Exercises

1. Given polynomials `p` and `q`, defined in the standard MATLAB way, how do you find their product? Write a code for it.

2. Using the —roots— command, find the roots of 2,000 random polynomials of degree 4. (Here we mean polynomials whose coefficients are independently normally distributed.) Plot them all as dots on a single graph in the complex plane. You'll want to limit the view to $|x| \leq 10$, $|y| \leq 10$.

3. NIST maintains a library of Statistical Reference Datasets. Find them on the web, look under "Linear Regression," and download the Norris dataset. Import it into MATLAB (editing the downloaded file if necessary) and perform a linear least-squares fit. Plot the data and fit.

4. Kepler's third law of planetary motion posits the power law $T = \alpha R^\gamma$, where T is orbital period and R is (maximum) orbital radius. Use a best linear fit to solar system data to discover reasonable values of α and γ. Plot the relevant data and fit.