MA231 – Spring 2008 **Homework 2** **Due 2/20/2009**

a.k.a. Homework Bayes

Homework Policies: You should give a brief and concise explanation for each question. Just writing down an answer with no explanation is usually not sufficient. If the homework requires output from Stata, incorporate that output into your written assignments. Homework is due at the *beginning* of class on the day indicated.

(1) M&M 1.126 (page 74)

(2) Below are five scores from a hypothetical exam. The first row gives the original scores (out of 100 points), and the second row shows the standardized scores. Fill in the three blanks. Show your work.

Original Score	79	64	52	72	____
Standardized	1.8	0.8	___	___	-1.4

(3) M&M 1.167, p.81

(4) Scores on many, but not all, IQ tests follow an approximately normal distribution with mean = 100, and SD = 15.

a. What percentage of people score between 80 and 120?
b. An article reported Sharon Stone as having an IQ of 150. What percentage of people taking an IQ test score over 150?
c. Ginger takes an IQ test and scores in the top 15%. What was her test score? In what percentile has she scored?

(5) Suppose we have two random variables X and Y, where $X \sim N(0,10)$ and $Y \sim N(0,5)$. Of the two probabilities, $P(-1 < X < 1)$ and $P(-1 < Y < 1)$, which is larger? Explain. No calculation is necessary.

(6) Go to http://www.stat.uiuc.edu/~stat100/java/GCApplet/GCAppletFrame.html and guess at least three sets of correlations (you don't need to turn anything in for this).

(7) M&M 2.11, p. 95

(8) M&M 2.13, p. 96

(9) M&M 2.19, pp. 97-98 (Use Stata; the data are on the course webpage in the *nba.dta* file)

(10) M&M 2.22, p. 99 (Use Stata; the data are on the course webpage in the *fuel.dta* file)

(11) M&M 2.39, p. 106

(12) M&M 2.44, p. 107

Famous Statistician of the Week

REV. T. BAYES

Who is this dude?
Thomas Bayes
1702-1761

Why is he cool?
One of Bayes' papers, "An Essay Towards Solving a Problem in the Doctrine of Chances" reversed de Moivre's focus of reasoning from the population to the sample and dealt with inferences from the sample to the population. The paper put forth a number of mathematical propositions; as "Proposition 9," it presented what is now known as Bayes' theorem (first discussed in Chapter 8 of the text). The essay is, perhaps, one of the least understood but most famous and controversial contributions ever made in the history of science. Many call it a masterpiece of mathematical elegance. In the words of Ronald Fisher (Biography 13.1), Bayes' "mathematical contributions.... show him to have been in the first rank of independent thinkers." Certainly, Bayes has become, through his famous theorem, the father of modern decision theory. For this reason, the optimal strategy selected in expected-payoff-optimizing decision making problems is universally referred to as *Bayes' strategy*. Courtesy of *http://www-gap.dcs.st-and.ac.uk/history/Mathematicians/Abbe.html*