STAT 645: Quiz 2
Due: March 11 at noon (in my mailbox)

(Note: You can use whatever software you wish. I suggested using PROC LOGISTIC because it outputs the estimated odds ratio and I gave you the data set in SAS form)

1. Referring to your data from the sunglasses experiment:

   (a) Enter the data into SAS, estimate the odds ratio, find its confidence interval, and interpret both the odds ratio and confidence interval

   (b) Using PROC LOGISTIC, fit a logistic regression of "sunglasses" on "Gender". Make sure to encode both variables the same as you have for part (a). Test the coefficient for Gender. Is gender related to sunglass use in this model? Derive the estimate of the odds ratio and compare this to part (a).

2. In 1846, the Donner party became stranded while crossing the Sierra Nevada mountains. We want to answer the question: Is there evidence that age has an effect of survival?

```
DATA donner;
INPUT Sex $ Age Survival $;
CARDS;
male 23 no
female 40 yes
male 40 yes
male 30 no
male 28 no
male 40 no
female 45 no
male 62 no
male 65 no
female 45 no
female 25 no
male 28 yes
male 28 no
male 23 no
female 22 yes
female 23 yes
male 28 yes
female 15 yes
femlae 47 no
male 57 no
female 20 yes
male 18 yes
male 25 no
male 60 no
male 25 yes
male 20 yes
male 32 yes
female 32 yes
female 24 yes
male 30 yes
male 15 no
female 50 no
female 21 yes
male 25 no
male 46 yes
female 32 yes
male 30 no
male 25 no
male 25 no
male 25 no
male 30 no
male 35 no
```

```
male 23 yes
male 24 no
female 25 yes
;
```

(a) Write down (symbolically) the logistic model with logit link that would answer this question.

(b) Interpret the parameters that you defined in (a)

(c) Fit the model you defined in (a). Include the output.

(d) Should Age be included in this model?

(e) Perhaps there is a quadratic effect for Age. Fit the model with quadratic Age effect and test to see if this is important to include.

(f) For your selected model, find the estimated probability of survival for a 24 years-old person.

(g) Pretend that you are a consultant responding to a principal investigator's question. Write a short, convincing statement detailing your findings in this question. Include in your write up what you feel is the 'scope of inference' of this study. *Note: we haven't officially talked about this in class, but scope of inference refers to the broader conclusions that you may be able to draw from a study. Essentially, what, if anything, about this study is representative of a larger population of interest? For instance, can we use the conclusions from this study to make statements about the comparative survivability of men and women in: 1846, now, the U.S.A, etc.?*