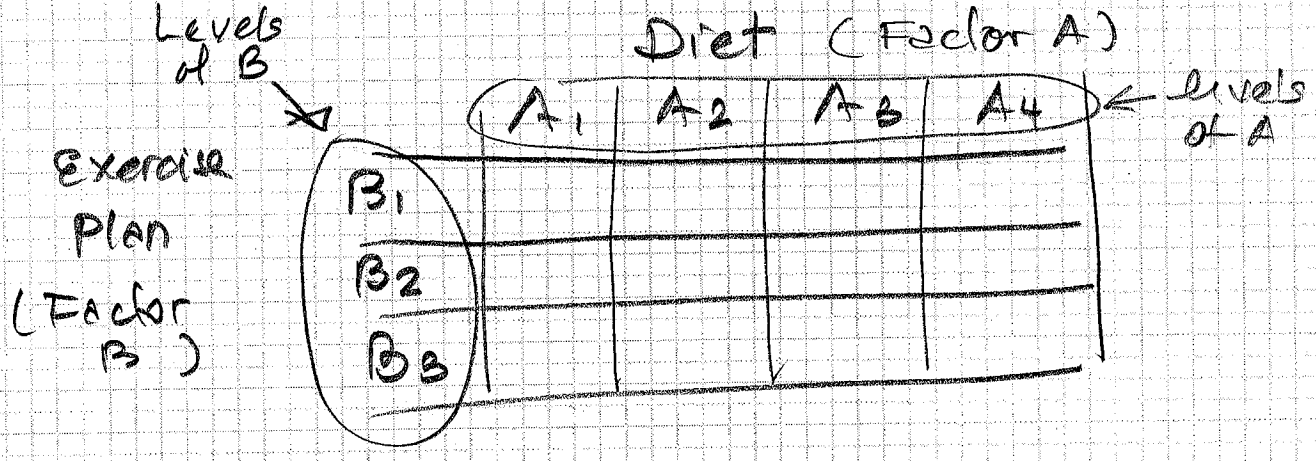
ANALYSIS OF VARIANCE (ANOVA)

A hypothesis test to compare the means of more than two populations

example: 500 patients : experimental units



Blood Sugar: Response Variable

A_1B_1 = treatment

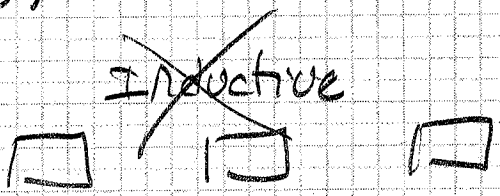
Example: Let's say we are doing a study to compare the effectiveness of two teaching methods: "inductive" and "deductive". 100 students will be randomly assigned to one of the two teaching methods and the SAT scores of all of them will be recorded

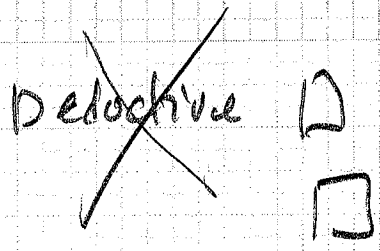
Questions

1) Response variable: SAT score

2) Experimental Units: 100 students

3) Factor (s)





Only one factor: teaching method

4) treatments: Inductive, Deductive

THE COMPLETELY RANDOMIZED DESIGN

Step1 $H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4$

H_a: At least two treatment means differ

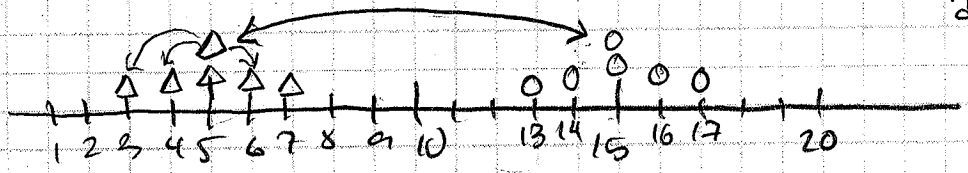
# of treatments = 4 = K

Step2 Test statistic (Tedious)

$$F = \frac{\text{variance "between" the treatments}}{\text{variance "within" the samples}} = 7.4$$

$df_{num} = v_1$

$df_{denom} = v_2$



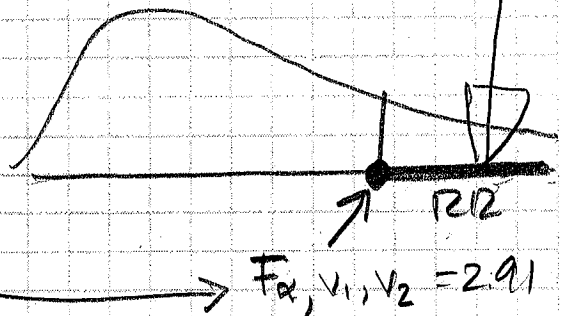
Δ = Boys Girls = O

Step3 Rejection Region (F-Distribution)

$\alpha = .05$

$v_1 = 7$

$v_2 = 12$



RR: $F > 2.91$

Step4 Decision: Reject H_0

Step5 Conclusion: the data provide sufficient evidence to conclude, at $\alpha = .05$, that at least two treatment means differ