42\,u^2 + \frac{8}{3}v^2$$

$$LocalMin = \left[\left[\frac{2}{3}, 2\right]\right], LocalMax = \left[\left[\frac{-4}{15}, 2\right]\right], Saddle = [[0, 0], [0, 4]]$$

```
Vyjdrete jako elementarni funkci integral z
(2*cos(x)^3+1-cos(x)^2)/(2*sin(x)*cos(x)^2)
```

$$\int \frac{1}{2}\frac{2\cos(x)^3 + 1 - \cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{1}{2}\frac{1}{\cos(x)}$$

line :=

"PMMAT2|172059|Kudlová, Monika |zk|ESF B-EKM POH [sem 2]

zadani pro, "Kudlová, Monika ", 172059

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`.2000000000`)*`4.100000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne

zvolenem bode priblizne vypocitejte:

$$\cos(.2000000000)\sqrt{4.100000000}$$

Reseni:

$$volime\ bod, [0, 4], funkci, (x, y) \to \cos(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to 1 + \frac{1}{4}y - \frac{1}{64}(y-4)^2 - x^2$$

Jeho hodnota v bode, [0.2000000000, 4.100000000], *je*, 1.984843750

```
metodou per partes vypoctete integral
 Int(x*cos(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int x\cos(x)\,dx = \sin(x)\,x - \int \sin(x)\,dx, "=", \cos(x) + \sin(x)\,x\right]$$

```
Najdete lokalni extremy a sedlove body funkce 7+14*x^2-6*x*y+y^2+5*x*y^2
```

funkce, $7+14x^2-6xy+y^2+5xy^2$, *má gradient*, $\begin{bmatrix} 28x-6y+5y^2 \\ -6x+2y+10xy \end{bmatrix}$,

ten je nulový v bodech, $\left[[x=0, y=0], \left[x=\frac{-1}{20}, y=\frac{-1}{5}\right], \left[x=\frac{-2}{7}, y=2\right]\right]$

v bode, $[x=0, y=0]$, *je druhy diferencial*,

$$(u, v) \to 28u^2-12vu+2v^2 = 28\left(u-\frac{3}{14}v\right)^2+\frac{5}{7}v^2$$

v bode, $\left[x=\frac{-1}{20}, y=\frac{-1}{5}\right]$, *je druhy diferencial*,

$$(u, v) \to 28u^2-16vu+\frac{3}{2}v^2 = 28\left(u-\frac{2}{7}v\right)^2-\frac{11}{14}v^2$$

v bode, $\left[x=\frac{-2}{7}, y=2\right]$, *je druhy diferencial*,

$$(u, v) \to 28u^2+28vu-\frac{6}{7}v^2 = 28\left(u+\frac{1}{2}v\right)^2-\frac{55}{7}v^2$$

$$LocalMin=[[0,0]], LocalMax=[\ ], Saddle=\left[\left[\frac{-1}{20}, \frac{-1}{5}\right], \left[\frac{-2}{7}, 2\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(2*cos(x)^3+1-cos(x)^2)/(2*sin(x)*cos(x)^2)
```

$$\int \frac{1}{2}\frac{2\cos(x)^3+1-\cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x))+\frac{1}{2}\frac{1}{\cos(x)}$$

line :=

"PMMAT2|171779|Kusák, Roman |zk|ESF B-EKM POH [sem 2]

zadani pro, "Kusák, Roman ", 171779

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte exp(`.2000000000`)*`9.100000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$e^{.2000000000}\sqrt{9.100000000}$$

Reseni:

volime bod, $[0, 9]$, *funkci*, $(x, y) \to e^x\sqrt{y}$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to \frac{3}{2}+\frac{1}{6}y+3x-\frac{1}{216}(y-9)^2+\frac{3}{2}x^2+\frac{1}{6}x(y-9)$$

$$\textit{Jeho hodnota v bode}, [0.2000000000, 9.100000000], \ \textit{je}, 3.679953704$$

```
metodou per partes vypoctete integral
 Int(arctan(x^2)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arctan(x^2)\, x\, dx = \frac{1}{2} x^2 \arctan(x^2) - \int \frac{x^3}{x^4+1}\, dx, \text{"="}, \quad \frac{1}{2} x^2 \arctan(x^2) - \frac{1}{4}\ln(x^4+1)\right]$$

```
Najdete lokalni extremy a sedlove body funkce 7+9*x+8*x^2+3*x*y-6*x^2*y-
6*x*y^2
```

$$\textit{funkce}, 7+9x+8x^2+3xy-6x^2y-6xy^2, \textit{má gradient},$$

$$\begin{bmatrix} 9+16x+3y-12xy-6y^2 \\ 3x-6x^2-12xy \end{bmatrix}, \textit{ten je nulový v bodech},$$

$$\left[[x=0, y=-1], \left[x=0, y=\frac{3}{2}\right], \left[x=\frac{-25}{18}, y=\frac{17}{18}\right], \left[x=\frac{-3}{2}, y=1\right]\right]$$

$$\textit{v bode}, [x=0, y=-1], \textit{je druhy diferencial},$$

$$(u, v) \to 28u^2+30vu = 28\left(u+\frac{15}{28}v\right)^2 - \frac{225}{28}v^2$$

$$\textit{v bode}, \left[x=0, y=\frac{3}{2}\right], \textit{je druhy diferencial},$$

$$(u, v) \to -2u^2-30vu = -2\left(u+\frac{15}{2}v\right)^2 + \frac{225}{2}v^2$$

$$\textit{v bode}, \left[x=\frac{-25}{18}, y=\frac{17}{18}\right], \textit{je druhy diferencial},$$

$$(u, v) \to \frac{14}{3}u^2+\frac{50}{3}vu+\frac{50}{3}v^2 = \frac{14}{3}\left(u+\frac{25}{14}v\right)^2 + \frac{25}{14}v^2$$

$$\textit{v bode}, \left[x=\frac{-3}{2}, y=1\right], \textit{je druhy diferencial},$$

$$(u, v) \to 4u^2+18vu+18v^2 = 4\left(u+\frac{9}{4}v\right)^2 - \frac{9}{4}v^2$$

$$\textit{LocalMin} = \left[\left[\frac{-25}{18}, \frac{17}{18}\right]\right], \textit{LocalMax} = [\ ],$$

$$\textit{Saddle} = \left[[0, -1], \left[0, \frac{3}{2}\right], \left[\frac{-3}{2}, 1\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
 (4*cos(x)^3+3-3*cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

$line := $ "PMMAT2|172078|Lízalová, Eva |zk|ESF B-HPS RRS [sem 2]

zadani pro, "Lízalová, Eva ", 172078

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte exp(`-.1000000000`)*`3.950000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$e^{-.1000000000}\sqrt{3.950000000}$$

Reseni:

volime bod, $[0,4]$, *funkci*, $(x,y)\to e^x\sqrt{y}$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x,y)\to 1+\frac{1}{4}y+2x-\frac{1}{64}(y-4)^2+x^2+\frac{1}{4}x(y-4)$$

Jeho hodnota v bode, [-0.1000000000, 3.950000000], *je*, 1.798710938

```
metodou per partes vypoctete integral
 Int(arctan(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arctan(x)\,dx = x\arctan(x)-\int\frac{x}{x^2+1}\,dx, \text{"="}, x\arctan(x)-\frac{1}{2}\ln(x^2+1)\right]$$

```
Najdete lokalni extremy a sedlove body funkce 4-11*x^2+12*y^2+16*x^3+5*y^3
```

funkce, $4-11x^2+12y^2+16x^3+5y^3$, *má gradient*, $\begin{bmatrix}-22x+48x^2\\ 24y+15y^2\end{bmatrix}$,

ten je nulový v bodech,

$$\left[[x=0,y=0],\left[x=0,y=\frac{-8}{5}\right],\left[x=\frac{11}{24},y=0\right],\left[x=\frac{11}{24},y=\frac{-8}{5}\right]\right]$$

v bode, $[x=0,y=0]$, *je druhy diferencial*,

$$(u,v)\to -22u^2+24v^2=-22u^2+24v^2$$

v bode, $\left[x=0,y=\frac{-8}{5}\right]$, *je druhy diferencial*,

$$(u,v)\to -22u^2-24v^2=-22u^2-24v^2$$

v bode, $\left[x=\frac{11}{24},y=0\right]$, *je druhy diferencial*,

$$(u,v)\to 22u^2+24v^2=22u^2+24v^2$$

$$v\ bode, \left[x=\frac{11}{24}, y=\frac{-8}{5}\right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow 22\,u^2 - 24\,v^2 = 22\,u^2 - 24\,v^2$$

$$LocalMin = \left[\left[\frac{11}{24}, 0\right]\right], LocalMax = \left[\left[0, \frac{-8}{5}\right]\right], Saddle = \left[[0, 0], \left[\frac{11}{24}, \frac{-8}{5}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(3*cos(x)^3+2-2*cos(x)^2)/(3*sin(x)*cos(x)^2)
```

$$\int \frac{1}{3}\,\frac{3\cos(x)^3 + 2 - 2\cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{2}{3}\,\frac{1}{\cos(x)}$$

line := "PMMAT2|174665|Lorenc, Jan |zk|ESF M-EKM POH [sem 2]

zadani pro, "Lorenc, Jan ", 174665

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`1.200000000`)*exp(`.1000000000`)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\ln(1.200000000)\,e^{.1000000000}$$

Reseni:

$$volime\ bod, [1, 0], funkci, (x, y) \rightarrow \ln(x)\,e^y$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \rightarrow x - 1 + (x-1)\,y - \frac{1}{2}(x-1)^2$$

Jeho hodnota v bode, [1.200000000, 0.1000000000], *je*, 0.2000000000

```
metodou per partes vypoctete integral
 Int(arctan(x^2),x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arctan(x^2)\,dx = \arctan(x^2)\,x - \int \frac{2\,x^2}{x^4+1}\,dx, "=", \arctan(x^2)\,x \quad - \frac{1}{2}\sqrt{2}\,\arctan(x\sqrt{2}-1)\right.$$

$$\left. - \frac{1}{4}\sqrt{2}\,\ln\left(\frac{x^2 - x\sqrt{2}+1}{x^2+x\sqrt{2}+1}\right) - \frac{1}{2}\sqrt{2}\,\arctan(x\sqrt{2}+1)\right]$$

```
Najdete lokalni extremy a sedlove body funkce -9+3*x^2+6*y^2-
8*x^3+3*x*y^2+5*y^3
```

$$funkce, -9+3x^2+6y^2-8x^3+3xy^2+5y^3, má\ gradient,$$

$$\begin{bmatrix} 6x-24x^2+3y^2 \\ 12y+6xy+15y^2 \end{bmatrix}, ten\ je\ nulový\ v\ bodech,$$

$$\left[[x=0, y=0], \left[x=\frac{1}{4}, y=0\right], \left[x=\frac{-8}{49}, y=\frac{-36}{49}\right], \left[x=\frac{1}{2}, y=-1\right]\right]$$

$$v\ bode, [x=0, y=0], je\ druhy\ diferencial,$$

$$(u, v) \to 6u^2+12v^2 = 6u^2+12v^2$$

$$v\ bode, \left[x=\frac{1}{4}, y=0\right], je\ druhy\ diferencial,$$

$$(u, v) \to -6u^2+\frac{27}{2}v^2 = -6u^2+\frac{27}{2}v^2$$

$$v\ bode, \left[x=\frac{-8}{49}, y=\frac{-36}{49}\right], je\ druhy\ diferencial,$$

$$(u, v) \to \frac{678}{49}u^2-\frac{432}{49}vu-\frac{540}{49}v^2 = \frac{678}{49}\left(u-\frac{36}{113}v\right)^2-\frac{1404}{113}v^2$$

$$v\ bode, \left[x=\frac{1}{2}, y=-1\right], je\ druhy\ diferencial,$$

$$(u, v) \to -18u^2-12vu-15v^2 = -18\left(u+\frac{1}{3}v\right)^2-13v^2$$

$$LocalMin = [[0, 0]], LocalMax = \left[\left[\frac{1}{2}, -1\right]\right], Saddle = \left[\left[\frac{1}{4}, 0\right], \left[\frac{-8}{49}, \frac{-36}{49}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3-3*cos(x)^2+3)/(4*sin(x)*cos(x)^2)
```

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

line := "PMMAT2| 99655|Malík, David |zk|ESF M-EKM POH [sem 6]

zadani pro, "Malík, David ", 99655

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`1.200000000`)*`4.100000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne
zvolenem bode priblizne vypocitejte:

$$\ln(1.200000000)\sqrt{4.100000000}$$

Reseni:

$$volime\ bod, [1, 4], funkci, (x, y) \to \ln(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \rightarrow 2x - 2 + \frac{1}{4}(x-1)(y-4) - (x-1)^2$$

Jeho hodnota v bode, $[1.200000000, 4.100000000]$, *je*, 0.3650000000

```
metodou per partes vypoctete integral
 Int(arcsin(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arcsin(x)\,dx = \arcsin(x)\,x - \int \frac{x}{\sqrt{-x^2+1}}\,dx, \text{"="}, \arcsin(x)\,x + \sqrt{-x^2+1}\right]$$

```
Najdete lokalni extremy a sedlove body funkce 4+3*x+11*y^2-9*x^3+12*y^3
```

funkce, $4 + 3x + 11y^2 - 9x^3 + 12y^3$, *má gradient*, $\begin{bmatrix} 3 - 27x^2 \\ 22y + 36y^2 \end{bmatrix}$,

ten je nulový v bodech,

$$\left[\left[x = \frac{1}{3}, y = 0\right], \left[x = \frac{-1}{3}, y = 0\right], \left[x = \frac{1}{3}, y = \frac{-11}{18}\right], \left[x = \frac{-1}{3}, y = \frac{-11}{18}\right]\right]$$

v bode, $\left[x = \frac{1}{3}, y = 0\right]$, *je druhy diferencial*,

$$(u, v) \rightarrow -18u^2 + 22v^2 = -18u^2 + 22v^2$$

v bode, $\left[x = \frac{-1}{3}, y = 0\right]$, *je druhy diferencial*,

$$(u, v) \rightarrow 18u^2 + 22v^2 = 18u^2 + 22v^2$$

v bode, $\left[x = \frac{1}{3}, y = \frac{-11}{18}\right]$, *je druhy diferencial*,

$$(u, v) \rightarrow -18u^2 - 22v^2 = -18u^2 - 22v^2$$

v bode, $\left[x = \frac{-1}{3}, y = \frac{-11}{18}\right]$, *je druhy diferencial*,

$$(u, v) \rightarrow 18u^2 - 22v^2 = 18u^2 - 22v^2$$

$$LocalMin = \left[\left[\frac{-1}{3}, 0\right]\right], LocalMax = \left[\left[\frac{1}{3}, \frac{-11}{18}\right]\right],$$

$$Saddle = \left[\left[\frac{1}{3}, 0\right], \left[\frac{-1}{3}, \frac{-11}{18}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(2*cos(x)^3+1-cos(x)^2)/(2*sin(x)*cos(x)^2)
```

$$\int \frac{1}{2} \frac{2\cos(x)^3 + 1 - \cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{1}{2}\frac{1}{\cos(x)}$$

line := "PMMAT2|137128|Markusík, David |zk|ESF M-HPS FP [sem 4] *zadani pro*, "Markusík, David ", 137128

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`-.1000000000`)*`8.950000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\cos(-.1000000000)\sqrt{8.950000000}$$

Reseni:

volime bod, $[0, 9]$, *funkci*, $(x, y) \to \cos(x)\sqrt{y}$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to \frac{3}{2} + \frac{1}{6}y - \frac{1}{216}(y-9)^2 - \frac{3}{2}x^2$$

Jeho hodnota v bode, [-0.1000000000, 8.950000000], *je*, 2.976655093

```
metodou per partes vypoctete integral
 Int(arcsin(x)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arcsin(x)\,x\,dx = \frac{1}{2}x^2\arcsin(x) - \int \frac{x^2}{2\sqrt{-x^2+1}}\,dx, "=", \frac{1}{2}x^2\arcsin(x) + \frac{x\sqrt{-x^2+1}}{4} - \frac{1}{4}\arcsin(x)\right]$$

```
Najdete lokalni extremy a sedlove body funkce 13-11*x^2+14*y^2+5*x^3+6*y^3
```

funkce, $13 - 11x^2 + 14y^2 + 5x^3 + 6y^3$, *má gradient*, $\begin{bmatrix} -22x + 15x^2 \\ 28y + 18y^2 \end{bmatrix}$,

ten je nulový v bodech,

$$\left[[x=0, y=0], \left[x=0, y=\frac{-14}{9}\right], \left[x=\frac{22}{15}, y=0\right], \left[x=\frac{22}{15}, y=\frac{-14}{9}\right]\right]$$

v bode, $[x=0, y=0]$, *je druhy diferencial*,

$$(u, v) \to -22u^2 + 28v^2 = -22u^2 + 28v^2$$

v bode, $\left[x=0, y=\frac{-14}{9}\right]$, *je druhy diferencial*,

$$(u, v) \to -22u^2 - 28v^2 = -22u^2 - 28v^2$$

$$v\ bode, \left[x = \frac{22}{15}, y = 0 \right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow 22\,u^2 + 28\,v^2 = 22\,u^2 + 28\,v^2$$

$$v\ bode, \left[x = \frac{22}{15}, y = \frac{-14}{9} \right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow 22\,u^2 - 28\,v^2 = 22\,u^2 - 28\,v^2$$

$$LocalMin = \left[\left[\frac{22}{15}, 0 \right] \right], LocalMax = \left[\left[0, \frac{-14}{9} \right] \right],$$

$$Saddle = \left[[0, 0], \left[\frac{22}{15}, \frac{-14}{9} \right] \right]$$

```
Vyjdrete jako elementarni funkci integral z
(cos(x)^3+2-2*cos(x)^2)/(sin(x)*cos(x)^2)
```

$$\int \frac{\cos(x)^3 + 2 - 2\cos(x)^2}{\sin(x)\cos(x)^2}\, dx = \ln(\sin(x)) + \frac{2}{\cos(x)}$$

line := "PMMAT2|100118|Miklas, David |zk|ESF B-HPS FP [sem 6]

zadani pro, "Miklas, David ", 100118

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`-.1000000000`)*`.9500000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\cos(-.1000000000)\sqrt{.9500000000}$$

Reseni:

$$volime\ bod, [0, 1], funkci, (x, y) \rightarrow \cos(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \rightarrow \frac{1}{2} + \frac{1}{2}y - \frac{1}{8}(y-1)^2 - \frac{1}{2}x^2$$

Jeho hodnota v bode, [-0.1000000000, 0.9500000000], *je*, 0.9696875000

```
metodou per partes vypoctete integral
 Int(arctan(x^2),x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arctan(x^2)\,dx = \arctan(x^2)\,x - \int \frac{2\,x^2}{x^4+1}\,dx, "=", \arctan(x^2)\,x \quad -\frac{1}{2}\sqrt{2}\,\arctan(x\sqrt{2}-1)\right]$$

$$-\frac{1}{4}\sqrt{2}\,\ln\left(\frac{x^2-x\sqrt{2}+1}{x^2+x\sqrt{2}+1}\right)-\frac{1}{2}\sqrt{2}\,\arctan(x\sqrt{2}+1)$$

```
Najdete lokalni extremy a sedlove body funkce 5+15*x+8*x*y-11*x^3-x^2*y-9*x^3*y
```

funkce, $5+15\,x+8\,x\,y-11\,x^3-x^2\,y-9\,x^3\,y$, *má gradient*,

$$\begin{bmatrix} 15+8\,y-33\,x^2-2\,x\,y-27\,x^2\,y \\ 8\,x-x^2-9\,x^3 \end{bmatrix}, \textit{ten je nulový v bodech},$$

$$\left[\left[x=0, y=\frac{-15}{8}\right], \left[x=-1, y=\frac{-18}{17}\right], \left[x=\frac{8}{9}, y=\frac{-299}{408}\right]\right]$$

$$\textit{v bode}, \left[x=0, y=\frac{-15}{8}\right], \textit{je druhy diferencial},$$

$$(u,v) \to \frac{15}{4}u^2+16\,v\,u = \frac{15}{4}\left(u+\frac{32}{15}v\right)^2 - \frac{256}{15}v^2$$

$$\textit{v bode}, \left[x=-1, y=\frac{-18}{17}\right], \textit{je druhy diferencial},$$

$$(u,v) \to \frac{186}{17}u^2-34\,v\,u = \frac{186}{17}\left(u-\frac{289}{186}v\right)^2 - \frac{4913}{186}v^2$$

$$\textit{v bode}, \left[x=\frac{8}{9}, y=\frac{-299}{408}\right], \textit{je druhy diferencial},$$

$$(u,v) \to -\frac{4493}{204}u^2-\frac{272}{9}v\,u = -\frac{4493}{204}\left(u+\frac{9248}{13479}v\right)^2 + \frac{1257728}{121311}v^2$$

$$\textit{LocalMin} = [\ ], \textit{LocalMax} = [\ ], \textit{Saddle} = \left[\left[0, \frac{-15}{8}\right], \left[-1, \frac{-18}{17}\right], \left[\frac{8}{9}, \frac{-299}{408}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(2*cos(x)^3+3-3*cos(x)^2)/(2*sin(x)*cos(x)^2)
```

$$\int \frac{1}{2}\,\frac{2\cos(x)^3+3-3\cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{3}{2}\,\frac{1}{\cos(x)}$$

line :=

"PMMAT2|137816|Mlynka, Jaroslav |zk|ESF M-HPS HOSP [sem 4]

zadani pro, "Mlynka, Jaroslav ", 137816

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`.9000000000`)*`8.950000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\ln(.9000000000)\sqrt{8.950000000}$$

Reseni:

$$\textit{volime bod}, [1, 9], \textit{funkci}, (x, y) \to \ln(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to 3x - 3 + \frac{1}{6}(x-1)(y-9) - \frac{3}{2}(x-1)^2$$

$$\textit{Jeho hodnota v bode}, [0.9000000000, 8.950000000], \ \textit{je}, \text{-}0.3141666667$$

```
metodou per partes vypoctete integral
 Int(x*cos(x),x)
,x na konci zadani ctete jako dx
```

$$[\int x\cos(x)\,dx = \sin(x)\,x - \int \sin(x)\,dx, "=", \cos(x) + \sin(x)\,x]$$

```
Najdete lokalni extremy a sedlove body funkce -8+8*x^2+17*y^2+7*x^3-9*y^3
```

$$\textit{funkce}, -8 + 8x^2 + 17y^2 + 7x^3 - 9y^3, \textit{má gradient}, \begin{bmatrix} 16x + 21x^2 \\ 34y - 27y^2 \end{bmatrix},$$

ten je nulový v bodech,

$$\left[[x = 0, y = 0], \left[x = 0, y = \frac{34}{27}\right], \left[x = \frac{-16}{21}, y = 0\right], \left[x = \frac{-16}{21}, y = \frac{34}{27}\right] \right]$$

$$\textit{v bode}, [x = 0, y = 0], \textit{je druhy diferencial},$$

$$(u, v) \to 16u^2 + 34v^2 = 16u^2 + 34v^2$$

$$\textit{v bode}, \left[x = 0, y = \frac{34}{27}\right], \textit{je druhy diferencial},$$

$$(u, v) \to 16u^2 - 34v^2 = 16u^2 - 34v^2$$

$$\textit{v bode}, \left[x = \frac{-16}{21}, y = 0\right], \textit{je druhy diferencial},$$

$$(u, v) \to -16u^2 + 34v^2 = -16u^2 + 34v^2$$

$$\textit{v bode}, \left[x = \frac{-16}{21}, y = \frac{34}{27}\right], \textit{je druhy diferencial},$$

$$(u, v) \to -16u^2 - 34v^2 = -16u^2 - 34v^2$$

$$\textit{LocalMin} = [[0, 0]], \textit{LocalMax} = \left[\left[\frac{-16}{21}, \frac{34}{27}\right]\right],$$

$$\textit{Saddle} = \left[\left[0, \frac{34}{27}\right], \left[\frac{-16}{21}, 0\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
```

```
(4*cos(x)^3+3-3*cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

line :=

"PMMAT2|107842|Navrkal, Ondøej |zk|ESF M-EKM POH [sem 2]

zadani pro, "Navrkal, Ondøej ", 107842

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte exp(`-.1000000000`)*`3.950000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$e^{-.1000000000}\sqrt{3.950000000}$$

Reseni:

volime bod, $[0, 4]$, *funkci*, $(x, y) \to e^x \sqrt{y}$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to 1+\frac{1}{4}y+2x-\frac{1}{64}(y-4)^2+x^2+\frac{1}{4}x(y-4)$$

Jeho hodnota v bode, [-0.1000000000, 3.950000000], *je*, 1.798710938

```
metodou per partes vypoctete integral
 Int(sin(x)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \sin(x)\,x\,dx=-x\cos(x)-\int -\cos(x)\,dx, \text{"="}, \sin(x)-x\cos(x)\right]$$

```
Najdete lokalni extremy a sedlove body funkce
5+10*x^2+10*x*y+12*y^2+4*x^3+6*x^2*y
```

funkce, $5+10x^2+10xy+12y^2+4x^3+6x^2y$, *má gradient*,

$$\begin{bmatrix} 20x+10y+12x^2+12xy \\ 10x+24y+6x^2 \end{bmatrix}, \textit{ten je nulový v bodech,}$$

$$\left[[x=0, y=0], \left[x=\frac{-5}{3}, y=0\right], \left[x=\frac{19}{6}, y=\frac{-551}{144}\right]\right]$$

v bode, $[x=0, y=0]$, *je druhy diferencial*,

$$(u, v) \to 20u^2+20vu+24v^2=20\left(u+\frac{1}{2}v\right)^2+19v^2$$

$$v\ bode, \left[x=\frac{-5}{3}, y=0\right], je\ druhy\ diferencial,$$

$$(u, v) \to -20\,u^2 - 20\,v\,u + 24\,v^2 = -20\left(u+\frac{1}{2}\,v\right)^2 + 29\,v^2$$

$$v\ bode, \left[x=\frac{19}{6}, y=\frac{-551}{144}\right], je\ druhy\ diferencial,$$

$$(u, v) \to \frac{601}{12}\,u^2 + 96\,v\,u + 24\,v^2 = \frac{601}{12}\left(u+\frac{576}{601}\,v\right)^2 - \frac{13224}{601}\,v^2$$

$$LocalMin = [[0, 0]], LocalMax = [\ ], Saddle = \left[\left[\frac{-5}{3}, 0\right], \left[\frac{19}{6}, \frac{-551}{144}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(3*cos(x)^3-2*cos(x)^2+2)/(3*sin(x)*cos(x)^2)
```

$$\int \frac{1}{3}\,\frac{3\cos(x)^3 - 2\cos(x)^2 + 2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{2}{3}\,\frac{1}{\cos(x)}$$

line :=

"PMMAT2|174963|Novotný, Michal |zk|ESF M-HPS RRS [sem 2]

zadani pro, "Novotný, Michal ", 174963

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`.2000000000`)*`4.100000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\cos(.2000000000)\sqrt{4.100000000}$$

Reseni:

$$volime\ bod, [0, 4], funkci, (x, y) \to \cos(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to 1 + \frac{1}{4}\,y - \frac{1}{64}\,(y-4)^2 - x^2$$

Jeho hodnota v bode, [0.2000000000, 4.100000000], *je*, 1.984843750

```
metodou per partes vypoctete integral
 Int(x*cos(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int x\cos(x)\,dx = \sin(x)\,x - \int \sin(x)\,dx, "=", \cos(x) + \sin(x)\,x\right]$$

```
Najdete lokalni extremy a sedlove body funkce -8*y+6*y^2+12*x^2*y-10*x^4
```

$$funkce, -8y+6y^2+12x^2y-10x^4, má\ gradient, \begin{bmatrix} 24xy-40x^3 \\ -8+12y+12x^2 \end{bmatrix},$$

ten je nulový v bodech,

$$\left[\left[x=0, y=\frac{2}{3}\right], \left[x=\frac{1}{2}, y=\frac{5}{12}\right], \left[x=\frac{-1}{2}, y=\frac{5}{12}\right]\right]$$

$$v\ bode, \left[x=0, y=\frac{2}{3}\right], je\ druhy\ diferencial,$$

$$(u,v) \to 16u^2+12v^2 = 16u^2+12v^2$$

$$v\ bode, \left[x=\frac{1}{2}, y=\frac{5}{12}\right], je\ druhy\ diferencial,$$

$$(u,v) \to -20u^2+24vu+12v^2 = -20\left(u-\frac{3}{5}v\right)^2+\frac{96}{5}v^2$$

$$v\ bode, \left[x=\frac{-1}{2}, y=\frac{5}{12}\right], je\ druhy\ diferencial,$$

$$(u,v) \to -20u^2-24vu+12v^2 = -20\left(u+\frac{3}{5}v\right)^2+\frac{96}{5}v^2$$

$$LocalMin = \left[\left[0, \frac{2}{3}\right]\right], LocalMax = [\ ], Saddle = \left[\left[\frac{1}{2}, \frac{5}{12}\right], \left[\frac{-1}{2}, \frac{5}{12}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(2*cos(x)^3+1-cos(x)^2)/(2*sin(x)*cos(x)^2)
```

$$\int \frac{1}{2}\frac{2\cos(x)^3+1-\cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x))+\frac{1}{2}\frac{1}{\cos(x)}$$

line :=

"PMMAT2|171864|Odehnal, Martin |zk|ESF B-EKM POH [sem 2]

zadani pro, "Odehnal, Martin ", 171864

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`-.1000000000`)*ln(`.9500000000`)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\cos(-.1000000000)\ln(.9500000000)$$

Reseni:

$$volime\ bod, [0, 1], funkci, (x,y) \to \cos(x)\ln(y)$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom

$$(x, y) \to y - 1 - \frac{1}{2}(y-1)^2$$

Jeho hodnota v bode, [-0.1000000000, 0.9500000000], *je*, -0.05125000000

```
metodou per partes vypoctete integral
 Int(ln(x)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \ln(x)\, x\, dx = \frac{1}{2} x^2 \ln(x) - \int \frac{x}{2}\, dx, "=", \frac{1}{2} x^2 \ln(x) - \frac{x^2}{4}\right]$$

```
Najdete lokalni extremy a sedlove body funkce
5+10*x^2+10*x*y+12*y^2+4*x^3+6*x^2*y
```

funkce, $5 + 10\,x^2 + 10\,x\,y + 12\,y^2 + 4\,x^3 + 6\,x^2\,y$, *má gradient*,

$$\begin{bmatrix} 20\,x + 10\,y + 12\,x^2 + 12\,x\,y \\ 10\,x + 24\,y + 6\,x^2 \end{bmatrix}, \textit{ten je nulový v bodech},$$

$$\left[[x=0, y=0], \left[x = \frac{-5}{3}, y=0\right], \left[x = \frac{19}{6}, y = \frac{-551}{144}\right]\right]$$

v bode, $[x=0, y=0]$, *je druhy diferencial*,

$$(u, v) \to 20\,u^2 + 20\,v\,u + 24\,v^2 = 20\left(u + \frac{1}{2}v\right)^2 + 19\,v^2$$

v bode, $\left[x = \frac{-5}{3}, y = 0\right]$, *je druhy diferencial*,

$$(u, v) \to -20\,u^2 - 20\,v\,u + 24\,v^2 = -20\left(u + \frac{1}{2}v\right)^2 + 29\,v^2$$

v bode, $\left[x = \frac{19}{6}, y = \frac{-551}{144}\right]$, *je druhy diferencial*,

$$(u, v) \to \frac{601}{12}u^2 + 96\,v\,u + 24\,v^2 = \frac{601}{12}\left(u + \frac{576}{601}v\right)^2 - \frac{13224}{601}v^2$$

$$LocalMin = [[0, 0]], LocalMax = [\ ], Saddle = \left[\left[\frac{-5}{3}, 0\right], \left[\frac{19}{6}, \frac{-551}{144}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(cos(x)^3+1-cos(x)^2)/(sin(x)*cos(x)^2)
```

$$\int \frac{\cos(x)^3 + 1 - \cos(x)^2}{\sin(x)\cos(x)^2}\, dx = \ln(\sin(x)) + \frac{1}{\cos(x)}$$

line :=

"PMMAT2|174734|Ohnheisrová, Iveta |zk|ESF M-HPS HOSP [sem 2]

zadani pro, "Ohnheisrová, Iveta ", 174734

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`-.1000000000`)*`.9500000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\cos(-.1000000000)\sqrt{.9500000000}$$

Reseni:

$$\textit{volime bod}, [0, 1], \textit{funkci}, (x, y) \to \cos(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to \frac{1}{2} + \frac{1}{2}y - \frac{1}{8}(y-1)^2 - \frac{1}{2}x^2$$

$$\textit{Jeho hodnota v bode}, [-0.1000000000, 0.9500000000], \textit{je}, 0.9696875000$$

```
metodou per partes vypoctete integral
 Int(x*2^x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int x\,2^x\,dx = \frac{2^x x}{\ln(2)} - \int \frac{2^x}{\ln(2)}\,dx, "=", \frac{(-1 + x\ln(2))\,2^x}{\ln(2)^2}\right]$$

```
Najdete lokalni extremy a sedlove body funkce 5*x+4*x^2-10*y^2-7*x^3+9*y^3
```

$$\textit{funkce}, 5x + 4x^2 - 10y^2 - 7x^3 + 9y^3, \textit{má gradient}, \begin{bmatrix} 5 + 8x - 21x^2 \\ -20y + 27y^2 \end{bmatrix},$$

ten je nulový v bodech,

$$\left[\left[x = \frac{-1}{3}, y = 0\right], \left[x = \frac{5}{7}, y = 0\right], \left[x = \frac{-1}{3}, y = \frac{20}{27}\right], \left[x = \frac{5}{7}, y = \frac{20}{27}\right]\right]$$

$$\textit{v bode}, \left[x = \frac{-1}{3}, y = 0\right], \textit{je druhy diferencial},$$

$$(u, v) \to 22u^2 - 20v^2 = 22u^2 - 20v^2$$

$$\textit{v bode}, \left[x = \frac{5}{7}, y = 0\right], \textit{je druhy diferencial},$$

$$(u, v) \to -22u^2 - 20v^2 = -22u^2 - 20v^2$$

$$\textit{v bode}, \left[x = \frac{-1}{3}, y = \frac{20}{27}\right], \textit{je druhy diferencial},$$

$$(u, v) \to 22u^2 + 20v^2 = 22u^2 + 20v^2$$

$$v\ bode, \left[x=\frac{5}{7}, y=\frac{20}{27}\right], je\ druhy\ diferencial,$$

$$(u, v) \to -22\, u^2 + 20\, v^2 = -22\, u^2 + 20\, v^2$$

$$LocalMin = \left[\left[\frac{-1}{3}, \frac{20}{27}\right]\right], LocalMax = \left[\left[\frac{5}{7}, 0\right]\right], Saddle = \left[\left[\frac{-1}{3}, 0\right], \left[\frac{5}{7}, \frac{20}{27}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3-3*cos(x)^2+3)/(4*sin(x)*cos(x)^2)
```

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

line := "PMMAT2|172037|Petroviè, Martin |zk|ESF B-EKM POH [sem 2]

zadani pro, "Petroviè, Martin ", 172037

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`1.200000000`)*exp(`.1000000000`)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\ln(1.200000000)\, e^{.1000000000}$$

Reseni:

$$volime\ bod, [1, 0], funkci, (x, y) \to \ln(x)\, e^y$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to x - 1 + (x-1)\, y - \frac{1}{2}(x-1)^2$$

Jeho hodnota v bode, [1.200000000, 0.1000000000], *je*, 0.2000000000

```
metodou per partes vypoctete integral
 Int(x*cos(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int x\cos(x)\, dx = \sin(x)\, x - \int \sin(x)\, dx, "=", \cos(x) + \sin(x)\, x\right]$$

```
Najdete lokalni extremy a sedlove body funkce 16+4*x-8*x^2+10*x*y+6*x*y^2
```

$$funkce, 16 + 4x - 8x^2 + 10xy + 6xy^2, \text{má gradient},$$

$$\begin{bmatrix} 4 - 16x + 10y + 6y^2 \\ 10x + 12xy \end{bmatrix}, \text{ten je nulový v bodech},$$

$$\left[\left[x = \frac{-1}{96}, y = \frac{-5}{6}\right], [x = 0, y = -1], \left[x = 0, y = \frac{-2}{3}\right]\right]$$

$$v\ bode, \left[x=\frac{-1}{96}, y=\frac{-5}{6}\right], je\ druhy\ diferencial,$$

$$(u, v) \to -16\,u^2 - \frac{1}{8}v^2 = -16\,u^2 - \frac{1}{8}v^2$$

$$v\ bode, [x=0, y=-1], je\ druhy\ diferencial,$$

$$(u, v) \to -16\,u^2 - 4\,v\,u = -16\left(u + \frac{1}{8}v\right)^2 + \frac{1}{4}v^2$$

$$v\ bode, \left[x=0, y=\frac{-2}{3}\right], je\ druhy\ diferencial,$$

$$(u, v) \to -16\,u^2 + 4\,v\,u = -16\left(u - \frac{1}{8}v\right)^2 + \frac{1}{4}v^2$$

$$LocalMin = [\ ], LocalMax = \left[\left[\frac{-1}{96}, \frac{-5}{6}\right]\right], Saddle = \left[[0, -1], \left[0, \frac{-2}{3}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+3-3*cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

line := "PMMAT2| 99620|Petøík, Martin |zk|ESF M-HPS FP [sem 4]

zadani pro, "Petøík, Martin ", 99620

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`.9000000000`)*`8.950000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\ln(.9000000000)\sqrt{8.950000000}$$

Reseni:

$$volime\ bod, [1, 9], funkci, (x, y) \to \ln(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to 3\,x - 3 + \frac{1}{6}(x-1)(y-9) - \frac{3}{2}(x-1)^2$$

Jeho hodnota v bode, [0.9000000000, 8.950000000], *je*, -0.3141666667

```
metodou per partes vypoctete integral
 Int(ln(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int \ln(x)\,dx = \ln(x)\,x - \int 1\,dx, \text{"="}, \ln(x)\,x - x\right]$$

```
Najdete lokalni extremy a sedlove body funkce 2+12*y-6*x^2+15*y^2-8*x^3+4*y^3
```

funkce, $2+12y-6x^2+15y^2-8x^3+4y^3$, *má gradient*,

$\begin{bmatrix} -12x-24x^2 \\ 12+30y+12y^2 \end{bmatrix}$, *ten je nulový v bodech*,

$$\left[[x=0, y=-2], \left[x=0, y=\frac{-1}{2}\right], \left[x=\frac{-1}{2}, y=-2\right], \left[x=\frac{-1}{2}, y=\frac{-1}{2}\right]\right]$$

v bode, $[x=0, y=-2]$, *je druhy diferencial*,

$$(u,v) \to -12u^2-18v^2 = -12u^2-18v^2$$

v bode, $\left[x=0, y=\frac{-1}{2}\right]$, *je druhy diferencial*,

$$(u,v) \to -12u^2+18v^2 = -12u^2+18v^2$$

v bode, $\left[x=\frac{-1}{2}, y=-2\right]$, *je druhy diferencial*,

$$(u,v) \to 12u^2-18v^2 = 12u^2-18v^2$$

v bode, $\left[x=\frac{-1}{2}, y=\frac{-1}{2}\right]$, *je druhy diferencial*,

$$(u,v) \to 12u^2+18v^2 = 12u^2+18v^2$$

$$LocalMin = \left[\left[\frac{-1}{2}, \frac{-1}{2}\right]\right], LocalMax = [[0, -2]], Saddle = \left[\left[0, \frac{-1}{2}\right], \left[\frac{-1}{2}, -2\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(cos(x)^3+3-3*cos(x)^2)/(sin(x)*cos(x)^2)
```

$$\int \frac{\cos(x)^3+3-3\cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{3}{\cos(x)}$$

line :=

"PMMAT2|171888|Podhradský, Juraj |zk|ESF B-EKM POH [sem 2]

zadani pro, "Podhradský, Juraj ", 171888

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`-.1000000000`)*ln(`.9500000000`)
```

*Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\
zvolenem bode priblizne vypocitejte:*

$$\cos(-.1000000000)\ln(.9500000000)$$

Reseni:

$$volime\ bod, [0, 1], funkci, (x, y) \to \cos(x) \ln(y)$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom

$$(x, y) \to y - 1 - \frac{1}{2} (y - 1)^2$$

$$Jeho\ hodnota\ v\ bode, [-0.1000000000, 0.9500000000], je, -0.05125000000$$

```
metodou per partes vypoctete integral
 Int(arcsin(x)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arcsin(x)\, x\, dx = \frac{1}{2} x^2 \arcsin(x) - \int \frac{x^2}{2\sqrt{-x^2+1}}\, dx, "=", \frac{1}{2} x^2 \arcsin(x) + \frac{x\sqrt{-x^2+1}}{4} - \frac{1}{4} \arcsin(x)\right]$$

```
Najdete lokalni extremy a sedlove body funkce 11-4*y-x^2+4*y^2-3*x^3+6*x^2*y
```

$$funkce, 11 - 4y - x^2 + 4y^2 - 3x^3 + 6x^2 y, má\ gradient,$$

$$\begin{bmatrix} -2x - 9x^2 + 12xy \\ -4 + 8y + 6x^2 \end{bmatrix}, ten\ je\ nulový\ v\ bodech,$$

$$\left[\left[x = 0, y = \frac{1}{2}\right], \left[x = \frac{-4}{3}, y = \frac{-5}{6}\right], \left[x = \frac{1}{3}, y = \frac{5}{12}\right]\right]$$

$$v\ bode, \left[x = 0, y = \frac{1}{2}\right], je\ druhy\ diferencial,$$

$$(u, v) \to 4u^2 + 8v^2 = 4u^2 + 8v^2$$

$$v\ bode, \left[x = \frac{-4}{3}, y = \frac{-5}{6}\right], je\ druhy\ diferencial,$$

$$(u, v) \to 12u^2 - 32vu + 8v^2 = 12\left(u - \frac{4}{3}v\right)^2 - \frac{40}{3}v^2$$

$$v\ bode, \left[x = \frac{1}{3}, y = \frac{5}{12}\right], je\ druhy\ diferencial,$$

$$(u, v) \to -3u^2 + 8vu + 8v^2 = -3\left(u - \frac{4}{3}v\right)^2 + \frac{40}{3}v^2$$

$$LocalMin = \left[\left[0, \frac{1}{2}\right]\right], LocalMax = [\ ], Saddle = \left[\left[\frac{-4}{3}, \frac{-5}{6}\right], \left[\frac{1}{3}, \frac{5}{12}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(cos(x)^3+1-cos(x)^2)/(sin(x)*cos(x)^2)
```

$$\int \frac{\cos(x)^3 + 1 - \cos(x)^2}{\sin(x)\cos(x)^2}\, dx = \ln(\sin(x)) + \frac{1}{\cos(x)}$$

line :=

"PMMAT2|170290|Pokorný, Franti¹ek |zk|ESF M-EKM POH [sem 2]

zadani pro, "Pokorný, Franti¹ek ", 170290

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte exp(`-.1000000000`)*`3.950000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\mathrm{e}^{-.1000000000}\sqrt{3.950000000}$$

Reseni:

$$\textit{volime bod}, [0, 4], \textit{funkci}, (x, y) \to \mathrm{e}^{x}\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to 1 + \frac{1}{4} y + 2 x - \frac{1}{64}(y-4)^2 + x^2 + \frac{1}{4} x (y-4)$$

$$\textit{Jeho hodnota v bode}, [-0.1000000000, 3.950000000], \ \textit{je}, 1.798710938$$

```
metodou per partes vypoctete integral
 Int(x*2^x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int x\,2^x\,dx = \frac{2^x x}{\ln(2)} - \int \frac{2^x}{\ln(2)}\,dx, "=", \frac{(-1 + x\ln(2))\,2^x}{\ln(2)^2}\right]$$

```
Najdete lokalni extremy a sedlove body funkce 11-4*y-x^2+4*y^2-3*x^3+6*x^2*y
```

funkce, $11 - 4y - x^2 + 4y^2 - 3x^3 + 6x^2 y$, *má gradient*,

$$\begin{bmatrix} -2x - 9x^2 + 12xy \\ -4 + 8y + 6x^2 \end{bmatrix}, \textit{ten je nulový v bodech},$$

$$\left[\left[x = 0, y = \frac{1}{2}\right], \left[x = \frac{-4}{3}, y = \frac{-5}{6}\right], \left[x = \frac{1}{3}, y = \frac{5}{12}\right]\right]$$

$$\textit{v bode}, \left[x = 0, y = \frac{1}{2}\right], \textit{je druhy diferencial},$$

$$(u, v) \to 4u^2 + 8v^2 = 4u^2 + 8v^2$$

$$\textit{v bode}, \left[x = \frac{-4}{3}, y = \frac{-5}{6}\right], \textit{je druhy diferencial},$$

$$(u, v) \to 12u^2 - 32vu + 8v^2 = 12\left(u - \frac{4}{3}v\right)^2 - \frac{40}{3}v^2$$

$$v\ bode, \left[x=\frac{1}{3}, y=\frac{5}{12}\right], je\ druhy\ diferencial,$$

$$(u, v) \to -3\,u^2 + 8\,v\,u + 8\,v^2 = -3\left(u - \frac{4}{3}\,v\right)^2 + \frac{40}{3}\,v^2$$

$$LocalMin = \left[\left[0, \frac{1}{2}\right]\right], LocalMax = [\ ], Saddle = \left[\left[\frac{-4}{3}, \frac{-5}{6}\right], \left[\frac{1}{3}, \frac{5}{12}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3-cos(x)^2+1)/(4*sin(x)*cos(x)^2)
```

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

line := "PMMAT2|134691|Potoèková, Zuzana |zk|ESF M-HPS FP [sem 2]

zadani pro, "Potoèková, Zuzana ", 134691

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`.2000000000`)*`4.100000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne

zvolenem bode priblizne vypocitejte:

$$\cos(.2000000000)\,\sqrt{4.100000000}$$

Reseni:

$$volime\ bod, [0, 4], funkci, (x, y) \to \cos(x)\,\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to 1 + \frac{1}{4}\,y - \frac{1}{64}\,(y-4)^2 - x^2$$

Jeho hodnota v bode, [0.2000000000, 4.100000000], *je*, 1.984843750

```
metodou per partes vypoctete integral
 Int(arctan(x^2),x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arctan(x^2)\,dx = \arctan(x^2)\,x - \int \frac{2\,x^2}{x^4+1}\,dx, "=", \arctan(x^2)\,x - \frac{1}{2}\sqrt{2}\,\arctan(x\sqrt{2}-1)\right.$$
$$\left. - \frac{1}{4}\sqrt{2}\,\ln\left(\frac{x^2 - x\sqrt{2}+1}{x^2 + x\sqrt{2}+1}\right) - \frac{1}{2}\sqrt{2}\,\arctan(x\sqrt{2}+1)\right]$$

```
Najdete lokalni extremy a sedlove body funkce 17-6*y+4*x^2-11*y^2-10*x^3-4*y^3
```

$funkce, 17 - 6y + 4x^2 - 11y^2 - 10x^3 - 4y^3, má\ gradient,$

$$\begin{bmatrix} 8x - 30x^2 \\ -6 - 22y - 12y^2 \end{bmatrix}, ten\ je\ nulový\ v\ bodech,$$

$$\left[\left[x = 0, y = \frac{-3}{2}\right], \left[x = 0, y = \frac{-1}{3}\right], \left[x = \frac{4}{15}, y = \frac{-3}{2}\right], \left[x = \frac{4}{15}, y = \frac{-1}{3}\right]\right]$$

$$v\ bode, \left[x = 0, y = \frac{-3}{2}\right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow 8u^2 + 14v^2 = 8u^2 + 14v^2$$

$$v\ bode, \left[x = 0, y = \frac{-1}{3}\right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow 8u^2 - 14v^2 = 8u^2 - 14v^2$$

$$v\ bode, \left[x = \frac{4}{15}, y = \frac{-3}{2}\right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow -8u^2 + 14v^2 = -8u^2 + 14v^2$$

$$v\ bode, \left[x = \frac{4}{15}, y = \frac{-1}{3}\right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow -8u^2 - 14v^2 = -8u^2 - 14v^2$$

$$LocalMin = \left[\left[0, \frac{-3}{2}\right]\right], LocalMax = \left[\left[\frac{4}{15}, \frac{-1}{3}\right]\right],$$

$$Saddle = \left[\left[0, \frac{-1}{3}\right], \left[\frac{4}{15}, \frac{-3}{2}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+3-3*cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

line := "PMMAT2|174793|Primová, Andrea |zk|ESF M-EKT EKON [
em 2]"

zadani pro, "Primová, Andrea ", 174793

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`.2000000000`)*exp(`.1000000000`)
```

*Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\
zvolenem bode priblizne vypocitejte:*

$$\cos(.2000000000)\, e^{.1000000000}$$

Reseni:

$$\textit{volime bod}, [0, 0], \textit{funkci}, (x, y) \rightarrow \cos(x)\,\mathbf{e}^y$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \rightarrow 1 + y + \frac{1}{2}y^2 - \frac{1}{2}x^2$$

$$\textit{Jeho hodnota v bode}, [0.2000000000, 0.1000000000], \ \textit{je}, 1.085000000$$

```
metodou per partes vypoctete integral
 Int(arctan(x^2)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arctan(x^2)\,x\,dx = \frac{1}{2}x^2\arctan(x^2) - \int \frac{x^3}{x^4+1}\,dx, \text{"="}, \qquad \frac{1}{2}x^2\arctan(x^2) - \frac{1}{4}\ln(x^4+1)\right]$$

```
Najdete lokalni extremy a sedlove body funkce -8*y+6*y^2+12*x^2*y-10*x^4
```

$$\textit{funkce}, -8y + 6y^2 + 12x^2y - 10x^4, \textit{má gradient}, \begin{bmatrix} 24xy - 40x^3 \\ -8 + 12y + 12x^2 \end{bmatrix},$$

ten je nulový v bodech,

$$\left[\left[x = 0, y = \frac{2}{3}\right], \left[x = \frac{1}{2}, y = \frac{5}{12}\right], \left[x = \frac{-1}{2}, y = \frac{5}{12}\right]\right]$$

$$\textit{v bode}, \left[x = 0, y = \frac{2}{3}\right], \textit{je druhy diferencial},$$

$$(u, v) \rightarrow 16u^2 + 12v^2 = 16u^2 + 12v^2$$

$$\textit{v bode}, \left[x = \frac{1}{2}, y = \frac{5}{12}\right], \textit{je druhy diferencial},$$

$$(u, v) \rightarrow -20u^2 + 24vu + 12v^2 = -20\left(u - \frac{3}{5}v\right)^2 + \frac{96}{5}v^2$$

$$\textit{v bode}, \left[x = \frac{-1}{2}, y = \frac{5}{12}\right], \textit{je druhy diferencial},$$

$$(u, v) \rightarrow -20u^2 - 24vu + 12v^2 = -20\left(u + \frac{3}{5}v\right)^2 + \frac{96}{5}v^2$$

$$\textit{LocalMin} = \left[\left[0, \frac{2}{3}\right]\right], \textit{LocalMax} = [\ ], \textit{Saddle} = \left[\left[\frac{1}{2}, \frac{5}{12}\right], \left[\frac{-1}{2}, \frac{5}{12}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(2*cos(x)^3+3-3*cos(x)^2)/(2*sin(x)*cos(x)^2)
```

$$\int \frac{1}{2}\,\frac{2\cos(x)^3 + 3 - 3\cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{3}{2}\,\frac{1}{\cos(x)}$$

line :=

"PMMAT2|171836|Prodìlalová, Linda |zk|ESF B-HPS VEK [sem 2] *zadani pro*, "Prodìlalová, Linda ", 171836

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`.9000000000`)*`8.950000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\ln(.9000000000)\sqrt{8.950000000}$$

Reseni:

volime bod, $[1, 9]$, *funkci*, $(x, y) \to \ln(x)\sqrt{y}$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to 3x - 3 + \frac{1}{6}(x-1)(y-9) - \frac{3}{2}(x-1)^2$$

Jeho hodnota v bode, [0.9000000000, 8.950000000], *je*, -0.3141666667

```
metodou per partes vypoctete integral
 Int(arctan(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arctan(x)\,dx = x\arctan(x) - \int \frac{x}{x^2+1}\,dx, \text{"="}, x\arctan(x) - \frac{1}{2}\ln(x^2+1)\right]$$

```
Najdete lokalni extremy a sedlove body funkce 2+12*y-6*x^2+15*y^2-8*x^3+4*y^3
```

funkce, $2 + 12y - 6x^2 + 15y^2 - 8x^3 + 4y^3$, *má gradient*,

$\begin{bmatrix} -12x - 24x^2 \\ 12 + 30y + 12y^2 \end{bmatrix}$, *ten je nulový v bodech*,

$$\left[[x=0, y=-2], \left[x=0, y=\frac{-1}{2}\right], \left[x=\frac{-1}{2}, y=-2\right], \left[x=\frac{-1}{2}, y=\frac{-1}{2}\right]\right]$$

v bode, $[x=0, y=-2]$, *je druhy diferencial*,

$$(u, v) \to -12u^2 - 18v^2 = -12u^2 - 18v^2$$

v bode, $\left[x=0, y=\frac{-1}{2}\right]$, *je druhy diferencial*,

$$(u, v) \to -12u^2 + 18v^2 = -12u^2 + 18v^2$$

v bode, $\left[x=\frac{-1}{2}, y=-2\right]$, *je druhy diferencial*,

$$(u, v) \to 12u^2 - 18v^2 = 12u^2 - 18v^2$$

$$v\ bode, \left[x = \frac{-1}{2}, y = \frac{-1}{2}\right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow 12\, u^2 + 18\, v^2 = 12\, u^2 + 18\, v^2$$

$$LocalMin = \left[\left[\frac{-1}{2}, \frac{-1}{2}\right]\right], LocalMax = [[0, -2]], Saddle = \left[\left[0, \frac{-1}{2}\right], \left[\frac{-1}{2}, -2\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(2*cos(x)^3+3-3*cos(x)^2)/(2*sin(x)*cos(x)^2)
```

$$\int \frac{1}{2} \frac{2\cos(x)^3 + 3 - 3\cos(x)^2}{\sin(x)\cos(x)^2}\, dx = \ln(\sin(x)) + \frac{3}{2} \frac{1}{\cos(x)}$$

line := "PMMAT2|171818|Rojko, Andrej |zk|ESF B-EKM POH [sem 2]

zadani pro, "Rojko, Andrej ", 171818

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`-.1000000000`)*`.9500000000`^(1/2)
```

*Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\
zvolenem bode priblizne vypocitejte:*

$$\cos(-.1000000000)\sqrt{.9500000000}$$

Reseni:

$$volime\ bod, [0, 1], funkci, (x, y) \rightarrow \cos(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \rightarrow \frac{1}{2} + \frac{1}{2}y - \frac{1}{8}(y-1)^2 - \frac{1}{2}x^2$$

Jeho hodnota v bode, [-0.1000000000, 0.9500000000], *je*, 0.9696875000

```
metodou per partes vypoctete integral
 Int(sin(x)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \sin(x)\, x\, dx = -x\cos(x) - \int -\cos(x)\, dx, "=", \sin(x) - x\cos(x)\right]$$

```
Najdete lokalni extremy a sedlove body funkce -3*x+3*x^2-7*y^2+15*x^3+7*y^3
```

$$funkce, -3\,x + 3\,x^2 - 7\,y^2 + 15\,x^3 + 7\,y^3, má\ gradient, \begin{bmatrix} -3 + 6\,x + 45\,x^2 \\ -14\,y + 21\,y^2 \end{bmatrix},$$

ten je nulový v bodech,

$$\left[\left[x = \frac{-1}{3}, y = 0\right], \left[x = \frac{1}{5}, y = 0\right], \left[x = \frac{-1}{3}, y = \frac{2}{3}\right], \left[x = \frac{1}{5}, y = \frac{2}{3}\right]\right]$$

$$v\ bode, \left[x = \frac{-1}{3}, y = 0\right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow -24\,u^2 - 14\,v^2 = -24\,u^2 - 14\,v^2$$

$$v\ bode, \left[x = \frac{1}{5}, y = 0\right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow 24\,u^2 - 14\,v^2 = 24\,u^2 - 14\,v^2$$

$$v\ bode, \left[x = \frac{-1}{3}, y = \frac{2}{3}\right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow -24\,u^2 + 14\,v^2 = -24\,u^2 + 14\,v^2$$

$$v\ bode, \left[x = \frac{1}{5}, y = \frac{2}{3}\right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow 24\,u^2 + 14\,v^2 = 24\,u^2 + 14\,v^2$$

$$LocalMin = \left[\left[\frac{1}{5}, \frac{2}{3}\right]\right], LocalMax = \left[\left[\frac{-1}{3}, 0\right]\right], Saddle = \left[\left[\frac{1}{5}, 0\right], \left[\frac{-1}{3}, \frac{2}{3}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(cos(x)^3+1-cos(x)^2)/(sin(x)*cos(x)^2)
```

$$\int \frac{\cos(x)^3 + 1 - \cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{1}{\cos(x)}$$

line := "PMMAT2|171756|Ryèek, Matou¹ |zk|ESF B-HPS VEK [sem 2]

zadani pro, "Ryèek, Matou¹   ", 171756

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`-.1000000000`)*ln(`.9500000000`)
```

*Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\
zvolenem bode priblizne vypocitejte:*

$$\cos(-.1000000000)\ln(.9500000000)$$

Reseni:

$$volime\ bod, [0, 1], funkci, (x, y) \rightarrow \cos(x)\ln(y)$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \rightarrow y - 1 - \frac{1}{2}(y - 1)^2$$

Jeho hodnota v bode, [-0.1000000000, 0.9500000000], *je*, -0.05125000000

```
metodou per partes vypoctete integral
 Int(arcsin(x)*x,x)
```

,x na konci zadani ctete jako dx

$$\left[\int \arcsin(x)\, x\, dx = \frac{1}{2} x^2 \arcsin(x) - \int \frac{x^2}{2\sqrt{-x^2+1}}\, dx, \text{"="}, \frac{1}{2} x^2 \arcsin(x) + \frac{x\sqrt{-x^2+1}}{4} - \frac{1}{4}\arcsin(x)\right]$$

Najdete lokalni extremy a sedlove body funkce 5+15*x+8*x*y-11*x^3-x^2*y-9*x^3*y

funkce, $5 + 15\,x + 8\,x\,y - 11\,x^3 - x^2\,y - 9\,x^3\,y$, *má gradient*,

$$\begin{bmatrix} 15 + 8\,y - 33\,x^2 - 2\,x\,y - 27\,x^2\,y \\ 8\,x - x^2 - 9\,x^3 \end{bmatrix}, \textit{ten je nulový v bodech},$$

$$\left[\left[x = 0, y = \frac{-15}{8}\right], \left[x = -1, y = \frac{-18}{17}\right], \left[x = \frac{8}{9}, y = \frac{-299}{408}\right]\right]$$

$$\textit{v bode}, \left[x = 0, y = \frac{-15}{8}\right], \textit{je druhy diferencial},$$

$$(u, v) \rightarrow \frac{15}{4} u^2 + 16\,v\,u = \frac{15}{4}\left(u + \frac{32}{15} v\right)^2 - \frac{256}{15} v^2$$

$$\textit{v bode}, \left[x = -1, y = \frac{-18}{17}\right], \textit{je druhy diferencial},$$

$$(u, v) \rightarrow \frac{186}{17} u^2 - 34\,v\,u = \frac{186}{17}\left(u - \frac{289}{186} v\right)^2 - \frac{4913}{186} v^2$$

$$\textit{v bode}, \left[x = \frac{8}{9}, y = \frac{-299}{408}\right], \textit{je druhy diferencial},$$

$$(u, v) \rightarrow -\frac{4493}{204} u^2 - \frac{272}{9} v\,u = -\frac{4493}{204}\left(u + \frac{9248}{13479} v\right)^2 + \frac{1257728}{121311} v^2$$

$$\textit{LocalMin} = [\ ], \textit{LocalMax} = [\ ], \textit{Saddle} = \left[\left[0, \frac{-15}{8}\right], \left[-1, \frac{-18}{17}\right], \left[\frac{8}{9}, \frac{-299}{408}\right]\right]$$

Vyjdrete jako elementarni funkci integral z (cos(x)^3+1-cos(x)^2)/(sin(x)*cos(x)^2)

$$\int \frac{\cos(x)^3 + 1 - \cos(x)^2}{\sin(x)\cos(x)^2}\, dx = \ln(\sin(x)) + \frac{1}{\cos(x)}$$

line := "PMMAT2|174809|Slezák, Martin |zk|ESF M-EKM POH [sem 2]

zadani pro, "Slezák, Martin ", 174809

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`1.200000000`)*exp(`.1000000000`)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\ln(1.200000000)\, e^{.1000000000}$$

Reseni:

$$\textit{volime bod}, [1, 0], \textit{funkci}, (x, y) \to \ln(x)\, e^{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom

$$(x, y) \to x - 1 + (x-1)\, y - \frac{1}{2}(x-1)^2$$

$$\textit{Jeho hodnota v bode}, [1.200000000, 0.1000000000], \ \textit{je}, 0.2000000000$$

```
metodou per partes vypoctete integral
 Int(x*cos(x),x)
,x na konci zadani ctete jako dx
```

$$[\int x\cos(x)\, dx = \sin(x)\, x - \int \sin(x)\, dx, "=", \cos(x) + \sin(x)\, x]$$

```
Najdete lokalni extremy a sedlove body funkce 1-9*x^2-8*x*y+15*x^3+2*x*y^2
```

$\textit{funkce}, 1 - 9x^2 - 8xy + 15x^3 + 2xy^2, \textit{má gradient},$

$$\begin{bmatrix} -18x - 8y + 45x^2 + 2y^2 \\ -8x + 4xy \end{bmatrix}, \textit{ten je nulový v bodech},$$

$$\left[[x=0, y=0], [x=0, y=4], \left[x = \frac{-4}{15}, y=2\right], \left[x = \frac{2}{3}, y = 2\right]\right]$$

$$\textit{v bode}, [x=0, y=0], \textit{je druhy diferencial},$$

$$(u, v) \to -18u^2 - 16vu = -18\left(u + \frac{4}{9}v\right)^2 + \frac{32}{9}v^2$$

$$\textit{v bode}, [x=0, y=4], \textit{je druhy diferencial},$$

$$(u, v) \to -18u^2 + 16vu = -18\left(u - \frac{4}{9}v\right)^2 + \frac{32}{9}v^2$$

$$\textit{v bode}, \left[x = \frac{-4}{15}, y = 2\right], \textit{je druhy diferencial},$$

$$(u, v) \to -42u^2 - \frac{16}{15}v^2 = -42u^2 - \frac{16}{15}v^2$$

$$\textit{v bode}, \left[x = \frac{2}{3}, y = 2\right], \textit{je druhy diferencial},$$

$$(u, v) \to 42u^2 + \frac{8}{3}v^2 = 42u^2 + \frac{8}{3}v^2$$

$$LocalMin = \left[\left[\frac{2}{3}, 2\right]\right], LocalMax = \left[\left[\frac{-4}{15}, 2\right]\right], Saddle = [[0, 0], [0, 4]]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+3-3*cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

line := "PMMAT2|171885|Slezáková, Petra |zk|ESF B-HPS VEK [sem 2]

zadani pro, "Slezáková, Petra ", 171885

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte exp(`.2000000000`)*`1.100000000`^(1/2)
```

*Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\
zvolenem bode priblizne vypocitejte:*

$$e^{.2000000000}\sqrt{1.100000000}$$

Reseni:

volime bod, $[0, 1]$, *funkci*, $(x, y) \to e^x \sqrt{y}$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to \frac{1}{2} + \frac{1}{2}y + x - \frac{1}{8}(y-1)^2 + \frac{1}{2}x^2 + \frac{1}{2}x(y-1)$$

Jeho hodnota v bode, $[0.2000000000, 1.100000000]$, *je*, 1.278750000

```
metodou per partes vypoctete integral
 Int(x*2^x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int x\,2^x\,dx = \frac{2^x x}{\ln(2)} - \int \frac{2^x}{\ln(2)}\,dx, \text{"="}, \frac{(-1+x\ln(2))\,2^x}{\ln(2)^2}\right]$$

```
Najdete lokalni extremy a sedlove body funkce 1-9*x^2-8*x*y+15*x^3+2*x*y^2
```

funkce, $1-9x^2-8xy+15x^3+2xy^2$, *má gradient*,

$$\begin{bmatrix} -18x-8y+45x^2+2y^2 \\ -8x+4xy \end{bmatrix}, \textit{ten je nulový v bodech},$$

$$\left[[x=0, y=0], [x=0, y=4], \left[x=\frac{-4}{15}, y=2\right], \left[x=\frac{2}{3}, y=2\right]\right]$$

v bode, $[x=0, y=0]$, *je druhy diferencial*,

$$(u, v) \to -18u^2 - 16vu = -18\left(u + \frac{4}{9}v\right)^2 + \frac{32}{9}v^2$$

$$v\ bode,\ [x=0,\ y=4],\ je\ druhy\ diferencial,$$

$$(u,v) \rightarrow -18\,u^2 + 16\,v\,u = -18\left(u - \frac{4}{9}v\right)^2 + \frac{32}{9}v^2$$

$$v\ bode,\ \left[x = \frac{-4}{15},\ y = 2\right],\ je\ druhy\ diferencial,$$

$$(u,v) \rightarrow -42\,u^2 - \frac{16}{15}v^2 = -42\,u^2 - \frac{16}{15}v^2$$

$$v\ bode,\ \left[x = \frac{2}{3},\ y = 2\right],\ je\ druhy\ diferencial,$$

$$(u,v) \rightarrow 42\,u^2 + \frac{8}{3}v^2 = 42\,u^2 + \frac{8}{3}v^2$$

$$LocalMin = \left[\left[\frac{2}{3}, 2\right]\right],\ LocalMax = \left[\left[\frac{-4}{15}, 2\right]\right],\ Saddle = [[0,0],[0,4]]$$

```
Vyjdrete jako elementarni funkci integral z
(2*cos(x)^3+1-cos(x)^2)/(2*sin(x)*cos(x)^2)
```

$$\int \frac{1}{2}\,\frac{2\cos(x)^3 + 1 - \cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{1}{2}\,\frac{1}{\cos(x)}$$

line := "PMMAT2|171931|Staroò, Richard |zk|ESF B-HPS FP [sem 2]

zadani pro, "Staroò, Richard ", 171931

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`1.200000000`)*`4.100000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\ln(1.200000000)\sqrt{4.100000000}$$

Reseni:

$$volime\ bod,\ [1,4],\ funkci,\ (x,y) \rightarrow \ln(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x,y) \rightarrow 2x - 2 + \frac{1}{4}(x-1)(y-4) - (x-1)^2$$

Jeho hodnota v bode, [1.200000000, 4.100000000], *je*, 0.3650000000

```
metodou per partes vypoctete integral
 Int(x*arctan(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int x\arctan(x)\,dx=\frac{1}{2}\arctan(x)\,x^2-\int\frac{x^2}{2\,(x^2+1)}\,dx,\ "=",\qquad \frac{1}{2}\arctan(x)\,x^2-\frac{x}{2}+\frac{1}{2}\arctan(x)\right]$$

```
Najdete lokalni extremy a sedlove body funkce 13*x^2+9*x*y+9*x^3+13*x^4-x^3*y
```

funkce, $13\,x^2+9\,x\,y+9\,x^3+13\,x^4-x^3\,y$, *má gradient*,

$\begin{bmatrix}26\,x+9\,y+27\,x^2+52\,x^3-3\,x^2\,y\\ 9\,x-x^3\end{bmatrix}$, *ten je nulový v bodech,*

$$\left[[x=0,\ y=0],\left[x=3,\ y=\frac{575}{6}\right],\left[x=-3,\ y=\frac{-413}{6}\right]\right]$$

v bode, $[x=0,\ y=0]$, *je druhy diferencial*,

$$(u,v)\to 26\,u^2+18\,v\,u=26\left(u+\frac{9}{26}\,v\right)^2-\frac{81}{26}\,v^2$$

v bode, $\left[x=3,\ y=\frac{575}{6}\right]$, *je druhy diferencial*,

$$(u,v)\to -133\,u^2-36\,v\,u=-133\left(u+\frac{18}{133}\,v\right)^2+\frac{324}{133}\,v^2$$

v bode, $\left[x=-3,\ y=\frac{-413}{6}\right]$, *je druhy diferencial*,

$$(u,v)\to 29\,u^2-36\,v\,u=29\left(u-\frac{18}{29}\,v\right)^2-\frac{324}{29}\,v^2$$

$$LocalMin=[\ ],\ LocalMax=[\ ],\ Saddle=\left[[0,0],\left[3,\frac{575}{6}\right],\left[-3,\frac{-413}{6}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+3-3*cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

line := "PMMAT2|172095|Steiger, Zdenìk |zk|ESF B-EKM POH [sem 2]

zadani pro, "Steiger, Zdenìk   ", 172095

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`.2000000000`)*`4.100000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne
zvolenem bode priblizne vypocitejte:

$$\cos(.2000000000)\,\sqrt{4.100000000}$$

Reseni:

$$volime\ bod,\ [0, 4],\ funkci,\ (x, y) \to \cos(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to 1 + \frac{1}{4}y - \frac{1}{64}(y-4)^2 - x^2$$

$$Jeho\ hodnota\ v\ bode,\ [0.2000000000, 4.100000000],\ je,\ 1.984843750$$

```
metodou per partes vypoctete integral
 Int(ln(x)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \ln(x)\, x\, dx = \frac{1}{2}x^2\ln(x) - \int \frac{x}{2}\, dx, "=", \frac{1}{2}x^2\ln(x) - \frac{x^2}{4}\right]$$

```
Najdete lokalni extremy a sedlove body funkce
11+10*x^2+9*x*y+5*y^2+17*x^3+17*x^2*y
```

$$funkce,\ 11 + 10x^2 + 9xy + 5y^2 + 17x^3 + 17x^2y,\ má\ gradient,$$

$$\begin{bmatrix} 20x + 9y + 51x^2 + 34xy \\ 9x + 10y + 17x^2 \end{bmatrix},\ ten\ je\ nulový\ v\ bodech,$$

$$\left[[x=0, y=0], \left[x = \frac{-7}{17}, y = \frac{7}{85}\right], \left[x = \frac{1}{2}, y = \frac{-7}{8}\right]\right]$$

$$v\ bode,\ [x=0, y=0],\ je\ druhy\ diferencial,$$

$$(u, v) \to 20u^2 + 18vu + 10v^2 = 20\left(u + \frac{9}{20}v\right)^2 + \frac{119}{20}v^2$$

$$v\ bode, \left[x = \frac{-7}{17}, y = \frac{7}{85}\right],\ je\ druhy\ diferencial,$$

$$(u, v) \to -\frac{96}{5}u^2 - 10vu + 10v^2 = -\frac{96}{5}\left(u + \frac{25}{96}v\right)^2 + \frac{1085}{96}v^2$$

$$v\ bode, \left[x = \frac{1}{2}, y = \frac{-7}{8}\right],\ je\ druhy\ diferencial,$$

$$(u, v) \to \frac{165}{4}u^2 + 52vu + 10v^2 = \frac{165}{4}\left(u + \frac{104}{165}v\right)^2 - \frac{1054}{165}v^2$$

$$LocalMin = [[0, 0]],\ LocalMax = [\ ],\ Saddle = \left[\left[\frac{-7}{17}, \frac{7}{85}\right], \left[\frac{1}{2}, \frac{-7}{8}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+1-cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

line := "PMMAT2|174905|Stratil, Martin |zk|ESF M-EKT EKON [sem 2] *zadani pro*, "Stratil, Martin ", 174905

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`1.200000000`)*exp(`.1000000000`)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\ln(1.200000000)\, e^{.1000000000}$$

Reseni:

volime bod, $[1, 0]$, *funkci*, $(x, y) \to \ln(x)\, e^{y}$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to x - 1 + (x - 1)\, y - \frac{1}{2}(x - 1)^2$$

Jeho hodnota v bode, $[1.200000000, 0.1000000000]$, *je*, 0.2000000000

```
metodou per partes vypoctete integral
 Int(arctan(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arctan(x)\, dx = x \arctan(x) - \int \frac{x}{x^2 + 1}\, dx, \text{"="}, x \arctan(x) - \frac{1}{2}\ln(x^2 + 1)\right]$$

```
Najdete lokalni extremy a sedlove body funkce -6+5*x^2-8*y^2+11*x^3-3*y^3
```

funkce, $-6 + 5x^2 - 8y^2 + 11x^3 - 3y^3$, *má gradient*, $\begin{bmatrix} 10x + 33x^2 \\ -16y - 9y^2 \end{bmatrix}$,

ten je nulový v bodech,

$$\left[[x = 0, y = 0], \left[x = 0, y = \frac{-16}{9}\right], \left[x = \frac{-10}{33}, y = 0\right], \left[x = \frac{-10}{33}, y = \frac{-16}{9}\right]\right]$$

v bode, $[x = 0, y = 0]$, *je druhy diferencial*,

$$(u, v) \to 10u^2 - 16v^2 = 10u^2 - 16v^2$$

v bode, $\left[x = 0, y = \frac{-16}{9}\right]$, *je druhy diferencial*,

$$(u, v) \to 10u^2 + 16v^2 = 10u^2 + 16v^2$$

v bode, $\left[x = \frac{-10}{33}, y = 0\right]$, *je druhy diferencial*,

$$(u, v) \to -10u^2 - 16v^2 = -10u^2 - 16v^2$$

$$v\ bode, \left[x = \frac{-10}{33}, y = \frac{-16}{9}\right], je\ druhy\ diferencial,$$

$$(u, v) \to -10\,u^2 + 16\,v^2 = -10\,u^2 + 16\,v^2$$

$$LocalMin = \left[\left[0, \frac{-16}{9}\right]\right], LocalMax = \left[\left[\frac{-10}{33}, 0\right]\right],$$

$$Saddle = \left[[0, 0], \left[\frac{-10}{33}, \frac{-16}{9}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(2*cos(x)^3+3-3*cos(x)^2)/(2*sin(x)*cos(x)^2)
```

$$\int \frac{1}{2}\,\frac{2\cos(x)^3 + 3 - 3\cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{3}{2}\,\frac{1}{\cos(x)}$$

line := "PMMAT2|174905|Stratil, Martin |zk|ESF M-HPS HOSP [sem 2]

zadani pro, "Stratil, Martin ", 174905

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`1.200000000`)*exp(`.1000000000`)
```

*Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\
zvolenem bode priblizne vypocitejte:*

$$\ln(1.200000000)\,e^{.1000000000}$$

Reseni:

$$volime\ bod, [1, 0], funkci, (x, y) \to \ln(x)\,e^y$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to x - 1 + (x - 1)\,y - \frac{1}{2}(x - 1)^2$$

Jeho hodnota v bode, [1.200000000, 0.1000000000], *je*, 0.2000000000

```
metodou per partes vypoctete integral
 Int(arctan(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arctan(x)\,dx = x\arctan(x) - \int \frac{x}{x^2+1}\,dx, "=", x\arctan(x) - \frac{1}{2}\ln(x^2+1)\right]$$

```
Najdete lokalni extremy a sedlove body funkce -6+5*x^2-8*y^2+11*x^3-3*y^3
```

$$funkce, -6+5x^2-8y^2+11x^3-3y^3, má\ gradient, \begin{bmatrix}10x+33x^2\\ -16y-9y^2\end{bmatrix},$$

$$ten\ je\ nulový\ v\ bodech,$$

$$\left[[x=0, y=0], \left[x=0, y=\frac{-16}{9}\right], \left[x=\frac{-10}{33}, y=0\right], \left[x=\frac{-10}{33}, y=\frac{-16}{9}\right]\right]$$

$$v\ bode, [x=0, y=0], je\ druhy\ diferencial,$$

$$(u, v) \to 10u^2-16v^2 = 10u^2-16v^2$$

$$v\ bode, \left[x=0, y=\frac{-16}{9}\right], je\ druhy\ diferencial,$$

$$(u, v) \to 10u^2+16v^2 = 10u^2+16v^2$$

$$v\ bode, \left[x=\frac{-10}{33}, y=0\right], je\ druhy\ diferencial,$$

$$(u, v) \to -10u^2-16v^2 = -10u^2-16v^2$$

$$v\ bode, \left[x=\frac{-10}{33}, y=\frac{-16}{9}\right], je\ druhy\ diferencial,$$

$$(u, v) \to -10u^2+16v^2 = -10u^2+16v^2$$

$$LocalMin = \left[\left[0, \frac{-16}{9}\right]\right], LocalMax = \left[\left[\frac{-10}{33}, 0\right]\right],$$

$$Saddle = \left[[0, 0], \left[\frac{-10}{33}, \frac{-16}{9}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(2*cos(x)^3+3-3*cos(x)^2)/(2*sin(x)*cos(x)^2)
```

$$\int \frac{1}{2}\frac{2\cos(x)^3+3-3\cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{3}{2}\frac{1}{\cos(x)}$$

line :=

"PMMAT2|172083|Svobodová, Veronika |zk|ESF M-HPS FP [sem 2]"

zadani pro, "Svobodová, Veronika ", 172083

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`.2000000000`)*`4.100000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne

zvolenem bode priblizne vypocitejte:

$$\cos(.2000000000)\sqrt{4.100000000}$$

Reseni:

$$volime\ bod, [0, 4], funkci, (x, y) \to \cos(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \rightarrow 1 + \frac{1}{4}y - \frac{1}{64}(y-4)^2 - x^2$$

Jeho hodnota v bode, $[0.2000000000, 4.100000000]$, *je*, 1.984843750

```
metodou per partes vypoctete integral
 Int(x*2^x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int x\, 2^x\, dx = \frac{2^x\, x}{\ln(2)} - \int \frac{2^x}{\ln(2)}\, dx, \text{"="}, \frac{(-1 + x\ln(2))\, 2^x}{\ln(2)^2}\right]$$

```
Najdete lokalni extremy a sedlove body funkce -6+5*x^2-8*y^2+11*x^3-3*y^3
```

funkce, $-6 + 5x^2 - 8y^2 + 11x^3 - 3y^3$, *má gradient*, $\begin{bmatrix} 10x + 33x^2 \\ -16y - 9y^2 \end{bmatrix}$,

ten je nulový v bodech,

$$\left[[x=0, y=0], \left[x=0, y=\frac{-16}{9}\right], \left[x=\frac{-10}{33}, y=0\right], \left[x=\frac{-10}{33}, y=\frac{-16}{9}\right]\right]$$

v bode, $[x=0, y=0]$, *je druhy diferencial*,

$$(u, v) \rightarrow 10u^2 - 16v^2 = 10u^2 - 16v^2$$

v bode, $\left[x=0, y=\frac{-16}{9}\right]$, *je druhy diferencial*,

$$(u, v) \rightarrow 10u^2 + 16v^2 = 10u^2 + 16v^2$$

v bode, $\left[x=\frac{-10}{33}, y=0\right]$, *je druhy diferencial*,

$$(u, v) \rightarrow -10u^2 - 16v^2 = -10u^2 - 16v^2$$

v bode, $\left[x=\frac{-10}{33}, y=\frac{-16}{9}\right]$, *je druhy diferencial*,

$$(u, v) \rightarrow -10u^2 + 16v^2 = -10u^2 + 16v^2$$

$$LocalMin = \left[\left[0, \frac{-16}{9}\right]\right], LocalMax = \left[\left[\frac{-10}{33}, 0\right]\right],$$

$$Saddle = \left[[0, 0], \left[\frac{-10}{33}, \frac{-16}{9}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+1-cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

line := "PMMAT2|174671|©afáøová, Monika |zk|ESF M-HPS FP [sem 2] *zadani pro*, "©afáøová, Monika ", 174671

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte exp(`.2000000000`)*`9.100000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\mathrm{e}^{.2000000000}\sqrt{9.100000000}$$

Reseni:

volime bod, $[0, 9]$, *funkci*, $(x, y) \rightarrow \mathrm{e}^{x}\sqrt{y}$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \rightarrow \frac{3}{2} + \frac{1}{6}y + 3x - \frac{1}{216}(y-9)^2 + \frac{3}{2}x^2 + \frac{1}{6}x(y-9)$$

Jeho hodnota v bode, $[0.2000000000, 9.100000000]$, *je*, 3.679953704

```
metodou per partes vypoctete integral
 Int(arcsin(x)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arcsin(x)\, x\, dx = \frac{1}{2}x^2 \arcsin(x) - \int \frac{x^2}{2\sqrt{-x^2+1}}\, dx, "=", \frac{1}{2}x^2 \arcsin(x) + \frac{x\sqrt{-x^2+1}}{4} - \frac{1}{4}\arcsin(x)\right]$$

```
Najdete lokalni extremy a sedlove body funkce 9-10*x^2+5*x*y+3*x^3+9*x^2*y-
6*x*y^2
```

funkce, $9 - 10x^2 + 5xy + 3x^3 + 9x^2y - 6xy^2$, *má gradient*,

$\begin{bmatrix} -20x + 5y + 9x^2 + 18xy - 6y^2 \\ 5x + 9x^2 - 12xy \end{bmatrix}$, *ten je nulový v bodech*,

$$\left[[x=0, y=0], \left[x=0, y=\frac{5}{6}\right], \left[x=\frac{5}{51}, y=\frac{25}{51}\right], \left[x=\frac{5}{9}, y=\frac{5}{6}\right]\right]$$

v bode, $[x=0, y=0]$, *je druhy diferencial*,

$$(u, v) \rightarrow -20u^2 + 10vu = -20\left(u - \frac{1}{4}v\right)^2 + \frac{5}{4}v^2$$

v bode, $\left[x=0, y=\frac{5}{6}\right]$, *je druhy diferencial*,

$$(u, v) \rightarrow -5u^2 - 10vu = -5(u+v)^2 + 5v^2$$

$$v\ bode, \left[x=\frac{5}{51}, y=\frac{25}{51}\right], je\ druhy\ diferencial,$$

$$(u, v) \to -\frac{160}{17} u^2 + \frac{30}{17} v\, u - \frac{20}{17} v^2 = -\frac{160}{17}\left(u - \frac{3}{32} v\right)^2 - \frac{35}{32} v^2$$

$$v\ bode, \left[x=\frac{5}{9}, y=\frac{5}{6}\right], je\ druhy\ diferencial,$$

$$(u, v) \to 5\, u^2 + 10\, v\, u - \frac{20}{3} v^2 = 5\,(u+v)^2 - \frac{35}{3} v^2$$

$$LocalMin = [\ ], LocalMax = \left[\left[\frac{5}{51}, \frac{25}{51}\right]\right], Saddle = \left[[0, 0], \left[0, \frac{5}{6}\right], \left[\frac{5}{9}, \frac{5}{6}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+3-3*cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

line :=

"PMMAT2| 99492|©amlová, Markéta |zk|ESF M-HPS RRS [sem 6]

zadani pro, "©amlová, Markéta ", 99492

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`-.1000000000`)*ln(`.9500000000`)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne

zvolenem bode priblizne vypocitejte:

$$\cos(-.1000000000)\ln(.9500000000)$$

Reseni:

$$volime\ bod, [0, 1], funkci, (x, y) \to \cos(x)\ln(y)$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to y - 1 - \frac{1}{2}(y-1)^2$$

Jeho hodnota v bode, [-0.1000000000, 0.9500000000], *je*, -0.05125000000

```
metodou per partes vypoctete integral
 Int(x*cos(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int x\cos(x)\,dx = \sin(x)\,x - \int \sin(x)\,dx, "=", \cos(x) + \sin(x)\,x\right]$$

```
Najdete lokalni extremy a sedlove body funkce 5*x+4*x^2-10*y^2-7*x^3+9*y^3
```

$$\textit{funkce},\ 5x+4x^2-10y^2-7x^3+9y^3,\ \textit{má gradient},\ \begin{bmatrix} 5+8x-21x^2 \\ -20y+27y^2 \end{bmatrix},$$

ten je nulový v bodech,

$$\left[\left[x=\frac{-1}{3}, y=0\right], \left[x=\frac{5}{7}, y=0\right], \left[x=\frac{-1}{3}, y=\frac{20}{27}\right], \left[x=\frac{5}{7}, y=\frac{20}{27}\right]\right]$$

$$\textit{v bode},\ \left[x=\frac{-1}{3}, y=0\right],\ \textit{je druhy diferencial},$$

$$(u, v) \to 22u^2-20v^2 = 22u^2-20v^2$$

$$\textit{v bode},\ \left[x=\frac{5}{7}, y=0\right],\ \textit{je druhy diferencial},$$

$$(u, v) \to -22u^2-20v^2 = -22u^2-20v^2$$

$$\textit{v bode},\ \left[x=\frac{-1}{3}, y=\frac{20}{27}\right],\ \textit{je druhy diferencial},$$

$$(u, v) \to 22u^2+20v^2 = 22u^2+20v^2$$

$$\textit{v bode},\ \left[x=\frac{5}{7}, y=\frac{20}{27}\right],\ \textit{je druhy diferencial},$$

$$(u, v) \to -22u^2+20v^2 = -22u^2+20v^2$$

$$\textit{LocalMin} = \left[\left[\frac{-1}{3}, \frac{20}{27}\right]\right],\ \textit{LocalMax} = \left[\left[\frac{5}{7}, 0\right]\right],\ \textit{Saddle} = \left[\left[\frac{-1}{3}, 0\right], \left[\frac{5}{7}, \frac{20}{27}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(2*cos(x)^3+3-3*cos(x)^2)/(2*sin(x)*cos(x)^2)
```

$$\int \frac{1}{2}\,\frac{2\cos(x)^3+3-3\cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{3}{2}\,\frac{1}{\cos(x)}$$

line :=

"PMMAT2|172194|©auerová, Ludmila |zk|ESF B-EKM POH [sem 2]

zadani pro, "©auerová, Ludmila ", 172194

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`.9000000000`)*`.9500000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\ln(.9000000000)\sqrt{.9500000000}$$

Reseni:

$$\textit{volime bod},\ [1, 1],\ \textit{funkci},\ (x, y) \to \ln(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to x - 1 + \frac{1}{2}(x-1)(y-1) - \frac{1}{2}(x-1)^2$$

Jeho hodnota v bode, [0.9000000000, 0.9500000000], *je*, -0.1025000000

```
metodou per partes vypoctete integral
 Int(ln(x)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \ln(x)\, x\, dx = \frac{1}{2}x^2 \ln(x) - \int \frac{x}{2}\, dx, "=", \frac{1}{2}x^2 \ln(x) - \frac{x^2}{4}\right]$$

```
Najdete lokalni extremy a sedlove body funkce 11-4*y-x^2+4*y^2-3*x^3+6*x^2*y
```

funkce, $11 - 4y - x^2 + 4y^2 - 3x^3 + 6x^2 y$, *má gradient*,

$\begin{bmatrix} -2x - 9x^2 + 12xy \\ -4 + 8y + 6x^2 \end{bmatrix}$, *ten je nulový v bodech*,

$\left[\left[x = 0, y = \frac{1}{2}\right], \left[x = \frac{-4}{3}, y = \frac{-5}{6}\right], \left[x = \frac{1}{3}, y = \frac{5}{12}\right]\right]$

$$v\ bode, \left[x = 0, y = \frac{1}{2}\right], je\ druhy\ diferencial,$$

$$(u, v) \to 4u^2 + 8v^2 = 4u^2 + 8v^2$$

$$v\ bode, \left[x = \frac{-4}{3}, y = \frac{-5}{6}\right], je\ druhy\ diferencial,$$

$$(u, v) \to 12u^2 - 32vu + 8v^2 = 12\left(u - \frac{4}{3}v\right)^2 - \frac{40}{3}v^2$$

$$v\ bode, \left[x = \frac{1}{3}, y = \frac{5}{12}\right], je\ druhy\ diferencial,$$

$$(u, v) \to -3u^2 + 8vu + 8v^2 = -3\left(u - \frac{4}{3}v\right)^2 + \frac{40}{3}v^2$$

$$LocalMin = \left[\left[0, \frac{1}{2}\right]\right], LocalMax = [\ ], Saddle = \left[\left[\frac{-4}{3}, \frac{-5}{6}\right], \left[\frac{1}{3}, \frac{5}{12}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(cos(x)^3+1-cos(x)^2)/(sin(x)*cos(x)^2)
```

$$\int \frac{\cos(x)^3 + 1 - \cos(x)^2}{\sin(x)\cos(x)^2}\, dx = \ln(\sin(x)) + \frac{1}{\cos(x)}$$

line := "PMMAT2|172149|©erý, Martin |zk|ESF B-HPS FP [sem 2]

zadani pro, "©erý, Martin ", 172149

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte exp(`.2000000000`)*`1.100000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$e^{.2000000000}\sqrt{1.100000000}$$

Reseni:

$$\textit{volime bod}, [0, 1], \textit{funkci}, (x, y) \to e^x \sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to \frac{1}{2} + \frac{1}{2}y + x - \frac{1}{8}(y-1)^2 + \frac{1}{2}x^2 + \frac{1}{2}x(y-1)$$

$$\textit{Jeho hodnota v bode}, [0.2000000000, 1.100000000], \ \textit{je}, 1.278750000$$

```
metodou per partes vypoctete integral
 Int(x*2^x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int x\,2^x\,dx = \frac{2^x x}{\ln(2)} - \int \frac{2^x}{\ln(2)}\,dx, \text{"="}, \frac{(-1 + x\ln(2))\,2^x}{\ln(2)^2}\right]$$

```
Najdete lokalni extremy a sedlove body funkce -9+3*x^2+6*y^2-
8*x^3+3*x*y^2+5*y^3
```

$$\textit{funkce}, -9 + 3x^2 + 6y^2 - 8x^3 + 3xy^2 + 5y^3, \textit{má gradient},$$

$$\begin{bmatrix} 6x - 24x^2 + 3y^2 \\ 12y + 6xy + 15y^2 \end{bmatrix}, \textit{ten je nulový v bodech},$$

$$\left[[x=0, y=0], \left[x=\frac{1}{4}, y=0\right], \left[x=\frac{-8}{49}, y=\frac{-36}{49}\right], \left[x=\frac{1}{2}, y=-1\right]\right]$$

$$\textit{v bode}, [x=0, y=0], \textit{je druhy diferencial},$$

$$(u, v) \to 6u^2 + 12v^2 = 6u^2 + 12v^2$$

$$\textit{v bode}, \left[x=\frac{1}{4}, y=0\right], \textit{je druhy diferencial},$$

$$(u, v) \to -6u^2 + \frac{27}{2}v^2 = -6u^2 + \frac{27}{2}v^2$$

$$\textit{v bode}, \left[x=\frac{-8}{49}, y=\frac{-36}{49}\right], \textit{je druhy diferencial},$$

$$(u, v) \to \frac{678}{49}u^2 - \frac{432}{49}v\,u - \frac{540}{49}v^2 = \frac{678}{49}\left(u - \frac{36}{113}v\right)^2 - \frac{1404}{113}v^2$$

$$v\ bode, \left[x = \frac{1}{2}, y = -1 \right], je\ druhy\ diferencial,$$

$$(u, v) \to -18\,u^2 - 12\,v\,u - 15\,v^2 = -18\left(u + \frac{1}{3}v\right)^2 - 13\,v^2$$

$$LocalMin = [[0, 0]], LocalMax = \left[\left[\frac{1}{2}, -1\right]\right], Saddle = \left[\left[\frac{1}{4}, 0\right], \left[\frac{-8}{49}, \frac{-36}{49}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(2*cos(x)^3+1-cos(x)^2)/(2*sin(x)*cos(x)^2)
```

$$\int \frac{1}{2} \frac{2\cos(x)^3 + 1 - \cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{1}{2}\frac{1}{\cos(x)}$$

line :=

"PMMAT2|170179|©mídová, Lucie |zk|ESF M-EKM POH [sem 2]

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aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`1.200000000`)*`4.100000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\ln(1.200000000)\sqrt{4.100000000}$$

Reseni:

$$volime\ bod, [1, 4], funkci, (x, y) \to \ln(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to 2\,x - 2 + \frac{1}{4}(x-1)(y-4) - (x-1)^2$$

Jeho hodnota v bode, [1.200000000, 4.100000000], *je*, 0.3650000000

```
metodou per partes vypoctete integral
 Int(sin(x)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \sin(x)\,x\,dx = -x\cos(x) - \int -\cos(x)\,dx, "=", \sin(x) - x\cos(x)\right]$$

```
Najdete lokalni extremy a sedlove body funkce -6+5*x^2-8*y^2+11*x^3-3*y^3
```

$$funkce, -6+5x^2-8y^2+11x^3-3y^3, má\ gradient, \begin{bmatrix} 10x+33x^2 \\ -16y-9y^2 \end{bmatrix},$$

$$ten\ je\ nulový\ v\ bodech,$$

$$\left[[x=0, y=0], \left[x=0, y=\frac{-16}{9}\right], \left[x=\frac{-10}{33}, y=0\right], \left[x=\frac{-10}{33}, y=\frac{-16}{9}\right]\right]$$

$$v\ bode, [x=0, y=0], je\ druhy\ diferencial,$$

$$(u, v) \to 10u^2-16v^2 = 10u^2-16v^2$$

$$v\ bode, \left[x=0, y=\frac{-16}{9}\right], je\ druhy\ diferencial,$$

$$(u, v) \to 10u^2+16v^2 = 10u^2+16v^2$$

$$v\ bode, \left[x=\frac{-10}{33}, y=0\right], je\ druhy\ diferencial,$$

$$(u, v) \to -10u^2-16v^2 = -10u^2-16v^2$$

$$v\ bode, \left[x=\frac{-10}{33}, y=\frac{-16}{9}\right], je\ druhy\ diferencial,$$

$$(u, v) \to -10u^2+16v^2 = -10u^2+16v^2$$

$$LocalMin = \left[\left[0, \frac{-16}{9}\right]\right], LocalMax = \left[\left[\frac{-10}{33}, 0\right]\right],$$

$$Saddle = \left[[0, 0], \left[\frac{-10}{33}, \frac{-16}{9}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(2*cos(x)^3+1-cos(x)^2)/(2*sin(x)*cos(x)^2)
```

$$\int \frac{1}{2} \frac{2\cos(x)^3+1-\cos(x)^2}{\sin(x)\cos(x)^2}\, dx = \ln(\sin(x)) + \frac{1}{2}\frac{1}{\cos(x)}$$

line := "PMMAT2|171979|©»astná, Pavlína |zk|ESF B-HPS VEK [sem 2]

zadani pro, "©»astná, Pavlína   ", 171979

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`1.200000000`)*`4.100000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne
zvolenem bode priblizne vypocitejte:

$$\ln(1.200000000)\sqrt{4.100000000}$$

Reseni:

$$volime\ bod, [1, 4], funkci, (x, y) \to \ln(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom

$$(x, y) \rightarrow 2x - 2 + \frac{1}{4}(x-1)(y-4) - (x-1)^2$$

Jeho hodnota v bode, $[1.200000000, 4.100000000]$, *je*, 0.3650000000

```
metodou per partes vypoctete integral
 Int(arctan(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arctan(x)\,dx = x\arctan(x) - \int \frac{x}{x^2+1}\,dx, \text{"="}, x\arctan(x) - \frac{1}{2}\ln(x^2+1)\right]$$

```
Najdete lokalni extremy a sedlove body funkce -9+3*x^2+6*y^2-
8*x^3+3*x*y^2+5*y^3
```

funkce, $-9 + 3x^2 + 6y^2 - 8x^3 + 3xy^2 + 5y^3$, *má gradient*,

$$\begin{bmatrix} 6x - 24x^2 + 3y^2 \\ 12y + 6xy + 15y^2 \end{bmatrix}, \textit{ten je nulový v bodech},$$

$$\left[[x=0, y=0], \left[x=\frac{1}{4}, y=0\right], \left[x=\frac{-8}{49}, y=\frac{-36}{49}\right], \left[x=\frac{1}{2}, y=-1\right]\right]$$

v bode, $[x=0, y=0]$, *je druhy diferencial*,

$$(u, v) \rightarrow 6u^2 + 12v^2 = 6u^2 + 12v^2$$

v bode, $\left[x=\frac{1}{4}, y=0\right]$, *je druhy diferencial*,

$$(u, v) \rightarrow -6u^2 + \frac{27}{2}v^2 = -6u^2 + \frac{27}{2}v^2$$

v bode, $\left[x=\frac{-8}{49}, y=\frac{-36}{49}\right]$, *je druhy diferencial*,

$$(u, v) \rightarrow \frac{678}{49}u^2 - \frac{432}{49}vu - \frac{540}{49}v^2 = \frac{678}{49}\left(u - \frac{36}{113}v\right)^2 - \frac{1404}{113}v^2$$

v bode, $\left[x=\frac{1}{2}, y=-1\right]$, *je druhy diferencial*,

$$(u, v) \rightarrow -18u^2 - 12vu - 15v^2 = -18\left(u + \frac{1}{3}v\right)^2 - 13v^2$$

$$\mathit{LocalMin} = [[0, 0]], \mathit{LocalMax} = \left[\left[\frac{1}{2}, -1\right]\right], \mathit{Saddle} = \left[\left[\frac{1}{4}, 0\right], \left[\frac{-8}{49}, \frac{-36}{49}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(2*cos(x)^3+1-cos(x)^2)/(2*sin(x)*cos(x)^2)
```

$$\int \frac{1}{2}\,\frac{2\cos(x)^3 + 1 - \cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{1}{2}\,\frac{1}{\cos(x)}$$

line :=

"PMMAT2|106163|©várová, Jana |zk|ESF M-EKT EKON [sem 2]

zadani pro, "©várová, Jana ", 106163

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte exp(`.2000000000`)*`9.100000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\mathbf{e}^{.2000000000}\sqrt{9.100000000}$$

Reseni:

$$\textit{volime bod}, [0, 9], \textit{funkci}, (x, y) \to \mathbf{e}^{x}\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to \frac{3}{2} + \frac{1}{6}y + 3x - \frac{1}{216}(y-9)^2 + \frac{3}{2}x^2 + \frac{1}{6}x(y-9)$$

$$\textit{Jeho hodnota v bode}, [0.2000000000, 9.100000000], \textit{je}, 3.679953704$$

```
metodou per partes vypoctete integral
 Int(arcsin(x)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arcsin(x)\, x\, dx = \frac{1}{2}x^2 \arcsin(x) - \int \frac{x^2}{2\sqrt{-x^2+1}}\, dx, "=", \frac{1}{2}x^2 \arcsin(x) + \frac{x\sqrt{-x^2+1}}{4} - \frac{1}{4}\arcsin(x)\right]$$

```
Najdete lokalni extremy a sedlove body funkce 1-9*x^2-8*x*y+15*x^3+2*x*y^2
```

$\textit{funkce}, 1 - 9x^2 - 8xy + 15x^3 + 2xy^2, \textit{má gradient},$

$$\begin{bmatrix} -18x - 8y + 45x^2 + 2y^2 \\ -8x + 4xy \end{bmatrix}, \textit{ten je nulový v bodech},$$

$$\left[[x=0, y=0], [x=0, y=4], \left[x = \frac{-4}{15}, y=2\right], \left[x = \frac{2}{3}, y = 2\right]\right]$$

$$\textit{v bode}, [x=0, y=0], \textit{je druhy diferencial},$$

$$(u, v) \to -18u^2 - 16vu = -18\left(u + \frac{4}{9}v\right)^2 + \frac{32}{9}v^2$$

$$v\ bode,\ [x=0,\ y=4],\ je\ druhy\ diferencial,$$

$$(u,v)\to -18\,u^2+16\,v\,u=-18\left(u-\frac{4}{9}v\right)^2+\frac{32}{9}v^2$$

$$v\ bode,\ \left[x=\frac{-4}{15},\ y=2\right],\ je\ druhy\ diferencial,$$

$$(u,v)\to -42\,u^2-\frac{16}{15}v^2=-42\,u^2-\frac{16}{15}v^2$$

$$v\ bode,\ \left[x=\frac{2}{3},\ y=2\right],\ je\ druhy\ diferencial,$$

$$(u,v)\to 42\,u^2+\frac{8}{3}v^2=42\,u^2+\frac{8}{3}v^2$$

$$LocalMin=\left[\left[\frac{2}{3},2\right]\right],\ LocalMax=\left[\left[\frac{-4}{15},2\right]\right],\ Saddle=[[0,0],[0,4]]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+3-3*cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

line :=

"PMMAT2|172008|Tomková, Hana |zk|ESF B-HPS VEK [sem 2]

zadani pro, "Tomková, Hana   ", 172008

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`-.1000000000`)*ln(`.9500000000`)
```

*Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\
zvolenem bode priblizne vypocitejte:*

$$\cos(-.1000000000)\ln(.9500000000)$$

Reseni:

$$volime\ bod,\ [0,1],\ funkci,\ (x,y)\to\cos(x)\ln(y)$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x,y)\to y-1-\frac{1}{2}(y-1)^2$$

$$Jeho\ hodnota\ v\ bode,\ [-0.1000000000,0.9500000000],\ je,\ -0.05125000000$$

```
metodou per partes vypoctete integral
 Int(x*arctan(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int x \arctan(x)\, dx = \frac{1}{2}\arctan(x)\, x^2 - \int \frac{x^2}{2\,(x^2+1)}\, dx, \text{"="}, \qquad \frac{1}{2}\arctan(x)\, x^2 - \frac{x}{2} + \frac{1}{2}\arctan(x)\right]$$

```
Najdete lokalni extremy a sedlove body funkce 13+15*x^2+16*y^2+10*x^3-y^3
```

funkce, $13 + 15\,x^2 + 16\,y^2 + 10\,x^3 - y^3$, *má gradient*, $\begin{bmatrix} 30\,x + 30\,x^2 \\ 32\,y - 3\,y^2 \end{bmatrix}$,

ten je nulový v bodech,

$$\left[[x=0, y=0], \left[x=0, y=\frac{32}{3}\right], [x=-1, y=0], \left[x=-1, y=\frac{32}{3}\right]\right]$$

v bode, $[x=0, y=0]$, *je druhy diferencial*,

$$(u, v) \to 30\,u^2 + 32\,v^2 = 30\,u^2 + 32\,v^2$$

v bode, $\left[x=0, y=\frac{32}{3}\right]$, *je druhy diferencial*,

$$(u, v) \to 30\,u^2 - 32\,v^2 = 30\,u^2 - 32\,v^2$$

v bode, $[x=-1, y=0]$, *je druhy diferencial*,

$$(u, v) \to -30\,u^2 + 32\,v^2 = -30\,u^2 + 32\,v^2$$

v bode, $\left[x=-1, y=\frac{32}{3}\right]$, *je druhy diferencial*,

$$(u, v) \to -30\,u^2 - 32\,v^2 = -30\,u^2 - 32\,v^2$$

$$LocalMin = [[0, 0]],\ LocalMax = \left[\left[-1, \frac{32}{3}\right]\right],\ Saddle = \left[\left[0, \frac{32}{3}\right], [-1, 0]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(cos(x)^3+1-cos(x)^2)/(sin(x)*cos(x)^2)
```

$$\int \frac{\cos(x)^3 + 1 - \cos(x)^2}{\sin(x)\cos(x)^2}\, dx = \ln(\sin(x)) + \frac{1}{\cos(x)}$$

line :=

"PMMAT2|171930|Turcsányi, Richard |zk|ESF B-EKM POH [sem 2]

zadani pro, "Turcsányi, Richard ", 171930

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`.9000000000`)*`.9500000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne
zvolenem bode priblizne vypocitejte:

$$\ln(.9000000000)\sqrt{.9500000000}$$

Reseni:

$$volime\ bod, [1, 1], funkci, (x, y) \to \ln(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to x - 1 + \frac{1}{2}(x-1)(y-1) - \frac{1}{2}(x-1)^2$$

$$Jeho\ hodnota\ v\ bode, [0.9000000000, 0.9500000000], \ je, -0.1025000000$$

```
metodou per partes vypoctete integral
 Int(ln(x)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \ln(x)\, x\, dx = \frac{1}{2}x^2 \ln(x) - \int \frac{x}{2}\, dx, "=", \frac{1}{2}x^2\ln(x) - \frac{x^2}{4}\right]$$

```
Najdete lokalni extremy a sedlove body funkce -10-9*y-9*x^2+11*y^2-9*x^3-x^4
```

$funkce, -10 - 9y - 9x^2 + 11y^2 - 9x^3 - x^4, má\ gradient,$

$$\begin{bmatrix} -18x - 27x^2 - 4x^3 \\ -9 + 22y \end{bmatrix}, ten\ je\ nulový\ v\ bodech,$$

$$\left[\left[x = 0, y = \frac{9}{22}\right], \left[x = -6, y = \frac{9}{22}\right], \left[x = \frac{-3}{4}, y = \frac{9}{22}\right]\right]$$

$$v\ bode, \left[x = 0, y = \frac{9}{22}\right], je\ druhy\ diferencial,$$

$$(u, v) \to -18u^2 + 22v^2 = -18u^2 + 22v^2$$

$$v\ bode, \left[x = -6, y = \frac{9}{22}\right], je\ druhy\ diferencial,$$

$$(u, v) \to -126u^2 + 22v^2 = -126u^2 + 22v^2$$

$$v\ bode, \left[x = \frac{-3}{4}, y = \frac{9}{22}\right], je\ druhy\ diferencial,$$

$$(u, v) \to \frac{63}{4}u^2 + 22v^2 = \frac{63}{4}u^2 + 22v^2$$

$$LocalMin = \left[\left[\frac{-3}{4}, \frac{9}{22}\right]\right], LocalMax = [\ ], Saddle = \left[\left[0, \frac{9}{22}\right], \left[-6, \frac{9}{22}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(cos(x)^3+1-cos(x)^2)/(sin(x)*cos(x)^2)
```

$$\int \frac{\cos(x)^3 + 1 - \cos(x)^2}{\sin(x)\cos(x)^2}\, dx = \ln(\sin(x)) + \frac{1}{\cos(x)}$$

line := "PMMAT2|171975|Turková, Lenka |zk|ESF B-HPS RRS [sem 2]

zadani pro, "Turková, Lenka ", 171975

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`.2000000000`)*`4.100000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\cos(.2000000000)\sqrt{4.100000000}$$

Reseni:

$$\textit{volime bod}, [0, 4], \textit{funkci}, (x, y) \to \cos(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to 1 + \frac{1}{4}y - \frac{1}{64}(y-4)^2 - x^2$$

$$\textit{Jeho hodnota v bode}, [0.2000000000, 4.100000000], \textit{ je}, 1.984843750$$

```
metodou per partes vypoctete integral
 Int(x*arctan(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int x \arctan(x)\, dx = \frac{1}{2}\arctan(x)\, x^2 - \int \frac{x^2}{2\,(x^2+1)}\, dx, \text{"="}, \quad \frac{1}{2}\arctan(x)\, x^2 - \frac{x}{2} + \frac{1}{2}\arctan(x)\right]$$

```
Najdete lokalni extremy a sedlove body funkce -9+3*x^2+2*y^2+x^3+15*y^3
```

$$\textit{funkce}, -9 + 3x^2 + 2y^2 + x^3 + 15y^3, \textit{má gradient}, \begin{bmatrix} 6x + 3x^2 \\ 4y + 45y^2 \end{bmatrix},$$

ten je nulový v bodech,

$$\left[[x=0, y=0], [x=-2, y=0], \left[x=0, y=\frac{-4}{45}\right], \left[x=-2, y=\frac{-4}{45}\right]\right]$$

$$\textit{v bode}, [x=0, y=0], \textit{je druhy diferencial},$$

$$(u, v) \to 6u^2 + 4v^2 = 6u^2 + 4v^2$$

$$\textit{v bode}, [x=-2, y=0], \textit{je druhy diferencial},$$

$$(u, v) \to -6u^2 + 4v^2 = -6u^2 + 4v^2$$

$$\textit{v bode}, \left[x=0, y=\frac{-4}{45}\right], \textit{je druhy diferencial},$$

$$(u, v) \to 6u^2 - 4v^2 = 6u^2 - 4v^2$$

$$\textit{v bode}, \left[x=-2, y=\frac{-4}{45}\right], \textit{je druhy diferencial},$$

$$(u, v) \to -6u^2 - 4v^2 = -6u^2 - 4v^2$$

$$\mathit{LocalMin} = [[0, 0]], \mathit{LocalMax} = \left[\left[-2, \frac{-4}{45}\right]\right], \mathit{Saddle} = \left[[-2, 0], \left[0, \frac{-4}{45}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+3-3*cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

line := "PMMAT2| 65353|Valentová, Jitka |zk|ESF M-HPS VEK [sem 4]

zadani pro, "Valentová, Jitka ", 65353

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`.2000000000`)*exp(`.1000000000`)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\cos(.2000000000)\, \mathrm{e}^{.1000000000}$$

Reseni:

volime bod, $[0, 0]$, *funkci*, $(x, y) \to \cos(x)\, \mathbf{e}^y$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to 1 + y + \frac{1}{2} y^2 - \frac{1}{2} x^2$$

Jeho hodnota v bode, $[0.2000000000, 0.1000000000]$, *je*, 1.085000000

```
metodou per partes vypoctete integral
 Int(arcsin(x)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arcsin(x)\, x\, dx = \frac{1}{2} x^2 \arcsin(x) - \int \frac{x^2}{2\sqrt{-x^2+1}}\, dx, \text{"="}, \frac{1}{2} x^2 \arcsin(x) + \frac{x\sqrt{-x^2+1}}{4} - \frac{1}{4}\arcsin(x)\right]$$

```
Najdete lokalni extremy a sedlove body funkce -2+3*x^2+6*y^2+7*x^3-9*x^2*y-
7*y^3
```

funkce, $-2 + 3x^2 + 6y^2 + 7x^3 - 9x^2 y - 7y^3$, *má gradient*,

$\begin{bmatrix} 6x + 21x^2 - 18xy \\ 12y - 9x^2 - 21y^2 \end{bmatrix}$, *ten je nulový v bodech*,

$$\left[[x = 0, y = 0], \left[x = 0, y = \frac{4}{7}\right], \left[x = \frac{-10}{41}, y = \frac{2}{41}\right], \left[x = \frac{2}{11}, y = \frac{6}{11}\right]\right]$$

$$v\ bode, [x=0, y=0], je\ druhy\ diferencial,$$
$$(u, v) \to 6u^2 + 12v^2 = 6u^2 + 12v^2$$

$$v\ bode, \left[x=0, y=\frac{4}{7}\right], je\ druhy\ diferencial,$$
$$(u, v) \to -\frac{30}{7}u^2 - 12v^2 = -\frac{30}{7}u^2 - 12v^2$$

$$v\ bode, \left[x=\frac{-10}{41}, y=\frac{2}{41}\right], je\ druhy\ diferencial,$$
$$(u, v) \to -\frac{210}{41}u^2 + \frac{360}{41}v\,u + \frac{408}{41}v^2 = -\frac{210}{41}\left(u-\frac{6}{7}v\right)^2 + \frac{96}{7}v^2$$

$$v\ bode, \left[x=\frac{2}{11}, y=\frac{6}{11}\right], je\ druhy\ diferencial,$$
$$(u, v) \to \frac{42}{11}u^2 - \frac{72}{11}v\,u - \frac{120}{11}v^2 = \frac{42}{11}\left(u-\frac{6}{7}v\right)^2 - \frac{96}{7}v^2$$

$$LocalMin = [[0, 0]], LocalMax = \left[\left[0, \frac{4}{7}\right]\right], Saddle = \left[\left[\frac{-10}{41}, \frac{2}{41}\right], \left[\frac{2}{11}, \frac{6}{11}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3-3*cos(x)^2+3)/(4*sin(x)*cos(x)^2)
```

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

line :=

"PMMAT2|171857|Valentová, Lenka |zk|ESF B-EKM POH [sem 2]

zadani pro, "Valentová, Lenka ", 171857

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`1.200000000`)*exp(`.1000000000`)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\ln(1.200000000)\,e^{.1000000000}$$

Reseni:

$$volime\ bod, [1, 0], funkci, (x, y) \to \ln(x)\,e^y$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to x - 1 + (x-1)\,y - \frac{1}{2}(x-1)^2$$

$$Jeho\ hodnota\ v\ bode, [1.200000000, 0.1000000000], je, 0.2000000000$$

metodou per partes vypoctete integral
 Int(ln(x),x)
,x na konci zadani ctete jako dx

$$[\int \ln(x)\,dx = \ln(x)\,x - \int 1\,dx, "=", \ln(x)\,x - x]$$

Najdete lokalni extremy a sedlove body funkce
11+10*x^2+9*x*y+5*y^2+17*x^3+17*x^2*y

$$\mathit{funkce}, 11 + 10x^2 + 9xy + 5y^2 + 17x^3 + 17x^2y, \mathit{má\ gradient},$$

$$\begin{bmatrix} 20x + 9y + 51x^2 + 34xy \\ 9x + 10y + 17x^2 \end{bmatrix}, \mathit{ten\ je\ nulový\ v\ bodech},$$

$$\left[[x = 0, y = 0], \left[x = \frac{-7}{17}, y = \frac{7}{85}\right], \left[x = \frac{1}{2}, y = \frac{-7}{8}\right]\right]$$

$$\mathit{v\ bode}, [x = 0, y = 0], \mathit{je\ druhy\ diferencial},$$

$$(u, v) \to 20u^2 + 18vu + 10v^2 = 20\left(u + \frac{9}{20}v\right)^2 + \frac{119}{20}v^2$$

$$\mathit{v\ bode}, \left[x = \frac{-7}{17}, y = \frac{7}{85}\right], \mathit{je\ druhy\ diferencial},$$

$$(u, v) \to -\frac{96}{5}u^2 - 10vu + 10v^2 = -\frac{96}{5}\left(u + \frac{25}{96}v\right)^2 + \frac{1085}{96}v^2$$

$$\mathit{v\ bode}, \left[x = \frac{1}{2}, y = \frac{-7}{8}\right], \mathit{je\ druhy\ diferencial},$$

$$(u, v) \to \frac{165}{4}u^2 + 52vu + 10v^2 = \frac{165}{4}\left(u + \frac{104}{165}v\right)^2 - \frac{1054}{165}v^2$$

$$\mathit{LocalMin} = [[0, 0]], \mathit{LocalMax} = [\ ], \mathit{Saddle} = \left[\left[\frac{-7}{17}, \frac{7}{85}\right], \left[\frac{1}{2}, \frac{-7}{8}\right]\right]$$

Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+3-3*cos(x)^2)/(4*sin(x)*cos(x)^2)

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

line := "PMMAT2|174790|Váòa, Vladislav |zk|ESF M-HPS FP [sem 2]

zadani pro, "Váòa, Vladislav   ", 174790

aaa

Priklad:

Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem bode priblizne vypocitejte exp(`-.1000000000`)*`3.950000000`^(1/2)

*Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\
zvolenem bode priblizne vypocitejte:*

$$e^{-.1000000000}\sqrt{3.950000000}$$

Reseni:

$$\textit{volime bod}, [0, 4], \textit{funkci}, (x, y) \rightarrow e^{x}\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \rightarrow 1 + \frac{1}{4}y + 2x - \frac{1}{64}(y-4)^2 + x^2 + \frac{1}{4}x(y-4)$$

$$\textit{Jeho hodnota v bode}, [-0.1000000000, 3.950000000], \ \textit{je}, 1.798710938$$

```
metodou per partes vypoctete integral
 Int(ln(x)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \ln(x)\,x\,dx = \frac{1}{2}x^2\ln(x) - \int \frac{x}{2}\,dx, "=", \frac{1}{2}x^2\ln(x) - \frac{x^2}{4}\right]$$

```
Najdete lokalni extremy a sedlove body funkce 3*x-11*x^2+16*x*y+13*x*y^2
```

$$\textit{funkce}, 3x - 11x^2 + 16xy + 13xy^2, \textit{má gradient}, \begin{bmatrix} 3 - 22x + 16y + 13y^2 \\ 16x + 26xy \end{bmatrix},$$

ten je nulový v bodech,

$$\left[\left[x = \frac{-25}{286}, y = \frac{-8}{13}\right], [x = 0, y = -1], \left[x = 0, y = \frac{-3}{13}\right]\right]$$

$$\textit{v bode}, \left[x = \frac{-25}{286}, y = \frac{-8}{13}\right], \textit{je druhy diferencial},$$

$$(u, v) \rightarrow -22u^2 - \frac{25}{11}v^2 = -22u^2 - \frac{25}{11}v^2$$

$$\textit{v bode}, [x = 0, y = -1], \textit{je druhy diferencial},$$

$$(u, v) \rightarrow -22u^2 - 20vu = -22\left(u + \frac{5}{11}v\right)^2 + \frac{50}{11}v^2$$

$$\textit{v bode}, \left[x = 0, y = \frac{-3}{13}\right], \textit{je druhy diferencial},$$

$$(u, v) \rightarrow -22u^2 + 20vu = -22\left(u - \frac{5}{11}v\right)^2 + \frac{50}{11}v^2$$

$$\textit{LocalMin} = [\ ], \textit{LocalMax} = \left[\left[\frac{-25}{286}, \frac{-8}{13}\right]\right], \textit{Saddle} = \left[[0, -1], \left[0, \frac{-3}{13}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(cos(x)^3+1-cos(x)^2)/(sin(x)*cos(x)^2)
```

$$\int \frac{\cos(x)^3 + 1 - \cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{1}{\cos(x)}$$

line :=

"PMMAT2|174973|Vdovec, Milan |zk|ESF M-EKM POH [sem 2]

zadani pro, "Vdovec, Milan ", 174973

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`.2000000000`)*exp(`.1000000000`)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\cos(.2000000000)\, \mathrm{e}^{.1000000000}$$

Reseni:

volime bod, $[0, 0]$, *funkci*, $(x, y) \to \cos(x)\, \mathrm{e}^{y}$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to 1 + y + \frac{1}{2} y^2 - \frac{1}{2} x^2$$

Jeho hodnota v bode, $[0.2000000000, 0.1000000000]$, *je*, 1.085000000

```
metodou per partes vypoctete integral
 Int(arctan(x^2),x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arctan(x^2)\, dx = \arctan(x^2)\, x - \int \frac{2\, x^2}{x^4 + 1}\, dx, \text{"="}, \arctan(x^2)\, x \quad - \frac{1}{2}\sqrt{2}\, \arctan(x\sqrt{2} - 1) - \frac{1}{4}\sqrt{2}\, \ln\left(\frac{x^2 - x\sqrt{2} + 1}{x^2 + x\sqrt{2} + 1}\right) - \frac{1}{2}\sqrt{2}\, \arctan(x\sqrt{2} + 1)\right]$$

```
Najdete lokalni extremy a sedlove body funkce -6+5*x^2-8*y^2+11*x^3-3*y^3
```

funkce, $-6 + 5\, x^2 - 8\, y^2 + 11\, x^3 - 3\, y^3$, *má gradient*, $\begin{bmatrix} 10\, x + 33\, x^2 \\ -16\, y - 9\, y^2 \end{bmatrix}$,

ten je nulový v bodech,

$$\left[[x = 0, y = 0], \left[x = 0, y = \frac{-16}{9}\right], \left[x = \frac{-10}{33}, y = 0\right], \left[x = \frac{-10}{33}, y = \frac{-16}{9}\right]\right]$$

v bode, $[x = 0, y = 0]$, *je druhy diferencial*,

$$(u, v) \to 10\, u^2 - 16\, v^2 = 10\, u^2 - 16\, v^2$$

v bode, $\left[x = 0, y = \frac{-16}{9}\right]$, *je druhy diferencial*,

$$(u, v) \to 10\, u^2 + 16\, v^2 = 10\, u^2 + 16\, v^2$$

$$v\ bode, \left[x = \frac{-10}{33}, y = 0 \right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow -10\,u^2 - 16\,v^2 = -10\,u^2 - 16\,v^2$$

$$v\ bode, \left[x = \frac{-10}{33}, y = \frac{-16}{9} \right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow -10\,u^2 + 16\,v^2 = -10\,u^2 + 16\,v^2$$

$$LocalMin = \left[\left[0, \frac{-16}{9} \right] \right], LocalMax = \left[\left[\frac{-10}{33}, 0 \right] \right],$$

$$Saddle = \left[[0, 0], \left[\frac{-10}{33}, \frac{-16}{9} \right] \right]$$

```
Vyjdrete jako elementarni funkci integral z
(cos(x)^3+1-cos(x)^2)/(sin(x)*cos(x)^2)
```

$$\int \frac{\cos(x)^3 + 1 - \cos(x)^2}{\sin(x)\cos(x)^2}\, dx = \ln(\sin(x)) + \frac{1}{\cos(x)}$$

line := "PMMAT2|106541|Vegrichtová, Marta |zk|ESF M-HPS FP [sem 2]

zadani pro, "Vegrichtová, Marta ", 106541

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`1.200000000`)*exp(`.1000000000`)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne

zvolenem bode priblizne vypocitejte:

$$\ln(1.200000000)\, \mathrm{e}^{.1000000000}$$

Reseni:

$$volime\ bod, [1, 0], funkci, (x, y) \rightarrow \ln(x)\, \mathrm{e}^y$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \rightarrow x - 1 + (x - 1)\, y - \frac{1}{2}(x - 1)^2$$

$$Jeho\ hodnota\ v\ bode, [1.200000000, 0.1000000000], je, 0.2000000000$$

```
metodou per partes vypoctete integral
 Int(arcsin(x),x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arcsin(x)\, dx = \arcsin(x)\, x - \int \frac{x}{\sqrt{-x^2 + 1}}\, dx, "=", \arcsin(x)\, x + \sqrt{-x^2 + 1} \right]$$

```
Najdete lokalni extremy a sedlove body funkce 7+14*x^2-6*x*y+y^2+5*x*y^2
```

$$funkce,\ 7+14x^2-6xy+y^2+5xy^2,\ má\ gradient,\ \begin{bmatrix} 28x-6y+5y^2 \\ -6x+2y+10xy \end{bmatrix},$$

$$ten\ je\ nulový\ v\ bodech,\ \left[[x=0,y=0], \left[x=\frac{-1}{20}, y=\frac{-1}{5}\right], \left[x=\frac{-2}{7}, y=2\right]\right]$$

$$v\ bode,\ [x=0,y=0],\ je\ druhy\ diferencial,$$

$$(u,v)\to 28u^2-12vu+2v^2=28\left(u-\frac{3}{14}v\right)^2+\frac{5}{7}v^2$$

$$v\ bode,\ \left[x=\frac{-1}{20}, y=\frac{-1}{5}\right],\ je\ druhy\ diferencial,$$

$$(u,v)\to 28u^2-16vu+\frac{3}{2}v^2=28\left(u-\frac{2}{7}v\right)^2-\frac{11}{14}v^2$$

$$v\ bode,\ \left[x=\frac{-2}{7}, y=2\right],\ je\ druhy\ diferencial,$$

$$(u,v)\to 28u^2+28vu-\frac{6}{7}v^2=28\left(u+\frac{1}{2}v\right)^2-\frac{55}{7}v^2$$

$$LocalMin=[[0,0]],\ LocalMax=[\ ],\ Saddle=\left[\left[\frac{-1}{20},\frac{-1}{5}\right],\left[\frac{-2}{7},2\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(2*cos(x)^3+3-3*cos(x)^2)/(2*sin(x)*cos(x)^2)
```

$$\int \frac{1}{2}\,\frac{2\cos(x)^3+3-3\cos(x)^2}{\sin(x)\cos(x)^2}\,dx=\ln(\sin(x))+\frac{3}{2}\,\frac{1}{\cos(x)}$$

line := "PMMAT2|171976|Virglová, Lucie |zk|ESF B-EKM POH [sem 2]

zadani pro, "Virglová, Lucie ", 171976

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte cos(`-.1000000000`)*`8.950000000`^(1/2)
```

*Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\
zvolenem bode priblizne vypocitejte:*

$$\cos(-.1000000000)\sqrt{8.950000000}$$

Reseni:

$$volime\ bod,\ [0,9],\ funkci,\ (x,y)\to\cos(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x,y)\to\frac{3}{2}+\frac{1}{6}y-\frac{1}{216}(y-9)^2-\frac{3}{2}x^2$$

$$\textit{Jeho hodnota v bode}, [-0.1000000000, 8.950000000], \textit{ je}, 2.976655093$$

```
metodou per partes vypoctete integral
 Int(arcsin(x)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arcsin(x)\, x\, dx = \frac{1}{2} x^2 \arcsin(x) - \int \frac{x^2}{2\sqrt{-x^2+1}}\, dx, "=", \frac{1}{2} x^2 \arcsin(x) + \frac{x\sqrt{-x^2+1}}{4} - \frac{1}{4}\arcsin(x)\right]$$

```
Najdete lokalni extremy a sedlove body funkce 4-11*x^2+12*y^2+16*x^3+5*y^3
```

$$\textit{funkce}, 4 - 11\, x^2 + 12\, y^2 + 16\, x^3 + 5\, y^3, \textit{má gradient}, \begin{bmatrix} -22\, x + 48\, x^2 \\ 24\, y + 15\, y^2 \end{bmatrix},$$

$$\textit{ten je nulový v bodech},$$

$$\left[[x=0, y=0], \left[x=0, y=\frac{-8}{5}\right], \left[x=\frac{11}{24}, y=0\right], \left[x=\frac{11}{24}, y=\frac{-8}{5}\right]\right]$$

$$\textit{v bode}, [x=0, y=0], \textit{je druhy diferencial},$$

$$(u, v) \to -22\, u^2 + 24\, v^2 = -22\, u^2 + 24\, v^2$$

$$\textit{v bode}, \left[x=0, y=\frac{-8}{5}\right], \textit{je druhy diferencial},$$

$$(u, v) \to -22\, u^2 - 24\, v^2 = -22\, u^2 - 24\, v^2$$

$$\textit{v bode}, \left[x=\frac{11}{24}, y=0\right], \textit{je druhy diferencial},$$

$$(u, v) \to 22\, u^2 + 24\, v^2 = 22\, u^2 + 24\, v^2$$

$$\textit{v bode}, \left[x=\frac{11}{24}, y=\frac{-8}{5}\right], \textit{je druhy diferencial},$$

$$(u, v) \to 22\, u^2 - 24\, v^2 = 22\, u^2 - 24\, v^2$$

$$\textit{LocalMin} = \left[\left[\frac{11}{24}, 0\right]\right], \textit{LocalMax} = \left[\left[0, \frac{-8}{5}\right]\right], \textit{Saddle} = \left[[0, 0], \left[\frac{11}{24}, \frac{-8}{5}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(cos(x)^3+2-2*cos(x)^2)/(sin(x)*cos(x)^2)
```

$$\int \frac{\cos(x)^3 + 2 - 2\cos(x)^2}{\sin(x)\cos(x)^2}\, dx = \ln(\sin(x)) + \frac{2}{\cos(x)}$$

line := "PMMAT2|174214|Vojtì¹ková, Ludmila |zk|ESF M-EKM POH [M
em 2]"

zadani pro, "Vojtì¹ková, Ludmila ", 174214

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte exp(`-.1000000000`)*`3.950000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\mathrm{e}^{-.1000000000}\sqrt{3.950000000}$$

Reseni:

$$\textit{volime bod}, [0, 4], \textit{funkci}, (x, y) \to \mathrm{e}^x \sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to 1 + \frac{1}{4}y + 2x - \frac{1}{64}(y-4)^2 + x^2 + \frac{1}{4}x(y-4)$$

$$\textit{Jeho hodnota v bode}, [-0.1000000000, 3.950000000], \textit{ je}, 1.798710938$$

```
metodou per partes vypoctete integral
 Int(arctan(x^2),x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arctan(x^2)\,dx = \arctan(x^2)\,x - \int \frac{2x^2}{x^4+1}\,dx, "=", \arctan(x^2)\,x - \frac{1}{2}\sqrt{2}\arctan(x\sqrt{2}-1) - \frac{1}{4}\sqrt{2}\ln\left(\frac{x^2 - x\sqrt{2}+1}{x^2+x\sqrt{2}+1}\right) - \frac{1}{2}\sqrt{2}\arctan(x\sqrt{2}+1)\right]$$

```
Najdete lokalni extremy a sedlove body funkce 16-9*x^2-3*x*y-2*y^2-9*x*y^2-
8*y^3
```

$$\textit{funkce}, 16 - 9x^2 - 3xy - 2y^2 - 9xy^2 - 8y^3, \textit{má gradient},$$

$$\begin{bmatrix} -18x - 3y - 9y^2 \\ -3x - 4y - 18xy - 24y^2 \end{bmatrix}, \textit{ten je nulový v bodech},$$

$$\left[[x=0, y=0], \left[x = \frac{1}{72}, y = \frac{-1}{6}\right], \left[x = \frac{-28}{9}, y = \frac{7}{3}\right]\right]$$

$$\textit{v bode}, [x=0, y=0], \textit{je druhy diferencial},$$

$$(u, v) \to -18u^2 - 6vu - 4v^2 = -18\left(u + \frac{1}{6}v\right)^2 - \frac{7}{2}v^2$$

$$\textit{v bode}, \left[x = \frac{1}{72}, y = \frac{-1}{6}\right], \textit{je druhy diferencial},$$

$$(u, v) \to -18u^2 + \frac{15}{4}v^2 = -18u^2 + \frac{15}{4}v^2$$

$$v\ bode, \left[x=\frac{-28}{9}, y=\frac{7}{3}\right], je\ druhy\ diferencial,$$

$$(u,v) \to -18\,u^2 - 90\,v\,u - 60\,v^2 = -18\left(u+\frac{5}{2}v\right)^2 + \frac{105}{2}v^2$$

$$LocalMin = [\ ], LocalMax = [[0,0]], Saddle = \left[\left[\frac{1}{72}, \frac{-1}{6}\right], \left[\frac{-28}{9}, \frac{7}{3}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(2*cos(x)^3+1-cos(x)^2)/(2*sin(x)*cos(x)^2)
```

$$\int \frac{1}{2}\,\frac{2\cos(x)^3+1-\cos(x)^2}{\sin(x)\cos(x)^2}\,dx = \ln(\sin(x)) + \frac{1}{2}\,\frac{1}{\cos(x)}$$

line := "PMMAT2|172170|Vravko, Matej |zk|ESF B-HPS RRS [sem 2]

zadani pro, "Vravko, Matej ", 172170

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`.9000000000`)*`.9500000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\ln(.9000000000)\sqrt{.9500000000}$$

Reseni:

$$volime\ bod, [1,1], funkci, (x,y) \to \ln(x)\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x,y) \to x - 1 + \frac{1}{2}(x-1)(y-1) - \frac{1}{2}(x-1)^2$$

Jeho hodnota v bode, [0.9000000000, 0.9500000000], *je*, -0.1025000000

```
metodou per partes vypoctete integral
 Int(sin(x)*x,x)
,x na konci zadani ctete jako dx
```

$$[\int \sin(x)\,x\,dx = -x\cos(x) - \int -\cos(x)\,dx, "=", \sin(x) - x\cos(x)]$$

```
Najdete lokalni extremy a sedlove body funkce
5+10*x^2+10*x*y+12*y^2+4*x^3+6*x^2*y
```

$funkce, 5+10x^2+10xy+12y^2+4x^3+6x^2y, má\ gradient,$

$$\begin{bmatrix} 20x+10y+12x^2+12xy \\ 10x+24y+6x^2 \end{bmatrix}, ten\ je\ nulový\ v\ bodech,$$

$$\left[[x=0, y=0], \left[x=\frac{-5}{3}, y=0\right], \left[x=\frac{19}{6}, y=\frac{-551}{144}\right]\right]$$

$$v\ bode, [x=0, y=0], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow 20u^2+20vu+24v^2 = 20\left(u+\frac{1}{2}v\right)^2+19v^2$$

$$v\ bode, \left[x=\frac{-5}{3}, y=0\right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow -20u^2-20vu+24v^2 = -20\left(u+\frac{1}{2}v\right)^2+29v^2$$

$$v\ bode, \left[x=\frac{19}{6}, y=\frac{-551}{144}\right], je\ druhy\ diferencial,$$

$$(u, v) \rightarrow \frac{601}{12}u^2+96vu+24v^2 = \frac{601}{12}\left(u+\frac{576}{601}v\right)^2-\frac{13224}{601}v^2$$

$$LocalMin=[[0, 0]], LocalMax=[\ ], Saddle=\left[\left[\frac{-5}{3}, 0\right], \left[\frac{19}{6}, \frac{-551}{144}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+3-3*cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

line := "PMMAT2|171839|Zlato¹, Michal |zk|ESF B-EKM POH [sem 2]

zadani pro, "Zlato¹, Michal ", 171839

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte exp(`.2000000000`)*`9.100000000`^(1/2)
```

*Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\
zvolenem bode priblizne vypocitejte:*

$$e^{.2000000000}\sqrt{9.100000000}$$

Reseni:

$$volime\ bod, [0, 9], funkci, (x, y) \rightarrow e^x\sqrt{y}$$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to \frac{3}{2} + \frac{1}{6} y + 3x - \frac{1}{216}(y-9)^2 + \frac{3}{2}x^2 + \frac{1}{6}x(y-9)$$

Jeho hodnota v bode, [0.2000000000, 9.100000000], *je*, 3.679953704

```
metodou per partes vypoctete integral
 Int(x*cos(x),x)
,x na konci zadani ctete jako dx
```

$$[\int x\cos(x)\,dx = \sin(x)\,x - \int \sin(x)\,dx, \text{"="}, \cos(x) + \sin(x)\,x]$$

```
Najdete lokalni extremy a sedlove body funkce -9+3*x^2+2*y^2+x^3+15*y^3
```

funkce, $-9 + 3x^2 + 2y^2 + x^3 + 15y^3$, *má gradient*, $\begin{bmatrix} 6x + 3x^2 \\ 4y + 45y^2 \end{bmatrix}$,

ten je nulový v bodech,

$$\left[[x=0, y=0], [x=-2, y=0], \left[x=0, y=\frac{-4}{45}\right], \left[x=-2, y=\frac{-4}{45}\right]\right]$$

v bode, $[x=0, y=0]$, *je druhy diferencial*,

$$(u, v) \to 6u^2 + 4v^2 = 6u^2 + 4v^2$$

v bode, $[x=-2, y=0]$, *je druhy diferencial*,

$$(u, v) \to -6u^2 + 4v^2 = -6u^2 + 4v^2$$

v bode, $\left[x=0, y=\frac{-4}{45}\right]$, *je druhy diferencial*,

$$(u, v) \to 6u^2 - 4v^2 = 6u^2 - 4v^2$$

v bode, $\left[x=-2, y=\frac{-4}{45}\right]$, *je druhy diferencial*,

$$(u, v) \to -6u^2 - 4v^2 = -6u^2 - 4v^2$$

$$LocalMin = [[0, 0]], LocalMax = \left[\left[-2, \frac{-4}{45}\right]\right], Saddle = \left[[-2, 0], \left[0, \frac{-4}{45}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(4*cos(x)^3+3-3*cos(x)^2)/(4*sin(x)*cos(x)^2)
```

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

line := "PMMAT2|174990|Zubatý, Adam |zk|ESF M-HPS FP [sem 2]"

zadani pro, "Zubatý, Adam ", 174990

aaa

Priklad:

```
Pomoci taylorova polynomu stupne 2 ve vhodne zvolene funkce ve vhodne zvolenem
bode priblizne vypocitejte ln(`.9000000000`)*`.9500000000`^(1/2)
```

Pomoci taylorova polynomu stupne 2 vhodne zvolene funkce ve vhodne\ zvolenem bode priblizne vypocitejte:

$$\ln(.9000000000)\sqrt{.9500000000}$$

Reseni:

volime bod, $[1, 1]$, *funkci*, $(x, y) \to \ln(x)\sqrt{y}$

Tayloruv polynom zvolene funkce v bode (1,0) je polynom,

$$(x, y) \to x - 1 + \frac{1}{2}(x-1)(y-1) - \frac{1}{2}(x-1)^2$$

Jeho hodnota v bode, $[0.9000000000, 0.9500000000]$, *je*, -0.1025000000

```
metodou per partes vypoctete integral
 Int(arcsin(x)*x,x)
,x na konci zadani ctete jako dx
```

$$\left[\int \arcsin(x)\, x\, dx = \frac{1}{2}x^2 \arcsin(x) - \int \frac{x^2}{2\sqrt{-x^2+1}}\, dx, \text{"="}, \frac{1}{2}x^2 \arcsin(x) + \frac{x\sqrt{-x^2+1}}{4} - \frac{1}{4}\arcsin(x)\right]$$

```
Najdete lokalni extremy a sedlove body funkce -10-9*y-9*x^2+11*y^2-9*x^3-x^4
```

funkce, $-10 - 9y - 9x^2 + 11y^2 - 9x^3 - x^4$, *má gradient*,

$\begin{bmatrix} -18x - 27x^2 - 4x^3 \\ -9 + 22y \end{bmatrix}$, *ten je nulový v bodech*,

$$\left[\left[x = 0, y = \frac{9}{22}\right], \left[x = -6, y = \frac{9}{22}\right], \left[x = \frac{-3}{4}, y = \frac{9}{22}\right]\right]$$

v bode, $\left[x = 0, y = \frac{9}{22}\right]$, *je druhy diferencial*,

$$(u, v) \to -18u^2 + 22v^2 = -18u^2 + 22v^2$$

v bode, $\left[x = -6, y = \frac{9}{22}\right]$, *je druhy diferencial*,

$$(u, v) \to -126u^2 + 22v^2 = -126u^2 + 22v^2$$

v bode, $\left[x = \frac{-3}{4}, y = \frac{9}{22}\right]$, *je druhy diferencial*,

$$(u, v) \to \frac{63}{4}u^2 + 22v^2 = \frac{63}{4}u^2 + 22v^2$$

$$LocalMin = \left[\left[\frac{-3}{4}, \frac{9}{22}\right]\right], LocalMax = [\ ], Saddle = \left[\left[0, \frac{9}{22}\right], \left[-6, \frac{9}{22}\right]\right]$$

```
Vyjdrete jako elementarni funkci integral z
(cos(x)^3+1-cos(x)^2)/(sin(x)*cos(x)^2)
```

$$\int \frac{\cos(x)^3 + 1 - \cos(x)^2}{\sin(x)\cos(x)^2}\, dx = \ln(\sin(x)) + \frac{1}{\cos(x)}$$

$$line := 0$$