

数Iレポート (3回目)

問1. 次の関数の全微分を求めよ.

$$z = f(x, y) = x^3 - 4xy + \sin y$$

$$dz = (\boxed{(1)} x^2 - 4y) dx + (-4x + \boxed{(2)} \cos y) dy$$

問2. 次の曲面の $(1, 1, g(1, 1))$ における接平面を求めなさい.

$$z = g(x, y) = 4x^2 - 6xy + 4y^2 - 2$$

$$z = \boxed{(3)} \cdot x + 2 \cdot y + \boxed{(4)}$$

$$\boxed{(1)} = 3$$

$$\boxed{(2)} = 1$$

$$\boxed{(3)} = 2$$

$$\boxed{(4)} = -4$$

問1.

$$\begin{cases} \frac{\partial f}{\partial x} = 3x^2 - 4y \\ \frac{\partial f}{\partial y} = -4x + \cos y \end{cases}$$

$$dz = (3x^2 - 4y) dx + (-4x + \cos y) dy$$

問2.

$$\begin{cases} \frac{\partial g}{\partial x} = 8x - 6y \\ \frac{\partial g}{\partial y} = -6x + 8y \end{cases}$$

$$g(1,1) = 4 - 6 + 4 - 2 = 0$$

$$\frac{\partial g}{\partial x}(1,1) = 2$$

$$\frac{\partial g}{\partial y}(1,1) = 2$$

$$z - g(1,1) = \frac{\partial g}{\partial x}(1,1)(x-1) + \frac{\partial g}{\partial y}(1,1)(y-1)$$

$$\begin{aligned} z &= 2(x-1) + 2(y-1) \\ &= 2x + 2y - 4 \end{aligned}$$