# STAT212 Assignment 6

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April 05, 2021

## Answer to Question 1

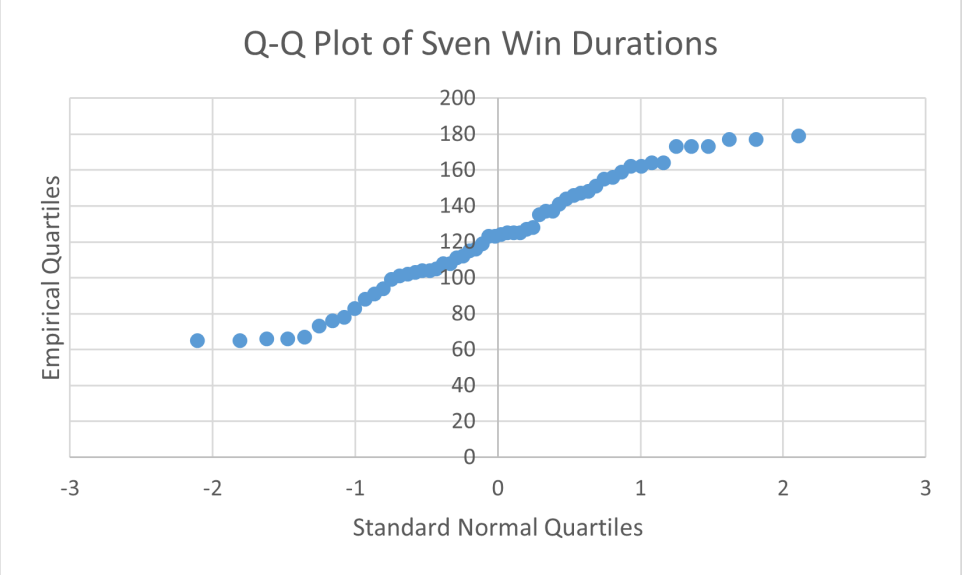
mean time it takes for Sven to beat his brother:

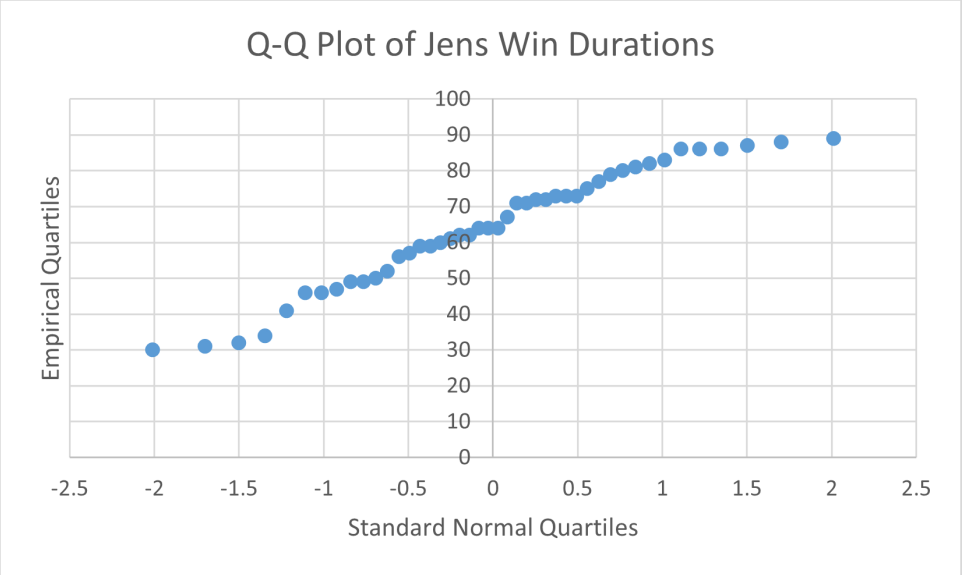
$$\frac{\text{total duration of games won}}{\text{games won}} = \frac{6879}{56} = 122.84$$

mean time it takes for Jens to beat his brother:

$$\frac{\text{total duration of games won}}{\text{games won}} = \frac{2826}{44} = 64.23$$

## Answer to Question 2



## Answer to Question 3

For Sven, all the observations lie 'roughly' on a straight line. For this instance, it is plausible to conclude that the 56 win durations recorded follow a normal distribution approximately.

For Jens, all the observations lie 'roughly' on a straight line. For this instance, it is plausible to conclude that the 44 win durations recorded follow a normal distribution approximately.

## Answer to Question 4

$$\mu_1 = \text{mean duration of games Sven wins}$$

$$\mu_2 = \text{mean duration of games Jens wins}$$

$$n_1 = 56$$

$$n_2 = 44$$

$$\bar{x}_1 = 122.84$$

$$\bar{x}_2 = 64.23$$

$$s_1 = 33.50$$

$$s_2 = 16.72$$

For a confidence level of $1 - \alpha$, we find $t_{\alpha/2}$ with $df = \Delta$, where

$$\Delta = \frac{[(s_1^2/n_1) + (s_2^2/n_2)]^2}{\frac{(s_1^2/n_1)^2}{n_1 - 1} + \frac{(s_2^2/n_2)^2}{n_2 - 1}}$$

rounded down to the nearest integer.

For a 70% confidence interval:

$$\alpha = 0.30$$

$$df = 84$$

$$t_{\alpha/2} = t_{0.30/2} = t_{0.15} = 1.043$$

The endpoints of the confidence interval for $\mu_1 - \mu_2$ are

$$(\bar{x}_1 - \bar{x}_2) \pm t_{\alpha/2} * \sqrt{(s_1^2/n_1) + (s_2^2/n_2)}$$

or

53.25 to 63.97

## Answer to Question 5

We can be 70% confident that the difference between the mean win durations times of Sven and Jens is somwhere between 53.25 to 63.97. In other words, we can be 70% confident that Sven, relative to Jens, has a greater mean win duration time somwhere between 53.25 to 63.97 higher.

Thus, even though Sven won 56 out of 100 games, he is not a better player than Jens.