Hypothesis Testing Cheat Sheet

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Type	Condition	Hypothesis	Statistic	Notes
Population Mean	σ is known n is large ($n>30$)	$H_0: \mu=\mu_0$ $H_1: \mu\neq\mu_0$ / $\mu>\mu_0$ / $\mu<\mu_0$	$Z=\frac{\bar{X}-\mu}{\frac{\sigma}{\sqrt{n}}}$	Z follows the the standard normal distribution.
	σ is known n is small ($n\leq 30$)	$H_0: \mu=\mu_0$ $H_1: \mu\neq\mu_0$ / $\mu>\mu_0$ / $\mu<\mu_0$	$t=\frac{\bar{X}-\mu}{\frac{\sigma}{\sqrt{n}}}$	t follows the t distribution with $n-1$ d.o.f.
	σ is unknown n is large ($n>30$)	$H_0: \mu=\mu_0$ $H_1: \mu\neq\mu_0$ / $\mu>\mu_0$ / $\mu<\mu_0$	$Z=\frac{\bar{X}-\mu}{\frac{s}{\sqrt{n}}}$	Z follows the the standard normal distribution.
	σ is unknown n is small ($n\leq 30$)	$H_0: \mu=\mu_0$ $H_1: \mu\neq\mu_0$ / $\mu>\mu_0$ / $\mu<\mu_0$	$t=\frac{\bar{X}-\mu}{\frac{s}{\sqrt{n}}}$	t follows the t distribution with $n-1$ d.o.f.
Population Proportion		$H_0: \pi=\pi_0$ $H_1: \pi\neq\pi_0$ / $\pi>\pi_0$ / $\pi<\pi_0$	$Z=\frac{p-\pi}{\sqrt{\frac{\pi(1-\pi)}{n}}}$	Z follows the the standard normal distribution.
Difference between Population Proportions		$H_0: \pi_1-\pi_2=0$ $H_1: \pi_1-\pi_2\neq 0$ / $\pi_1-\pi_2>0$ / $\pi_1-\pi_2<0$	$Z=\frac{p_1-p_2-(\pi_1-\pi_2)}{\sqrt{P(1-P)(\frac{1}{n_1}+\frac{1}{n_2})}}$	Z follows the the standard normal distribution. $P=\frac{x_1+x_2}{n_1+n_2}$ where x_1 , x_2 is the number of subjects in group 1, 2 resp. that have the characteristic
Difference between Population Means	σ_1, σ_2 are known	$H_0: \mu_1-\mu_2=\mu_0$ $H_1: \mu_1-\mu_2\neq\mu_0$ / $\mu_1-\mu_2>\mu_0$ / $\mu_1-\mu_2<\mu_0$	$Z=\frac{\bar{x}_1-\bar{x}_2-(\mu_1-\mu_2)}{\sqrt{\frac{\sigma_1^2}{n_1}+\frac{\sigma_2^2}{n_2}}}$	Z follows the the standard normal distribution.
	σ_1, σ_2 are unknown σ_1, σ_2 are unequal n_1, n_2 are large	$H_0: \mu_1-\mu_2=\mu_0$ $H_1: \mu_1-\mu_2\neq\mu_0$ / $\mu_1-\mu_2>\mu_0$ / $\mu_1-\mu_2<\mu_0$	$Z=\frac{\bar{x}_1-\bar{x}_2-(\mu_1-\mu_2)}{\sqrt{\frac{s_1^2}{n_1}+\frac{s_2^2}{n_2}}}$	Z follows the the standard normal distribution.
	σ_1, σ_2 are unknown σ_1, σ_2 are equal	$H_0: \mu_1-\mu_2=\mu_0$ $H_1: \mu_1-\mu_2\neq\mu_0$ / $\mu_1-\mu_2>\mu_0$ / $\mu_1-\mu_2<\mu_0$	$t=\frac{\bar{x}_1-\bar{x}_2-(\mu_1-\mu_2)}{\sqrt{S_p^2(\frac{1}{n_1}+\frac{1}{n_2})}}$	t follows the t distribution with n_1+n_2-2 d.o.f.
Population Variance		$H_0: \sigma^2=\sigma_0^2$ $H_1: \sigma^2\neq\sigma_0^2$	$\chi^2=\frac{(n-1)s^2}{\sigma^2}$	χ^2 follows the χ^2 distribution with $n-1$ d.o.f.
Difference between Population Variances		$H_0: \sigma_1^2=\sigma_2^2$ $H_1: \sigma_1^2\neq\sigma_2^2$	$F=\frac{s_1^2}{s_2^2}$	F follows the F distribution with n_1-1 and n_2-1 d.o.f.