

# MATH 4780 (MSSC 5780) In-class Activity 5

November 11, 2023

Adam, please present your work on Nov 14. Remember to ask MATH 4780 students two Non-yes-no questions. You, as a teacher, try to get students understand your work.

## Regression to the mean (Adam)

Francis Galton, one of the original quantitative social scientists, who fit linear models to understand the heredity of human height. Predicting children's heights from parent's heights, he noticed that children of tall parents tended to be taller than average but less tall than their parents. From the other direction, children of shorter parents tended to be shorter than average but less short than their parents. Thus, from one generation to the next, people's heights have "regressed" to the average or mean, in statistics jargon.

1. Tell the history and story of regression to students.
2. Demonstrate the idea using the data `height.txt` (in inches) to predict daughter's height from mother's height.
3. If *regression to the mean* is true, does that mean "*daughters will be more average than their mothers, and that if this continues, each generation will be more average than the last, until, after a few generations, everyone will be just about of average height?*" For example, a mother who is 8 inches taller than average is predicted to have a daughter 4 inches taller than average, whose daughter would be predicted to be only 2 inches taller than average, with her daughter predicted to be only an inch taller than average, and so forth. Comment on the correctness of the statement.