

QMM 1002 Module 3 Assignment

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Create and submit an R script which, when run, will print the answers to the following questions. Your R script must include a title with your **name** and **student number** and comments for each question number.

1. **(14 marks)** The following data gives the number of miles per gallon for a random sample of U.S. cars vs. Japanese cars. We would like to test the hypothesis that Japanese cars get better mileage than U.S. cars at an alpha level of 0.01.
 - a) State the null and alternative hypotheses
 - b) Check the assumptions and conditions. Are they satisfied? Give your histograms for the nearly normal condition (use 5 bins).
 - c) Perform the hypothesis test using the `t.test()` function. State the t-test statistic.
 - d) Determine the critical value t^* .
 - e) State the result of the hypothesis test. What can you conclude?

US	Japanese
18	24
15	27
16	27
16	25
17	31
15	30
14	24
16	19
16	28
15	23

2. **(12 marks)** Read in the *RealEstate* dataset. This gives a random sample of 1047 homes and includes the price (in dollars), living area (in sq. ft.), bathrooms (#), bedrooms (#), lot size (acres), age (years), and fireplace (1=yes, 2=no). A real estate agent receives a commission for each home they sell. To guide their housing choices to maximize their commission, the agent would like to examine if older homes sell for the same price as newer homes.
 - a) Add a new categorical variable to the *RealEstate* dataset called *Old*. Classify an old home as one that is greater than 30 years old, and a new home as one that is less than or equal to 30 years old.
 - b) Test the hypothesis that old and new homes sell for the same price at the 0.05 level. State the hypotheses, perform the test and interpret your results.
 - c) Determine the 95% confidence interval for the mean difference in price between new and old homes.
 - d) Create a bar plot of the old and new home means with bars showing the 95% confidence intervals. Add proper labels.

Save your R Script as: **Last Name, First Name Module 3 Assignment**

Upload your R Script to the **"Module 3 Assignment"** drop box on Moodle before **February 1st at 11:59 PM.**