Problem 1. In a study of a particular complex disorder, affected individuals and their parents are genotyped for a particular SNP (AT). Considering transmission of AT parents, they find that among 104 children, each with a one heterozygous AT parent, 42 have the A variant transmitted, and 62 the T variant. Using the TDT test, is there evidence of linkage? Please give both the approximate test (McNemar) and the p-value from the exact binomial test. Is the use of the chi-square approximation valid in this case? Why or why not?

a. There is no table provided for this problem: In the case of the TDT test, why do we not need to know the outcomes from homozygous parents who have either both AA or TT SNPs?

b. What is the value of the test statistic using McNemar's test? What is the p-value? Again, you can use the R function `1 - pchisq(statistic, df)` to find the result.

c. What is the p-value from using the exact binomial test? This can be found in R using the `binom.test` test function. For counts b and c, this can be computed with `binom.test(x = c, n = c + b)`

d. Is the use of the chi-square approximation valid in this case? Why or why not?

Problem 2. The table below shows fatality results for drivers and passengers in auto accidents in Florida in 2008, according towhether the person was wearing a seat belt

	Injury	
Seat Belt Use	Fatal	Not Fatal
No	1085	55,623
Yes	703	441,239

a. Estimate the probability of fatality, conditional on seatbelt use. That is, what was the probability of a fatality for those wearing a seatbelt and those who did not?

b. Find and interpret the odds ratio for fatalities based on seatbelt use

c. Create a 95% confidence interval for the odds ratio. What are your conclusions?

d. Find the relative risk of fatality for not wearing a seatbelt.

e. Why are the odds ratio and the relative risk approximately equal in this case?