CHI-SQUARE χ^2 (Section 8.3)

CHI-SQUARE TEST BASED ON UNIVARIATE CATEGORICAL DATA (GOODNESS OF FIT) - (p. 374)

1. **H_o:** $\pi_1 = \pi_{1O}, \ldots, \pi_k = \pi_{kO}$ (random variable follows claimed distribution)
   H_A: the specifications of π_i**'S** H_o is not correct. (r.v. does not follow claimed distribution)

2. **Alpha Level:** Use given α

3. **Test Value:** $\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$ where $\begin{cases} O_i = \textbf{observed value} \\ E_i = \textbf{expected value} \end{cases}$

4. **Critical Value:** find range of p-values from Table VII (p. 571-2), always right tailed, df = # categories – 1

5. **Decision Rule:** Reject H_o if p-value $\leq \alpha$; Accept H_o if test value $> \alpha$

CHI-SQUARE TEST FOR HOMOGENEITY OF SEVERAL CATEGORICAL POPULATIONS (contingency table) – (p. 378)

1. **H_o:** the populations are homogeneous with respect to the categories
   H_A: the populations are not homogeneous

2. **Alpha Level:** Use given α

3. **Test Value:**
   A. Compute row and column totals and grand total

   B. **Expected value** for a given cell = $\frac{\textbf{row total} \times \textbf{column total}}{\textbf{grand total}}$

   C. **Test Value:** tv = $\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$ where $\begin{cases} O_i = \textbf{observed value} \\ E_i = \textbf{expected value} \end{cases}$

4. **Critical Value:** find range of p-values from Table VII (p. 571-2), always right tailed, df = (# rows – 1) x (# columns – 1)

5. **Decision Rule:** Reject H_o if p-value $\leq \alpha$; Accept H_o if test value $> \alpha$

CHI-SQUARE TEST FOR INDEPENDENCE – (p. 381)

1. **H_o:** Row variable and column variable are independent
   H_A: Row variable and column variable are dependent

2. – 5. Same as Test for Homogeneity above