§ 9.1 Inferences for $\mu_1 - \mu_2$

Procedure

Step 1: Find $H_0 : \mu_1 = \mu_2$

$H_a : \mu_1 \neq \mu_2$

Step 2: Find $t* = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$

Step 3: Find $\mathbb{R}$ or $\mathbb{P}$

Step 4: Conclusion/Summary
Ex: BK Restaurant claims that the amount of saturated fat in its hamburgers is less than that of the MD restaurant. A sample is taken from each restaurant. The BK sample (n=25) has a mean of 80 grams and standard deviation of 10 grams, while the MD sample (n=20) yields a mean of 84 grams with a standard deviation of 8 grams.

(a) Is there enough evidence to suggest that there is a difference? use $\alpha = 0.01$ (both methods)
(b) Is there enough evidence to support BK's claim? use $\alpha = 0.01$
(both methods)
9.2 Inferences for $p_1 - p_2$

Procedure

Step 1: Find $H_0: p_1 = p_2$

$H_a: p_1 \neq p_2$

$\bar{p} = \frac{x_1 + x_2}{n_1 + n_2}$

Step 2: Find $Z^* = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\bar{p}(1 - \bar{p}) \left( \frac{1}{n_1} + \frac{1}{n_2} \right)}}$

Step 3: Find $\mathbb{R}$ or $\mathbb{P}$

Step 4: Conclusion/Summary
Ex: In a sample of 370 men, 70% admitted to driving without a seat belt. In a sample of 280 women, 63% admitted to driving without a seat belt. At $\alpha = 0.05$ is there enough evidence to show that there is a difference in the proportions?
9.3 Difference of two Means - Dependent Samples

Procedure

Step 1: \( H_0 : \mu_d = 0 \)
\( H_a : \mu_d \neq 0 \)

Step 2: Find
\[
    t^* = \frac{\bar{d} - \mu_d}{S_d/\sqrt{n}},
\]
\[
    S^2_d = \frac{\sum d^2 - (\sum d)^2}{n-1}/n
\]

Step 3: Find the Rejection Region or P-value

Step 4: Conclusion
Ex: A volley-ball shoe manufacturer claims that its new shoes increase the vertical jump (in inches) of any athlete. The following tables shows that result of five athletes with regular shoes and the new shoes. Is there enough evidence to suggest that there is a difference? Use $\alpha = 0.05$

Table 1: Vertical Jumps in Inches

<table>
<thead>
<tr>
<th>$x_1$</th>
<th>30</th>
<th>28</th>
<th>27</th>
<th>33</th>
<th>44</th>
</tr>
</thead>
<tbody>
<tr>
<td>$x_2$</td>
<td>34</td>
<td>29</td>
<td>27</td>
<td>34</td>
<td>48</td>
</tr>
</tbody>
</table>
§ 9.4 Inferences for $\sigma_1 - \sigma_2$

F-Table

$$F_{0.025,8,7} =$$

$$F_{0.01,13,3} =$$

$$F_{0.005,5,13} =$$

$$F_{0.005,25,6} =$$
Procedure

Step 1: Find  \( H_0 : \sigma_1 = \sigma_2 \)

\[ H_a : \sigma_1 \neq \sigma_2 \]

Step 2: Find  \( F^* = \frac{S_1^2}{S_2^2} \)

Step 3: Find  \( RR \)      or      \( P \)

Step 4: Conclusion/Summary