STAT 100 SUMMER II 2001 (PROFESSOR GREEN)
SOLUTIONS TO ASSIGNED PROBLEMS DUE AUGUST 23

Problem 12. The row sums are [567 155 28]. The column sums are 500 and 250 as mentioned in the text of the problem. This gives the expected value matrix

	More	Not more	Not sure
Executives	378	103.3	18.7
Students	189	51.7	9.3

and a χ^2 statistic of 38.045. With two degrees of freedom, this gives a P-value far below .01 and rejects the null hypothesis that the distribution of opinion is the same among executives as among students. It appears from the data that Students are proportionally more in favor of involvement than executives.

Problem 14. The χ^2 statistic takes the value .2 for a P-value in excess of .5. These results are not significant. For the Z-test, let p be the proportion of secure attachment. Then the null hypothesis is $p_1 = p_2 = \frac{48}{82} = .585$. The test statistic is given by

$$Z = \frac{\hat{p_1} - \hat{p_2}}{\sqrt{p(1-p)\frac{2}{41}}}$$

and takes the value .448, which we could also have obtained by taking the square root of the χ^2 statistic. For a two-sided test, the P-value is $2P(Z > .448) = 2 \times .3264 = .6528$. This is consistent with the estimate of the P-value from the χ^2 test and confirms that the data are not significant.

Problem 18. With four degrees of freedom , the χ^2 statistic takes the value 28.16, giving a P-value less than .01. Such a P-value provides very strong evidence that the change in bone mineral is different for the different groups.

Problem 22. The observed data for this problem are

	basket	no basket
purchase	60	41
no purchase	20	79

The value of χ^2 is a huge 60.54 with one degree of freedom, which has a P-value much less than .01. As the raw data indicate, this makes it a virtual certainty that the proportion of purchases among shoppers with baskets is different from (and clearly, from the data, higher than) the proportion of purchases among shoppers without baskets. The consultant may be misinterpreting this fact; it is more likely that taking a basket signals a customer's intent to purchase than that having a basket influences a customer's decision to purchase.

Problem 24. $\chi^2 = 21.17$ with two degrees of freedom. This gives a P-value well below .01 and rejects the null hypothesis that attitudes are independent of gender in favor of the alternative hypothesis that attitudes are somehow associated with gender.