

PARCIA'LNI DERIVACE - príklad 3

$$f(x, y) = \ln(x^2 + 3x\sqrt{y}) - y \cdot \sin 2$$

$$1) \frac{\partial f}{\partial x} = \frac{1}{x^2 + 3x\sqrt{y}} \cdot (2x + 3\sqrt{y}) = \frac{2x + 3\sqrt{y}}{x^2 + 3x\sqrt{y}}$$

(y = konst.)

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

$$= \frac{\frac{3}{2\sqrt{y}} \cdot (x^2 + 3x\sqrt{y}) - x(2x + 3\sqrt{y})}{(x^2 + 3x\sqrt{y})^2} = \frac{\frac{3x}{2\sqrt{y}} (x + 3\sqrt{y}) - 2x - 3\sqrt{y}}{(x^2 + 3x\sqrt{y})^2} =$$

$$= \frac{\frac{3x}{2\sqrt{y}} - x}{(x^2 + 3x\sqrt{y})^2}$$

$$3) \frac{\partial f}{\partial y} = (x \text{ je konstanta}) = \frac{1}{x^2 + 3x\sqrt{y}} \cdot (0 + 3x \cdot \frac{1}{2\sqrt{y}}) = \frac{3x \cdot \frac{1}{2\sqrt{y}}}{x^2 + 3x\sqrt{y}}$$

$$4) \frac{\partial^2 f}{\partial y \partial x} = \frac{\frac{3}{2\sqrt{y}} (x^2 + 3x\sqrt{y}) - 3x \cdot \frac{1}{2\sqrt{y}} (2x + 3\sqrt{y})}{(x^2 + 3x\sqrt{y})^2} =$$

(y = konstant)

$$= \frac{\frac{3x}{2\sqrt{y}} (x + 3\sqrt{y}) - 2x - 3\sqrt{y}}{(x^2 + 3x\sqrt{y})^2} = \frac{\frac{3x}{2\sqrt{y}} - x}{(x^2 + 3x\sqrt{y})^2}$$

$$\frac{\partial^2 f}{\partial x \partial y} = \frac{\partial^2 f}{\partial y \partial x}$$