Newton Method

1. Calculate $f(x^{(0)})$
2. Calculate derivation $\bigtriangledown f(x,y) = \begin{pmatrix} \frac{\partial^2 f(x^{(i)})}{\partial x_1} \\ \frac{\partial^2 f(x^{(i)})}{\partial x_2} \end{pmatrix}$
3. Calculate hessian Matrix $H_f(x^{(i)}) = \begin{pmatrix} \frac{\partial^2 f(x^{(i)})}{\partial x_1 \partial x_1} & \frac{\partial^2 f(x^{(i)})}{\partial x_1 \partial x_2} \\ \frac{\partial^2 f(x^{(i)})}{\partial x_2 \partial x_1} & \frac{\partial^2 f(x^{(i)})}{\partial x_2 \partial x_2} \end{pmatrix}$
4. While $f(x^{(0)}) < f(x^{(i)})$
    1. Calculate $\bigtriangledown f(x^{(i)})$
    2. Calculate $H_f(x^{(i)})$ and inverse it
    3. Calculate $x^{(i)} = x^{(i-1)} - (H_f(x^{(i-1)})) * \bigtriangledown f(x^{(i-1)})$
    4. Calculate $f(x^{(i)})$

Use the following table to keep track of your calculations:

i	$x^{(i)}$	$f(x^{(i)})$	$\bigtriangledown f(x^{(i)})$	$H_f(x^{(i)})$	$H_f(x^{(i)})^{-1}$