Homework policies: You should give a brief and concise explanation for each question. Just writing down an answer (e.g., “SD = 3.3”) with no explanation is not sufficient. Homework is due at the beginning of class on the due date. Late homework will not be accepted, with one exception: you may hand in one assignment late (by the beginning of the next class) once during the semester. If you are planning to hand in a homework late, you must email me by the beginning of class on the original due date.

Collaboration: I encourage you to discuss homework problems with other students (and with me, of course). Your final answer should be written in your own words. If you work with other students, list their names on your paper.

Please type your responses to these questions (except for the graph in #1).

(1) Briefly describe the pros (if any) and cons (if any) of the following graph. Make a rough sketch (by hand) of an improved version of the graph.

![Fuel Economy Standards for Autos](image)


(3) chapter 13, question 35 (wine) [31]

(4) chapter 13, question 41 (weekend deaths). Omit part (a). [37]

(5) A certain drug known to affect coordination can be administered in three ways: orally, by injection under the skin, or by injection into a vein. The potency of the drug may depend on the method of administration as well as the dosage administered.

A researcher wants to compare the effect of two factors on coordination: high or low dosage, and the method of administration. The response variable is the score of the subjects on a standard test of coordination. Sixty subjects are available.

(a) How many levels does each of the factors have?

(b) How many treatments can be formed from the two factors? List them.

(c) Briefly describe an appropriate randomized design. (Just outline the design; don’t carry out the actual randomization.)

(d) The researcher could study the effect of dosage in an experiment comparing two dosage levels for one method of administration. She then could separately study the effect of administration by comparing the three methods at one dosage level. What advantages does the two-factor experiment you designed above have over these two one-factor experiments taken together?

(over)
(6) chapter 12, questions 7, 9 (identify terms). Omit part (c). [3, 5]

(7) chapter 12, questions 25, 26 (wording of questions). You do not need to hand in a response to this question; just read the question and think of an answer. [21, 22]

(8) chapter 12, question 35 (sampling methods) [31]

(9) Suppose a survey is carried out by the planning department to determine the distribution of household size in a large city. The researchers select a random sample of 1000 households and send out interviewers to interview people in these households. After several visits, however, the interviewers find people at home in only 856 of the sample households. Rather than face such a high non-response rate, the planners draw a second batch of households, and use the first 144 completed interviews in the second batch to bring the sample size up to its planned size of 1000 households. They count 3203 people in the 1000 households and therefore estimate the mean household size in the city to be about 3.2 people. Is this estimate likely to be too low, too high, or about right? Explain briefly.

(10) Download and read “How Polls Are Conducted” from the link on the following web page:


According to the article, once a randomly selected household is reached on the phone, the interviewer attempts to select a random adult within the household. Why is this necessary, as opposed to just interviewing whoever answers the phone?

(11) Read the following article from a recent New York Times Magazine (after which you may never believe any medical studies again) and answer the following questions (a short sentence or two should suffice for each part):

http://tinyurl.com/2lb2h9

(a) According to the article, why are randomized clinical trials (experiments) the “gold standard” for establishing medical knowledge?
(b) What is the healthy-user bias? Why does it make it difficult to draw causal conclusions from observational studies?
(c) What is the prescriber effect? Why does it make it difficult to draw causal conclusions from observational studies?
(d) What is the compliance effect? Why does it make it difficult to draw causal conclusions even from controlled experiments?