# Multimedia 1

Interval for the mean response is

$$\hat{y}_{\underset{\sim}{x}_0} \pm t_{\frac{\alpha}{2}, df} \times \sqrt{(\underset{\sim}{x}_0^T (\underset{\sim}{X}^T \underset{\sim}{X})^{-1} \underset{\sim}{x}_0) \hat{\sigma}^2}$$

It is easy to calculate $\hat{y}_{\underset{\sim}{x}_0}$. This turns out to be 44.60.

Use tinv function in Excel with inputs 0.05 and 26 to get $t_{.025, 26} = 2.06$.
C.L df

Now, we give you $\sqrt{(\underset{\sim}{x}_0^T (\underset{\sim}{X}^T \underset{\sim}{X})^{-1} \underset{\sim}{x}_0 \hat{\sigma}^2}$ to be 1.34 and so simply plug in the numbers as follows

$$44.60 \pm 2.06 \times 1.34 \quad \{\text{you do the math.}\}$$

The prediction interval is given by

$$\hat{y}_{\underset{\sim}{x}_0} \pm t_{\frac{\alpha}{2}, df} \times \sqrt{\hat{\sigma}^2 + \hat{\sigma}^2 \underset{\sim}{x}_0^T (\underset{\sim}{X}^T \underset{\sim}{X})^{-1} \underset{\sim}{x}_0}$$

we know $\hat{y}_{\underset{\sim}{x}_0} = 44.60$

$t_{\frac{\alpha}{2}, df} = 2.06$

$\hat{\sigma}^2 \underset{\sim}{x}_0^T (\underset{\sim}{X}^T \underset{\sim}{X})^{-1} \underset{\sim}{x}_0 = 1.34$

and from earlier slides

$\hat{\sigma}^2 = (2.31)^2$ $\{\text{rmse}^2\}$

So, simply substitute the numbers and solve.