

State Problem Set (Assignment 11)

Ans.1

$\bar{X}_1 = 83.5$	$Sd_1 = 16.9$	$n_1 = 35$
$\bar{X}_2 = 92.3$	$Sd_2 = 14.6$	$n_2 = 35$
$\bar{X}_3 = 88.6$	$Sd_3 = 14.2$	$n_3 = 35$
$\bar{X}_4 = 99.4$	$Sd_4 = 14.1$	$n_4 = 35$

$$\bar{X} = \frac{83.5 + 92.3 + 88.6 + 99.4}{4} = 90.95$$

$$N = n_1 + n_2 + n_3 + n_4 = 140$$

$$k = 4$$

$$SS_{\text{Between}} = n_1(\bar{X}_1 - \bar{X})^2 + n_2(\bar{X}_2 - \bar{X})^2 + n_3(\bar{X}_3 - \bar{X})^2 + n_4(\bar{X}_4 - \bar{X})^2$$

$$= 35[(83.5 - 90.95)^2 + (92.3 - 90.95)^2 + (88.6 - 90.95)^2 + (99.4 - 90.95)^2]$$

On Solving

$$= 35 \times 1340.25$$

$$SS_{\text{Between}} = 4690.75$$

$$df_{\text{between}} = k - 1 = 3$$

$$df_{\text{within}} = N - k = 136$$

$$df_{\text{Total}} = N - 1 = 139$$

$$MS_{\text{Between}} = \frac{4690.75}{3} = 1566.25$$

$$SS_{\text{within}} = \sum (X_{i1} - \bar{X}_1)^2 + \sum (X_{i2} - \bar{X}_2)^2 + \sum (X_{i3} - \bar{X}_3)^2 + \sum (X_{i4} - \bar{X}_4)^2$$

$$= S_1^2(n_1 - 1) + S_2^2(n_2 - 1) + S_3^2(n_3 - 1) + S_4^2(n_4 - 1)$$

$$= 34(16.9^2 + 14.6^2 + 14.2^2 + 14.1^2)$$

On Solving

$$= 34 \times 899.22$$

$$SS_{\text{within}} = 30573.48$$

$$MS_{\text{within}} = \frac{30573.48}{136} = 224.805$$

$$F \text{ Statistic} = \frac{MS_{\text{between}}}{MS_{\text{within}}} = 6.967149$$

$$p\text{-value} = 1 - pf(F, df_1 = 3, df_2 = 136)$$

$$\downarrow = 0.0002140835$$

Right tail probability