6a)

Price	Sqft_living
221900	1180
538000	2570
180000	770
604000	1960

Sample set/Batch1

Price(y)	sqft_living(x)
221900	1180
538000	2570

Sample set 2/Batch2

Price(y)	Sqft_living(x)
180000	770
604000	1960

① $\eta = 0.1$, epochs = 1, $m = 1$, $c = -1$, $n = 2$

② set iteration = 1

③ set batch = 1

④ $\frac{\partial E}{\partial m} = -(0.5)\left[((221900 - 1 * 1180 + 1) * 1180) + ((538000 - 1 * 2570 + 1) * 2570)\right]$

$= -(0.5)(1636084450) = -818042225$

$\frac{\partial E}{\partial c} = -(0.5)\left[((221900 - 1 * 1180 + 1) + (538000 - 1 * 2570 + 1))\right]$

$= -(0.5)(756152)$

$= -378076$

⑤ Step length: $\Delta m = -(0.1)(-818042225)$

$= 81804222.5$

$\Delta c = -(0.1)(-378076)$

$= 37807.6$

(6) update $m = 1 + 81825422.5$

$= 81825423.5$

$c = -1 + 37807.6$

$= 37806.6$

(7) ~~Skip~~ batch $i = i+1 = 2$ & $i = 2$

Repeat 4: $\frac{\partial E}{\partial m} = -(0.5)[((1180000 - 81825423.5 * 770 - 37806.6) * 770) + ((604000 - 81825423.5 * 1960 - 37806.6) * 1960)]$

$= -(0.5)[-3.10532093 * 10^{14}]$

$= 1.55266047 * 10^{14}$

$\frac{\partial E}{\partial c} = -(0.5)[(1180000 - 81825423.5 * 770 - 37806.6) + (604000 - 81825423.5 * 1960 - 37806.6)]$

$= -(0.5)(-1.66679898 * 10^{11}) =$

$= 8.33394989 * 10^{10}$

Repeat 5: step length $\Delta m = -(0.1)(1.55266047 * 10^{14})$

$= -1.55266047 * 10^{13}$

$\Delta c = -(0.1)(8.33394989 * 10^{10})$

$= -8.33394989 * 10^{9}$

Repeat 6: $m = 81825423.5 - 1.55266047 * 10^{13}$

$m = -1.55265229 * 10^{13}$

$c = 37806.6 - 8.33394989 * 10^{9}$

$c = -8.33394208 * 10^{9}$