Stat 482 Homework Set #4

1. Refer to the data from Exercise 1.20.
Data has been collected on 45 calls for routine maintenance. The goal is to explore the relationship between the number of copiers serviced (x) and the time in minutes spent to complete the service (y).

(a) Determine the boundary values of the confidence band for the regression function $\mu(x)$ at $x = 3$ copiers.
(b) Explain why the confidence band at x_h is wider than a confidence interval for μ_h.
(c) Plot the estimated regression function along with both the confidence band and the confidence intervals on the input space $x = 1, 2, \ldots, 10$.

2. Refer to the data from Exercise 1.27
A person's muscle mass is expected to decrease with age. To explore this relationship in women, a nutritionist randomly selected 15 women for each 10 year age group, beginning with 40 and ending with age 79. The input variable x is age (in years), and the response variable y is muscle mass (in muscle mass units).

(a) State the equations for $E(MSR)$ and $E(MSE)$.
(b) Use part (a) to explain a motivation behind the F test for input effects.

(c) Compute the F^* statistic and the p-value.
Provide an interpretation, stated in the context of the problem.

(d) Compute the coefficient of determination r^2.
Provide an interpretation, stated in the context of the problem.