

Lab 7: ANOVA

Name: Omar Ali

Date: 11/13/2025

1. Descriptive statistics for HINCOME9 and HIGSCHL9

HINCOME9	number	mean	standard deviation
South	38	31,603.74	3,383.501
Midwest	24	33,075.61	3,482.958
West	16	32,306.97	4,273.298
Northeast	7	33,939.82	2,867.605

HIGSCHL9	number	mean	standard deviation
South	38	86.39701	4.299031
Midwest	24	90.11043	2.278952
West	16	90.19077	4.130893
Northeast	7	91.20209	1.079700

2. ANOVA Results and Hypotheses

(A) HINCOME9 ANOVA

R output shows:

p-value = 0.262

What this means:

There is no evidence that the average income is different across the four regions.

Hypotheses:

H_0 (null): All regions have the same average income.

H_1 (alt.): At least one region has a different average income.

(B) HIGSCHL9 ANOVA

R output shows:

p-value = 0.0000721

What this means:

There is a difference between regions in high school completion rates.

Hypotheses:

H_0 (null): All regions have the same average high school completion rate.

H_1 (alt.): At least one region is different.

3. Decisions at the 0.05 Level

HINCOME9 Decision

p = 0.262

$0.262 > 0.05$

We do not reject the null hypothesis.

Meaning:

Average income does not significantly differ between regions.

HIGSCHL9 Decision

p = 0.0000721

$0.0000721 < 0.05$

We reject the null hypothesis.

Meaning:

High school completion rates do differ between regions.

Assignment II

Kruskal-Wallis Test for HINCOME9

R output shows:

p-value = 0.2203

1. Report Your Results

The Kruskal-Wallis test gives $p = 0.2203$, which is greater than 0.05.

2. Hypotheses

H_0 (null): All regions have the same distribution of income.

H_1 (alt.): At least one region has a different distribution.

3. Decision

$p = 0.2203$

$0.2203 > 0.05$

We do NOT reject the null hypothesis.

Meaning:

There is no evidence that the regions are different in terms of income distribution.

4. Comparing ANOVA and Kruskal-Wallis

For HINCOME9, both tests say the same thing:

test	p-value	Decision	Meaning
ANOVA	0.262	Fail to reject	No difference in averages
Kruskal-Wallis	0.2203	Fail to reject	No difference in distributions

Result:

Both methods agree, there is no regional difference in household income.

