(1) Let $f\colon \mathbb{R}^3 \to \mathbb{R}$ be given by $f(x,y,z) = \sin(xyz) + e^{2x+y(z-1)}$. show that the level set $\{f = 1\}$ can be solved as $x = x(y,z)$ near $(0,0,0)$ and compute $\frac{\partial x}{\partial y}(0,0)$ and $\frac{\partial x}{\partial z}(0,0)$

(2) let $f\colon \mathbb{R}^3 \to \mathbb{R}^2$ be given by $f_1(x,y,z) = \sin(x+y) - x + 2z$, $f_2(x,y,z) = y + \sin z$ Show that the level set $\{f_1 = 0, f_2 = 0\}$ can be solved near $(0,0,0)$ as $y = y(x), z = z(x)$ and compute $\frac{\partial y}{\partial x}(0)$ and $\frac{\partial z}{\partial x}(0)$

Extra Credit: Let $U \subset \mathbb{R}^n$ be open and $f\colon U \to \mathbb{R}^m$ be C^1 where $m < n$.

Prove that f can not be 1-1 on U.