Q1)

1. Shapiro test indicates that the data cannot be from a normal distribution
2. Since data is not normal, we applied Wilcoxon signed rank test. p-val = 0.04763 < 0.05 (alpha) => H0 rejected => H1 accepted
3. CLT Confidence Interval around mean: [13.911658,18.133797]
4. 95% pivotal confidence interval: (13.82, 18.00)

Q2)

1. Shapiro test indicates that the data cannot be from a normal distribution
2. Since data is not normal, we applied Wilcoxon signed rank test. p-val = 0.02063 < 0.05 (alpha) => H0 rejected => H1 accepted
3. 95% bootstrap pivotal interval: ( 0.480, 5.080 )

Q3)

1. Fat% (in women aged between 23-61) = 0.2401\*Age+20.1116
2. R squared: 0.2566 (Poor estimate, not good for prediction)

P-value: 0.06451 > 0.05, we cannot conclude that the predictor variable age affects the response variable fat % in women aged between 23 and 61.

1. In the linear model, we tried to build in order to predict fat% of women aged between 23 and 61 (response variable) as a function of age (predictor variable). We found that a linear relationship could be established by looking at the dataset. The relationship that was found was Fat% = 0.2401\*Age+20.1116 by regression. The model was built with a data age range of 23 to 61 and thus limiting the model's prediction capacity to this age range.

0.2401 (coefficient of age) indicates the change in the average fat% in women for a unit change in age.

The model created had a low R squared of 0.2566 which indicates the low prediction power of the model.

The p-value was also > 0.05 and thus we were unable to conclude that age affects the response variable fat % in women aged between 23 and 61.

Q4)

1. From Shapiro test, p-val= 0.3669 > 0.1 => normal
2. From Shapiro test, p-val= 0.8269 > 0.1 => normal
3. On using two sample T-test, p-val = 0.9998 > 0.05 (alpha) => do not reject Ho, insufficient data to conclude
4. On conducting the test to verify that the average amount of butterfat in Ayrshire cow milk is greater than that of Guernsey cow's milk, we found that the test yielded a p-value of 0.9998. This p-value is greater than the level of significance of 0.05 used for the test. The result indicates that we have insufficient data to make such claims and that there maybe a possibility of the average butterfat in Ayrshire cow being less than or equal to Guernsey cow's milk. We would need more data to make a conclusive statement.

Q5)

1. Ho: 𝜇1973 <= 𝜇1970; H1: 𝜇1973 > 𝜇1970
2. From Shapiro test, data normal. T-test concludes p-val = 0.759> 0.05 (alpha) => do not reject Ho, insufficient data to conclude
3. On conducting the test to verify that the average amount of wheat produced per unit area in the year 1973 is greater than that of the year 1970, we found that the test yielded a p-value: 0.759. This p-value is greater than the level of significance of 0.05 used for the test. The result indicates that we have insufficient data to make such claims and there maybe a possibility of the average amount of wheat produced per unit area in 1973 is less than or equal to that of the year 1970. We would need more data to make a conclusive statement.