1. A firm has a generous but rather complicated policy concerning end-of-year bonuses for its lower-level managerial personnel. The policy’s key factor is a subjective judgment of “contribution to corporate goals.” A personnel officer took samples of 24 female and 36 male managers to see whether there was any difference in bonuses, expressed as a percentage of yearly salary. The data are listed in “Bonus” worksheet.

**a.** State the null and alternative hypotheses.

**b.** Run the appropriate test using equal variance assumption. Use α = 0.01.

**c.** Provide your decision and conclusions.

1. Refer to the same Dataset given in Task 1. Suppose population variances cannot be assumed equal.

**a.** State the hypotheses to test whether male managers are paid significantly higher bonuses.

**b.** Run the appropriate test using α = 0.10.

**c.** Provide your decision and conclusions.

1. A study was designed to measure the effect of home environment on academic achievement of 12-year-old students. Because genetic differences may also contribute to academic achievement, the researcher wanted to control for this factor. Thirty sets of identical twins were identified who had been adopted prior to their first birthday, with one twin placed in a home in which academics were emphasized (Academic) and the other twin placed in a home in which academics were not emphasized (Nonacademic). The final grades (based on 100 points) for the 60 students are given in “Twins” worksheet. Use α = 0.05 for your tests.

**a.** Evaluate whether there is a difference in the mean final grade between the students in an academically oriented home environment and those in a non-academically oriented home environment.

**b.** Estimate the size of the difference with 95% confidence in the mean final grades of the students in academic and nonacademic home environments.

1. [**OPTIONAL**] Insurance adjusters are concerned about the high estimates they are receiving for auto repairs from garage I compared to garage II. To verify their suspicions, each of 15 cars recently involved in an accident was taken to both garages for separate estimates of repair costs. The estimates from the two garages are given in “Repair” worksheet.

**a.** State your hypotheses for this case.

**b.** Calculate the test statistic and rejection region (α = 0.05).

**c.** Provide your test results and conclusions.

**d.** Place a 95% confidence interval on μd.