

## Stat 705, Homework 5

1. Write down the product (for  $j = 1, \dots, c$ ) of the terms in 14.33; this is  $L(\beta_0, \beta_1)$ . Confirm that the log of this expression can be written as 14.34. Take the partial derivative of 14.34 for both  $\beta_0$  and  $\beta_1$  and set the partial derivatives to 0. Re-express this as an estimating equation, with statistics on the right and terms involving parameters on the left.
2. Refer to the Bottle Return data described in 14.11 of your text.
  - (a) 14.11a-f. 14.11e and 14.11f can be done “by hand” if you’d like.
  - (b) 14.17a-c. Most of this problem simply involves reading output from your logistic regression in part a.
  - (c) 14.23. Simply use the default Hosmer-Lemeshow goodness of fit test results to answer this question.
  - (d) 14.35b-c. Rather than the cutoffs provided, simply use the default values shown in ROC curve output from PROC LOGISTIC.
3. In class, we derived the sensitivity and specificity for threshold  $\hat{\pi} > 0.0205$ . Confirm the remaining values for sensitivity and specificity in the ROC curve for the Snoring data by constructing appropriate classification tables and computing the appropriate conditional probabilities.