**HANDS-ON ANALYSIS (TO BE SUBMITTED ON 1ST August 2020)**

Use the *churn* data set, and complete the following exercises:

1. Explore whether there are missing values for any of the variables.
2. Use a graph to visually determine whether there are any outliers among the number of

calls to customer service.

1. Identify the range of customer service calls that should be considered outliers, using:

the *Z*-score method;

the IQR method.

1. Transform the *day minutes* attribute using *Z*-score standardization.
2. Work with skewness as follows:

Calculate the skewness of *day* minutes.

Then calculate the skewness of the *Z*-score standardized *day minutes*. Comment.

Based on the skewness value, would you consider *day minutes* to be skewed or nearly

perfectly symmetric?

6. Construct a normal probability plot of *day minutes*. Comment on the normality of the data.

**7** Work with *international minutes* as follows:

Construct a normal probability plot of *international minutes*.

What is preventing this variable from being normally distributed.

Construct a flag variable to deal with the situation in (b).

Construct a normal probability plot of the derived variable *nonzero international minutes*.

Comment on the normality of the derived variable.

**8.** Transform the *night minutes* attribute using *Z*-score standardization. Using a graph,

describe the range of the standardized values.