

In this assignment, you will ask and answer the questions below. The objectives of the assignment are to:

- Practice computing confidence intervals and sample size calculation;
- Employ t-tests for hypothesis testing of means.

1. According to 2016 American Community Survey, the point estimates of average per capita income for Beaverton, Hillsboro, and Portland and the corresponding Margin of Error is listed in the table below. Can you state with 95% confidence level that the average per capita income in Portland is higher than Beaverton and Hillsboro? Hint: ACS uses margin of errors corresponding to 90% confidence level. (15 pts)

	Per capita Income Estimate	Margin of Error
Beaverton City	\$34,414	+/-2,606
Hillsboro city	\$32,296	+/-2,930
Portland city	\$37,513	+/-989

2. You have been asked to manage a regional study on attitudes toward regional growth management. You've been given a budget of \$75,000 to conduct a regional mail survey of households. Your Board wants to know the proportion of residents in favor of an urban growth boundary within an accuracy of plus or minus two percent and at a confidence level of 90 percent. (Recall that when you don't know the true population proportion, to be conservative you should assume a maximum standard error). What is the minimum number of households you need to randomly sample? Can you conduct the survey within budget given an estimated cost of \$25 for administering each survey? (15 pts)

3. A random sample of adults living in 60 traditional, mixed-use, pedestrian-friendly neighborhoods and adults living in 55 postwar, auto-oriented neighborhoods, all with comparable household income levels, revealed the following:

- Traditional neighborhoods averaged 15.8 daily vehicle miles traveled (VMT) per adult household member, with a standard deviation of 5.3 VMT.
- Auto-oriented neighborhoods averaged 18.3 VMT per adult household member and a standard deviation of 7.5 VMT.

Create 90% confidence intervals for VMT for each type of neighborhoods. Do the intervals overlap with each other? Using the hypothesis testing process, test at $\alpha = .10$ level the hypothesis of New Urbanists that people living in traditional neighborhoods have lower automobile usage. (20 pts)

4. Housing values were compared between residences with a view of Mount Hood and otherwise comparable residences (e.g., amenities, neighborhood quality) though without a view. The analysis sought to measure the imputed value of a view on home sales prices. Two factors were also controlled for in the analysis: age of home and distance to downtown Portland. Thus, randomly selected homes that just sold were matched on these two factors, yielding the data shown in the excel spreadsheet view.csv. Test at $\alpha = .05$ level that homes with a view enjoy

significant value premiums, as reflected by differences in housing values. (20 pts)

5. Using your own data set and test a hypothesis with t-test. First select (or create by recoding) a nominal variable (“V1”) with two categories (for example, male and female, income above or below poverty line, before or after a “treatment”), then choose a continuous variable (or a discrete or even an ordinal variable if there is no continuous variable in your dataset) (“V2”), and finish the following tasks (30 points):

- 1.) Calculate confidence intervals for V2, first for all observations and then for each of the two groups (categories) in variable V1;
- 2.) Formulate a hypothesis for the relationship between the two groups (categories), conduct a t-test for your hypothesis, and interpret your hypothesis testing results;
- 3.) Describe and discuss your findings, as appropriate.