1. Using the body fat data, use matrix calculations to calculate the following:

(a) Write down the $20 \times 4$ design matrix $X$ and the $20 \times 1$ response vector $Y$.
(b) Calculate the vector $b=(b_0, b_1, b_2, b_3)'$ of parameter estimates.
(c) Calculate MSR and MSE.
(d) Calculate the standard errors of $b_0$, $b_1$, $b_2$ and $b_3$.
(e) Calculate $\hat{Y}_h$ when $X_{h1} = 20.0$ $X_{h2} = 40.0$ and $X_{h3} = 25.0$.
(f) Calculate the standard error of $\hat{Y}_h$ when $X_{h1} = 20.0$ $X_{h2} = 40.0$ and $X_{h3} = 25.0$. 