Math 236 **Problem Set 8.5** **Spring, 2001**

Do this to prepare for exam review Tuesday. This set is *not* to be turned in for grading!

Exam 2: Wednesday, April 18, normal class time

0. (Carried over from Problem Set 8.) Use paper and pencil to do this problem (but you may use MATHEMATICA to verify your answers). Use exact fractions, not approximating decimals, throughout your calculations!

   (a) Do page 199, Exercise 2.

   (b) Do page 199, Exercise 6.

1. Find the least-squares solution for the linear system in page 222, Exercise 20, in two ways:

   (a) by the "geometric" method of finding $\vec{p} = \text{proj}_{C(A)}(\vec{b})$ and then solving the consistent linear system $A\vec{x} = \vec{p}$; and

   (b) by setting up and solving the relevant normal equation.

   As the text asks, also verify that $\vec{b} - A\vec{x}^*$ is perpendicular to $C(A)$.

2. Do page 223, Exercise 22. Also comment upon the meaning of the error $\|\vec{b} - A\vec{x}^*\|$ you calculated.

3. Do page 223, Exercise 30.

4. Consider the *quadratic* polynomial that best fits the data points $(0, 27)$, $(1, 0)$, $(2, 0)$, $(3, 0)$ in the least-squares sense. Just set up a *consistent* linear system whose exact solution gives the coefficients of that polynomial. (Do *not* actually solve this consistent linear system and hence do *not* actually find these coefficients.)

5. Do page 225, Exercise 40. You *may* use MATHEMATICA's `Fit` function (appropriately).