

**Exercises from Strang** P.315 8-10,27; P. 345 7-10,12,13,17,20,32; P. 358 2, 7, 14, 18-20, 22, 28

## Extra Problems

1. Find the eigenvalues and eigenvectors of the matrix

$$A = \begin{pmatrix} 2 & 4 & 2 \\ -2 & 4 & 1 \\ 0 & -5 & 2 \end{pmatrix}.$$

You should show all your work by hand, but you can use SAGE to check your answers.

2. (a) Use the Fundamental Theorem of Algebra to show that every odd degree polynomial with real coefficients must have at least one real root.  
(b) We showed that every polynomial with *real* coefficients has roots that come in complex-conjugate pairs. Write down a polynomial (of degree at least 2) with complex coefficients for which this is not true.