

3a

$$f: \mathbb{R}^2 = 3x^2 - 2y^3$$

$$df(A) = ?$$

$$A[x_0, y_0]$$

$$\frac{\partial f}{\partial x} = f'_x = 6x$$

$$\frac{\partial f}{\partial y} = f'_y = -6y^2$$

$$df = \frac{\partial f}{\partial x} dx + \frac{\partial f}{\partial y} dy = 6x dx + (-6y^2) dy$$

$$\underline{df(A) = 6x_0 \cdot (x - x_0) + (-6y_0^2)(y - y_0)}$$