# Tutorial 8

## Solutions to manually graded questions

**Question 1.2**
{points: 1}

We have just calculated the 95% confidence interval for the mean brozek index for men of different weights in our sample.

Provide a brief interpretation for the 95% confidence interval for prediction you have calculated in row 1.

> *Your answer goes here.*

## BEGIN SOLUTION

Row 1: with 95% confidence, we expect the average brozek index for a man that weights 154.25lb to be between 13.954 and 15.943

## END SOLUTION

**Question 1.4**
{points: 1}

We have just calculated the 95% prediction interval for the brozek index of men of different weights in our sample.

Provide a brief interpretation for the 95% prediction interval you have calculated in row 1. Your interpretation goes here.

> *Your answer goes here.*

## BEGIN SOLUTION

Row 1: with 95% confidence, the brozek index for a man that weights 154.25lb will be between 2.824 and 27.072.

## END SOLUTION

**Question 1.5**
{points: 1}

Compare the confidence intervals computed in **Question 1.1** with those computed in **Question 1.3** (by row). Which confidence intervals are wider?? Respond and explain why in one or two sentences.

> *Your answer goes here.*

## BEGIN SOLUTION

PI are wider than CIP. There are 2 sources of variation in PI, the variation in estimating the LR plus the variation between the LR and an actual observation.

## END SOLUTION

**Question 2.5**
{points: 1}

Interpret the coefficient of determination $R^2$ computed in **Question 2.4** and comment on the goodness of fit of the selected model.

> *Your answer goes here.*

## BEGIN SOLUTION

The obtained `r.squared` value suggests that `fat_bwd_generative` is a good model (compared to the intercept-only model) as it explains about 73% of the observed variation in the response.

## END SOLUTION

**Question 2.6**
{points: 1}

Previous research has shown that while weight can be highly variable during the day and even across days, body circumference measurements (e.g., abdominal circumference) are more stable and better predictors of body fat. Using the results from **Question 2.3**, corroborate if the abdominal circumference, `abdom` is statistically associated with the percent of body fat measured by `brozek`.

In your answer, include an interpretation of the estimated coefficients as well as the results of the $t$-tests reported using `tidy()`.

> *Your answer goes here.*

## BEGIN SOLUTION

The estimated coefficient of `abdom` in `fat_bwd_generative` equals 0.996. This indicates that for every additional $\mathrm{cm}$ of abdomen circumference, and holding all other variables fixed, the percent of body fat measured by `brozek` increases by 0.996.

The p-value for the $t$-test of this coefficient is 6.786360e-24. Thus, we have enough evidence to reject the null hypothesis that `abdom` and `brozek` are not associated (or slope = \beta_{abdom} = 0).

## END SOLUTION