AI-assignment-3 19K41A05D9

$f(x,y) = 3x^2 + 5e^{-y} + 10$

$\frac{df(x,y)}{dx} = 6x$

$\frac{df(x,y)}{dy} = -5e^{-y}$

learning rate = 0.153

let $x_0 = 10, y_0 = 8.1$

grad at $x_0 = 6 \times 9.2 = 55.2$

grad at $y_0 = -5e^{-(8.1)} = -0.001517$

ite-1 :-

$x_1 = x_0 - (\text{learning rate} \times \text{grad f at } x_0)$

$y_1 = y_0 - (\text{learning rate} \times \text{gradient fat } y_0)$

$y_1 = 8.1 - (0.153 \times (-0.001517))$

$= 8.1 - 0.00023$

$= 8.099767 \simeq 8.10$

$x_1 = 9.2 - (0.153 \times 55.2)$

$= 9.2 - 8.4456$

$= 0.7544$

ite-2

$x_2 = x_1 - (\text{learning rate} \times \text{grad x at } x_1)$

$x_2 = 0.7544 - 1.426878$

$= 0.672478$

$y_2 = y_1 - (\text{learning rate} \times \text{grad y at } y_1)$

$y_2 = 8.10023 - (0.153 \times 8.1)$

$= 6.86$