STAT525 HOMEWORK#1

1. KNNL Problem 1.26

2. A regression analysis of a set of data produced the following fitted equation: $\hat{y} = 3+8x$.

   (a) If x increases 5 units, how does $\hat{y}$ change?

   (b) Here x was measured in degrees Celsius. Rewrite the fitted equation with x replaced by x^* where x^* is x expressed in degrees Fahrenheit. Use the fact that $x = (5/9) \times (x^* - 32)$.

3. KNNL Problem 1.39 part a.

   Hint $(Y_1 - a)^2 + (Y_2 - a)^2 = 2(\bar{Y} - a)^2 + (Y_1 - \bar{Y})^2 + (Y_2 - \bar{Y})^2$, where $\bar{Y} = (Y_1 + Y_2)/2$ for any Y_1, Y_2 and a.

4. Derive the MLE estimator for $(\beta_0, \beta_1, \sigma^2)$ for simple linear regression with normal error.

5. Show that $s^2 = \sum(Y_i - \hat{Y}_i)^2/(n-2)$ is an unbiased estimator for σ^2.