Assignment 2 Solution

1.

1.1 a

Note the situation $x \in [0, 0.05]$ and $x \in [0.95, 1]$

$$\int_0^{0.05} (100x + 5)dx + \int_{0.05}^{0.95} 10dx + \int_0^{0.05} (105 - 100x)dx = 9.75 \tag{1}$$

or simple use the 10% is OK

1.2 b

$(0.975)^2 = 0.950625$ or 0.01

1.3 c

$0.975^{100} \simeq 0$

1.4 d

The fraction of avaliable observations we will use to make the prediction is $(9.75\%)^p$ with p the number of features.

so:

$$\lim_{p \to \infty} (9.75\%)^p = 0 \tag{2}$$

2.

3.1 a

$$p(x) = \frac{\exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2)}{1 + \exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2)} \tag{3}$$

X1=40, X2=3.5, $p(x) = 37.75\%$

3.2 b

$X_2 = 3.5$ and set $p(x) = 50$, we can get $X_1 = 50$ hours