

7.5: Testing a claim: sigma unknown

We will use t instead of z .

Assumptions for means, sigma unknown

- 1) SRS
- 2) sigma not known
- 3) $n > 30$ or normally distributed

p. 415
1-4

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- ① \bar{x} or ~~\bar{x}~~ or neither
 - ② t or ~~z~~ or neither
 - ③ ~~t~~ or z or neither
 - ④ t or ~~z~~ or neither

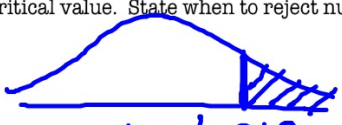
Test statistic
(means ; σ unknown)

$$t = \frac{(\bar{x} - \mu)}{(s/\sqrt{n})}$$

Use the traditional method to test the claim. A large university claims the mean number of classroom hours per week for full-time faculty is more than 9. A random sample of the number of classroom hours for 11 full-time faculty for one week is listed below. At $\alpha = 0.05$, test the university's claim. Assume the population is normally distributed.

10.7 9.8 11.6 9.7 7.6 11.3 14.1 8.1 11.5 8.5 6.9

$$\bar{x} = 9.98, s = 2.13$$

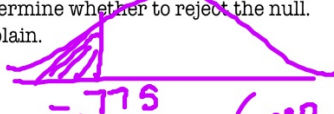
<p>1. State H_0 & H_a; write a sentence for the claim</p> <p>$H_0: \mu = 9$ $H_a: \mu > 9$ Claim: mean # of classroom hours per week is more than 9 for full time faculty.</p>	<p>2. State the assumptions.</p> <p>SRS σ unknown $n > 30$ or normal</p>	<p>3. Sketch bell curve. Determine the critical value. State when to reject null.</p>  <p>$t_{cr} = 1.812$ reject H_0 if t is in the crit. region</p>
<p>4. Calculate the test statistic.</p> $t = \frac{(9.98 - 9)}{(2.13 / \sqrt{11})}$ <p>1.526</p>	<p>5. Determine whether to reject the null. Explain.</p> <p>fail to reject H_0; t is not in the crit. region</p>	<p>6. Conclusion</p> <p>There is not sufficient evidence to support the claim that the mean classroom hrs per week is more than 9.</p>

10.7
9.8
11.6
9.7
7.6
11.3
14.1
8.1
11.5
8.5
6.9

$$\bar{X} = 9.98$$
$$S = 2.13$$

A travel association says the daily lodging costs for a family in the U.S. is \$152. You work for a tourist publication and want to test this claim. You randomly select 10 U.S. families and find out how much each spent on lodging for one overnight trip. Assume the population is normally distributed. Use a significance level of 0.02. Use p-value method.

164 137 142 155 119 104 74 204 148 181

<p>1. State H_0 & H_a; write a sentence for the claim</p> <p>$H_0: \mu = 152$ $H_a: \mu \neq 152$ claim: Daily lodging cost for a family is \$152.</p>	<p>2. State the assumptions.</p> <p>SRS σ unknown $n > 30$ or normal</p>	<p>3. State when to reject null for p-value method.</p> <p>reject H_0 if $p\text{-value} < .02$</p>
<p>4. Calculate the test statistic.</p> <p>$t = -.775$</p>	<p>5. Sketch and find the p-value.. Determine whether to reject the null. Explain.</p>  <p>$p\text{-value} = t\text{cdf}(-.775, -1000, 9) \times 2$ $= .458$</p>	<p>6. Conclusion</p> <p>There is not sufficient evidence to warrant rejection of the claim that...</p>

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164	137	142	155	119
104	74	204	148	181

$$\bar{x} = 142.8$$

$$s = 37.52$$