(a) State the Inverse Mapping Theorem.

(b) Consider the mapping $f \in C^\infty(\mathbb{R}^3, \mathbb{R}^3)$ given by

$$f(x, y, z) = (e^x \sin y, x + y + z, 2z^2 - 1).$$

For which points $(x, y, z)$ is $f$ guaranteed to have a local inverse of class $C^\infty$?