Statistic	Formula	Extreme?	R
Leverage	$h_i = \frac{(X_i-\overline{X})^2}{\sum_{j=1}^{n}(X_j-\overline{X})^2} + \frac{1}{n} = \mathbf{X}_i^t(\mathbf{X}^t\mathbf{X})^{-1}\mathbf{X}_i$	$> \frac{2p}{n}$ or .2-.5 = moderate, $> .5$ high	`hatvalues`
DFFITS	$\frac{\hat{Y}_i-\hat{Y}_{i(i)}}{\sqrt{MSE_{(i)}h_{ii}}}$	> 1 for med-sized data sets, $> 2\sqrt{\frac{p}{n}}$ for large data sets	`dffits`
Cook's Distance	$D_i = \frac{\sum_{j=1}^{n}(\hat{Y}_j-\hat{Y}_{j(i)})^2}{pMSE}$	≥ 1	`cooks.distance`
DFBETAS	$\frac{b_k-b_{k(i)}}{\sqrt{MSE_{(i)}c_{kk}}}$ $c_{kk} = (\mathbf{X}^t\mathbf{X})^{-1}_{kk}$	> 1 for med-sized data sets, $> 2/\sqrt{n}$ for large data sets	`dfbetas`
Resid	$e_i = (Y_i - \hat{Y}_i)$		resid
Semi-studentized Resid	$\frac{e_i}{\sqrt{MSE}}$	outside (-2,2)	`rstandard`
(Internally) Studentized Resid	$\frac{e_i}{\sqrt{MSE}\sqrt{1-h_{ii}}}$	outside (-2,2)	
Deleted Studentized Resid	$\frac{e_i}{\sqrt{MSE_{(i)}}\sqrt{1-h_{ii}}}$	outside (-2,2)	`rstudent`
VIF	$(1-R_k^2)^{-1}$ R_k^2 from X_k regressed on $(p-2)$ vars	$\max(VIF) > 10$ $\text{mean}(VIF) >> 1$	vif package car

Notes:

- The first four statistics are measures of how **influential** the value is. Leverage measures the distance of the explanatory variables from the average. Cook's distances, and the derivatives, are a measure of how much the predicted values change when the point is removed from the model.
- The residual statistics are measures of how well the regression line fits the value. A residual is the distance from the point to the line. We standardize the residual in different ways. The studentized residuals contain the more accurate measure of standard error.
- The VIF measures the degree of collinearity between the explanatory variables. Collinear variables indicates that we should be cautious interpreting any coefficients. mean$(VIF) >> 1$ is meant to indicate that the average VIF is considerably larger than 1.
- Any value containing a "(i)" indicates that the i^{th} point was removed before calculating the value. For example, $MSE_{(i)}$ is the MSE for the full model containing all the data **except** the i^{th} point.
- Most of the functions are in R under a general heading of `influence.measures`. The `vif` function is in the `car` package.