

$$\begin{aligned} \text{Sum of squares} &= \sum (x_1 - \bar{x}_1)^2 + \sum (x_2 - \bar{x}_2)^2 + \sum (x_3 - \bar{x}_3)^2 \\ &= (48.2 - 51)^2 + (48.2 - 45)^2 + (48.2 - 33)^2 + (48.2 - 45)^2 - \dots \\ &= 1860.8 \end{aligned}$$

$$\text{Sum of Groups} = 4883.73 - 1860.8 = 3022.93$$

5) Calculate the variance

$$\begin{aligned} \text{ms between} &= \frac{\text{Sum of square b/w}}{\text{degree of freedom}} = \frac{3022.93}{2} \\ &= 1511.46 \end{aligned}$$

$$\text{ms within group} = \frac{1860.8}{12} = 155.06$$

$$\begin{aligned} \text{f) } f\text{-statistic} &= \frac{\text{Mean square b/w}}{\text{mean square within}} = \frac{1511.46}{155.06} \\ &= 9.7475 \end{aligned}$$

$$f_{\text{critical value}} = 3.89 < 9.7475$$

So, fail to reject the null hypothesis, this conclude that at least two of the means are significantly different from each other.