Unit 1 Practice Problems: Real Estate

Use the Real_Estate.xls file which consists of 100 homes purchased in 2007 and appraised in 2008. It includes variables regarding the number of bedrooms, number of bathrooms, whether the house has a pool or garage, the age, size and price of the home, what the house is constructed from, how far it is to the city center, and the appraisals from two agents.

PRACTICE PROBLEM 1: Perform a categorical analysis on the construction of the homes. Describe your findings.

PRACTICE PROBLEM 2: Create a frequency distribution & histogram on the sales price of the homes. Use ranges of 125-150k, 150-175k, …, 300-325k. Describe your findings.

PRACTICE PROBLEM 3: Compute the descriptive statistics for the sizes of the homes. Describe your findings.

Solutions are provided to practice problems so you can check your work.

Unit 2 Practice Problems: Real Estate

Use the Real_Estate.xls file which consists of 100 homes purchased in 2007 and appraised in 2008. It includes variables regarding the number of bedrooms, number of bathrooms, whether the house has a pool or garage, the age, size and price of the home, what the house is constructed from, and the appraisals from two agents.

PRACTICE PROBLEM 1: Create a pivot table of Pool and Garage. Then complete the Joint Probability table so you can answer the following:

a) What is the probability of randomly choosing a home that has no pool?
b) What is the probability of randomly choosing a home that has a pool AND no garage?
c) What is the probability of randomly choosing a home that has a pool OR a garage?
d) Given that the home you selected has a pool, what is the probability it also has a garage?

PRACTICE PROBLEM 2: Let's assume that the Real_Estate.xls file was the entire population. We know the mean and standard deviation of home sizes to be 2212 sq. ft. and 235 sq. ft., respectively. Using the Normal_ Probability.xls file, compute the percentage of homes that are

a) smaller than 2500 sq. ft.?
b) larger than 2300 sq. ft.?
c) between 2000 and 2100 sq. ft.?
d) The largest 20% of homes are greater than what size?

In each case, compare the computed results to the truth as found in the actual data file.

PRACTICE PROBLEM 3: Knowing the mean and standard deviation of home sizes to be 2212 sq. ft. and 235 sq. ft., respectively, if we were to visit 4 homes at random every day and compute the mean size, what is the probability that the mean would be

a) smaller than 2500 sq. ft.?
b) larger than 2300 sq. ft.?
c) between 2000 and 2100 sq. ft.?
d) 20% of the time what would you expect the mean to be above?

Solutions are provided to practice problems so you can check your work.

Unit 3 Practice Problems: Real Estate

Use the Real_Estate.xls file which consists of 100 homes purchased in 2007 and appraised in 2008. It includes variables regarding the number of bedrooms, number of bathrooms, whether the house has a pool or garage, the age, size and price of the home, what the house is constructed from, how far it is to the city center, and the appraisals from two agents.

PRACTICE PROBLEM 1: You wish to know the average sale price of a home in 2007. Compute the 95% confidence interval of the mean using the sample of 100 homes. Describe your findings.

PRACTICE PROBLEM 2: You wish to know the proportion of homes with a swimming pool in 2007. Compute the 95% confidence interval of the proportion using the sample of 100 homes. Describe your findings.

PRACTICE PROBLEM 3: You wish to learn the average appraised price of a home in 2008 within $5000, and with 95% confidence, assuming a standard deviation of $43,250. How large of a sample should you get? (*note: the standard deviation shown here was computed from the 200 appraisals in the sample; unless historical data is provided, the best option is to take an initial sample of at least 30 to get an estimated standard deviation*).

PRACTICE PROBLEM 4: You wish to learn the proportion of homes with a garage within 3%, and with 90% confidence. How large of a sample should you get? (*note: the estimate of the true proportion is defaulted to 0.50 unless you have prior knowledge or an initial sample. Since there is a sample of 100 in the data file and 66 of the 100 have a garage, you can use 0.66 as the estimate. standard deviation shown here was computed from the 200 appraisals in the sample; unless historical data is provided, the best option is to take an initial sample of at least 30 to get an estimated standard deviation*).

Solutions are provided to practice problems so you can check your work.

Unit 4 Practice Problems: Real Estate

Use the Real_Estate.xls file which consists of 100 homes purchased in 2007 and appraised in 2008. It includes variables regarding the number of bedrooms, number of bathrooms, whether the house has a pool or garage, the age, size and price of the home, what the house is constructed from, how far it is to the city center, and the appraisals from two agents.

PRACTICE PROBLEM 1: Assume that in 2000, the average sales price of a home was $205,000. Has this increased in seven years? Using the sample of 100 homes, conduct a one-sample hypothesis test to determine if the mean sales price of a home is greater than $205,000. Use a .05 significance level.

PRACTICE PROBLEM 2: Assume you read in an advertisement that the average home in a community is 5 years. Is this really true? You took a sample of 100 homes (in the data file). Conduct a one-sample hypothesis test to determine if the mean age is different from 5 years. Use a .05 significance level.

PRACTICE PROBLEM 3: You have heard from many folks in the real estate business that fewer than half of the homes are made of brick, and you decide to put data to the test. You took a sample of 100 homes (in the data file). Conduct a one-sample hypothesis test to determine if the proportion of homes made of brick is less than 50%. Use a .05 significance level.

Solutions are provided to practice problems so you can check your work.

Unit 5 Practice Problems: Real Estate

Use the Real_Estate.xls file which consists of 100 homes purchased in 2007 and appraised in 2008. It includes variables regarding the number of bedrooms, number of bathrooms, whether the house has a pool or garage, the age, size and price of the home, what the house is constructed from, how far it is to the city center, and the appraisals from two agents.

PRACTICE PROBLEM 1: It has been noted that swimming pools do nothing to increase value of a home. Using the sample of 100 homes, conduct a hypothesis test for two independent samples to determine if the mean sales differs for homes with and without a pool. Use a .05 significance level. *Note that this requires an assumption that homes with a pool vs. those without are not much different otherwise (if those with a pool are in better locations, made of better materials, are newer and larger, then those homes will be worth more and it won't have a thing to do with a pool. So for the sake of simplicity, let's assume that the homes with vs. without a pool have similar variability in them.*

PRACTICE PROBLEM 2: How different can two real estate agents be in their appraisals? In the sample of 100 homes (in the data file), conduct a hypothesis test for paired samples and test if there is a difference in the mean appraisal prices given by these agents on the same homes. Use a .05 significance level.

PRACTICE PROBLEM 3: If people are going to spend a lot on their homes by constructing them out of brick, are they going to take the plunge and get a swimming pool too? Using the sample of 100 homes (in the data file), conduct a hypothesis test of proportions to determine if the proportion of homes made of brick are more likely to have a swimming pool vs. homes made of other materials. Use a .05 significance level.

PRACTICE PROBLEM 4: You might expect that homes with more bedrooms are worth more since they are probably larger, but is there more to the value (like location, construction, age, etc.).? Using the sample of 100 homes (in the data file), conduct a hypothesis test using Analysis of Variance to determine if there is a difference in the mean sale price of homes with 2 bedrooms vs. 3 bedrooms vs. 4 bedrooms vs. 5 bedrooms. Use a .05 significance level. *Since there are homes made of varying sizes at different locations and made of different material for this sample, it would be reasonable to assume that location and construction are not factors in this test.*

Solutions are provided to practice problems so you can check your work.

Unit 6 Practice Problems: Real Estate

Use the Real_Estate.xls file which consists of 100 homes purchased in 2007 and appraised in 2008. It includes variables regarding the number of bedrooms, number of bathrooms, whether the house has a pool or garage, the age, size and price of the home, what the house is constructed from, how far it is to the city center, and the appraisals from two agents.

PRACTICE PROBLEM 1: It has been noted that swimming pools do nothing to increase value of a home, and yet, understandably, many homes have them. Whether a homeowner puts in a pool depends largely on the size of their backyard, whether the subdivision has a community pool, and the general climate in their location. Using the sample of 100 homes (in the data file), conduct a Chi Square Goodness of Fit test to determine if there is an equal split in those homeowners who have or do not have a swimming pool installed. Use a .05 significance level.

PRACTICE PROBLEM 2: Brick is better for maintaining the value of a home, no doubt, but it costs more up front and can prove a barrier to prospective buyers. If the historical data for your city showed 40% of the homes sold in the USA in the last 25 years were made of wood, 30% of brick and 30% of stucco, how does the sample of homes in your city compare (i.e., the 100 homes in the data file)? Using the sample of 100 homes (in the data file), conduct a Chi Square Goodness of Fit test to determine if the homes purchased recently fit the distribution of homes in the USA in terms of construction material. Use a .05 significance level.

PRACTICE PROBLEM 3: A swimming pool is considered a luxury, especially since it doesn't add value to a home in most cases. And brick homes cost more to build than those of wood or stucco. So if you follow the money, might you see that those with brick homes are more inclined to spend the money on a swimming pool? Or perhaps those who saved money by buying a wood home used their savings to get a pool? Using the sample of 100 homes (in the data file), conduct a Chi Square Test of Independence to determine if owning a swimming pool is independent of the construction of one's home. Use a .05 significance level.

Solutions are provided to practice problems so you can check your work.

Unit 7 Practice Problems: Real Estate

Use the Real_Estate.xls file which consists of 100 homes purchased in 2007 and appraised in 2008. It includes variables regarding the number of bedrooms, number of bathrooms, whether the house has a pool or garage, the age, size and price of the home, what the house is constructed from, how far it is to the city center, and the appraisals from two agents.

PRACTICE PROBLEM 1: When you get ready to sell your house, you get it appraised so that you know how much you can sell it for. Depending on the economy, your patience and the accuracy of the appraisal, you hopefully sell your home for as much as possible. One would expect that a higher appraisal means a higher sales price. Using a significance level of .05, test whether there is a correlation between the Appraisal #1 and the sales price. Also, answer the following:

a) What is the correlation coefficient and how strong is it?
b) What is the best fit regression equation that can predict sales price from the appraised value?
c) What percent of the variability in the sales price can be explained by the regression model?
d) What would you expect a house to sell for if the appraised value is $250,000?

PRACTICE PROBLEM 2: When appraising a house, an agent looks at many different factors and draws comparisons to historical data. Create a multiple regression model predicting the Appraisal #2 by using the Size, whether the house has a Pool, whether the house has a Garage, the number of Baths, the number of Bedrooms, and the Age. Use the Stepwise technique to eliminate non-significant variables, one at a time, until all remaining variables are significant. Use a .05 significance level. After you create your model, predict the appraisal price for a 5-year old home that is 2000 square feet, has 3 bathrooms, 4 bedrooms, a pool, and a garage.

Solutions are provided to practice problems so you can check your work.