

7.4: Testing a claim about a mean: sigma known

Assumptions for Means, sigma known

- 1) SRS
- 2) Sigma known (σ known)
- 3) $n > 30$ or normally distributed

σ : population st. dev.

Can we use z for the following situation?

1. $n = 35$; sigma is known; population is not normally distributed

Yes; σ known
 $n > 30$

Can we use z for the following situation?

2. $n = 25$; σ is not known;
population is normally distributed

No σ unknown

Can we use z for the following situation?

3. $n = 25$; sigma is known; population is not normally distributed

No $n < 30$
not normal

Can we use z for the following situation?

4. $n = 15$; σ is known; population is normally distributed

Yes; σ known
normal

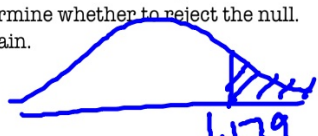
Test statistic for means, sigma known

$$Z = \frac{(\bar{X} - \mu)}{(\sigma / \sqrt{n})}$$

\bar{X} : mean of sample
 μ : mean of population
 σ : population st. dev.
 n : sample size


Conduct a 6 step hypothesis test

$\bar{x} = 120$, $n = 50$, and $\sigma = 12$, test the claim that the mean IQ score of statistics professors is greater than 118. Use a $\alpha = .05$ significance level. Use the p-value method

<p>1. State H_0 & H_a; write a sentence for the claim</p> <p>$H_0: \mu = 118$ $H_a: \mu > 118$ claim: mean IQ score of stat. professors is greater than 118.</p>	<p>2. State the assumptions.</p> <p>SRS σ known $n > 30$ or normal</p>	<p>3. State when to reject null for p-value method.</p> <p>reject H_0 if $p\text{-value} < .05$</p>
<p>4. Calculate the test statistic.</p> $Z = \frac{\bar{X} - \mu}{\sigma / \sqrt{n}} = \frac{(120 - 118)}{(12 / \sqrt{50})} = 1.179$	<p>5. Sketch and find the p-value.. Determine whether to reject the null. Explain.</p>  <p>$p\text{-value} = \text{ncdf}(1.179, 888) = .119$ Fail to reject $\alpha = .05$</p>	<p>6. Conclusion</p> <p>There is not sufficient evidence to support the claim that the mean IQ score for stat. professor is greater than 118.</p>

Conduct a 6-step hypothesis test

The mean body temperature of 106 people was 98.2°F. Assume that $\sigma = 0.62$. Use a .01 significance level to test the claim that the common belief that the mean body temperature is 98.6°F. Use the traditional method.

<p>1. State H_0 & H_a; write a sentence for the claim</p> <p>$H_0: \mu = 98.6^\circ\text{F}$ $H_a: \mu \neq 98.6^\circ\text{F}$ claim: mean body temp is 98.6°F.</p>	<p>2. State the assumptions.</p> <p>SRS σ known $n > 30$ or normal</p>	<p>3. Sketch bell curve. Determine the critical value. State when to reject null.</p>  <p>invnorm(.01/2) = ±2.576 reject H_0 if z is in the critical region</p>
<p>4. Calculate the test statistic.</p> $Z = \frac{(98.2 - 98.6)}{(.62/\sqrt{106})}$ $= -6.642$	<p>5. Determine whether to reject the null. Explain.</p> <p>reject null; $z = -6.642$ is in the critical region.</p>	<p>6. Conclusion</p> <p>There is sufficient evidence to warrant rejection of the claim that the mean body temperature is 98.6.</p>