



DUE: March 15th, 2019 at 11:59 PM

QMM 1002 Case Study 1

SCENARIO

Rockland, Ontario is a community located 40 km east of Ottawa on the Ottawa River. On January 1, 1988 the Town of Rockland was amalgamated with Clarence Township, forming a city with two areas. A family of four is interested in purchasing a home in Rockland – they have a budget of \$350 000. They want to investigate the area and learn about homes on the market before making a decision to purchase. A random sample of 169 dwellings is taken from the MLS listings and the following variables are recorded: list price, type of dwelling (apartment, house, mobile, or row/townhouse), number of bedrooms, number of bathrooms, title (freehold or condo), and area (Clarence-Rockland or Rockland). The data is given in the file “*Rockland.csv*”. Specifically, the family is interested in answering the following questions:

1. What should they expect to pay to buy a home in Rockland? Can they afford to buy a home in Rockland?
2. How do the list prices compare for the different types of homes?
3. Is it more expensive to purchase a home in one area of the city?
4. Are there any specific patterns/differences in the types of homes available that will have enough bedrooms for the family of four?

CASE STUDY 1

For the scenario above, answer the **four given questions** and any questions you create that could help a family learn about homes in Rockland by conducting appropriate statistical tests. You will complete the tests in R and write up a summary of your methods and interpretations of your results in a short report using Word. In your report you must:

- State the statistical tests and methods that are utilized (You must create at least one confidence interval, perform at least one t-test and one ANOVA)
- List all null and alternative hypotheses for the tests used
- Check all assumptions and conditions for the tests used
- Include at least two plots in your report to investigate the data and describe/interpret the plots created

EVALUATION

A rubric is provided on the next page that details ALL of the requirements of the report. You must submit a Word document of your report (a template is provided) and an R script that includes all of your code.

	0 marks	1 mark	2 marks	3 marks	Gr.
<u>Data Analysis</u>	No confidence interval is included	A confidence interval is included with more than 1 error	A confidence interval is included with 1 error	A correct confidence interval is included	
	No or an inappropriate t-test is included	An appropriate t-test is included with more than 1 error	An appropriate t-test is included with 1 error	A correct and appropriate t-test is included	
	No or an inappropriate ANOVA test	An ANOVA is included with more than 1 error	An ANOVA is included in 1 error	A correct ANOVA test is included	
	No plots are created	A single correct plot is created to support the data analysis	At least two plots are created but contain errors	At least two correct plots are created to support the data analysis	
<u>Report</u>	No conditions and assumptions are checked	Conditions and assumptions are checked with 2 errors	Conditions and assumptions are checked with 1 error	All conditions and assumptions are checked correctly and in detail	X3
	The Rockland housing scenario question is not answered	The housing scenario question is answered with some missing detail	The housing scenario question is clearly answered in full detail	N/A	X4
	No interpretation of test/confidence intervals is included	Interpretation of test/interval is included with error	A correct interpretation is given for the test/interval	N/A	X3
	No correct hypotheses are included for the test conducted	Hypotheses are included for the test conducted with at least 1 error	Correct hypotheses are included for the test conducted	N/A	X2
	No interpretation of plots	Plot is interpreted with at least 1 error	Plot is correctly interpreted	N/A	X2
<u>Format</u>	Numerous spelling errors, incorrect punctuation, and/or severe errors in grammar so that the report is hard to understand.	Frequent spelling errors, incorrect punctuation, and grammar problems that sometimes interfere with understanding.	Occasional lapses in spelling, punctuation, grammar, but not enough to seriously distract the reader.	Very few spelling errors, correct punctuation, grammatically correct, complete sentences.	
	Incorrect notation and terminology used throughout	More than 2 errors in notation and terminology	1-2 minor errors in notation and terminology	No errors in notation or terminology	
	There are not 3 sections of the report	There are 3 sections of the report as given in the template	N/A	N/A	
<u>Bonus</u>	No additional test(s) are conducted	N/A	N/A	Additional test(s) are conducted and interpreted without error to support decision making	