**Departmental Narrative for Math 106 (Elementary Probability and Statistics) August 12, 2008**

Math 106 s is a GER1 course at William and Mary. Using only basic algebra skills, Math 106 provides a proper foundation of probability and statistics should a student chose to take another probability and statistics course. (However, see the restriction on multiple statistics courses in the Degree Requirements section of the *College Catalog*.) Some of the topics covered are descriptive statistics, experimental design, regression, probability, discrete random variables including the binomial distribution, the normal distribution, confidence intervals, hypothesis tests for a single parameter as well as inference on two samples and the chi-square distribution to test goodness-of-fit and independence. Students acquire an understanding of statistical terms, methods, and computations through exercises that use real, sourced data from a variety of disciplines. Every section of Math 106 includes the three GER1 criteria of (1) calculations, done by hand or using a calculator, (2) theoretical explanations of why the procedures used in part (1) actually work, and (3) applications recognizable as such to educated non-mathematicians. Most exercise and test problems in Math 106 satisfy a combination of the three criteria listed above. Here are typical questions and the criteria they meet:

I. (Criteria 1 and 3) The stemplot shows the number of home runs made by each of the American League teams in 1994.

American League: 1994 Home Runs

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3 | 5
4 | 0 3 9
5 | 1 4 7 8 8
6 | 4 8 8
7 | 5 7
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(a) Find the five-number summary for the data.

(b) Suppose someone notices that the team with 77 home runs was recorded incorrectly. If this team actually had 99 homeruns, is this considered an outlier? Show work to support your answer.

II. (Criteria 1 and 3) The serum cholesterol levels in 16 to 19 year old females are normally distributed with mean cholesterol level $\mu = 171$ and standard deviation is $\sigma = 39.8$. What proportion of 16 to 19 year old females have a cholesterol level greater than 190?

III. (Criteria 1 and 3) One used car lot classifies their motor vehicles as either cars or light trucks. Vehicles are also identified as either foreign or domestic. One vehicle is randomly chosen from those sold in 2004. The probability it is a light truck is .69, the probability it is domestic is .78 and the probability it is both a light truck and domestic is .55. Find the probability that the randomly chosen vehicle is either a light truck or domestic.

IV. (Criteria 2 and 3) A normal probability plot is constructed below for seven randomly selected race times for a greyhound named Barbies Bomber.

(a) Does the plot support the belief that the race times are normally distributed? Explain why or why not.

(b) There are two race times of 32.52 seconds. Explain why they are assigned different *z*-scores on the graph.