**Notes**

**Chi square test**

Deﬁnition: A chi-square goodness-of-ﬁt test is used to test whether a frequency distribution obtained experimentally ﬁts an “expected” frequency distribution that is based on the theoretical or previously known probability of each outcome.

An experiment is conducted in which a simple random sample is taken from a population, and each member of the population is grouped into exactly one of k categories.

Step 1: The observed frequencies are calculated for the sample.

Step 2: The expected frequencies are obtained from previous knowledge (or belief) or probability theory. In order to proceed to the next step, it is necessary that each expected frequency is at least 5.

Step 3: A hypothesis test is performed:

(i) The null hypothesis H0: the population frequencies are equal to the expected frequencies.

(ii) The alternative hypothesis, Ha: the null hypothesis is false (what does this imply about the population frequencies?).

(iii) α is the level of signiﬁcance. (iv) The degrees of freedom: k−1. (v) A test statistic is calculated:



(vi) From α and k−1, a critical value is determined from the chi-square table. (vii) Reject H0 if χ2 is larger than the critical value (right-tailed test).