This is the MTH 452 HW for sections 6.4 and 6.5*.
It is due on Thursday, Feb. 24. Also, we will have a quiz then.
Orlando M.

Sec. 6.4:

6.4.4, 6.4.5, 6.4.7, 6.4.8, 6.4.10, 6.4.12, 6.4.18

Sec. 6.5 (well, not 6.5 from the book but from the notes)

6.5.1 Let $X_1, \ldots, X_n$ be a random sample from a normal distribution with $\sigma^2 = 64$.
a) Show that $C = \{(x_1, \ldots, x_n) : \overline{x} \leq c\}$ is a best critical region for testing $H_0 : \mu = 80$ against $H_1 : \mu = 76$.
b) Find n and c so that $\alpha = 0.05$ and $\beta = 0.05$ approximately.

6.5.2 Let $X_1, \ldots, X_n$ be a random sample of Bernoulli trials with probability of success $= p$.
a) Show that the best critical region for testing $H_0 : p = 0.9$ against $H_1 : p = 0.8$ can be based on the statistic $Y = \sum_{\ell=1}^{n} X_\ell$, which is binomial$(n, p)$.
b) If $C = \{(x_1, \ldots, x_n) : \sum_{\ell=1}^{n} x_\ell \leq 0.85n\}$ and $Y = \sum_{\ell=1}^{n} X_\ell$, use the normal approximation to the binomial dist. to find the value of n such that $\alpha = 0.10 = P(Y \leq 0.85n\ ;\ p = 0.9)$
c) What is the approximate value of β for the test given in part (b)?
d) Is the test in part (b) a uniformly most powerful critical region for testing $H_0 : p = 0.9$ when the alternative hypothesis is $H_1 : p < 0.9$?

6.5.3 Let $X_1, \ldots, X_n$ be a random sample from the normal distribution $N(\mu, 36)$.
a) Show that a uniformly most powerful critical region for testing $H_0 : \mu = 50$ against $H_1 : \mu < 50$ is given by $C_2 = \{(x_1, \ldots, x_n) : \overline{x} \leq c\}$.
b) With this result and the example discussed in class argue that a uniformly most powerful test for testing $H_0 : \mu = 50$ agains $H_1 : \mu \neq 50$ does not exist.