4. cvičení

Metodou Jacobiánu určete extrémy funkce F na dané množině.

$\boxed{\mathbf{1}}$ $F(x,y) = 2x - y + 1,\ x^2 + y^2 = 5$

$\boxed{\mathbf{2}}$ $F(x,y) = e^{xy},\ x^2 + y^2 = 8$

$\boxed{\mathbf{3}}$ $F(x,y) = x - \sqrt{3}y + 1,\ x^2 + y^2 = 4$

$\boxed{\mathbf{4}}$ $F(x,y) = x^2 - 2y^2,\ 4x^2 + y^2 = 4$

$\boxed{\mathbf{5}}$ $F(x,y) = 3xy,\ x^4 + y^4 = 32$

$\boxed{\mathbf{6}}$ $F(x,y) = (x-y)^6,\ x^2 + 4y^2 = 20$

$\boxed{\mathbf{7}}$ $F(x,y) = (x-y)^7,\ x^2 + 4y^2 = 20$

$\boxed{\mathbf{8}}$ $F(x,y) = \operatorname{arctg}(xy),\ x^4 + x^2y^2 + y^4 = 3$

$\boxed{\mathbf{9}}$ $F(x,y) = x^2 + 2y^2,\ x^3 - y^3 = 27$

$\boxed{\mathbf{10}}$ $F(x,y) = 5 - x^2 - y^2,\ x^4 - y^4 = 1$

$\boxed{\mathbf{11}}$ $F(x,y) = x^2y^2,\ x^5 + y^5 = 2$

$\boxed{\mathbf{12}}$ $F(x,y) = xy,\ x^5 + y^5 = 2$

$\boxed{\mathbf{13}}$ $F(x,y) = \operatorname{arctg}(xy),\ x^3 + y^3 = 2$

$\boxed{\mathbf{14}}$ $F(x,y) = \operatorname{arctg}(xy),\ x^3 - y^3 = 2$

Výsledky: $\boxed{\mathbf{1}}$ min $= F(-2,1) = -4$, max $= F(2,-1) = 6$; $\boxed{\mathbf{2}}$ min $= F(2,-2) = F(-2,2) = e^{-4}$, max $= F(2,2) = F(-2,-2) = e^4$; $\boxed{\mathbf{3}}$ min $= F(-1,\sqrt{3}) = -3$, max $= F(1,-\sqrt{3}) = 5$; $\boxed{\mathbf{4}}$ min $= F(0,2) = F(0,-2) = -8$, max $= F(1,0) = (-1,0) = 1$; $\boxed{\mathbf{5}}$ min $= F(2,-2) = F(-2,2) = -12$, max $= F(2,2) = F(-2,-2) = 12$; $\boxed{\mathbf{6}}$ min $= F(2,2) = F(-2,-2) = 0$, max $= F(-4,1) = F(4,-1) = 5^6$; $\boxed{\mathbf{7}}$ min $= F(-4,1) = -5^7$, max $= F(4,-1) = 5^7$; $\boxed{\mathbf{8}}$ min $= F(1,-1) = F(-1,1) = -\frac{\pi}{4}$, max $= F(1,1) = F(-1,-1) = \frac{\pi}{4}$; $\boxed{\mathbf{9}}$ min $= F(3,0) = 9$, sup $= \infty$; $\boxed{\mathbf{10}}$ inf $= -\infty$, max $= F(-1,0) = F(1,0) = 4$; $\boxed{\mathbf{11}}$ min $= F(\sqrt[5]{2},0) = F(0,\sqrt[5]{2}) = 0$, sup $= \infty$; $\boxed{\mathbf{12}}$ inf $= -\infty$, max $= F(1,1) = 1$; $\boxed{\mathbf{13}}$ inf $= -\frac{\pi}{2}$, max $= F(1,1) = \frac{\pi}{4}$; $\boxed{\mathbf{14}}$ min $= F(1,-1) = -\frac{\pi}{4}$, sup $= \frac{\pi}{2}$.

$\boxed{\bigstar}$ Určete extrémy funkce

$$F(x,y) = x + y$$

na množině

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

Jak vypadá tato množina?
Jak vypadají lokální extrémy?