In this problem, we will revisit the data in `bias_variance_trade.txt` to demonstrate generalized aliasing. Remember that the first and third columns are samples of the independent variable x, while the second and fourth columns are samples of the dependent variable y that correspond to those points.

(a) Combine the two samples into one dataset and generate a system matrix assuming a basis of sines and cosines with frequency that increases with column number (i.e. $\cos(x), \cos(2x), \cos(3x)$, etc.). Your system matrix should have 1,000 columns. Do not print this matrix.

(b) Use your programming language of choice to create an integer list of terms that are roughly equidistant in logarithmic space between 1 and 1,000. For each number of terms, produce a fit to the combined data set. Plot a representative subsample of these fits with the data used to produce them.

(c) Assuming that the true signal is characterized by $f(x) = e^{-6x^2}\cos(4\pi x)$, calculate the Euclidean norm of the difference between the true signal and each of your models for 100 equally spaced samples between -1 and 1. Report the cost versus number of terms in a log-log plot.

(d) Using the language of the General Aliasing Decomposition, explain the shape of the plot you produced in the prior part.