Quantitative Methods (Geo 441)
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The formats below are to be used when completing the exercises and tests for this course.

Format for Hand Calculation:

Research Question: One hundred and fifty students in Geo 441 were surveyed to determine if the use of the correct answer format was associated with student survival.

Clearly stated research question

H_o : Student survival is independent of using the correct answer format.
H_A : Student survival is contingent upon using the correct answer format.

Null and alternate hypotheses statements

$\sigma = 0.05$

Alpha level

Observed

	Dead	Alive	Total
Used Format	17	54	71
Did Not Use Format	67	12	79
Total	84	66	150

Clearly typed problem

Expected

	Dead	Alive
Used Format	39.8	31.2
Did Not Use Format	44.2	34.8

$$\chi^2 = \frac{(17-39.8)^2}{39.8} + \frac{(54-31.2)^2}{31.2} + \frac{(67-44.2)^2}{44.2} + \frac{(12-34.8)^2}{34.8} = 56.4$$

Clearly typed answer

$\chi^2 = 56.4$
Df $= 1$
$\chi^2_{c\ 0.05,\ 1} = 3.841$

Listing of the test statistic, degrees of freedom, and critical value

Therefore, reject H_o.

Student survival is contingent upon using the correct answer format when completing Geography 441 exercises ($\chi^2 = 56.4$, $p < 0.001$).

Statement of the results, test statistic, and probability

Research Question: Are Arctic tribes more compact than Plains tribes, based on their cormic (standing to sitting height ratio) indices?

H_{o1} : Arctic tribe cormic indices are not different than normal.
H_{a1} : Arctic tribe cormic indices are different than normal.
H_{o2} : Plains tribe cormic indices are not different than normal.
H_{a2} : Plains tribe cormic indices are different than normal.

Tests of Normality

	Region	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Cormic Index	Arctic	.229	8	.200[*]	.909	8	.349
	Plains	.253	12	.033	.848	12	.035

The cormic indices for Arctic tribe are normally distributed (Shapiro-Wilk$_{0.909}$, p = 0.349), however, the comic indices for Plains tribes were found to be non-normal (Shapiro-Wilk$_{0.848}$, p = 0.035).

H_o: Arctic tribes are not more compact than plains tribes (e.g do not have higher a cormic index).
H_a: Arctic tribes are more compact than plains tribes (e.g do have higher a cormic index).

Ranks

	RegCode	N	Mean Rank	Sum of Ranks
Cormic Index	Arctic	8	13.38	107.00
	Plains	12	8.58	103.00
	Total	20		

Test Statistics[a]

	Cormic Index
Mann-Whitney U	25.000
Wilcoxon W	103.000
Z	-1.774
Asymp. Sig. (2-tailed)	.076
Exact Sig. [2*(1-tailed Sig.)]	.082[b]

Arctic tribes are not more compact than plains tribes (e.g do not have higher a cormic index) (Mann-Whitney U$_{25}$, p = 0.082).