Chi Square – Homogeneity & Independence

STEP	Homogeneity	Independence
State	H_0: There is no difference in the distribution of (the categorical variable) for (several populations or treatments). H_A: There is a difference in the distribution of (the categorical variable) for (several populations or treatments). α = ___ (0.05 unless stated otherwise)	H_0: (Categorical variable #1) and (categorical variable #2) are independent in (the population of interest). H_A: (Categorical variable #1) and (categorical variable #2) are not independent in (the population of interest). *You can also write "There is an association between…" or "there is not an association between…"* α = ___ (0.05 unless stated otherwise)
Plan	**Random**: Check to make sure the samples were taken randomly and are independent. **10% condition**: Check to make sure that 10 times our sample is less than the entire population FOR ALL SAMPLES. **Large Counts**: All ***expected*** counts must be at least 5. *(row total * column total / table total)* YOU MUST ACTUALLY LIST THESE! (you can list them by performing the test in your calculator and then looking at MATRIX B). *Because our conditions are met, we will use a Chi Square Test of Homogeneity.*	**Random**: Check to make sure the sample was taken randomly or comes from a well-designed randomized experiment. **10% condition**: Check to make sure that 10 times our sample is less than the entire population. **Large Counts**: All ***expected*** counts must be at least 5. *(row total * column total / table total)* YOU MUST ACTUALLY LIST THESE! (you can list them by performing the test in your calculator and then looking at MATRIX B). *Because our conditions are met, we will use a Chi Square Test of Independence.*
Do	On the calculator, choose: STAT → TESTS → C: χ^2**-Test** WRITE: χ^2 = (1st term) + (2nd term) + (3rd term) + … Test statistic: df = (# of rows – 1)(# of columns – 1) p-value:	On the calculator, choose: STAT → TESTS → C: χ^2**-Test** WRITE: χ^2 = (1st term) + (2nd term) + (3rd term) + … Test statistic: df = (# of rows – 1)(# of columns – 1) p-value:
Conclude	Because our P-value = ____ is greater/less than the significance level α = ___, we (fail to) reject H_0. There is (not) convincing evidence that (alternative hypothesis).	Because our P-value = ____ is greater/less than the significance level α = ___, we (fail to) reject H_0. There is (not) convincing evidence that (alternative hypothesis).

Good rule of thumb for telling the difference:

Homogeneity – Multiple samples being compared from different populations.
Independence – One sample categorized with variables compared.