Assignment 3

→ $f(x,y) = 3x^2 + 5e^{-y} + 10$

$\eta = 0.01$, $x = 2$, $y = 3$, epochs = 100, iter = 1

Iteration 1:

↳ $\frac{df}{dx}\Big|_{x=2} = 6x = 6 \times 2 = 12$ | $\frac{df}{dy}\Big|_{y=3} = -5 \times e^{-3} = -0.24$

$$\Delta x = -\eta \frac{df}{dx}\Big|_{x=2} = -(0.01)(12) = -0.12$$

$$\Delta y = -\eta \frac{df}{dx}\Big|_{y=2} = -(0.01)(-0.24) = 0.0024$$

$$x = x + \Delta x = 2 - 0.12 = 1.88$$

$$y = y + \Delta y = 3 + 0.0024 = 3.0024$$

Iteration 2: $\frac{df}{dx}\Big|_{x} = 6x$

$$\frac{df}{dx}\Big|_{x=1.88} = (6)(1.88) = 11.28$$

$$\frac{df}{dy}\Big|_{y=3.002} = -5 \times e^{-3.002} = -0.248$$

$$\Delta x = -\eta \frac{df}{dx}\Big|_{x=2} = -(0.01)(11.28) = -0.1128$$

$$\Delta y = -\eta \frac{df}{dy}\Big|_{y=3.002} = -(0.01)(-0.24) = 0.0024$$

$$x = x + \Delta x = 1.88 - 0.1128 = 1.76$$

$$y = y + \Delta y = 3.002 + 0.0024 = 3.004$$