

MTH225 Spring2017 Final Problem 12

MCAS scores in a certain district appear to be slightly higher than last year's average of 243.1. The superintendent is interested in finding the probability that this year's average is indeed higher than 243.1, based on a sample of 120 scores.

The data is in `MTH225_Spring2017_Final_Problem12.csv`. The variables are:

- MCAS Mean MCAS score for this student

Use STAN to model the data as a sample from a normal distribution, and use the posterior draw to compare the value of the mean parameter to last year's value of 243.1, and to estimate the probability that this year's mean is higher than 243.1.

MCAS scores range between 220 and 280. Your prior for the mean score should allow for values in this range.

- 2 points: Write R code to read the data and convert it to an R data frame.
- 1 point: Write the data block of a STAN model file that extracts the data from the R workspace.
- 1 point: Write the parameters block of a STAN model file that declares the parameter(s) of your model.
- 2 points: Write the model block of a STAN model file that specifies the priors and likelihood for your model.
- 1 point: Write R code to apply the `extract` function to the data structure output from the `stan` function.
- 1 point: Use the `extract()` function of the RSTAN package to obtain the values for the parameters from the posterior draw.
- 1 point: Compute 95% confidence intervals for the differences between this year's mean and 243.1.
- 1 point: Use the posterior draw for this year's mean to estimate the probability that it is greater than 243.1.

(10 points possible)