

Name _____

Please answer each of the following on these test pages in the blanks or spaces provided. Show any significant work (except arithmetic) for part credit. A calculator is recommended. Continue answers on the backs of these test pages if necessary. Statistical tables are attached for your use.

1) In the court case *Connecticut versus Teal* (1982), a written test used to determine eligibility for promotion was challenged as discriminatory. Of 48 blacks who took the test, 26 passed (54%), while 206 out of 256 whites passed (80%). The data are given at the right.

	Pass	Fail	Total
Black	26	22	48
White	206	53	259
Total	232	75	307

You are thinking of doing a chi-square analysis of this table to determine if there is a statistically significant association in this data between race and passing or failing the test.

a) [4 points] How would you compute the number of individuals in the “Black/Pass” cell under the hypothesis that these test results are independent of race? [A formula is fine, or words...]

b) [4 points] Under the null hypothesis that there is no association between race and test result in this data, the expected values in each of the cells are shown at the right.

	Pass	Fail	Total
Black	36.3	11.7	48
White	195.7	63.3	259
Total	232	75	307

Tell how you would compute the *chi-square statistic* from this table and the table in part (a). (Again, a formula or words. But don't waste time computing it; the result is given in part (c).)

c) [4 points] The chi-square statistic for this data turns out to be 14.12. Use the attached chi-square table to test the hypothesis that race is independent of test results in this data.

Be sure to tell:

- How many degrees of freedom are involved?
- What do you find out from chi-square table?
- Do you accept or reject the null hypothesis?
- What confidence level applies to your conclusion?

d) [4 points] Investigate (somehow) and present (somehow) whatever pattern of apparent association between race and test results exists in this data. Explain what you are doing and showing.

2) A national opinion poll of 320 Americans found that 44% agreed that parents should be able to obtain vouchers that would enable their children to attend any public or private school of their choice.

a) [6 points] Find a 95% confidence interval for the proportion of all Americans who believe as these 44% do. [Recall that, if p is the population proportion, the standard deviation of the distribution of the sample proportion \hat{p} is $\sqrt{p(1-p)/n}$.]

b) [4 points] Could the true population proportion be as large as 55%? Explain.

c) [4 points] Brenda hypothesizes that the true fraction of adult Americans that believe vouchers should be allowed is 40 percent. Should Brenda accept or reject that null hypothesis based on this data? Justify your answer.