Case 1: One Variable (Population)

Assumptions	σ is known	σ is unknown	$n(p_0) > 5$ and $n(1 - p_0) > 5$
Parameter of interest:	Mean, μ	Mean, μ	Proportion, p
Confidence Interval Formula:	$\bar{x} \pm z(\alpha/2)\frac{\sigma}{\sqrt{n}}$	$\bar{x} \pm t(df, \alpha/2)\frac{s}{\sqrt{n}}$ with $df = n - 1$	$p' \pm z(\alpha/2)\sqrt{\frac{p'q'}{n}}$
Name of Hypothesis Test, H_0	One sample z-test, $H_0: \mu = \mu_0$	One sample t-test, $H_0: \mu = \mu_0$	One sample test of proportion$H_0: p = p_0$
Test Statistic Formula:	$z^* = \frac{\bar{x} - \mu_0}{\sigma/\sqrt{n}}$	$t^* = \frac{\bar{x} - \mu_0}{s/\sqrt{n}}$ with $df = n - 1$	$z^* = \frac{p' - p_0}{\sqrt{\frac{p_0 q_0}{n}}}$
p-value:	$H_a: \mu > \mu_0$, p-value=$P(z \geq z^*)$ $H_a: \mu < \mu_0$, p-value=$P(z \leq z^*)$ $H_a: \mu \neq \mu_0$, p-value=$2 \times P(z \geq \|z^*\|)$	$H_a: \mu > \mu_0$, p-value=$P(t(df) \geq t^*)$ $H_a: \mu < \mu_0$, p-value=$P(t(df) \leq t^*)$ $H_a: \mu \neq \mu_0$, p-value=$2 \times P(t(df) \geq \|t^*\|)$	$H_a: p > p_0$, p-value=$P(z \geq z^*)$ $H_a: p < p_0$, p-value=$P(z \leq z^*)$ $H_a: p \neq p_0$, p-value=$2 \times P(z \geq \|z^*\|)$

Case 3: More than Two Populations
(Multinomial Experiment, Contingency Table, Test of Homogeneity - ANOVA)

	Multinomial Experiment, Contingency Table, Homogeneity		**Analysis of Variance (ANOVA)**
Parameter of interest:	Probability: $p_1, p_2, \cdots, p_k$	Probability	Mean: $\mu_1, \mu_2, \cdots, \mu_c$
H_0	$H_0: p_1 = p_{10}, \cdots, p_k = p_{k0}$	H_0: Independency (Homogeneity)	$H_0: \mu_1 = \mu_2 = \cdots = \mu_c$
Test Statistic Formula:	$\chi^{2*} = \sum_{\text{all cells}} \frac{(O-E)^2}{E}$		$F^* = \frac{\mathrm{MS(factor)}}{\mathrm{MS(error)}} = \frac{\mathrm{SS(factor)/df(factor)}}{\mathrm{SS(error)/df(error)}}$
df and other items	$df = k-1$ $E_i = n \times p_{i0}$	$df = (r-1)(c-1)$ $E_{ij} = \frac{R_i \times C_j}{n}$	$\mathrm{df(factor)} = c-1, \quad \mathrm{df(error)} = n-c$ $\mathrm{SS(factor)} = \left(\frac{C_1^2}{k_1} + \frac{C_2^2}{k_2} + \cdots + \frac{C_c^2}{k_c}\right) - \frac{(\sum x)^2}{n}$ $\mathrm{SS(error)} = \sum(x^2) - \left(\frac{C_1^2}{k_1} + \frac{C_2^2}{k_2} + \cdots + \frac{C_c^2}{k_c}\right)$
p-value:	p-value=$P(\chi^2(df) \geq \chi^{2*})$		p-value=$P(F(df_n, df_d) \geq F^*)$