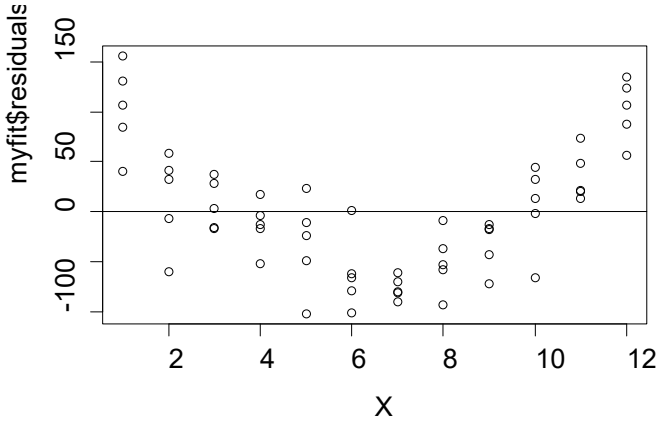
Math 327 – Residual Plots

Residual Plot	Linear relation?	Variance constant?	Residuals uncorrelated?	Normal distribution?	Outliers?	Other predictors?
Residuals vs Predictor variable or Fitted Values	X	X			X	
Squared or absolute residuals vs Predictor		X				
Residuals vs Order of data collection			X		X	
Box plot of residuals				X	X	
Normal probability plot of residuals				X	X	
Semi studentized residuals vs Predictor	(X)	(X)			X	
Residuals vs omitted predictor						X

1. What should we see in each residual plot if the data satisfy the model assumptions?

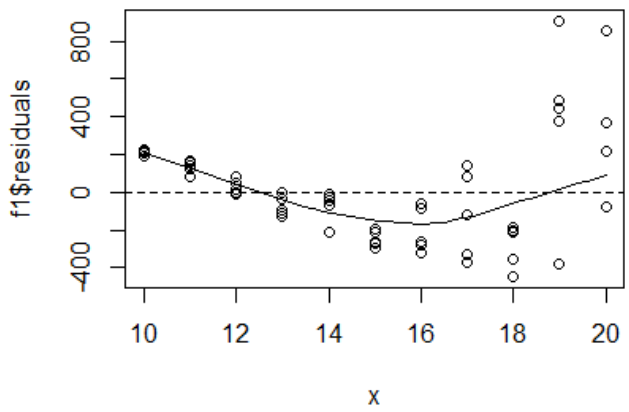
Residual Plot	Expected result if model assumptions are correct
Residuals vs Predictor variable or Fitted Values	Random scatter of points above and below zero with uniform vertical spread across the plot
Squared or absolute residuals vs Predictor	Random scatter of points with uniform vertical spread across the plot
Residuals vs Order of data collection	Random scatter with no apparent patterns
Box plot of residuals	Symmetric distribution centered at zero
Normal probability plot of residuals	Most or all points are near the slanted dashed line

2. What model departure(s) does this residual plot suggest?



This residual plot indicates there is a non-linear relationship between Y and X. Note, however, that the residual variance appears to be constant.

3. What model departure(s) does this residual plot suggest? What remedial measures might you take?



This residual plot indicates both non-constant residual variance (increasing variance as X increases) and a non-linear relationship between Y and X.

4. Both of these plots are close to what we would like to see to indicate that the residuals are consistent with a random sample from a normal distribution.