Exercise Set #23

Answers to Odd-Numbered Exercises

23-1 (a) This is an experiment, since data is collected with intervention from a researcher, the researcher deciding with which drug or placebo subjects will be injected.

(b) "Reaction time" is the response variable, and "which drug or placebo is injected" is the explanatory variable; each subject is a sampling unit.

(c) The subjects would be divided randomly into three groups, one group injected with drug A, one group injected with drug B, and one group injected with the placebo.

(d) Drug A, drug B, and the placebo would be injected into each subject (in random order), and the reaction time would be measured three times for each subject, once after each injection.

(e) The randomized block design (part (d)) would be preferable, because the influence of extraneous variables on the results can be greatly reduced.

(f) To make this experiment single-blind, subjects would not be told whether they were being injected with drug A, drug B, or the placebo. This is appropriate for human subjects in order to prevent subjects’ knowledge about their treatment from influencing results.
23-1 - *continued*

(g) To make this experiment double-blind, neither subjects nor person(s) measuring reaction times would not be told whether the subject was being injected with drug A, drug B, or the placebo. This is appropriate in order to prevent both subjects’ knowledge and researchers’ knowledge about treatment from influencing results.

(h) Human subjects’ awareness that they are in a study could affect their reaction times.

23-3 (a) (i) response variable: “weekly nicotine intake”
(ii) explanatory variable: “before or after the seminars”
(iii) sampling units: the individual smokers
(iv) one sample of paired observations

(b) (i) response variable: “weekly radio hours”
(ii) explanatory variable: “sex”
(iii) sampling units: the individual males and females
(iv) two independent samples of observations

(c) (i) response variable: “sales”
(ii) explanatory variable: “location”
(iii) sampling units: the individual restaurants
(iv) two independent samples of observations
23-3 - continued
(d) (i) response variable: “weekly hours”
(ii) explanatory variable: “watching TV or studying”
(iii) sampling units: the individual students
(iv) one sample of paired observations
(e) (i) response variable: “grade point average (GPA)”
(ii) explanatory variable: “high school or college freshman”
(iii) sampling units: the individual students
(iv) one sample of paired observations
(f) (i) response variable: “lifetime”
(ii) explanatory variable: “type of battery”
(iii) sampling units: the individual batteries
(iv) two independent samples of observations

23-5 (a) one-sided (b) two-sided (c) two-sided
(d) two-sided (e) two-sided (f) one-sided

23-7 Since the two variables temperature and breaking strength are not commensurate, obtaining differences is meaningless.

23-9 (a) (ii) (b) (i)