8 Steps to Formal Hypothesis Testing

1. Write the claim in symbolic form and state the "opposite of the claim"

2. State the null and alternative hypotheses, H_0 and H_1

3. Determine if the test is left-tailed (<), right-tailed (>), or two-tailed (≠)

based on H_1

4. Identify the significance level α *(and the area in two tails* $\alpha/2$ *if necessary)*

5. Find the critical value(s) based on the area(s) in the tail(s)

6. Find the value of the test statistic by substituting the sample data into one of the 4 formulas (*depending on what you're testing a claim about*)

7: Determine if the test statistic falls inside the critical region.

State if we should: Reject H_0 OR Fail to reject H_0

8: Write the formal conclusion (using the table) that connects the context of the original claim with the results from step 7.

Parameter Being Tested	**Requirements**	**Test Statistic Formula**
Proportion p	np ≥ 5 and nq ≥ 5	$z = \frac{\hat{p} - p}{\sqrt{\frac{pq}{n}}}$
Mean μ	σ is unknown and normally distributed population OR σ is unknown and n > 30	$t = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}}$
Mean μ	σ is known and normally distributed population OR σ is known and n > 30	$z = \frac{\bar{x} - \mu}{\frac{\sigma}{\sqrt{n}}}$
Standard deviation σ or variance σ^2	normally distributed population (strict requirement)	$\chi^2 = \frac{(n-1)s^2}{\sigma^2}$

Condition	**Conclusion**
Original claim does not include equality and you reject H_0	"There is sufficient evidence to support the claim that…(original claim)"
Original claim does not include equality and you fail to reject H_0	"There is not sufficient evidence to support the claim that…(original claim)"
Original claim includes equality and you reject H_0	"There is sufficient evidence to warrant rejection of the claim that…(original claim)"
Original claim includes equality and you fail to reject H_0	"There is not sufficient evidence to warrant rejection of the claim that … (original claim)"