1. Suppose that $y_i = \mu + \epsilon_i$, where $i = 1, \ldots, n$ and the ϵ_i are independents errors with mean and variance σ^2. Find the least squares estimate of μ.

2. Find the least square estimate of β for fitting the line $y = \beta x$ to points (x_i, y_i) where $i = 1, \ldots, n$.

3. Suppose that we want to predict the value of a new observation, Y_0 at x_0,

$$Y_0 = \beta_0 + \beta_1 x_0 + \epsilon_0$$

by the estimate

$$\hat{Y}_0 = \hat{\beta}_0 + \hat{\beta}_1 x_0$$

(a) Find the MSE of $\hat{Y}_0$