Chapter 8: Hypothesis Testing

α = alpha	n = sample size
μ = Population Mean	$\bar{x}$ = Sample Mean
σ^2 = Population Variance	S^2 = Sample Variance
σ = Population Standard Deviation	S = Sample Standard Deviation
P = Population Proportion	$\hat{P}$ = Point Estimate of P = x/n

Note: **σ** is the square root of σ^2 ; **S** is the square root of S^2

Z Test for μ σ Known	**T Test for μ σ Unknown**	**Z Test for P Proportion**	**Chi-Square Test for σ^2 & σ** (always test for σ^2)
Z Table	**T Table**	**Z Table**	**Chi-Square Table**
Test Value = $Z_{cal} = \frac{\bar{x}-\mu_0}{\sigma/\sqrt{n}}$	**Test Value =** $t_{cal} = \frac{\bar{x}-\mu_0}{S/\sqrt{n}}$	**Test Value =** $Z_{calP} = \frac{\hat{p}-p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}}$	**Test Value =** $\chi^2_{cal} = \frac{(n-1)S^2}{\sigma_0^2}$
Two Tail: = ≠ Critical Values: $\pm Z_{1-\frac{\alpha}{2}}$ **R.R:** $\lvert Z_{cal}\rvert > Z_{1-\frac{\alpha}{2}}$ P-Value: $\frac{1}{2}P_{Value} = P(Z > \lvert Z_{cal}\rvert)$	**Two Tail: = ≠** Critical Values: $\pm t_{\frac{\alpha}{2},n-1}$ **R.R:** $\lvert t_{cal}\rvert > t_{\frac{\alpha}{2},n-1}$ P-Value: $\frac{1}{2}P_{Value} = P(t_{n-1} > \lvert t_{cal}\rvert)$	**Two Tail: = ≠** Critical Values: $\pm Z_{1-\frac{\alpha}{2}}$ **R.R:** $\lvert Z_{calp}\rvert > Z_{1-\frac{\alpha}{2}}$ P-Value: $\frac{1}{2}P_{Value} = P(Z > \lvert Z_{calp}\rvert)$	**Two Tail: = ≠** Critical Values: $\chi^2_{\frac{\alpha}{2},n-1}$ & $\chi^2_{1-\frac{\alpha}{2},n-1}$ **R.R:** $\chi^2_{cal} > \chi^2_{\frac{\alpha}{2},n-1}$ OR $\chi^2_{cal} < \chi^2_{1-\frac{\alpha}{2},n-1}$ P-Value: $\frac{1}{2}P_{Value} = P(\chi^2_{n-1} > \chi^2_{cal})$
Right Tail: = > Critical Value: $+Z_{1-\alpha}$ **R.R:** $Z_{cal} > +Z_{1-\alpha}$ P-Value: $P_{Value} = P(Z > Z_{cal})$	**Right Tail: = >** Critical Value: $+t_{\alpha,n-1}$ **R.R:** $t_{cal} > +t_{\alpha,n-1}$ P-Value: $P_{Value} = P(t_{n-1} > t_{cal})$	**Right Tail: = >** Critical Value: $+Z_{1-\alpha}$ **R.R:** $Z_{calp} > +Z_{1-\alpha}$ P-Value: $P_{Value} = P(Z > Z_{calp})$	**Right Tail: = >** Critical Value: $\chi^2_{\alpha,n-1}$ **R.R:** $\chi^2_{cal} > \chi^2_{\alpha,n-1}$ P-Value: $P_{Value} = P(\chi^2_{n-1} > \chi^2_{cal})$
Left Tail: = < Critical Value: $-Z_{1-\alpha}$ **R.R:** $Z_{cal} < -Z_{1-\alpha}$ P-Value: $P_{Value} = P(Z < Z_{cal})$	**Left Tail: = <** Critical Value: $-t_{\alpha,n-1}$ **R.R:** $t_{cal} < -t_{\alpha,n-1}$ P-Value: $P_{Value} = P(t_{n-1} < t_{cal})$	**Left Tail: = <** Critical Value: $-Z_{1-\alpha}$ **R.R:** $Z_{calp} < -Z_{1-\alpha}$ P-Value: $P_{Value} = P(Z < Z_{calp})$	**Left Tail: = <** Critical Value: $\chi^2_{1-\alpha,n-1}$ **R.R:** $\chi^2_{cal} < \chi^2_{1-\alpha,n-1}$ P-Value: $P_{Value} = P(\chi^2_{n-1} < \chi^2_{cal})$