Homework 3 for Math 140C - Spring 2018

(I) Ch 9, problems 11, 13, 14 (abd), 16, 17, 19

(II) Consider the function

$$\begin{aligned} f: \quad & \mathbb{R}^2 \to \mathbb{R}^2 \\ & (x, y) \mapsto ((x+y)^2, x^4 + y^4). \end{aligned}$$

(a) Show that f is continuously differentiable.

(b) Show that there is an open set containing $(x, y) = (1, 0)$, on which f is invertible.

(c) Show that there exists **no** open set containing $(x, y) = (1, 1)$ on which f is invertible.

(d) Why does this not contradict the inverse function theorem?