Homework #11

Name__________________________

1. We try to find the least squares line for the following pairs of $x$ and $y$ values:

   \[ x = (7, 4, 6, 2, 1, 1, 3) \]
   \[ y = (2, 4, 2, 5, 7, 6, 5). \]

   Please do the following tasks: (a) complete the table, (b) find $SS_{xy}$, (c) Find $SS_{xx}$, (d) find $\hat{\beta}_1$, (e) find $\bar{x}$ and $\bar{y}$, (f) find $\hat{\beta}_0$, (g) find the least squares line.

2. [The Data and Story Library (http://lib.stat.cmu.edu/DASL/)] at Carnegie Mellon University is a nice place to visit, where dazzling stories accompany interesting data sets. Here is one: [http://lib.stat.cmu.edu/DASL/Stories/usdev.html] has the per capita income (PCINC) in $ versus year for the USA.

   \[ year = (1870, 1880, 1890, 1900, 1910, 1920, 1930, 1940, 1950, 1960) \]
   \[ PCINC = (340, 499, 592, 757, 927, 1050, 1170, 1364, 1836, 2132). \]

   (a) Plot the $PCINC$ vs. $year$ and $log(PCINC)$ vs. $year$ for the USA data. Which shows a better linear trend? (b) Suppose we believe a linear model for $log(PCINC)$ on $year$. What does that say about the growth rate? (c) Run a linear regression of $log(PCINC)$ on $year$ to find the estimated slope and its 95% confidence interval.