Panel 1

Exam 3

Confidence intervals for μ — large n / small n

for π

Hyp. Testing for μ

for $\mu_1 - \mu_2$

for π.

large n

small n

1

Panel 2

Tests

H_0:

H_a:

$\left.\begin{matrix} z_0 \\ t_0 \end{matrix}\right\} z$

$p = 2P(z > |z_0|) < 0.05$

$|t_0| > t_\alpha$

Reject H_0

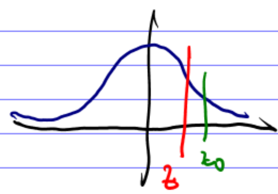
2

Panel 3

Your test results in "reject H_0" for a given sample size. Say you increase n. Can your conclusion change?

$z_0 = \frac{\bar{x}-\mu}{(s/\sqrt{n})} = 2.38$, say, $P(z > 2.38) < 0.05$

If n is bigger $z_0 > 2.38$, say $2.5 \Rightarrow P(z > 2.5)$



3

Panel 4

According to USA Today (Dec. 1999) the average age of MSNBC TV News viewers is 50 years. A company wants to market a product for this age group, but wants to ensure that the USA Today study is correct before investing advertisement money. They select 50 US households at random that view MSNBC TV News and find their average age to be 51.3 years with a standard deviation of 7.1 years. Should the company invest in advertising?

$H_0: \mu = 50$

$H_a: \mu \neq 50$

$t_0 = \frac{\bar{x}-\mu}{(s/\sqrt{n})} = \frac{51.3-50}{7.1/\sqrt{50}} \approx 1.3$

$p = 2 \cdot P(t > 1.3) = 2 \cdot 0.0968 \approx 0.1800 > 0.05$

$\Rightarrow$ Test inconclusive $\Rightarrow$

4

Panel 5

To test the research hypothesis that teacher expectation can improve student performance, two groups of 61 students were compared. Teachers of the experimental group were told that their students would show large IQ gains during the test semester, while teachers of the control group were told nothing. At the end of the semester, IQ change scores were calculated with the following results:

	Mean	Standard Deviation	Sample Size
Experimental	16.5	14.2	61
Control	7.0	13.1	61

Test the null hypothesis of no effect on mean IQ change scores against the above research hypothesis.

Reject H_0!

Diff. of Means Test

$H_0: \mu_1 = \mu_2$

$H_a: \mu_1 \neq \mu_2$

$z = \dfrac{\bar{X}_1 - \bar{X}_2 - (\mu_1 - \mu_2)}{S}$, $S = \sqrt{\dfrac{S_1^2}{n_1} + \dfrac{S_2^2}{n_2}} = 2.473$

$= 9.5/2.473 = 3.841$

$p = 2P(z > 3.841) = 2 \cdot 0.000233 = 0.000466 < 0.05$

5

Panel 6

We conduct a survey to ask people if they are for or against Hydraulic fracturing in a particular county. The survey asked 265 people, 116 came out for the practice, 149 against. Compute a 95% confidence interval for the probability of voting for hydraulic fracturing. If you were to advise a congress person to represent her district accurately, would you advise her to vote for or against the practice?

Standard error: $\sqrt{\dfrac{\pi(1-\pi)}{n}} = 0.0305$ $S = \sqrt{\pi(1-\pi)}$

Multiplier: 1.96

std. error: 0.0305

$\bar{X} = 116/265 = 0.4377$

$\bar{X} = 149/265 = 0.5622$

from $0.4377 - 0.05978 =$

$0.4377 + 0.05978 = 0.4974$

from $0.5622 - 0.05978 = 0.50242$

6

S = vote for. Vote against

S = vote against

6

Panel 7

If·we·flip·a·coin·144·times·and·find·that·heads·shows·up·100·time, ·while·tail·occurs·44·times, then a·90% confidence·interval·is·from ~~0.69 to 0.71~~¶, where S = heads

F

S = heads

$\cancel{S = \text{tails}}$

$\bar{x} = \underline{0.694}$

$\cancel{\bar{x} = 0.306}$

$S = \sqrt{0.694 \cdot 0.306} = \sqrt{0.2123} = 0.461$

std error $\sqrt{\dfrac{0.694 \cdot 0.306}{144}} = 0.0384$

From $0.694 - 1.645 \cdot 0.0384 =$

to $0.694 + 1.645 \cdot 0.0384 =$

7