

Dataset 2: Penguin

- This dataset includes size measurements for adult foraging penguins near Palmer Station, Antarctica. The location of each penguin was also found.
- The following variables are used:
 - species – factor denoting penguin species (Adelie, Chinstrap, and Gentoo)
 - island – a factor denoting island in Palmer Archipelago, Antarctica (Biscoe, Dream, or Torgersen)
 - sex – factor denoting penguin sex (female, male)
 - body_mass_g – body mass of penguin in grams
- Use this to answer the following questions:

Part (a): Is the variance of body mass different for each sex of the penguin? Conduct a hypothesis test to test this. Also check the assumptions of this test.

Part (b): Does the species of penguins have different mean weights? Conduct a one-factor ANOVA to determine this.

Part (c): Based on your results from part (b), should you proceed with multiple comparisons of means? If yes, determine which penguin has the lowest mean and which penguin has the highest mean weight.

Part (d): Does the different islands have different average weight of penguins? Conduct a one-factor ANOVA to determine this. There is no need to do post-hoc analysis for this step.

Part (e): Conduct a two-factor ANOVA with species as one factor and sex as another factor to compare the mean weights of the penguins. Make sure to conduct all relevant hypothesis tests.