Real Analysis: Homework 2

1. (a) Let $f(x,y) = \cosh x \cosh y$, then

$$\nabla f|_{(0,0)} = \begin{bmatrix} \sinh x \cosh y \\ \cosh x \sinh y \end{bmatrix}\bigg|_{(0,0)} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

$$\nabla^2 f|_{(0,0)} = \begin{bmatrix} \cosh x \cosh y & \sinh x \sinh y \\ \sinh x \sinh y & \cosh x \cosh y \end{bmatrix}\bigg|_{(0,0)} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

   (b)

2. (a)

   (b)

3.

4.