(1) Let $f\colon R^3 \to R$ 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 $f\colon R^3 \to R^2$ 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 $U \subset R^n$ be open and $f\colon U \to R^m$ be C^1 where $m < n$. prove that f can not be 1-1 on U.

Hint: Use that if f is 1-1 then one of the partial derivatives of f is not identically zero.