Cheat Sheet for Hypothesis Tests

Steps:

1. State null and alternate hypotheses (H_o includes the equal sign, H_a does not)
2. State the significance level, α
3. Determine the critical value (use the appropriate table)
4. Determine the Test Statistic (use table below for the correct formula)
5. Sketch distribution and mark the rejection regions and test statistic
6. Make a decision (if z, t, χ^2 is in the rejection region, reject H_o. Otherwise fail to reject H_o)
7. Interpret the decision in the context of the original claim.

Test for	Sample Statistic	Test Statistic	Rejection region p-value	Use When
One population mean, μ	$\bar{x}$	$z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}}$	Z-Test	σ is known
One population mean, μ	$\bar{x}$	$t = \frac{\bar{x} - \mu}{s/\sqrt{n}}$ $df = n - 1$	T-Test	σ is unknown
One population proportion, p	$\hat{p}$	$z = \frac{\hat{p} - p}{\sqrt{pq/n}}$	1-PropZTest	$n\hat{p} \geq 10$ $n\hat{q} \geq 10$
One population standard deviation, σ	s	$\chi^2 = \frac{(n-1)s^2}{\sigma^2}$ $df = n - 1$	χ^2 Test	X is normal
Difference of two population means $(\mu_1 - \mu_2)$	$\bar{x}_1 - \bar{x}_2$	$\frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$	2-SampZTest	σ_1, σ_2 are known
Difference of two population means $(\mu_1 - \mu_2)$	$\bar{x}_1 - \bar{x}_2$	$t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$	2-SampTest	σ_1, σ_2 are unknown
		$df = \frac{(s_1^2/n_1 + s_2^2/n_2)^2}{\frac{(s_1^2/n_1)^2}{n_1 - 1} + \frac{(s_2^2/n_2)^2}{n_2 - 1}}$		
Difference between two means (dependent samples)	$\bar{d} = \bar{x}_1 - \bar{x}_2$	$t = \frac{\bar{x}_d - \mu_d}{s_d/\sqrt{n}}$ $df = n - 1$	TTest	σ_1, σ_2 are unknown
Difference of two proportions $(p_1 - p_2)$	$\hat{p}_1 - \hat{p}_2$	$z = \frac{(\hat{p}_1 - \hat{p}_2) - (p_1 - p_2)}{\sqrt{\bar{p}\bar{q}(1/n_1 + 1/n_2)}}$ $\bar{p} = \frac{x_1 + x_2}{n_1 + n_2}$	2-PropZtest	$n_1\hat{p}_1 \geq 10; n_1\hat{q}_1 \geq 10$ $n_2\hat{p}_2 \geq 10; n_2\hat{q}_2 \geq 10$