Practice Problem Solutions

Problems 1 through 4.

Type of Shape

Triangle $X_1 X_1^2$	Pentagon $X_2 X_2^2$	-	
$\sum X_1 = 9$	$\sum X_2 = 19$	$\sum X_3 = 25$	$\sum X_4 = 35$
$\sum X_1^2 = 15$	$\sum X_2^2 = 63$	$\sum X_3^2 = 111$	$\sum X_4^2 = 207$
1. <i>Ho</i> :µ	$\mu_1 - \mu_2 - \mu_3 - \mu_4 = 0$)	

1. Ho:
$$\mu_1 - \mu_2 - \mu_3 - \mu_4 = 0$$

 $H_1: \ \mu_1 - \mu_2 - \mu_3 - \mu_4 \neq 0$

2. a & b)
$$SS_{bg} = \left[\frac{(9)^2}{6} + \frac{(19)^2}{6} + \frac{(25)^2}{6} + \frac{(35)^2}{6}\right] - \left[\frac{(9+19+25+35)^2}{24}\right] = 59.33$$

 $SS_{wg} = \left[15+63+111+207\right] - \left[\frac{(9)^2}{6} + \frac{(19)^2}{6} + \frac{(25)^2}{6} + \frac{(35)^2}{6}\right] = 14.00$
 $SS_{TOT} = 59.33+14.00 = 73.33$

c)
$$df_{bg} = 4 - 1 = 3$$
 $df_{wg} = (6-1) + (6-1) + (6-1) + (6-1) = 20$ $df_{TOT} = 24 - 1 = 23$

d)
$$MS_{wg} = \frac{59.33}{3} = 19.778$$
 $MS_{bg} = \frac{14.00}{20} = 0.70$ e) $F = \frac{59.33}{14.00} = 28.254$

Source Table for Shape of Object Data							
Source	Sums of	df	Mean	F	р		
	Squares		Square		-		
Between	59.33	3	19.778	28.254	< .05		
Within	14.00	20	0.700				
Total	73.33	23					

f) Critical value for $F_{(3,\,20)}$ = 3.10 α = .05 $\,$ Reject the null hypothesis.

3. HSD =
$$3.96 \cdot \sqrt{\frac{.70}{6}} = 1.353$$

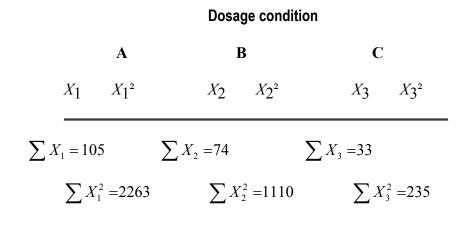
$$\overline{X}_1 = 1.50$$
 $\overline{X}_2 = 3.167$ $\overline{X}_3 = 4.167$ $\overline{X}_4 = 5.833$

$$S_1 = .548$$
 $S_2 = .753$ $S_3 = 1.169$ $S_4 = .753$

Triangle 1.50 - Pentagon 3.167 = 1.667 **Triangle 1.50 - Octagon 4.167 = 2.667 **Triangle 1.50 - Dodecagon 5.833 = 4.333**Pentagon 3.167 - Octagon 4.167 = 1.00Pentagon 3.167 - Dodecagon 5.833 = 2.666**Octagon 4.167 - Dodecagon 5.833 = 1.666**

4. Results indicate that a significantly different number of fixations are required depending on the shape. A Tukey HSD post-hoc analysis reveals that all conditions significantly differed from each other with the exception of the pentagon/octagon. The highest number of fixations is required for the decadagon while the lowest number of fixations is required for the triangle.

Problems 5 through 8.



5.
$$Ho: \mu_1 - \mu_2 - \mu_3 = 0$$

 $H_1: \mu_1 - \mu_2 - \mu_3 \neq 0$

6. a & b)
$$SS_{bg} = \left[\frac{(105)^2}{5} + \frac{(74)^2}{5} + \frac{(33)^2}{5}\right] - \left[\frac{(105+74+33)^2}{15}\right] = 521.733$$

 $SS_{wg} = \left[2263 + 1110 + 235\right] - \left[\frac{(105)^2}{5} + \frac{(74)^2}{5} + \frac{(33)^2}{5}\right] = 90.00$
 $SS_{total} = 521.733 + 90.00 = 611.733$

c)
$$df_{bg} = 3 - 1 = 2$$
 $df_{wg} = (5 - 1) + (5 - 1) + (5 - 1) = 12$ $df_{total} = 15 - 1 = 14$

d)
$$MS_{bg} = \frac{521.733}{2} = 260.867$$
 $MS_{wg} = \frac{90}{12} = 7.50$

Source Table for Dosage Data							
Source	Sums of	df	Mean	F	р		
	Squares		Square		-		
Between	521.733	2	260.867	34.782	< .05		
Within	90.000	12	7.50				
Total	611.733	14					

e) $F = \frac{260.867}{7.5} = 34.782$ f) Critical value $F_{(2, 12)} = 3.89$ alpha = .05 Reject the null hypothesis

7. HSD = $3.77 \cdot \sqrt{\frac{7.50}{5}} = 4.617$ $\overline{X}_1 = 21.00$ $\overline{X}_2 = 14.8$ $\overline{X}_3 = 6.60$ $S_1 = 3.808$ $S_2 = 1.924$ $S_3 = 1707$

> Dosage A 21.00 – Dosage B 14.8 = 6.20 ** Dosage A 21.00 - Dosage C 6.60 = 14.40 ** Dosage B 14.8 - Dosage C 6.60 = 8.20**

8. There are significant differences in the average number of expressed delusions as a function of the dosage condition. A HSD post-hoc analysis reveals all conditions differed significantly from each other. However, patients taking Dosage C expressed the least number of delusions followed by those taking Dosage B and Dosage A.