2. With 10,000 trials and no bias in the ballot order, what is the expected number (E) of times each browser should appear in positions 1 through 5? (in each table)   E = _____

degrees of freedom

3. In each table, the number of rows (r) = __5__ and the columns (c) = __10__, so the degrees of freedom (df) for this chi-squared test = (r − 1)(c − 1) = __42__

$$(5-1)(10-1)$$
$$50 + 1 - 10 + 1$$

594

Chpt. 11

Verifying the Chi-squared test values ("X-squared =") on the previous page: *597*

Use this formula $Chi^2 \text{ test} = \sum \dfrac{(O - E)^2}{E}$ with a calculator & paper (longer) or spreadsheet (quicker − see pages 603 and 619 of the textbook. Despite what it says, Office 2003 or later has Chi-squared testing as part of its built-in functions). Typical spreadsheets do not calculate p-values to the same accuracy as the reported results, but they'll be close enough.

Spreadsheet section:

4. Enter each table above into a spreadsheet (the observed "O" data) and also create a same-sized table filled with the expected "E" data (from question #2).

5. Write the above chi-squared test formula in spreadsheet notation. For example, if cells A1 to E5 contain the "O" data, and cells G1 to K5 contain the "E" data, use this formula in cell M1:

=((A1-G1)^2)/G1

Copy & paste this formula down to row 5 and over to column Q (cells M1 to Q5 overall)
In cell M6, use this formula
=SUM(M1:Q5)   ← this gives the Chi-squared test value.

6. Repeat this setup for the Firefox data. Then write the calculated Chi-squared test values here:

Firefox: chi-squared = _____   IE: chi-squared = _____

7. There is a built-in function that calculates the p-value automatically. Keeping with the earlier arrangement of cells, in F6 write

=CHITEST(A1:E5, G1:K5)

Similarly for the Firefox data. Write the calculated Chi-squared p-values here:

Firefox: = _____   IE: = _____

Compare the Chi-squared test values with a critical value from the textbook's Chi-squared distribution table (p785), or use the built-in function =CHIINV(alpha, df). You must specify some size for alpha (α) As seen at the website, the result of the test was to reject the null hypothesis, since

test value > critical value   or, the same thing,   p-value < alpha

8. Put your name and Stat 200 on this spreadsheet and print it (or if you used a calculator and paper, turn that in)