Assignment - 4A

x	y
7.6	157
7.1	174

Iteration 1: $\eta = 0.1, m = 1, c = -1$ (sample 1)

$y_p = mx + c = 6.6$

$E = \frac{1}{2}(y_a - mx - c)^2 = \frac{1}{2}(157 - (1)(7.6) - (-1))^2$

$E = 11310.08$

$\frac{\partial E}{\partial m} = -(y_a - mx - c)x = -(157 - 6.6) * 7.6 = -1143.04$

$\frac{\partial E}{\partial c} = -(y_a - mx - c) = -150.4$

$\Delta m = -(0.1)(-1143.04) = 114.304$

$\Delta c = -(0.1)(-150.4) = 15.04$

$m = 1 + 114.304 = 115.304$

$c = -1 + 15.04 = 14.04$

Sample (2) $m = 115.304, \quad c = 14.04$

$y_p = (115.304) * (7.1) + (14.04)$

$y_p = 832.6984$

$E = \frac{1}{2}(174 - 832.6984)^2 = 216941.791$

$\frac{\partial E}{\partial m} = -(174 - 832.6984) * (7.1) = 4674.759$

$\frac{\partial E}{\partial c} = -(174 - 832.6984) = 658.698$

$\Delta m = -(0.1)(4674.759) = -467.676$

$\Delta c = -(0.1)(658.698) = -658.698$

$m = 115.304 - 467.676 = -352.372$

$c = 14.04 - 658.698 = -644.658$

Iteration 2

$m = -352.372$, $c = -644.658$

$y_p = (-352.372)(7.6) + (-644.658)$

$= -3322.685$

$E = \frac{1}{2}(1574 - 3322.685)^2 = 6054104.546$

$\frac{\partial E}{\partial m} = -(3479.685)(7.6) = -26445.606$

$\frac{\partial E}{\partial c} = -3479.685$

$\Delta m = 2644.560$

$\Delta c = 347.968 \approx 347.969$

$c = -644.658 + 347.969 = -296.689$

$m = -352.372 + 2644.560 = 2292.188$

Sample 2 $m = 2292.188$, $c = -296.689$

$y_p = (2292.188)(7.1) - 296.689 = 15977.846$

$E = \frac{1}{2}(174 - 15977.846)^2 = 124330771.035$

$\frac{\partial E}{\partial m} = (174 - 15977.846)(7.1) = 112207.305$

$\frac{\partial E}{\partial c} = -(174 - 15977.846) = 15803.846$

$\Delta m = -11220.7205$

$\Delta c = -1580.3846$

$m = 2292.188 - 11220.7205 = -8928.544$

$c = -296.689 - 1580.335 = -1877.074$