

# 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  $\alpha$ .
  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.