Name: _____
Lecture Time (10, 11, or 12): _____

# Quiz 10 Remote

Statistics 200 Spring 2012 Dr. Nancy Pfenning

1. (5 pts.) Researchers in India surveyed teenagers as to whether or not they had used tobacco, and whether or not their parents used tobacco.

| | Children Used Tobacco | Children Didn't Use | Total |
|---|---|---|---|
| Parents No Tobacco Use | 64 | 360 | 424 |
| Parents With Tobacco Use | 38 | 128 | 166 |
| Total | 102 | 488 | 590 |

(a) Which *two* of these are correct formulations of the null hypothesis?

i. Use of tobacco by children is not related to use by parents.
ii. Use of tobacco by children is related to use by parents.
iii. Proportions of children using tobacco is different for children of tobacco-users compared to children of non-users in the general population.
iv. Proportions of children using tobacco is the same for children of tobacco-users as it is for children of non-users in the general population.

(b) If proportions using tobacco were actually equal for children of parents who did and did not use tobacco, then the proportions would both be about _____. (Round to the nearest hundredth, which is two decimal places.)

(c) Complete this table of counts expected under the null hypothesis, reporting each to the nearest tenth (one decimal place).

| Expected | Children Used Tobacco | Children Didn't Use | Total |
|---|---|---|---|
| Parents No Tobacco Use | (i) _____ | (iii) _____ | 424 |
| Parents With Tobacco Use | (ii) _____ | (vi) _____ | 166 |
| Total | 102 | 488 | 590 |

(d) The value of the chi-square statistic is calculated to be 5.1, so the $P$-value is
(i) not small at all (ii) borderline (iii) small

(e) Draw your conclusions (circle *two* of the following:)

i. There is no evidence that use of tobacco by children is related to use by parents.
ii. There is evidence that use of tobacco by children is related to use by parents.
iii. We cannot believe that proportions using tobacco is the same for all children whose parents use tobacco compared to all children whose parents do not use tobacco.
iv. We can believe that proportions using tobacco is the same for all children whose parents use tobacco compared to all children whose parents do not use tobacco.

2. (5 pts.) End-of-semester averages for samples of students taking introductory statistics were compared for freshmen, sophomores, juniors, and seniors.

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Source     DF        SS        MS        F        P
Factor      3    1263.1     421.0     5.84    0.009
Error      13     937.0      72.1
Total      16    2200.1

                                 Individual 95% CIs For Mean
                                 Based on Pooled StDev
Level       N      Mean     StDev  --------+---------+---------+--------
Freshman    3     93.67      6.53                  (--------*--------)
Sophomor    5     86.20      6.50               (------*------)
Junior      4     75.25      8.77    (-------*------)
Senior      5     70.80     11.54  (------*------)
                                 --------+---------+---------+--------
Pooled StDev =     8.49                 72        84        96
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(a) Total sample size is $N =$ (i) _____ and number of groups is $I =$ (ii) _____

(b) As far as the samples are concerned, the students with the highest average are in what year level? _____

(c) Apparently, the $F$ statistic is (i) large (ii) not large (iii) we have no way of knowing

(d) The size of the $P$-value suggests which **two** of the following conclusions?

i. There is evidence of a relationship in general between year and performance in introductory statistics.

ii. There is no compelling evidence of a relationship in general between year and performance in introductory statistics.

iii. Overall mean end-of-semester score could be the same for students of the four year levels in the general population of introductory statistics students.

iv. Population mean end-of-semester score differs for at least two year levels.

(e) For each of these, answer "T" if it would produce **more** evidence of a difference among end-of-semester scores; otherwise answer "F".

i. If the sample means had been closer together. ___

ii. If sampled scores had been spread out less around the three group means. ___

iii. If similar results had arisen from smaller samples of students. ___

(f) Sample standard deviations are

i. close enough to assume equal population standard deviations

ii. not close enough to assume equal population standard deviations