Stat763 **HW03**

1. The usefulness of the model $y = \beta_0 + \beta_1 + \epsilon$ is confirmed by an F-test for the significance for regression based on a sample of $n = 20$. The following statistics are also obtained.

$$\widehat{\beta}_0 = 2628,\ S_{\widehat{\beta}_0} = 44,\ \widehat{\beta}_1 = -37, S_{\widehat{\beta}_1} = 3,\ \widehat{y}(10) = 2258 \text{ and } S_{\widehat{y}(10)} = 23.6.$$

   Keep 3 digits after decimal point for all final computation results

   (1) Find a 95% lower-sided CI for β_0.

   (2) Find a 95% upper-sided CI for β_1.

   (3) Find a 95% CI for $E[y(10)]$.

2. For $y = \beta x + \epsilon$, $\epsilon \sim N(0, \sigma^2)$, a sample of size $n = 8$ produced $\widehat{y}(0.65) = 0.4045$ and $S_{\widehat{y}(0.65)} = 0.0920$.
   For final results of computations keep 4 digits after decimal points.

   (1) Test $H_0 : E[y(0.65)] \geq 1$ vs $H_a : E[y(0.65)] < 1$ using rejection region with level 0.05.

   (2) Test $H_0 : E[y(0.65)] \leq 2$ vs $H_a : E[y(0.65)] > 2$ using p-value.

   (3) Perform t-test on $H_0 : E[y(0.65)] = 0$ vs $H_a : E[y(0.65)] \neq 0$ using p-value.