For each problem, state clearly:

- Is this a designed experiment or an observational study? (Designed experiments carry weight in establishing evidence of causation; observational studies do not carry much weight in establishing evidence of causation.)

- What random variable(s) are in the problem. (There is no single answer to this, which is all the more reason why you need to be explicit about it. You may need to make assumptions about it based on limited information. However, this will allow you to be clear about the scope of inference of your test.)

- What type of test you are conducting.

- What the null and alternative hypotheses of the test are, in the context of your particular data (not just in general terms).

- How this null hypothesis allows you to use the test you are using. (That is, how is the distribution of the test statistic under the null hypothesis known in this situation?)

- Anything peculiar that you encountered while conducting the analysis.

- What the p-value for your particular data was.

- What you did or did not find statistically significant evidence of at the 0.05 significance level.

Also include additional analysis to follow up on the test you conducted, and give any other useful numerical or graphical summaries to provide further information about what you have explored. For example, if you detect a difference in medians, you might give an estimate for that difference and show density plots that illustrate this difference.

Do not include any R code or text output cut and pasted from R. You may of course include graphics directly from R.

1. In a study testing the effects of calcium supplements on blood pressure in men, eight men were randomly chosen and given a calcium supplement for 12 weeks. The measurements listed in the data frame are for each subject’s diastolic blood pressure taken before and after the 12-week treatment period. Use an appropriate nonparametric test to test whether there we a reduction in diastolic blood pressure.

2. A private industry analyst claims that there is no difference in the salaries earned by workers in the manufacturing and construction industries. A random sample of ten manufacturing and ten construction workers and their salaries is listed in the data frame. Use an appropriate nonparametric test to test the analyst’s claim.

3. A social sciences association conducted a study to determine the median age of recipients of social science doctorates. As part of the study, the association randomly selected 20 social science doctorates and found that 9 were conferred before age 36, 8 were conferred after age 36, and 3 were conferred at age 36. Use an appropriate nonparametric test to test whether the median age of recipient social science doctorates is 36 years.

4. The data frame lists the annual premium in 2010 for a random sample of high-risk home insurance policies in California, Florida, and Illinois. Use an appropriate nonparametric test to test whether the distributions of the annual premiums in the three states are the same.