APPLIED REGRESSION **Home Work - 8** **SPRING 2018**

1. The data in attached file (sheet1) presents the test-firing results for 25 surface-to-air antiaircraft missiles at targets of varying speed. The result of each test is either a hit (y = 1) or a miss (y = 0).

a. Fit a logistic regression model to the response variable y. Use a simple linear regression model as the structure for the linear predictor.

b. Does the model deviance indicate that the logistic regression model from part a is adequate?

c. Provide an interpretation of the parameter β_1 in this model.

d. Expand the linear predictor to include a quadratic term in target speed. Is there any evidence that this quadratic term is required in the model?

2. A study was performed to investigate new automobile purchases. A sample of 20 families was selected. Each family was surveyed to determine the age of their oldest vehicle and their total family income. A follow-up survey was conducted 6 months later to determine if they had actually purchased a new vehicle during that time period (y = 1 indicates yes and y = 0 indicates no). The data from this study is in the data file (sheet2).

a. Fit a logistic regression model to the data.

b. Does the model deviance indicate that the logistic regression model from part a is adequate?

c. Interpret the model coefficients β_1 and β_2.

d. What is the estimated probability that a family with an income of $45,000 and a car that is 5 years old will purchase a new vehicle in the next 6 months?

e. Expand the linear predictor to include an interaction term. Is there any evidence that this term is required in the model?

f. If income goes up by $1000 in model of part (a) while age remain fixed, how much the odds of buying change.

g. Find approximate 95% confidence intervals on the model parameters for the logistic regression model from part a.