**Hypothesis Testing for Population Variance (**$σ^{2})$

Hypothesis testing for population variance is conducted using chi-squared distribution, provided the underlying population is normally distributed.

Consider the example below:



$$H\_{0}: σ^{2}=1 cm^{3}$$

$$H\_{1}: σ^{2}<1 cm^{3}$$

First convert the sample variance to a chi-squared statistic:



*df* = *n* – 1

Compare the $χ^{2}$ to the chi-squared critical value that has a $α$ area to the right at *df* = *n* – 1.

Interval Estimation

Estimate the value of $σ^{2}$ at 95% confidence.

To compute this, find two chi-squared critical values – one that has an area of $^{α}/\_{2}$ on its left and one that has an area of $^{α}/\_{2}$ on its right.

Let the chi-squared critical value with $^{α}/\_{2}$ on its right be denoted as $χ\_{^{α}/\_{2}}^{2}$

Let the chi-squared critical value with $^{α}/\_{2}$ on its left be denoted as $χ\_{^{1-α}/\_{2}}^{2}$

Lower Confidence Limit (LCL) :



Upper Confidence Limit (UCL):

