

Final Review – Part 6: ANOVA Hypothesis Tests

Basics

- A hypothesis test problem will ask you to test a claim.
- Look for a significance level, not a confidence level.
- Use the 5 step process.
 1. State H_0 & H_1 .
 2. State the level of significance α .
 3. State which test you are performing.
 4. State the calculated value of the test statistic and P-value from StatCrunch.
 5. Make a decision about H_0 . (Reject H_0 or Fail to Reject H_0)
Make a conclusion about H_1 . (There {is/is not} sufficient evidence to conclude that “ H_1 is true”.)
- These tests will use 3 or more samples of numerical data.

ANOVA Hypothesis Test

- The wording should indicate that we are testing a claim about 3 or more populations being equal.
- The sample information provided will be 3 sets of numerical data.
- StatCrunch steps:
 - For each sample enter the data in its own column.
 - Stat > ANOVA > One Way
 - Select the columns containing the data, and press compute! for test statistic & P-value.

Example

1) The weights (in ounces) of 19 baby boys are listed. The data are divided by whether the mother had 6 or more prenatal visits, between 3 and 5 prenatal visits, or fewer than 3 prenatal visits.

6+ visits	131	119	128	126	142	137	125	128
3-5 visits	120	117	121	124	119	130		
Less than 3 visits	96	101	97	104	130			

At the 0.05 level of significance, test the claim that the mean weight is the same for all 3 groups of mothers.

“Test the claim that ...” & “0.05 level of significance” → Hypothesis Test Problem

3 sets of numerical data, claim refers to 3 equal means → Hypothesis Test for ANOVA

ANSWER:

1. $H_0: \mu_1 = \mu_2 = \mu_3$

H_1 : At least one mean is different than the others.

2. $\alpha = 0.05$

3. ANOVA

4. $F = 11.27$, $P\text{-value} = 0.0009$

5. Reject H_0 .

There is sufficient evidence to conclude that least one mean is different than the others.