

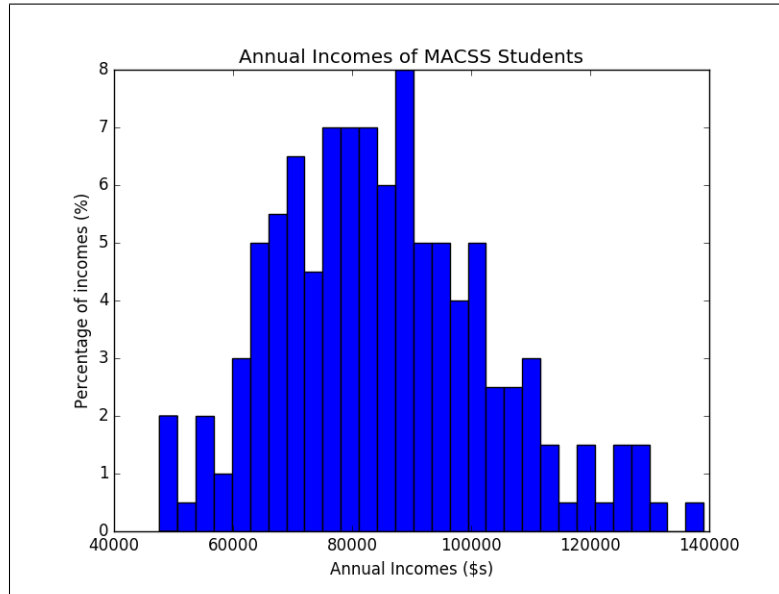
Problem Set #2

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Problem 1

Part (a).

Figure 1: Question 1 part(a)



Part (b). The value of the log likelihood value for this parameterization of the distribution and given this data is -8298.637 .

Part (c). Firstly, $\mu_{mle} = 11.331$, $\sigma_{mle} = .212$. The log likelihood value of the data given these parameters is -2239.535 . The variance-covariance matrix is:

$$\begin{bmatrix} 4.6514e-04 & -5.0323e-05 \\ -4.0407e-05 & -2.7311e-04 \end{bmatrix}$$

Part (d). The Likelihood Ratio Test p-value is: 0.0. This number is really low ($< .05$) so it is unlikely that the data came from the distribution in part (b).

Part (e). The probability that I will earn more than \$100,000 is 0.196.

The probability that I will earn less than \$75,000 is 0.308.

Problem 2

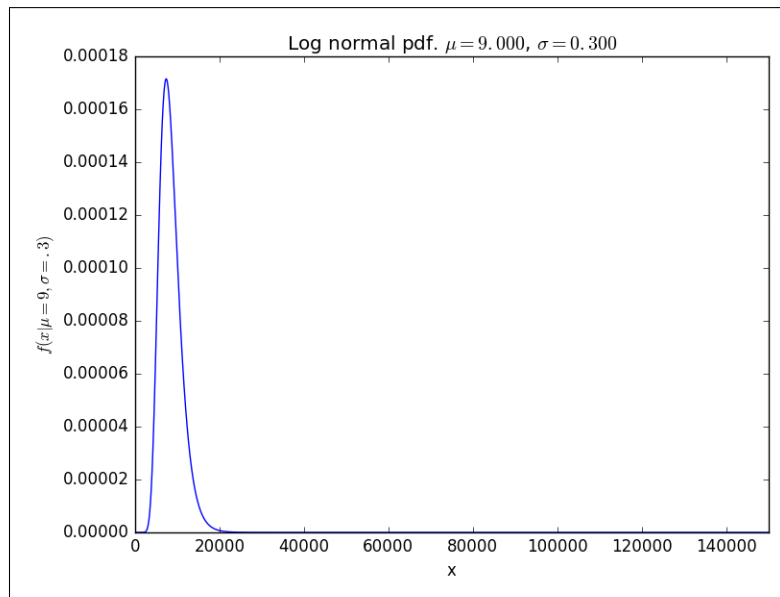
Part (a). $\beta_0^{mle} = .252$ $\beta_1^{mle} = -0.013$ $\beta_2^{mle} = -0.04$ $\beta_3^{mle} = 0.009992$ $\sigma_{mle}^2 = 9.11e-06$ The value of the log likelihood function is: 876.865. Unless you round to

past 7 decimal places, the variance-covariance matrix just looks like this:

$$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

Part (b). Likelihood Ratio Test p-value is: 0.0

Figure 2: Question 1 part(b)



This number is really low ($< .05$), so it is unlikely that age number of children, and average winter temperature have no effect on the number of sick days.

Figure 3: Question 1 part(c)

