

Panel 1

Last Time

Test for Mean

- $H_0: \mu = \mu_0$
- $H_a: \mu \neq \mu_0$
- $t_0 = \frac{\bar{x} - \mu_0}{s/\sqrt{n}}$
- $p = 2P(t \geq |t_0|)$ $< 0.05 \rightarrow$ reject H_0 and accept H_a

Test for Difference of Means *2 sample means, 2 pop variances*

- $H_0: \mu_1 = \mu_2$
- $H_a: \mu_1 \neq \mu_2$
- $t_0 = \frac{\bar{x}_1 - \bar{x}_2}{s/\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$ $s = \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$
- $p = 2P(t \geq |t_0|)$

Panel 3

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 52.3 years with a standard deviation of 7.1 years. Should the company invest in advertising?

~~$H_0: \mu = 50$~~
 $H_a: \mu \neq 50$ ✓

$df = n - 1$

$t_0 = \frac{\bar{x} - \mu_0}{s/\sqrt{n}} = \frac{52.3 - 50}{7.1/\sqrt{50}} = \frac{2.3}{1.01} = 2.290$

$p = 2P(t \geq 2.290) = 2 \cdot 0.011 = 0.022$

\Rightarrow Reject H_0 , i.e. no ad-campaign

Panel 2

Suppose you want to compare a new method of teaching reading to "slow learners" to the current standard method. You select a random sample of 22 slow learners; 10 of them are taught by the new method and 12 are taught by the standard method, for the same period of time. The reading scores for the two groups were as follows:

New Method	Standard Method
80, 80, 79, 81, 76, 66, 71, 76, 70, 85	79, 62, 70, 68, 73, 76, 86, 73, 72, 68, 75, 66

a) What is the difference in average reading scores between the two methods?
 b) Conduct a test to determine whether the new method is better than the standard method.

Diff of Means

Test for mean!

Panel 4

Suppose you want to compare a new method of teaching reading to "slow learners" to the current standard method. You select a random sample of 22 slow learners; 10 of them are taught by the new method and 12 are taught by the standard method, for the same period of time. The reading scores for the two groups were as follows:

New Method	Standard Method
80, 80, 79, 81, 76, 66, 71, 76, 70, 85	79, 62, 70, 68, 73, 76, 86, 73, 72, 68, 75, 66

a) What is the difference in average reading scores between the two methods?
 b) Conduct a test to determine whether the new method is better than the standard method.

$\bar{x}_1 = 76.4$ $s_1 = 7.1$ $n_1 = 10$
 $\bar{x}_2 = 72.3$ $s_2 = 6.7$ $n_2 = 12$

$H_0: \mu_1 = \mu_2$
 $H_a: \mu_1 > \mu_2$

$t_0 = \frac{\bar{x}_1 - \bar{x}_2}{s/\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} = \frac{76.4 - 72.3}{2.573} = 1.5873$ $s = \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}} = \sqrt{\frac{50}{10} + \frac{45}{12}} = 2.573$

$p = 2P(t \geq 1.5873) = 2 \cdot 0.054 = 0.12$ inconclusive

$df = n_1 + n_2 - 2$

Panel 5

Name: _____

Quiz #9

① The average weight of a box of chocolate is 250 gr. You suspect that this is incorrect so you weigh a sample of 100 boxes to find that $\bar{x} = 235$ with $s = 6$. Is the claimed weight correct?

$H_0:$

$H_a:$

$t_0 = -$ drop any use of sign

$p = 2 \cdot P(Z > +) = 0$

Panel 6

② To test a new blood pressure medication, one group of patients receives the new drug, the other gets a placebo. Their blood pressure is measured as follows:

Group A: 90, 80, 89, 92, 86 (with medication)

Group B: 110, 115, 97, 107, 120 (with placebo)

Is there a significant difference between the groups?

$H_0:$

$H_a:$

$t_0 =$

$p =$

Panel 7

Dividing a Sample into Two Groups:

Example: The shared data set "ComputerAssign2-normaltemp" shows temperature, sex, and heart beat of subjects. Check whether there is a significant difference in heart beat between men and women.

Stats \rightarrow Z -Stats \Rightarrow 2 Samples \Rightarrow will Data

Panel 8

Proportion

One experiment with 2 outcomes.

Denote $P(S) =$

$\rightarrow P(\bar{S}) =$

$H_0:$

$H_a:$

$t_0 =$

$p = 2 P\left(\frac{t}{s} \geq \frac{|t_0|}{|s|}\right)$

~~Handlong~~