Statistics 111 Homework 1 - Due at start of recitation on Friday, Feb. 5th

1. IPS 3.53 (Survey), p. 201
2. IPS 3.78 (Survey Questions), p. 205
3. IPS 3.125 (Type of Study), p. 229
4. IPS 1.39 (Vehicle Colors), p. 27 (Enter data manually into R)
5. IPS 1.71 (Potatoes), p. 50 (data available on course website: potato.txt)
6. IPS 1.73 (Papua New Guinea), p. 50 (data available on course website: crp.txt)

7. Several large observational studies suggested that women who take hormones such as estrogen after menopause have lower risk of a heart attack than women who do not take hormones. Hormone replacement became popular. In 2002, several careful experiments showed that hormone replacement does not reduce heart attacks. The NIH concluded that the earlier observational studies were wrong. Taking hormones after menopause quickly fell out of favor.
   a. Explain the difference between an observational study and an experiment to compare women who do and don’t take hormones after menopause.
   b. Suggest some characteristics of women who choose to take hormones that might affect the rate of heart attacks. In an observational study, these factors are confounded with taking hormones.

8. A team of seven lightweight male rowers has an average weight of 158.6 pounds, but needs another rower for an 8-man race. If the team needs to maintain a mean weight below 160 pounds, what is the maximum that this additional rower can weigh?

9. Assume the Philadelphia 76ers basketball team signed a star player at the beginning of the season to a contract paying an annual salary of $18 million. To make room for this contract under the salary cap, they released all the other players and replace them with 11 rookies, paying each of them the league minimum salary of $455,000.
   a. What is the mean salary of the team? What is the median salary of the team?
   b. How many players earn less than the mean? How many earn less than the median?
   c. Next season, the star gets a raise to $28,000,000, while the other players stay at the same salary. How does this affect the mean salary of the team? How does it affect the median salary?

10. You roll a standard die four times and then calculate the SD for these rolls. What is the largest possible SD? What is the smallest possible SD? Explain briefly.