We have:

$$F = \frac{\text{Extra SS}/q}{\text{RSS}_1/(n-p-1)} = \boxed{\frac{(\text{RSS}_0 - \text{RSS}_1)/q}{\text{RSS}_1/(n-p-1)}}.$$

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_1^2 + \beta_3 x_2 + \beta_4 x_3 + \epsilon \qquad \text{(full model)}$$

was to fit the data and resulted in $R^2 = 0.940 = R_1^2$

- A second regression equation $y = \gamma_0 + \gamma_1 x_1 + \gamma_2 x_1^2 + \epsilon$ was to fit to the data and resulted $R^2 = 0.915 = R_0^2$ (reduced model)

$$R_0^2 = 1 - \frac{RSS_0}{TSS} \Rightarrow \frac{RSS_0}{TSS} = (1 - R_0^2)$$

$$R_1^2 = 1 - \frac{RSS_1}{TSS} \Rightarrow \frac{RSS_1}{TSS} = (1 - R_1^2)$$

$$\Rightarrow F = \frac{(RSS_0 - RSS_1)/q}{RSS_1/(n-p-1)} = \frac{n-p-1}{q} \cdot \frac{RSS_0 - RSS_1}{RSS_1}$$

$$= \frac{n-p-1}{q} \cdot \frac{RSS_0/TSS - RSS_1/TSS}{RSS_1/TSS}$$

$$= \frac{n-p-1}{q} \cdot \frac{R_1^2 - R_0^2}{1 - R_1^2} \simeq 7.7$$