COP2073C Practice Exercise 9

- Use the survey data frame from the package MASS for this exercise.
  - To install a package in R, use install.packages("package_name").
  - To load a library from an installed package, use library(package_name).
- Using the fitted model of student height on writing hand span, provide point estimates and 99% confidence intervals for the mean student height for hand spans of 12, 15.2, 17, and 19.9 cm.
- Fit a simple linear model to predict the mean student height from their pulse rate, given in the variable Pulse.
- Fit the regression model and create a scatterplot with the fitted line superimposed on the data.
- Identify and interpret the point estimate of the slope, as well as the result of the hypothesis test for H0: B1 = 0; HA: B1≠ 0. Find a 90% confidence interval for the slope parameter.
- Create an incomplete.obs vector for the current "height on pulse" data using the which() function.
- Using the unary "-" operator to exclude that vector, calculate the sample mean of the height observations used in the fitted model, e.g., mean(survey$Height[-incomplete.obs]).
- Add a horizontal line to the plot representing this mean (use color or line type options to avoid confusion with the other lines present).

Non-Functional Requirements:

- Include a 4-line ID header at the beginning of your script.
- Include vertical spacing (a blank line) between logical blocks for readability.
- Comment your code thoughtfully (avoid excessive commenting).
- Ensure each line of code does not exceed 80 columns.

Sample Output:

```
       fit      lwr      upr
1 151.3285 145.6937 156.9633
2 161.3390 158.0832 164.5947
3 166.9698 164.8601 169.0796
4 176.0418 174.2389 177.8447

Slope Estimate:  -0.0732099
t-statistic:  -1.101584
p-value:  0.2722184

The point estimate of the slope is  -0.0732099 , which indicates that
for each unit increase in pulse rate, the expected change in student
height is  -0.0732099  cm.
```

The p-value is 0.2722184 , which is greater than the significance level of 0.05. This suggests that we fail to reject the null hypothesis (H0: B1 = 0) and conclude that there is no statistically significant relationship between pulse rate and height.
90% Confidence Interval for Slope: -0.183131 0.0367112

Mean Student Height: 172.5167