CHAPTER 8
INFERENCES ABOUT TWO Samples

8-2 INFERENCES ABOUT TWO PROPORTIONS

Assumptions

1) We have proportions from 2 simple random samples that are independent. (The sample values from one population are not related or matched with the sample values from the other population.)

2) For both samples, $np \geq 5$ and $nq \geq 5$.

3) Both are binomial distributions.

When comparing two population proportions, we can usethe 2-prop-z-test command on the calculator

OR

we use the 2-prop-z-int command to make a confidence interval

$.25 = .25$

$p_1 = p_2$

$p_1 - p_2 = 0$

$.26 \quad .24$

$p_1 > p_2$

$p_1 - p_2 > 0$

Use a significance level of 0.05 to test the claim that the proportion of freshmen that are tardy is less than the proportion of sophomores that are tardy. (P-value method)

Freshman p_1	Sophomores p_2
$n_1 = 405$	$n_2 = 400$
$x_1 = 47$	$x_2 = 75$

"2 prop Z test"

1) State Ho, Ha, and write a sentence for the claim.	2) State when to reject Ho.
Ho : $p_1 = p_2$ Ha : $p_1 < p_2$ claim: freshmen are tardy less than sophomores.	reject Ho pvalue < .05
3) Find the test statistic and p-value.	**4) Conclusion**
$Z = -2.827$ pvalue = .00235	reject Ho freshmen are tardy less than sophomores

****If you want to estimate the difference between 2 population proportions, construct a confidence interval.

IF THE CONFIDENCE INTERVAL INCLUDES 0 (zero) THEN THERE IS NO SIGNIFICANT DIFFERENCE BETWEEN p_1 and p_2.

(.02, .035) sign. difference

(-.10, .02) no sign. difference

Construct a 95% confidence interval estimate of the difference between the two population proportions of grandparents that use the internet. Is there a substantial difference between them? (Is 0 in the interval?)

Grandpas	Grandmas
$n_1 = 205$	$n_2 = 331$
$x_1 = 43$	$x_2 = 87$

"2 prop z int"

1) Write the confidence interval.	2) Is there a difference between the populations? Explain.
(-.126, .0201)	No, zero is in the conf. interval. No difference between grandpas and grandpas using the internet.

A survey of 480 Weston residents showed that 99 have visited the library within the last 30 days. A survey of 425 Pembroke Pines residents showed that 74 of them have visited the library recently. Use a 0.10 significance level to test the claim that the proportion Weston residents who have visited the library within the last 30 days is different than the proportion of Pembroke Pines residents. Use the traditional method.

"2 prop z test"

1) State H_o, H_a, and write a sentence for the claim.	2) Find the critical value. State when to reject H_o.
$H_o: p_1 = p_2$ $H_a: p_1 \neq p_2$ claim: The proportion of Weston residents who have visited the library is different from Pembroke Pines residents.	invnorm(.10/2) reject if z is in a critical region 
3) Find the test statistic and determine whether to reject the null. Explain.	4) Conclusion
$z = 1.227$; fail to reject, z is not in a critical region.	The proportions of residents in these 2 cities that use the library are not different.

23% of 423 seniors said they are going to the prom.

17% of 307 juniors said they are going to the prom.

Make a 90% confidence interval for the difference between the proportion of seniors and juniors going to the prom. (Is 0 in the interval?)

1) Write the confidence interval.	2) Is there a difference between the populations? Explain.
(.0113, .109)	Yes, there is a difference between the proportion of juniors + seniors that say they are going to the prom.

"2prop z int" (command to use on the calculator)