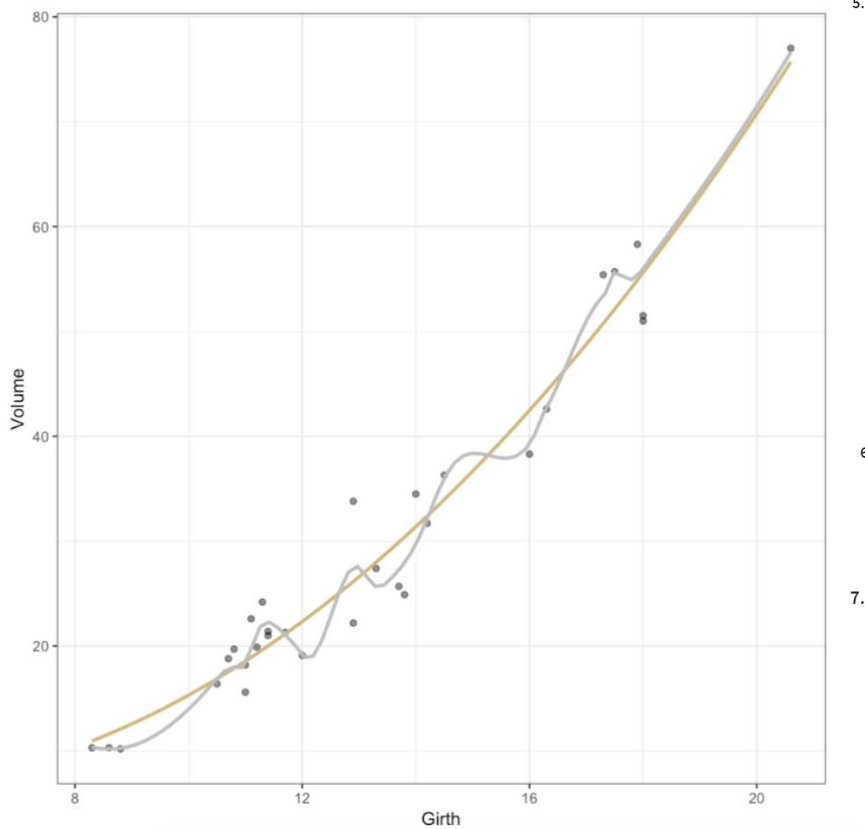
1. The trees data frame has 31 observations on 3 variables.

   1. **Girth**: numeric Tree diameter in inches

   2. **Height**: numeric Height in ft

   3. **Volume**: numeric Volume of timber in cubic ft

   Suppose that the grey fit is labeled f_1 and the gold fit is labeled f_2. Then $\int [f_1''(x)]^2 dx > \int [f_2''(x)]^2 da$



   True

   False

2. Parametric modeling is more efficient when the relationship between variables is unknown.

   True

   False

3. Binomial regression is a type of nonparametric model.

   True

   False

4. In the context of kernel estimation, the smaller the bandwidth, the rougher the fit.

   True

   False

5. Consider the following modeling scenario: Ethanol fuel was burned in a single-cylinder engine. For variou settings of the engine compression, the emissions of nitrogen oxides were recorded:

   NOx: Concentration of nitrogen oxides (NO and NO2) in micrograms/J).

   C: Compression ratio of the engine.

   Researchers would like to understand how NOx is related to C. It is quite plausible that the relationship is nonlinear.

   Based on the information given, a reasonable first attempt at answering this question would include:

   A Poisson regression model.

   A kernel regreesion.

   A smoothing spline.

   A linear regression model.

   A loess model.

6. The nonparametric approach assumes far less about the form of the model and so it is less liable to make major mistakes that result in bias.

   True

   False

7. Nonparametric models often don't have a formulaic way of describing the relationship between the predictors and response.

   True

   se

8. In smoothing spline regression, we estimate our model f by minimizing the mean squared error:

$$MSE = \frac{1}{n}\sum_{i=1}^{n}\left(y_i - f(x_i)\right)^2.$$

   True

   False

9. In the context of smoothing spline regression, as $\lambda \to \infty$, the fit converges to $\hat{f}(x_i) = 0$ for all i.

   True

   False

10. Since loess models rely on theory for weighted regression, it is not possible to quantify uncertainties in the model, in much the same way as is done for, e.g., linear regression.

    True

    False

11. Disadvantages of the loess fit include:

    Loess requires a pre-specified functional form.

    Loess can be computationally expensive.

    Loess is not as easy to interpret as standard linear regression.

    Loess requires fairly large, densely sampled data in order to produce good models.