Statistics 300 Tue./Thu.
Quiz #19 7:00-8:50 p.m. Name: Solution

(8 points : 10 minutes)

1. **Use the data below to complete the Analysis of Variance Table and test the claim that all of the 1998 Chevy Nova cars have the same gas mileage today.** (Use a 0.05 significance level for the test.)

Car	Test 1	2	3	4	Sample Size	Mean	Standard Deviation
Car 1	20.33		20.63	17.00	3	19.32	2.015
Car 2	19.93	20.06	17.52		3	19.17	1.430
Car 3	17.53	18.50	17.10	20.87	4	18.50	1.685
Car 4	19.54	17.81	20.81	17.91	4	19.02	1.434
Car 5	20.39	20.33	18.56		3	19.76	1.040
Car 6	19.14	17.29	17.01	20.04	4	18.37	1.460
Car 7	19.77	20.60	19.08	19.96	4	19.85	0.626
Car 8	17.85	17.72	18.45		3	18.01	0.389
Car 9	19.10	17.09	17.45		3	17.88	1.072

$SS(\text{total}) = (N-1)s_x^2$ ← overall variance

$= (31-1)(1.331)^2$

$= 53.147$

MSE = pooled variance

$= (1.335)^2 = 1.782$

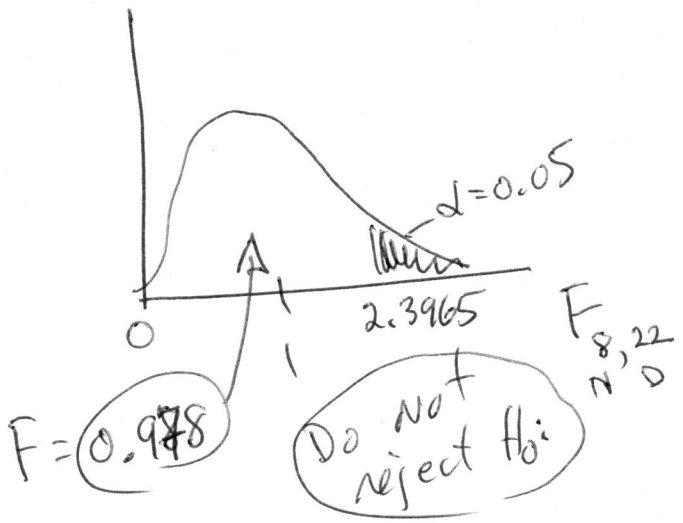
Total N	Overall Mean	Overall St. Dev.	Pooled St. Dev.
31	18.88	1.331	1.335

Analysis of Variance Table

Source	Deg. of Freedom	Sum of Squares	Mean Square	F
Cars	8	13.943	1.743	0.978
Error	22	39.204	1.782	
Total	30	53.147		

$H_0: \mu_1 = \mu_2 = \cdots = \mu_9$

$H_1:$ at least one $\mu_i \neq$ another



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2. **Use the information below to test the claim that all of the 1998 Chevy Nova cars tested have the same gas mileage today.**
(Use a 0.10 significance level for the test.)

Car	Test 1	2	3
Car 1	20.33	17.00	20.63
Car 2	19.93	20.06	17.52
Car 3	17.53	18.50	17.10
Car 4	19.54	17.81	20.81
Car 5	20.39	20.33	18.56
Car 6	19.14	17.29	17.01
Car 7	19.77	20.60	19.08
Car 8	17.85	17.72	18.45
Car 9	19.10	17.09	17.45

$H_0: \mu_1 = \mu_2 = \cdots = \mu_9$

H_1: at least one of the μ_i is not equal to another

$\alpha = 0.10$

pvalue = 0.188

P-value $> \alpha$ so

Do not reject H_0:

Analysis of Variance:One Way

Summary

Groups	*Count*	*Sum*	*Average*	*Variance*
Car 1	3	57.96	19.32	4.0593
Car 2	3	57.51	19.17	2.0461
Car 3	3	53.13	17.71	0.5143
Car 4	3	58.16	19.387	2.267633
Car 5	3	59.28	19.76	1.0809
Car 6	3	53.44	17.813	1.339633
Car 7	3	59.45	19.817	0.579233
Car 8	3	54.02	18.007	0.151633
Car 9	3	53.64	17.88	1.1487

Analysis of Variance Table

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*
Between Groups	18.994	8	2.3743	1.6204	0.187788
Within Groups	26.375	18	1.4653		
Total	45.369	26			