

Name: _____

Consider the multiple regression model:

$$\begin{aligned}E[Y] &= \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \\ Y &= \text{baby's weight in ounces} \\ X_1 &= \text{lbs mother gained} \\ X_2 &= \text{smoking status} \\ X_3 &= \text{mother's age}\end{aligned}$$

We'll talk about this more, but for now, notice that the sums of squares values in multiple linear regression are the same as they were in simple linear regression:

$$\begin{aligned}\text{SSE} &= \sum_i (Y_i - \hat{Y}_i)^2 \\ \text{SSR} &= \sum_i (\hat{Y}_i - \bar{Y})^2 \\ \text{SSTO} &= \sum_i (Y_i - \bar{Y})^2\end{aligned}$$

Find the equation for and interpret in words the value of R^2 .

Solution:

$$R^2 = \frac{\text{SSR}}{\text{SSTO}} = 1 - \frac{\text{SSE}}{\text{SSTO}}$$

As before, R^2 is the proportion of variability in the response explained by the linear model.