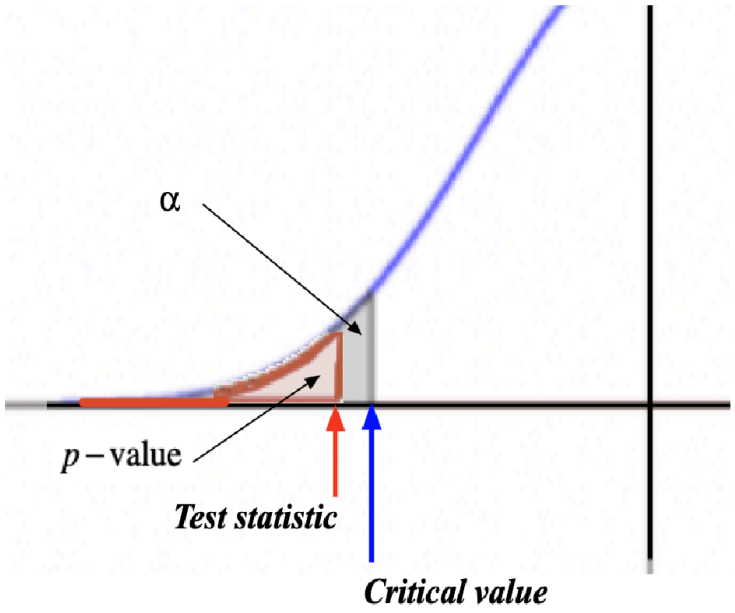
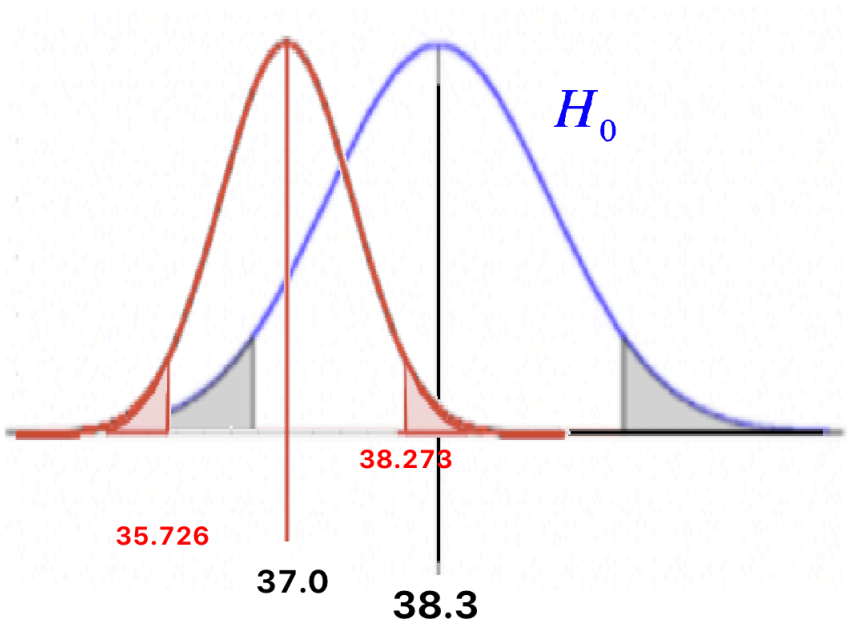
Using Confidence Intervals





n = 100 Confidence = 0.95

x_o = 37

sigma = 6.5

Margin of error, E = 1.273

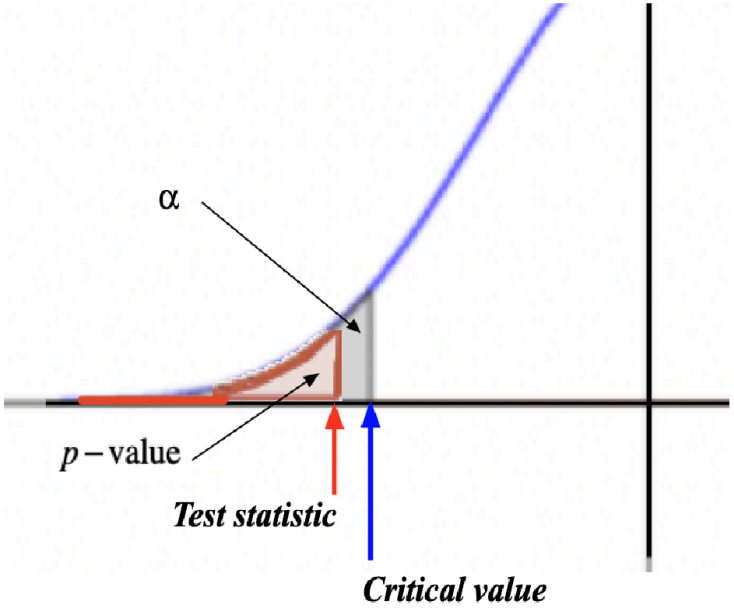
95% Confident the population mean is within the range:

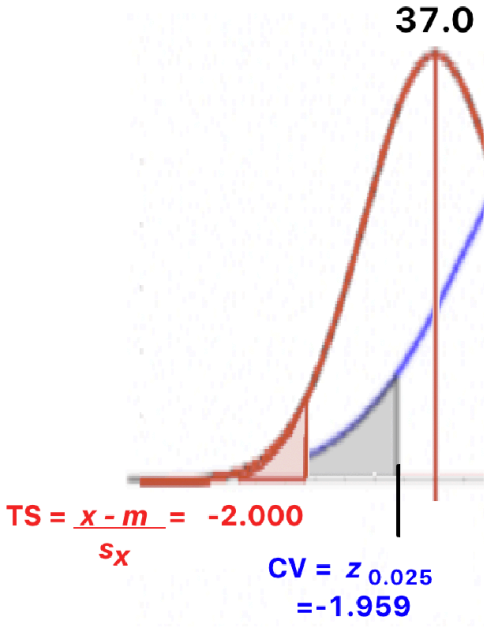
35.726 < mean <38.273

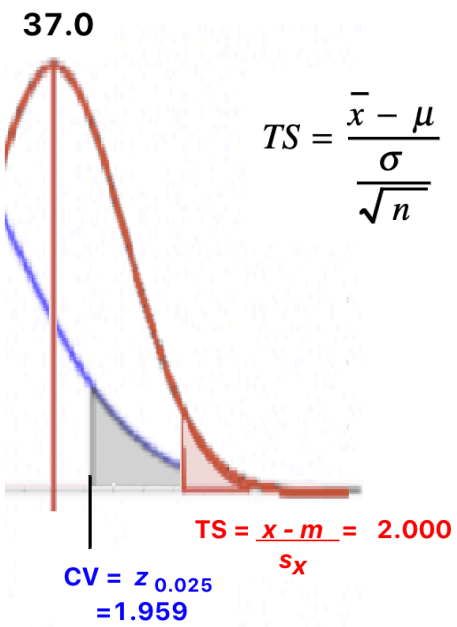
If our confidence interval contains the value claimed by the null hypothesis, then our sample result is close enough to the claimed value, and we therefore do not reject H_0.

If our confidence interval does not contain the value claimed by the null hypothesis, then our sample result is different enough from the claimed value, and we therefore reject H_0.

Using Rejection Regions







$$TS = \frac{\bar{x} - \mu}{\frac{\sigma}{\sqrt{n}}}$$

The rejection range is determined by the confidence interval. The boundaries become yur critical values. The complement of the confidence interval is the rejection range.

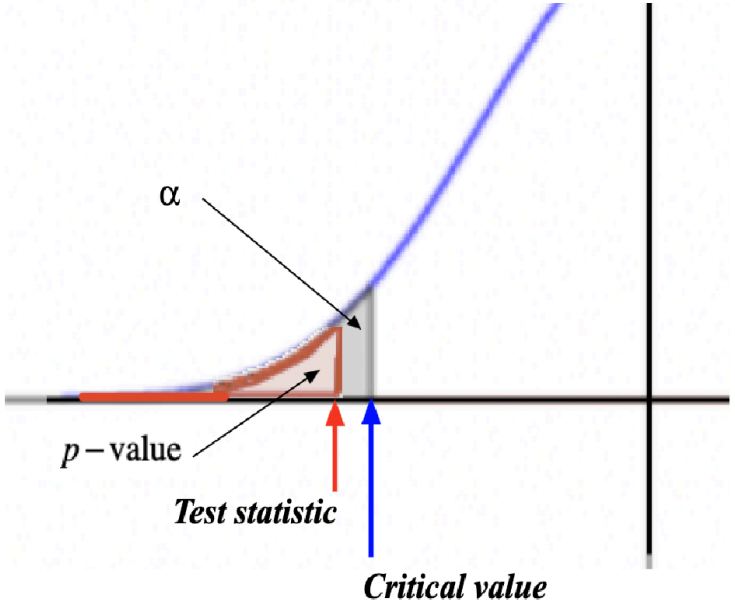
If the test statistic lies within this rejection range, we reject the null hypothesis.

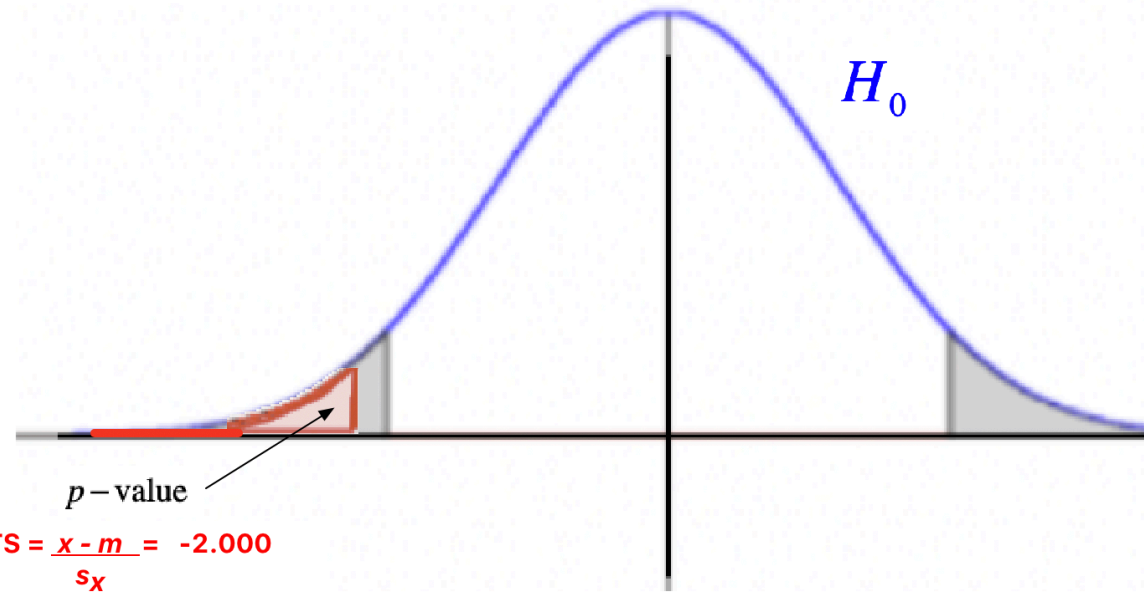
Otherwise, we fail to reject the null hypothesis.

```
Alternative Hypothesis:
  μ not equal to μ(hyp)

z Test
Test Statistic, z: -2.0000
Critical z:         ±1.9600
P-Value:            0.0455

95% Confidence interval:
35.72602 <  μ < 38.27398
```

$$TS = \frac{\bar{x} - \mu}{s_{\bar{x}}} = \frac{37 - 38.3}{\frac{6.5}{\sqrt{100}}} = -2.000$$

Using *p*-values





TS = $\frac{x - m}{s_x}$ = -2.000

p-value = *P*(*z* = -2.000) = 0.045

38.3

The *p*-value is the probability that your test statistic is it's calculated value.

If the p-value is less than alpha, **we reject the null hypothesis.**

Otherwise, we fail to reject the null hypothesis.

```
Alternative Hypothesis:
  μ not equal to μ(hyp)

z Test
Test Statistic, z: -2.0000
Critical z:        ±1.9600
P-Value:            0.0455

95% Confidence interval:
35.72602 <  μ < 38.27398
```