

HYPOTHESIS TESTING

Null Hypothesis: H_0 - Trying to disprove

Alternative Hypothesis: H_a - What you think
is happening

Testing airbags. Researchers believe they do
not open properly.

H_0 : Airbags open correctly.

H_a : Airbags do not open correctly.

Developers believe new paint dries more quickly.

H_0 : New paint dries at the same or more slowly
than standard paint.

H_a : New paint dries faster than standard
paint.

Hypothesis Test

- 1) Define parameters. (What numerical info is needed.)
- 2) Set up H_0 + H_a .
- 3) Set the criteria for the test.
 - a) What kind of distribution? Normal
 - b) Set level of confidence. for H_0

$$p < 0.05 \quad p < 0.01$$

(95%)

99%

- 4) List sample evidence.

$$n, \bar{x}, \sigma \text{ or } s, \sigma_{\bar{x}}, Z^*$$

(called the test statistic)

- 5) Find probability. ($p =$)

$$Z^* = \frac{\bar{x} - \mu}{\sigma_{\bar{x}}}$$

- 6) If $p < \#$, then Reject the H_0 .
If $p > \#$, then Fail to Reject the H_0 .

Millvale H.S. - National Test

95% confidence

National Test $\mu = 50$ $\sigma = 10$ 900 students $\bar{x} = 51.1$ $S = 10$

Did Millvale students really do better?

1) Parameter: student test scores

2) $H_0: \mu = 50$ (\leq) $H_a: \mu > 50$ 3) Criteria: Normal Distribution
 $p < 0.05$ 4) $n = 900$ $\sigma_{\bar{x}} = \frac{S}{\sqrt{n}} = \frac{10}{\sqrt{900}} = 0.333$
 $\bar{x} = 51.1$ $S = 10$ 5)  $Z^* = \frac{\bar{x} - \mu}{\sigma_{\bar{x}}} = \frac{51.1 - 50}{0.333} = 3.3$ 6)  $p = 0.0005$
Reject the H_0

Millvale HS students performed better than the national average.

Two-tailed


Two-Tailed Test

99% Conf.

Kelley Employment Agency $\mu = 82$ $\sigma = 8$ * Brown Agency $n = 36$ $\bar{x} = 79$ $S = 8$

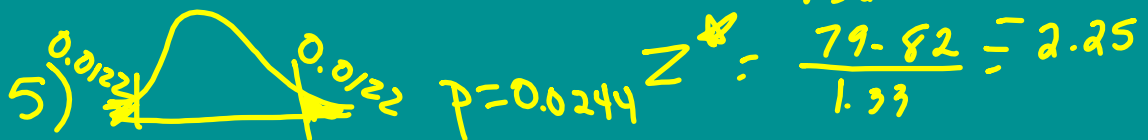
1) Param: test scores on Brown test

2) $H_0: \mu \neq 82$ $H_a: \mu = 82$ Two-tailed $\mu \neq \#$

3) Criteria; Normal

 $P < 0.01$ One Tailed $\mu > \#$ $\mu < \#$

4) Evidence:

 $n = 36$ $\bar{x} = 79$ $S = 8$ $\sigma_{\bar{x}} = \frac{8}{\sqrt{36}} = 1.33$ 5)  $p = 0.0244$ $z = \frac{79 - 82}{1.33} = -2.25$ 6) Fail to Reject the H_0

Brown test does not give same results as Kelley Test