Final Review

Names of group members:

1. The mean score of a political methodology course in 2010 was 78, with a standard deviation of 15. In this year, 55 students were enrolled in the course. Did these students perform differently than the class of 2009, where the 60 enrolled students' mean score was 85 with a standard deviation of 13?

    H_0: $\mu_2 - \mu_1 = 0$ H_a: $\mu_2 - \mu_1 \neq 0$

    SE = $\sqrt{(15^2/55) + (13^2/60)}$ = $\sqrt{6.9076}$ = 2.628

    Difference in means = 85-78 = 7

    Test statistic = (7-0)/2.628 = 2.664

    p(2.664) = .00386(2) = .00772

    Reject the null hypothesis—there is a significant difference between average score from 2009 and 2010.

2. For a random sample of individuals in South Park, we are comparing adults and children on the number of curses they say per day. Conduct a hypothesis test using a 0.05 significance level.

Group	N	Mean	Std Dev.	SE Mean
Adults	11	3.59	1.94	0.585
Children	18	2.02	2.02	0.476

    H_0: $\mu_2 - \mu_1 = 0$ H_a: $\mu_2 - \mu_1 \neq 0$

    σ_{hat} = $\sqrt{3.963}$ = 1.991

    SE = 1.991$\sqrt{.146}$ = .761

    (3.95-2.02-0)/.762 = 2.0604

    p(2.0604), 27 df = .0246(2)=.0492

    Reject the null hypothesis—adults and children swear at different rates.

3. The table below refers to a survey of senior high school students in Dayton, Ohio. Test whether cigarette use and alcohol use are statistically independent. Report the P-value and interpret.

		Cigarette Use	
		Yes	No
Alcohol Use	Yes	1449	500
	No	46	281

Expected table:

		Cigarette Use		
		Yes	No	Total
Alcohol Use	Yes	1280.2	668.79	1949
	No	214.79	112.21	327
	Total	1495	781	2276

$X^2 = 22.257 + 42.599 + 132.64 + 253.99 = 451.396$

$P(451.396)$, 1 df $= 3.58 \times 10^{-100}$

Alcohol Use and Cigarette Use are NOT statistically independent—Alcohol use and cigarette use are correlated.

4. A study in 2000 by the National Highway Traffic Safety Administration estimated that 73% of people wear seat belts, that failure to wear seat belts led to 9200 deaths in the previous year, and that that value would decrease by 270 for every 1 percentage point gain in seat belt usage. Let y = predicted number of deaths in a year and x = percentage of people who wear seat belts. Find the prediction equation that yields these results.

$y = \alpha + \beta x$

(.73, 9200)

+.01x -> -270y: $\beta = -270/.01 = -27{,}000$

$9200 = \alpha + (-27{,}000)(.73)$

$\alpha = 28{,}910$

$y = 28{,}910 - 27{,}000x$

5. 49 students at the University of Florida made blinded evaluations of cola drinks. 29 students preferred Coke over Pepsi. Would you say there is strong evidence that more students at the university prefer Coke?

H_0: π=.5 H_a: π>.5
29/49 = .5918

SE = $\sqrt{(.5*.5)/49}$ =.0714

t = $\dfrac{.5918-.5}{.0714}$ = 1.286

p(1.286) = .0992 (one-tailed)

Cannot reject the null hypothesis—not significant proof that more students prefer Coke.

6. A poll in Canada indicated that 48% of Canadians favor imposing the death penalty. A report by Amnesty International on this and related polls did not report the sample size but stated, "Polls of this size are considered to be accurate within 1.5 percentage points 95% of the time." About how large was the sample size?

N = $\dfrac{1.96^2(.48*.52)}{.015^2}$
=4262