S12 - 3.5 - Hyp Intro Notes

Hypothesis — a claim* or statement about a property of the population
Hypothesis Test - a procedure to test a claim about the property of a population

Null Hypothesis H_0 — a statement that the value of the population parameter
some claimed value. Assume it is true until a conclusion
to reject or fail to reject it.
Alternate Hypothesis H_A - a statement that differs from the null hypothesis

Test Statistic - a value used in making a decision about the null hypothesis
$p - value$ — the probability of a test statistic

Claim*
$H_0: \mu = \#$
$H_a: \mu \neq \# \ or \ H_a < \# \ or \ H_a > \#$
There is   sufficient evidence to reject the H_0 (Original Claim is rejected)
There is not sufficient evidence to reject the H_0
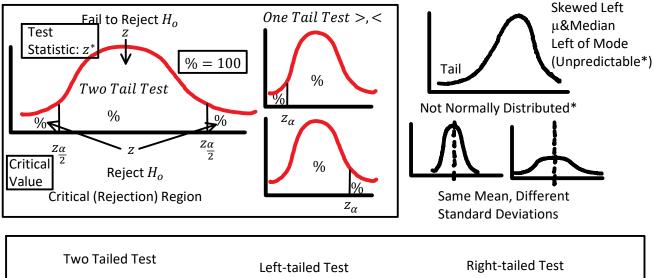
OR

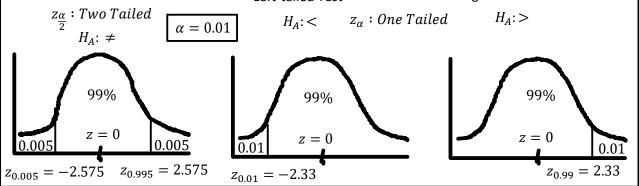The   evidence   supports H_O (Original Claim is supported)
There is not sufficient evidence to support H_O

If the Test Statistic <u>falls</u>   within the critical region, <u>reject H_0</u>
If the Test Statistic <u>does not fall within</u> the critical region, <u>fail to reject H_0</u> | $Fail \ to \ reject \ = \ Accept^*$ |

Type I Error - Mistake of rejecting the Null Hypothesis when it is actually true.
Type II Error - Mistake of failing to reject the Null Hypothesis when it is actually false.

Steps
-Identify a null/alternative hypothesis
-Calculate the value of the test statistic
-Identify the critical values
-Identify the P-value
-State the conclusion

Categorical/Numerical
1 Cat : p-test
2 Cat : Chi-squared-test
1 Num : t-test
2 Num : Correlation-test
1 Cat/Num : t-test/ANOVA

Fail to Reject H_o
Test Statistic: z^*
z
$\% = 100$
Two Tail Test
%
$\frac{z\alpha}{2}$ z $\frac{z\alpha}{2}$
Critical Value
Reject H_o
Critical (Rejection) Region

One Tail Test $>, <$
%
z_α
%
z_α

Skewed Left
μ&Median
Left of Mode
(Unpredictable*)
Tail

Not Normally Distributed*

Same Mean, Different
Standard Deviations

Two Tailed Test
$z_{\frac{\alpha}{2}} : Two \ Tailed$
$H_A: \neq$
$\alpha = 0.01$
99%
$z = 0$
0.005   0.005
$z_{0.005} = -2.575$ $z_{0.995} = 2.575$

Left-tailed Test
$H_A: <$ $z_\alpha : One \ Tailed$
99%
0.01 $z = 0$
$z_{0.01} = -2.33$

Right-tailed Test
$H_A: >$
99%
$z = 0$ 0.01
$z_{0.99} = 2.33$