

Chapter 17

2. a. ANOVA Table

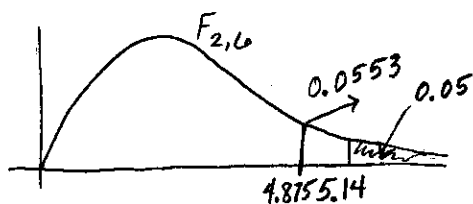
Source	DF	SS	MS	F	$P_{F > F}$
Model	2	26.0	13.0	<u>4.875</u>	0.0553
Error	<u>6</u>	<u>16.0</u>	<u>2.6667</u>		
Corrected Total	8	<u>42.0</u>			

$$\begin{aligned}\text{Corrected Total Sum of Squares} &= \sum Y^2 - \frac{(\sum Y)^2}{n} \\ &= 163 - \frac{(33)^2}{9} \\ &= 42\end{aligned}$$

b. $H_0: \mu_1 = \mu_2 = \mu_3$

$H_A: \text{Not } H_0$

Test Statistic: 4.875



Do not reject H_0 .

There is not sufficient evidence to suggest that at least two of the mean sulfur dioxide concentration levels are different.

f. Find a 90% CI for $\mu_1 - \mu_2$.

$$\bar{Y}_1 - \bar{Y}_2 \pm (t_{n-k, 1-\frac{\alpha}{2}}) \sqrt{MSE \left(\frac{1}{n_1} + \frac{1}{n_2} \right)}$$

$$2 - 6 \pm t_{6, 0.95} \sqrt{2.6667 \left(\frac{1}{3} + \frac{1}{3} \right)}$$

$$-4 \pm 1.943 \sqrt{2.6667 \left(\frac{2}{3} \right)}$$

$$-4 \pm 2.5907$$

$$(-6.59, -1.41)$$

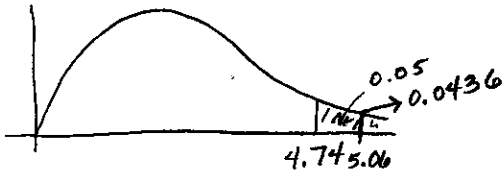
4. a. ANOVA Table

<u>Source</u>	<u>DF</u>	<u>SS</u>	<u>MS</u>	<u>F</u>	<u>Pr > F</u>
Model	2	0.01389	0.006945	5.06	0.0436
Error	7	0.0096	0.00137143		
Corrected Total	9	0.02349			

b. $H_0: \mu_1 = \mu_2 = \mu_3$

$H_A: \text{Not } H_0$

Test Statistic: 5.06

Reject H_0 .

There is sufficient evidence to suggest that at least two of the average proportions of patients discharged are different.

c. It may be a good idea to account for the possible correlation among patients within an institution. Also, it may have been better to use a randomized block design where an institution is a block.

d. Possible Violations of ANOVA Assumptions

- Normality assumption
- Homogeneity of variance assumption

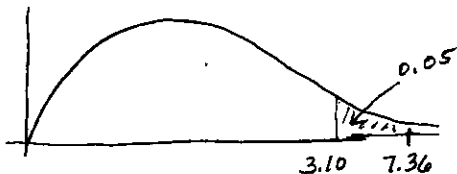
19. b. ANOVA Table

Source	DF	SS	MS	F Value	Pr > F
Model	3	282.0545833	94.0181944	7.36	0.001 < p-value < 0.005
Error	20	255.505	12.77525		
Corrected Total	23	537.5595833			

$$C. H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4$$

$$H_A: \text{Not } H_0$$

Test Statistic: 7.36



Reject H_0 .

There is sufficient evidence to suggest that the average overall performance indices (OPI) differ significantly across the four fund categories (CAT).

- d. Based on the computer output for the Tukey-Kramer method, the average OPI for categories 2 and 4 is different, and the average OPI for categories 3 and 4 is different.

11. a. The blocks are the 3 groups of years of production-line experience (<1 Year, 1-2 Years, >2 Years).
 The treatments are the production-line technologies (High Automation, Moderate Automation, Low Automation).

b. ANOVA Table from computer output

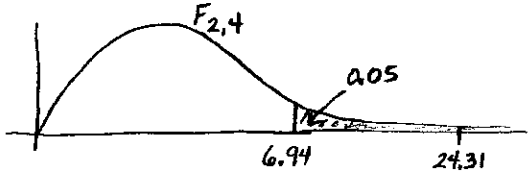
Source	DF	SS	MS	F Value	Pr > F
Model	4	153.1111111	38.2777778	26.50	0.0039
Error	4	5.7777778	1.4444445		
Corrected Total	8	158.8888889			

Source	DF	Type I SS	MS	F Value	Pr > F
Line	2	70.2222222	35.1111111	24.31	0.005 < p-value < 0.01
exper	2	82.8888889	41.4444444	28.69	0.001 < p-value < 0.005

Source	DF	Type III SS	MS	F Value	Pr > F
Line	2	70.2222222	35.1111111	24.31	0.005 < p-value < 0.01
exper	2	82.8888889	41.4444444	28.69	0.001 < p-value < 0.005

c. $H_0: \mu_H = \mu_m = \mu_L$
 $H_A: \text{Not } H_0$

Test Statistic: 24.31



Reject H_0 .

There is sufficient evidence to suggest that the mean output is different for at least two of the technologies.

d. $15.6 - 11 \pm 4.604 \sqrt{1.44444445 \left(\frac{1}{3} + \frac{1}{3}\right)}$ $t_{4,0.995} = 4.604$
 (0.149, 9.185)

