

## HW #5

5.4, 5.10, 5.16, 5.17, 5.18, 5.23

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**5.4**

**5.10**

**5.16**

term	df	sumsq	meansq	statistic	p.value
Judge	6	1927.1	321.18	6.718	6.096e-05
Residuals	39	1864.4	47.81		

**5.17**

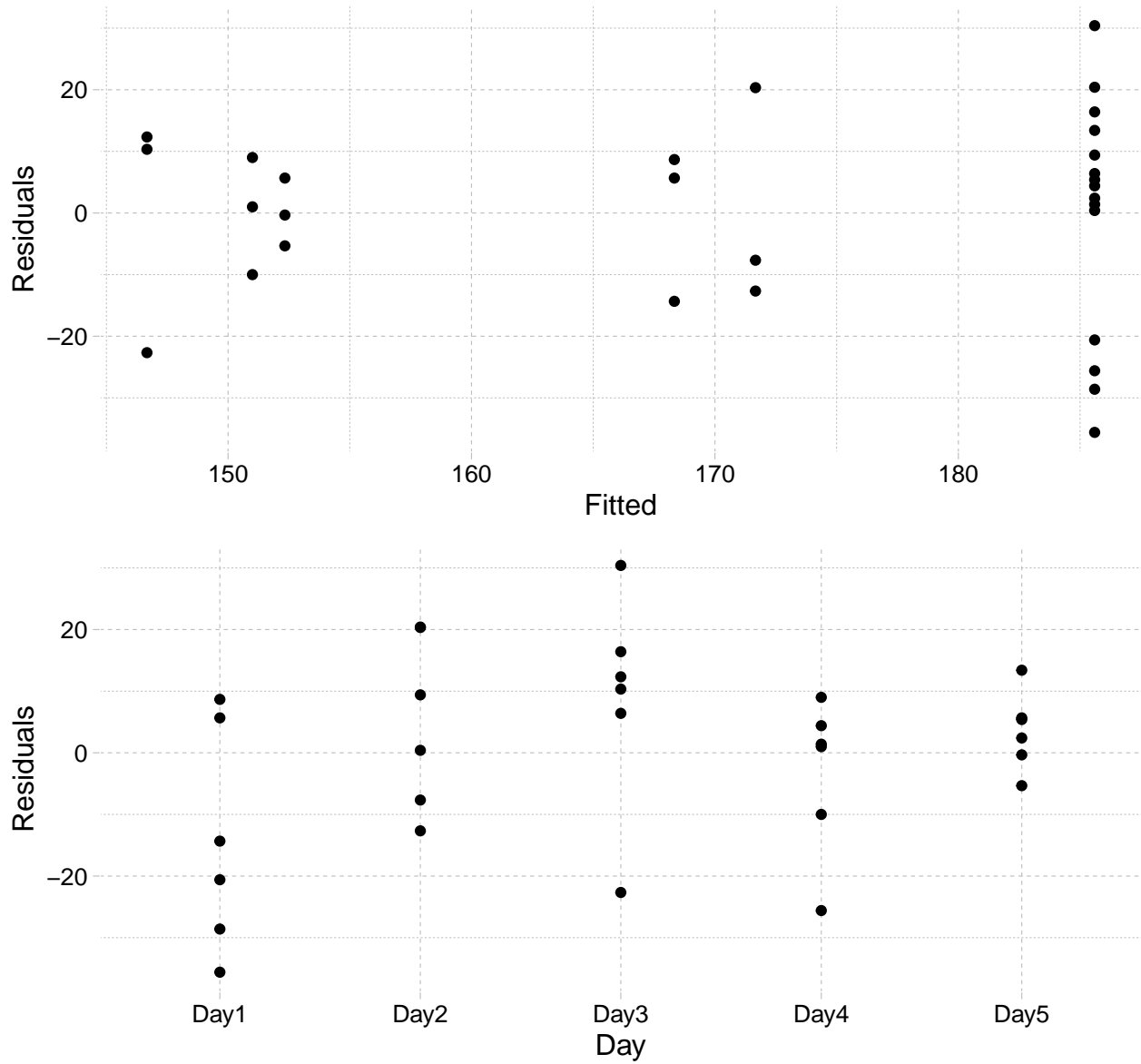
Source	DF	SumSq	MeanSq	Fstat	Pval
Between Groups	7	35819	5117	3.5	0.0099
Within Groups	24	35088	1462		

There were 8 groups, and there is evidence at the  $\alpha = 0.01$  level that the group means are *not* identical.

**5.18**

**a**

Treatment	mean.treat
CPFA150	171.7
CPFA300	146.7
CPFA450	151.0
CPFA50	168.3
CPFA600	152.3
Control	185.6



**b**

Treatment	Day1	Day2	Day3	Day4	Day5
CPFA50	168.3				
CPFA150		171.7			
CPFA300			146.7		
CPFA450				151	
CPFA600					152.3
Control	157.3	195.7	203.3	179	192.7

term	df	sumsq	meansq	statistic	p.value
Treatment	5	7222.5	1444.51	9.098	0.00012
Day	4	3924.9	981.23	6.180	0.00209
Residuals	20	3175.3	158.77		

From this we can conclude that the means of all 10 groups are *not* equal.

**c**

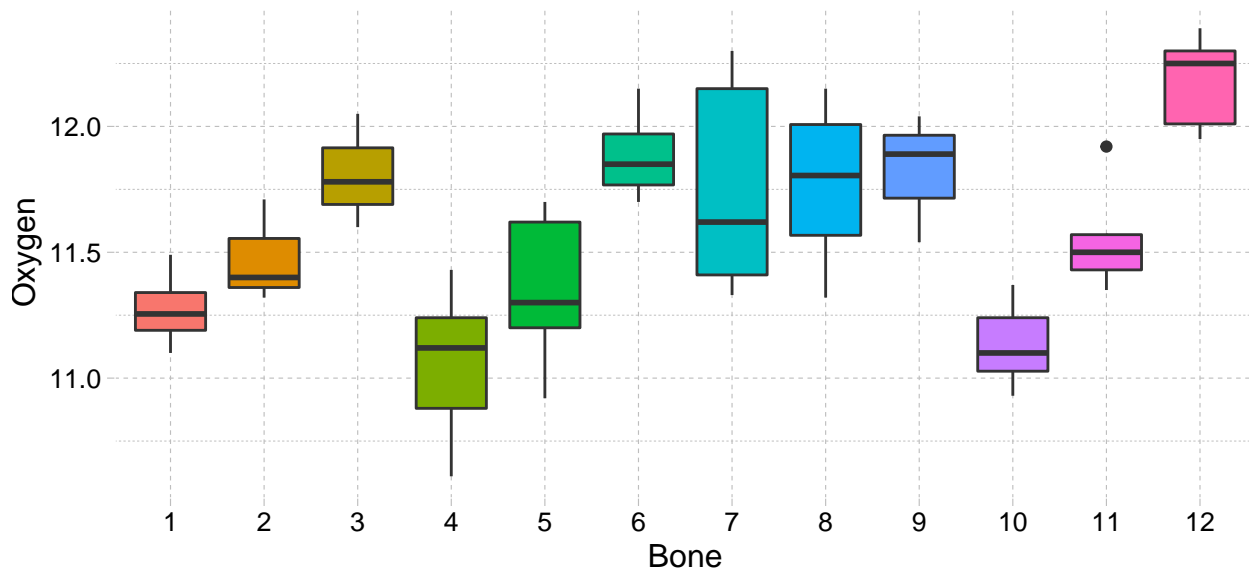
We compare the two models as follows:

Model	df	sumsq	meansq	fstat	pvalue
w/o Day (6 means)	5	7222.5	1444.5	1.166	0.395
With Day (10 means)	9	11147.5	1238.6		

This gives no evidence that the means between days are different.

## 5.23

A boxplot of the data is given below:



The results of an ANOVA test are given below:

term	df	sumsq	meansq	statistic	p.value
Bone	11	6.07	0.552	7.43	1e-06
Residuals	40	2.97	0.074		

Based on these results, there is strong evidence against the means being equal.