Assignment 4

1.

Consider the following:

$f(x) = x^3 - x^2 - x + 5,$

$x_0 = 0.75$

$\eta = 0.25$

(1) Use the traditional derivative method to find the value(s) of x that minimizes $f(x)$.

(2) Use gradient descent up to two iterations to find the values of x_1 and x_2.

(3) Write a function to implement the update step of gradient descent. Use the above values to test this function. Perform gradient descent up to 10 iterations and observe the values of x in each iteration.

2.

Consider the following:

$f(x, y) = 2xy + 2x - x^2 - 2y^2$

$(x_0, y_0) = (-1, -1)$

$\eta = 0.2$

Compute (x_1, y_1) and (x_2, y_2) using gradient descent.