

## 2. cvičení

Rozhodněte, zda je funkce  $F$  omezená.

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

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

$$\boxed{3} \quad F(x, y) = \ln(xy) + x + y$$

$$\boxed{4} \quad F(x, y) = \frac{x}{y^3}$$

$$\boxed{5} \quad F(x, y) = \frac{x}{y^4}$$

$$\boxed{6} \quad F(x, y) = \frac{x^2}{y^4}$$

$$\boxed{7} \quad F(x, y) = \frac{x^2}{y^3} + y^2 - 2y$$

$$\boxed{8} \quad F(x, y) = \ln(xy) + \ln(1 - xy)$$

$$\boxed{9} \quad F(x, y) = \frac{1}{x^4 + y^4}$$

$$\boxed{10} \quad F(x, y) = x^2 - 2y^2 + xy$$

$$\boxed{11} \quad F(x, y) = \cos(x + \pi y)$$

$$\boxed{12} \quad F(x, y) = \operatorname{arctg}(x^2 - y^2)$$

Výsledky:  $\boxed{1}$  omezená shora:  $\inf = -\infty$ ,  $\max = 10 = F(0, 0)$ ;  $\boxed{2}$  neomezená:  $\inf = -\infty$ ,  $\sup = \infty$ ;  $\boxed{3}$  neomezená:  $\inf = -\infty$ ,  $\sup = \infty$ ;  $\boxed{4}$  neomezená:  $\inf = -\infty$ ,  $\sup = \infty$ ;  $\boxed{5}$  neomezená:  $\inf = -\infty$ ,  $\sup = \infty$ ;  $\boxed{6}$  omezená zdola:  $\min = 0 = F(0, y)$  pro  $y \neq 0$ ,  $\sup = \infty$ ;  $\boxed{7}$  neomezená:  $\inf = -\infty$ ,  $\sup = \infty$ ;  $\boxed{8}$  omezená shora:  $\inf = -\infty$ ,  $\max = -2 \ln 2 = F(x, \frac{1}{2x})$  pro  $x \neq 0$ ;  $\boxed{9}$  omezená zdola:  $\inf = 0$ ,  $\sup = \infty$ ;  $\boxed{10}$  neomezená:  $\inf = -\infty$ ,  $\sup = \infty$ ;  $\boxed{11}$  omezená:  $\min = -1 = F(x, 2k - \frac{x}{\pi} + 1)$ ,  $\max = 1 = F(x, 2k - \frac{x}{\pi})$  pro  $k \in \mathbb{Z}$ ;  $\boxed{12}$  omezená:  $\inf = -\frac{\pi}{2}$ ,  $\sup = \frac{\pi}{2}$ .