HW 12 is due on Friday, Nov. 15. Turn in early if you know you will miss class. Exam 3 is Wednesday, Nov. 20. The Final is Tuesday, Dec. 10, 10:15-12:15. Quiz 10 is on Wed. Nov. 13 and covers ch. 17–20: especially the one and two sample intervals and tests for proportions. You should be able to do a forwards calculation for $\hat{p}$ and find the sample size needed to estimate p to within a margin of error m. Four sheets of notes. **Two pages: problems A)- D)**

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Chi-square test: Expected counts are printed below observed counts.

          < 2     2 to 12   > 12  Total
A,B,C      11          68      3     82
         13.78       62.71   5.51

D or F      9          23      5     37
          6.22       28.29   2.49

Total      20          91      8    119

Chi-sq = 0.561 +  0.447 + 1.145 +
         1.244 +  0.991 + 2.538 = 6.926
DF = 2, P-Value = 0.031
```

A) Use the above output to perform a 4 step test of hypothesis for whether there is a relationship between extracurricular activities and grades.

comment: See examples 22.4 and 22.6, p. 570-572, and class notes.

B) A questionnaire sent to the senior class of the University of Illinois College of business administration asked which major within the business program the student had

chosen. The data is in the following table.

	Female	Male
Accounting	68	56
Administration	91	40
Economics	5	6
Finance	61	59

i) Make a table of observed counts, expected counts, and cell chisquare contributions, as done in class. Keep at least 3 decimal places.

ii) Perform a 4 step test of hypothesis for whether there is a relationship between major and gender.

comment: X^2 should be close to 10.827 but a bit off due to rounding. See p. 566, p. 568, ex 22.2, ex 22.3, and ex. 22.7 on p. 578.

C) A study of customers' attitudes toward secondhand stores interviewed samples of shoppers at two secondhand stores of the same chain in two cities. The data is in the

Income	City 1	City 2
Under $10000	70	62
$10000 to $19999	52	63
$20000 to $24999	69	50
$25000 to $34999	22	19
$35000 or more	28	24

following table.

Perform a 4 step test of hypothesis for whether there is a relationship between city and income if $X^2 = 3.955$.

comment: Note that the test statistic is given. See ex. 22.2, 22.3, 22.5, 22.6 and 22.7.

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D)    Under25K 25KTo35K 35KTo50K 50KTo75K 75K&Over    Total
 1       14       10       24       12        3        63
       12.77    10.82    19.48    12.77     7.14

 2       21       22       29       15        3        90
       18.25    15.46    27.84    18.25    10.21

 3       11        8       14       17       14        64
       12.98    11.00    19.79    12.98     7.26

 4       13       10       23       15       13        74
       15.00    12.71    22.89    15.00     8.39

Total    59       50       90       59       33       291

Chi-Sq =  0.118 +  0.063 +  1.046 +  0.047 +  2.404 +
          0.415 +  2.763 +  0.049 +  0.578 +  5.088 +
          0.301 +  0.817 +  1.696 +  1.248 +  6.263 +
          0.268 +  0.580 +  0.001 +  0.000 +  2.531 = 26.273
DF = 12, P-Value = 0.010

The table shows the number of individuals who last bought jeans from 4 major
stores, classified by the individuals' yearly income. Use the Minitab output
to determine if there is a relationship between income and the stores.
Use a 4 step test.
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