CHAPTER 22 comparing two proportions:

Often times researchers are concerned with comparing two groups. More specifically "is the true proportion of people who _____ the same as the true proportion of people that _____?

So to answer questions like that, a 2-proportion z-test or a 2-proportion z-interval should be evaluated.

The conditions are basically the same as those for a 1-proportion analysis except this time we need to check those conditions for both groups (a bit more writing)

The natural Null Hypothesis for a 2-prop. Z-test is:
Ho: the two proportions are the same. Or in other words, the difference between the two proportions is zero
$P1 - P2 = 0$

And the alternative hypothesis is based on the context of the problem: Either one is larger than the other OR they just are not equal

$P1 - P2 > 0$ or $P1 - P2 < 0$ or $P1 - P2 \neq 0$

EXAMPLE:
Suppose the Acme Drug Company develops a new drug, designed to prevent colds. The company states that the drug is more effective for women than for men. To test this claim, they choose a simple random sample of 100 women and 200 men from a population of 100,000 volunteers.

At the end of the study, 38% of the women caught a cold; and 51% of the men caught a cold. Based on these findings, can we conclude that the drug is more effective for women than for men? Use a 0.05 level of significance.

1) Companies like Amazon and Barnes & Noble are concerned with the online buying practices of their customers. They would like to know if online shopping is gender bias (meaning do men or women spend more online). This information could potentially help them market different genres of books online vs in stores.

A survey of 430 adults found that 21% of the 222 men and 18% of the 208 women had purchased books online. Is there evidence at the 1% significance level that men are more likely to purchase books online? (Assume all the conditions for running the appropriate test are valid)

2) Suppose a 2-proportion z interval was calculated to try to determine the true difference between the following proportions:

P_k = the true proportion of kids that choose pizza as their favorite food
P_a = the true proportion of adults that choose pizza as their favorite food

The 90% Confidence interval for Pa – Pk = [-.2275, -.0575]

Does this interval provided evidence that the true proportion of kids that choose pizza as their favorite food is more than the true proportion of adults that choose pizza as their favorite food?