Boston University
Department of Mathematics and Statistics

MA213 - Fall 2025

Basic Statistics and Probability
Lab 6 Plan

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1. Objectives

   - Describe and Assess Relationships Between Two Variables: Describe the association between two numerical variables in a scatter plot in terms of direction, shape (linear or nonlinear), and strength, and assess whether linear regression is an appropriate model.
   - Compute and Interpret Correlation and R^2: Compute and interpret correlation coefficients and R^2 values, while recognizing that correlation does not imply causation. [Q5, L6]
   - Fit and Interpret Linear Models Using Least Squares: Fit the intercept and slope of a linear model to data using the least squares method, interpret the fitted values, and use the model to predict responses to new inputs. [Q5, L6]

2. Plan

   - 1. Walk through linear regression
     (a) Checking the assumption (linearity, normal residual, constant variability, independence)
     (b) Finding fitted line by formula using R
     (c) Interpretation of parameter estimates
     (d) R^2 to describe the strength of a fit
     (e) Inference for linear regression
     (f) lm function and usages
   - 2. Regression data anlysis on different data (group work)
     (a) Checking the assumption (linearity, normal residual, constant variability, independence)
     (b) Finding fitted line by lm function
     (c) Interpretation of parameter estimates
     (d) R^2 to describe the strength of a fit
     (e) Inference for linear regression

3. Grouping

   - How many students? (4 to 5?)
   - Randomly assigned or Student can choose ?