Premedical course
Solution to MINITAB practical 7

Question 1. The χ^2 test gives a P-value of 0.0049. This may be on the low side because some of the expected values are rather small.

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MINITAB - Untitled Worksheet
File  Edit  Manip  Calc  Stat  Window  Graph  Editor  Help

Session
MTB > ChiSquare C1 C2.

Expected counts are printed below observed counts

            C1       C2    Total
    1       83        3       86
         77.50     8.50

    2       72       14       86
         77.50     8.50

Total      155       17      172

ChiSq =  0.390 +  3.559 +
         0.390 +  3.559 = 7.898
df = 1

MTB > CDF 7.898;
SUBC>    Chisquare 1.
    7.8980    0.9951
MTB >
```
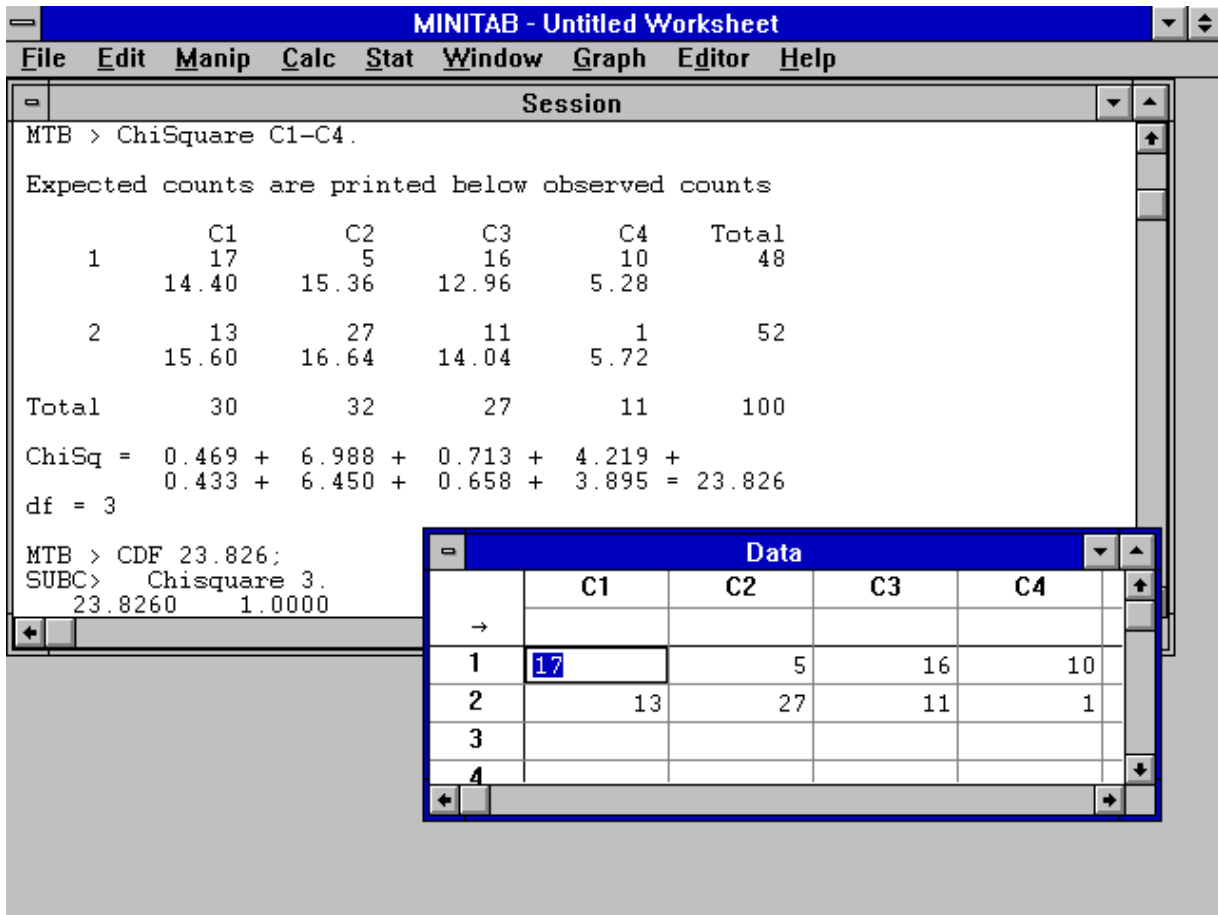
```
Data
        C1        C2
→
  1          83         3
  2          72        14
  3      ▮
  4
```

Question 2. The order of the categories is important. Since there is no inherent ordering in them care must be taken to ensure that none is implied, for example by ordering the categories in terms of their success rate. In this case the numbers of cases in each category happens to produce the same ordering; we choose alphabetic ordering of the abbreviated names.

Mode of presentation

		AP	ARF	NS	RH	Total
Own renal function	Yes	17	5	16	10	48
at two years	No	13	27	11	1	52
	Total	30	32	27	11	100
%		57	16	59	91	48

The MINITAB output shows that the four modes of presentation do not all have the same probability of being on ones own renal function after two years. Where the differences arise is quite clear and no further analysis is required.

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MINITAB - Untitled Worksheet
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Session

MTB > ChiSquare C1-C4.

Expected counts are printed below observed counts

              C1        C2        C3        C4     Total
    1         17         5        16        10        48
            14.40     15.36     12.96      5.28

    2         13        27        11         1        52
            15.60     16.64     14.04      5.72

Total         30        32        27        11       100

ChiSq =   0.469 +   6.988 +   0.713 +   4.219 +
          0.433 +   6.450 +   0.658 +   3.895 = 23.826
df = 3

MTB > CDF 23.826;
SUBC>    Chisquare 3.
    23.8260      1.0000
```

```
Data
        C1      C2      C3      C4
  →
  1     17       5      16      10
  2     13      27      11       1
  3
  4
```

Question 3. MINITAB is of little help for this question, which is better tackled using a calculator. We easily obtain $\hat{\psi} = 5.38$, and $\sqrt{1/a + 1/b + 1/c + 1/d} = 0.656$ whence 95% confidence limits for $\log \hat{\psi}$ are $1.683 \pm 1.96 \times 0.656$, i.e. 0.397 and 2.969, whence 95% confidence limits for $\hat{\psi}$ itself are 1.49 and 19.5. What causes the enormous range is the smallest of the observed frequencies, i.e. 3. This example shows that although a result may be highly significant there still may be a great deal of uncertainty about the strength of the association.