

9.7.2

$$f = 9x^2 + 4y^2$$

$$\nabla f = \left[ \frac{\partial f}{\partial x}, \frac{\partial f}{\partial y} \right]^T$$

$$= \begin{bmatrix} 18x \\ 8y \end{bmatrix}$$

$$f = \begin{bmatrix} 4x^2 + 9xy \\ 5y^2 - 2x \end{bmatrix}$$

$$f: \mathbb{R}^n \rightarrow \mathbb{R}$$