Find the global minimum point and value for the function $f(x) = 3x^2 + 5e^{-y} + 10$

Manual calculation

Iteration 1:

Let x = 2, y = 3 and $\eta = 0.01$

At x = 2 df (x, y)/dx | x = 2 = 6(2) =12

At y = 3 df (x, y)/dy | y = 3 = $-5*e^{-y} = -5*2.71^{-3} = -0.25$

Gradient is not close to zero, calculate step length

$\Delta x = -0.01 * 12 = -0.12$ and $\Delta y = -0.01 * -0.25 = 2.5 \times 10^{-3}$

Update x and y values as $x = 2 - 0.12 = 1.88$ and $y = 3 + 2.5 \times 10^{-3} = 3.0$

Iteration 2:

At x = 2 df(x, y)/dx | x = 2 = 6(1.88) = 11.28

At y = 3 df(x, y)/dy | y = 3 = $-5*e^{-y} = -5*2.71^{-3} = -0.25$

Gradient is not close to zero, calculate step length

$\Delta x = -0.01 * 11.28 = -0.1128$ and $\Delta y = -0.01 * -0.25 = 2.5 \times 10^{-3}$

$x = 2 - 0.1128 = 1.88$ and $y = 3 + 2.5 \times 10^{-3} = 3.0$

the process repeats until gradient is near to zero with x = 1.88 and y = 3.0