

6(a)

price	sqft_living
221900	1180
538000	2570
180000	770
604000	1960

sample set 1 / batch-1

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

sample set 2 / batch-2

price(y)	sqft_living(x)
180000	770
604000	1960

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

step-2 set iteration = 1

step-3 set batch = 1

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

$$= -(0.5)(1636508450)$$

$$= -818254225$$

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

$$= -(0.5)(756152)$$

$$= -378076$$

step-5 Steplength

$$\Delta m = -(0.1) (-818254225) \\ = 81825422.5$$

$$\Delta c = -(0.1) (-378076) \\ = 37807.6$$

step-6 update m, c

$$m = 1 + 81825422.5$$

$$m = 81825423.5$$

$$c = -1 + 37807.6$$

$$c = 37806.6$$

step-7 set batch $i = i+1$
 $= 2$
& $i=2$

Repeat step 4

$$\frac{\partial E}{\partial m} = -(0.5) \left[(180000 - 81825423.5 * 770 - 37806.6) \right. \\ \left. * 770 + \right. \\ \left. (604000 - 81825423.5 * 1960 - 37806.6) * 1960 \right] \\ = -(0.5) (-3 - 10332013e^{13}) \\ = 1.55266047e^{14}$$

step-5

$$\Delta m = -(0.1) (1.55266047e^{14}) \\ = -1.55266047e^{13}$$

$$\Delta c = -(0.1) (8.33399489e^{10}) \\ = -8.33399489e^9$$

step-6

$$m = 81825423.5 - 1.55266047$$

$$m = -1.55265229e^{13}$$

$$c = 37806.6 - 8.33399487e^7$$

$$c = -8.333395708e^7$$