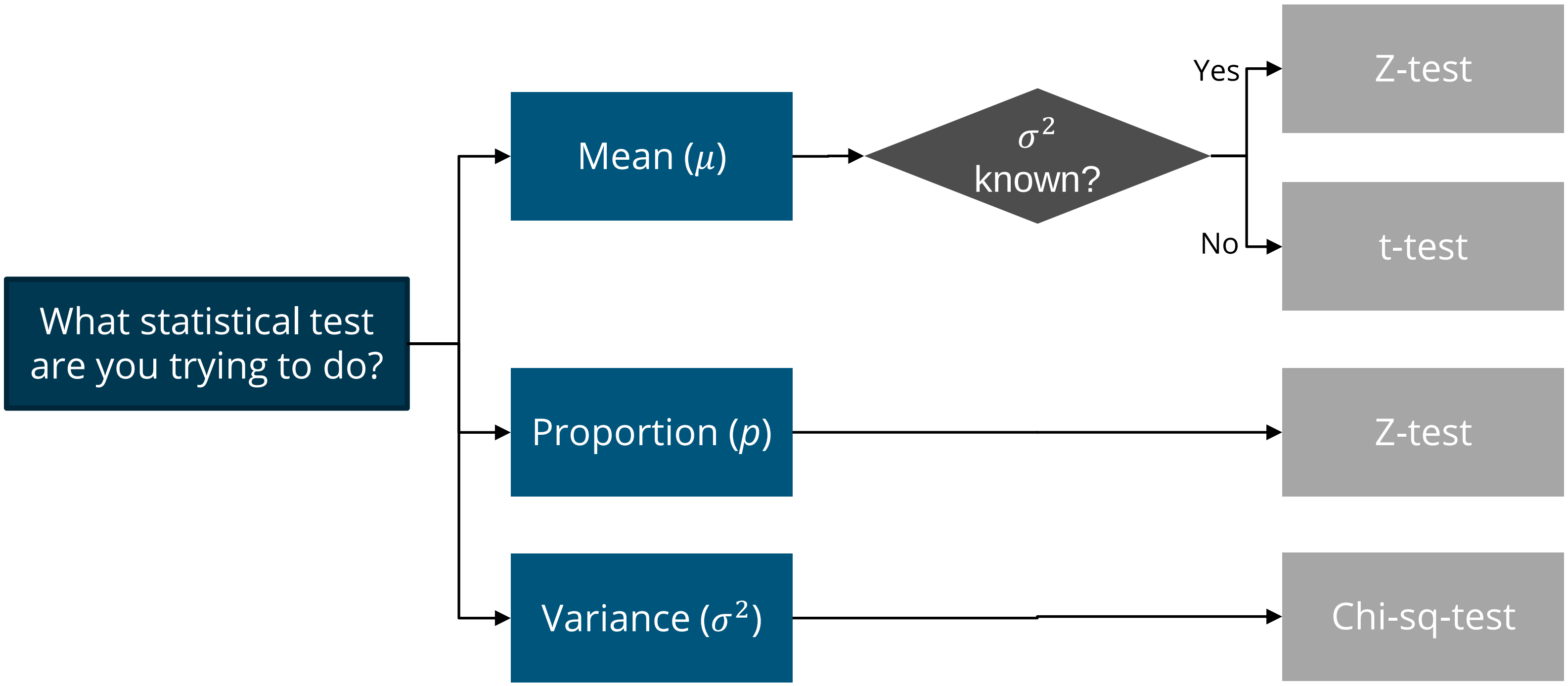
CHEAT SHEET (1 SAMPLE)



MEAN (σ^2 known)

	Right-side	Left-side	Two-tail
Hypothesis	$H_0 : \mu = \mu_0$ $H_1 : \mu > \mu_0$	$H_0 : \mu = \mu_0$ $H_1 : \mu < \mu_0$	$H_0 : \mu = \mu_0$ $H_1 : \mu \neq \mu_0$
Statistics	$Z_{hit} = \dfrac{\bar{X} - \mu_0}{\sigma/\sqrt{n}}$		
Critical Value	$Z_{hit} > Z_{\alpha}$	$Z_{hit} < -Z_{\alpha}$	$Z_{hit} < -Z_{\alpha/2}$ or $Z_{hit} > Z_{\alpha/2}$
Confidence Interval	$\bar{X} - Z_{\alpha/2}\dfrac{\sigma}{\sqrt{n}} < \mu < \bar{X} + Z_{\alpha/2}\dfrac{\sigma}{\sqrt{n}}$		

MEAN (σ^2 unknown)

	Right-side	Left-side	Two-tail
Hypothesis	$\mathrm{H}_0 : \mu = \mu_0$ $\mathrm{H}_1 : \mu > \mu_0$	$\mathrm{H}_0 : \mu = \mu_0$ $\mathrm{H}_1 : \mu < \mu_0$	$\mathrm{H}_0 : \mu = \mu_0$ $\mathrm{H}_1 : \mu \neq \mu_0$
Statistics	$T_{hit} = \dfrac{\bar{X} - \mu_0}{S/\sqrt{n}}$		
Critical Value	$T_{hit} > t_{\alpha;v}$	$T_{hit} < -t_{\alpha;\mathrm{v}}$	$T_{hit} < -t_{\alpha/2;v}$ or $T_{hit} > t_{\alpha/2;v}$
Degree of Freedom	$v = n - 1$		
Confidence Interval	$\bar{X} - t_{\alpha/2}\dfrac{S}{\sqrt{n}} < \mu < \bar{X} + t_{\alpha/2}\dfrac{S}{\sqrt{n}}$		

PROPORTION

	Right-side	Left-side	Two-tail
Hypothesis	$\mathrm{H}_0 : \mathrm{p} = p_0$ $\mathrm{H}_1 : \mathrm{p} > p_0$	$\mathrm{H}_0 : \mathrm{p} = p_0$ $\mathrm{H}_1 : \mathrm{p} < p_0$	$\mathrm{H}_0 : \mathrm{p} = p_0$ $\mathrm{H}_1 : p \neq p_0$
Statistics	$Z_{hit} = \dfrac{\hat{p} - p_0}{\sqrt{\hat{p}\hat{q}/_n}}$		
Critical Value	$Z_{hit} > Z_\alpha$	$Z_{hit} < -Z_\alpha$	$Z_{hit} < -Z_{\alpha/2}$ or $Z_{hit} > Z_{\alpha/2}$
Confidence Interval	$\hat{p} - Z_{\alpha/2}\sqrt{\hat{p}\hat{q}/_n} < \mathrm{p} < \hat{p} + Z_{\alpha/2}\sqrt{\hat{p}\hat{q}/_n}$		

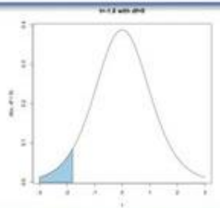
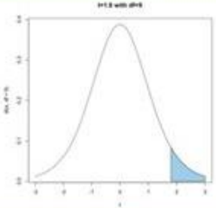
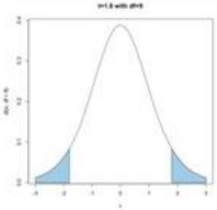
VARIANCE

	Right-side	Left-side	Two-tail
Hypothesis	$\mathrm{H}_0 : \sigma^2 = \sigma_0^2$ $\mathrm{H}_1 : \sigma^2 > \sigma_0^2$	$\mathrm{H}_0 : \sigma^2 = \sigma_0^2$ $\mathrm{H}_1 : \sigma^2 < \sigma_0^2$	$\mathrm{H}_0 : \sigma^2 = \sigma_0^2$ $\mathrm{H}_1 : \sigma^2 \neq \sigma_0^2$
Statistics	$\chi^2_{hit} = (n-1)\dfrac{s^2}{\sigma^2}$		
Critical Value	$\chi^2_{hit} > \chi^2_{\alpha;\mathrm{v}}$	$\chi^2_{hit} < \chi^2_{(1-\alpha);\mathrm{v}}$	$\chi^2_{hit} < \chi^2_{(1-\frac{\alpha}{2});\mathrm{v}}$ or $\chi^2_{hit} > \chi^2_{(\frac{\alpha}{2});\mathrm{v}}$
Degree of Freedom	$v = n - 1$		
Confidence Interval	$(n-1)\dfrac{s^2}{\chi^2_{(\frac{\alpha}{2});\mathrm{v}}} < \sigma^2 < (n-1)\dfrac{s^2}{\chi^2_{(1-\frac{\alpha}{2});\mathrm{v}}}$		

02

P-VALUE

Calculating P-Values Cheat Sheet

	H_a Description	Figure	Example t values	R code to get p-values
One-tailed	Population mean is below the standard		t = -1.8	pt(-1.8, df=9)
One-tailed	Population mean is above the standard		t = 1.8	1-pt(1.8, df=9) '1 - ' because otherwise you will get the probability for t less than 1.8
Two-tailed	Population mean is different from the standard		t = 1.8 t = -1.8	2*(1-pt(1.8, df=9)) 2*pt(-1.8, df=9)

R FUNCTIONS

Function	Description	Usage
d*dist*	Density	Find PDF
p*dist*	Distribution function	Find CDF (p-value)
q*dist*	Quantile function	Find inverse CDF (critical value)
r*dist*	Random deviated	Generate random variable