STAC32 Assignment 2

Due Thursday September 19 at 11:59pm

Hand in your answers to Question 2. Question 1 contains suggested problems from PASIAS to work through. They may contain hints for the question to hand in.

The assignment is due on the date shown above. An assignment handed in after the deadline is late, and may or may not be accepted (see course outline). My solutions to the assignment questions will be available when everyone has handed in their assignment.

You are reminded that work handed in with your name on it must be *entirely your own work*.

Assignments are to be handed in on Quercus. See `https://www.utsc.utoronto.ca/~butler/c32/quercus1.nb.html` for instructions on handing in assignments in Quercus. Markers' comments and grades will be available there as well.

You will probably want to begin with this:

```
library(tidyverse)
```

(If you have opened a new project on `rstudio.cloud` for this assignment, you will most likely need `install.packages("tidyverse")` first.)

1. In PASIAS , work through problems 6.1 through 6.4.

   Hand the next question in:

2. How accurate are radon detectors of a type sold to homeowners? In a study, researchers placed 12 detectors of this type in a chamber that exposed them to a certain dose of radon. The data are in `http://www.utsc.utoronto.ca/~butler/assgt_data/radon.txt`. There is only one column of values. These values are in units of picocuries per litre.

   (a) (2 marks) Read in and display the data.

   (b) (3 marks) Obtain numerical summaries for the radon readings, one to summarize the centre, and the other to summarize spread.

   (c) (4 marks) Obtain a 90% confidence interval for the mean radon level (of all detectors of this type). Make a brief statement containing your conclusion in the context of the data.

   (d) (3 marks) The researchers actually filled the chamber with radon at a concentration of 105 picocuries per litre. Test whether the mean reading (of all detectors of this type, if they had been placed in this chamber) differs from 105. What do you conclude, in the context of the data?

   (e) (2 marks) Why might you have guessed, looking at your confidence interval, that your hypothesis test would come out the way it did? Explain briefly.

   (f) (3 marks) Make a suitable graph to display your data. Does your graph suggest that it is reasonable to use t-procedures here, or not? Explain briefly.