QMS210: ANOVA

Smith, D., & Chua, C. (2020). *Business Statistics 15th Custom Edition for Ryerson University.* **New York: Pearson Education Inc.**

H_0: μ1 = μ2 = μ3 = μ4 ....
H_1: Not all $μ_j$ are equal

Degrees of Freedom:

Among Group	c - 1	c = total number of groups
Within Group	n - c	n = total number of samples within all groups
Totals	n - 1	

Sum of Squares:

$$\underline{\underline{x}} = \frac{\Sigma_{j=1}^{c} \quad \Sigma_{i=1}^{nj} \quad X_{ij}}{n}$$ -> grand mean

Among Group	$$SSA = \sum_{j=1}^{c} n_j(\underline{x}_j - \underline{\underline{x}})^2$$	$\underline{x}_j$ = sample mean of group j $\underline{\underline{x}}$ = grand mean c = number of groups n_j = number of values in group j
Within Group	$$SSW = \sum_{j=1}^{c} \sum_{i=1}^{nj} (X_{ij} - \underline{x}_j)^2$$	X_{ij} = ith value in a group j $\underline{x}_j$ = sample mean of group j
Totals	$$SST = \sum_{j=1}^{c} \sum_{i=1}^{nj} (X_{ij} - \underline{\underline{x}})^2$$	X_{ij} = ith value in a group j n_j = number of values in group j n = total number of values in group j c = number of group

SST = SSW + SSA

Mean Square (Variances):

Among Group	MSA = SSA / (c − 1)	
Within Group	MSW = SSW / (n − c)	F_{STAT}= MSA / MSW
Totals	MST = SST / (n - 1)	

F Critical Values:

- STAT -> DIST ->F -> InvF
- Data: variable

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- area: 0.05 (level of significance),
- n:df = refers to the degrees of freedom calculation under "Among Group"
- d:df = refers to the degrees of freedom calculation under "Within Group"

ANOVA calculator Instructions:

- STAT -> TEST -> ANOV
- How Many: 1 - because we're doing one way ANOVA
- Factor A: List 1 (the list where you indicated which data set each value came from)
- Dependent: List 2 (the list where the data was entered)
  Example:

Data set provided in question		
Data Set 1	Data Set 2	Data Set 3
9	6	2
5	8	6

Inputting data into Casio fx-9750GII Calculator	
List 1	List 2
1	9
1	5
2	6
2	8
3	2
3	6